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With this publication, the CD with all papers from the International Conference on Information Technology and Development of Education, ITRO 2013 is also published.

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INTRODUCTION

This Proceedings comprises papers from the **International conference on Information technology and development of education** that is held in the "Vojvodina" Hotel in Zrenjanin on June 28th 2013.

The International conference on Information technology and development of education has had a goal to contribute to the development of education in Serbia and in the region, as well as, to gather experts in natural and technical sciences' teaching fields.

The expected scientific-skilled analysis of the accomplishment in the field of the contemporary information and communication technologies, as well as analysis of state, needs and tendencies in education all around the world and in our country have been realized.

The authors and the participants of the Conference have dealt with the following thematic areas:

- Theoretical and methodological questions of contemporary pedagogy
- Personalization and learning styles
- Social networks and their influence on education
- Children security and safety on the Internet
- Curriculum of contemporary teaching
- Methodical questions of natural and technical sciences subject teaching
- Lifelong learning and teachers' professional training
- E-learning
- Education management
- Development and influence of IT on teaching
- Information communication infrastructure in teaching process

All submitted papers have been reviewed at least two independent members of the Science Committee.

The papers presented on the Conference and published in this Proceedings can be useful for teacher while learning and teaching in the fields of informatics, technics and other teaching subjects and activities. Contribution to science and teaching development in this region and wider has been achieved in this way.

The Organizing Committee of the Conference

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SESSION 1
INFORMATION TECHNOLOGIES AND E-LEARNING

When we talk about distance learning many terms are used such as: Distance Learning, Distance Training, Distance Education, eLearning (e-Learning, „e"Learning), Online (On-line) Education, Virtual Instruction, Virtual Education, Virtual Classrooms, Electronic Classroom, Blended Learning, etc. Comprehending these terms as synonyms is not accidental. They all have a common feature that they represent a learning process in which knowledge source and the recipient are physically separated, and in which their relationship is supported by applying ICT. They individually represents option nuance within the distance learning process.

Providing hardware and software is no problem for implementing computer technology into educational process. The students are usually enthusiastic about learning from electronic teaching materials. Assuming the appropriate hardware and software have been chosen, the success of this technology depends on how it has been implemented. In our educational institutions, the Internet and educational computer software are not used sufficiently due to relatively law number of such software on our market.

In the frame of this session there are papers dedicated to social networks possibilities that have been used more and more for learning and exchanging teaching materials as well as users' experience.

Review of papers and their contributions:

1. **SOCIAL NETWORKS FROM THE PERSPECTIVE OF DIFFERENT THEORIES**
   The paper gives a critical evaluation of the contributions made by different theories to the understanding of interpersonal relationships. At the same time the latest results from these research fields will produce synergetic effects, lead to increasing research on social networks and, finally, identify their influence on education.
2. **DISTANCE LEARNING – AN INNOVATIVE WAY OF GETTING EDUCATION**
   The author examines the main types and models of distant learning, shows the differences between the form of distance learning and the traditional one. The author points out that the effectiveness of distant education is determined by the use of teaching technologies that underlie learning.
3. **PRACTICE DEVELOPMENT OF ELECTRONIC MULTIMEDIA TEACHING AIDS**
   The graphic interface and the structure of developed and examined multimedia tutorials on training areas of the institute are described and presented in details. The advantages of using electronic means of learning are studied.
4. **DESIGN OF LEARNING MANAGEMENT SYSTEM WITH USE OF INNOVATIVE WEB BASED 3D USER INTERFACE**
   Innovative structure of visual 3D user interface was designed with the aim of possibility to visually represent term relationships and to visually navigate through the knowledge base.
5. **IMPLEMENTING IMPROVEMENTS TO THE "SOFTWARE ENGINEERING BASICS" COURSE**
   In this paper, authors propose the improvements of learning and exercising processes introduced with emphasis on student project assessment and UML language skills.
6. **ACHIEVING HIGHER STUDENT PARTICIPATION ON LMS CONTENT CREATION THROUGH THE CROWD SOURCING AND POSITIVE MOTIVATION**
   The paper presents the way where students are motivated to create the content; this content is further shared among class. Motivation is done by evaluating the students. To achieve this model authors are using reputation and crowd-sourcing as phenomena of recent years.

7. **PEX4FUN: A WEB-BASED ENVIRONMENT FOR TEACHING COMPUTER SCIENCE**
   Pex4Fun can be used to teach and learn computer programming at many levels from high school all the way through graduate courses. It provides three very useful capabilities to support testing.
8. **E-LEARNING AT UNIVERSITY OF MONTENEGRO**
   The focus of e-learning implementation into educational process is always giving educators the best tools to promote learning and to improve methods of knowledge transfer. The main aim of digital learning in Montenegro is that every student is on higher level of education that has almost the same chances and opportunities in education as all others.
9. **POSSIBILITIES OF IMPLEMENTING WEB 2.0 TOOLS IN EDUCATION**
   In this paper, is presented – without completeness – the Web 2.0 tools that can be successfully used in education and for scientific research purposes. To implement web 2.0 services in education, it is necessary to have Internet connection and technical and methodical knowledge. Web 2.0 tools, such as online documents, social networks, wikis, blogs, social bookmarking and online presentations are interesting possibilities with interactive and multimedia support, which motivate students and fit their mentality and everyday lives.
10. **DEVELOPMENT OF SYSTEM FOR AUTOMATED RANKING**
    When candidates are registering to study, a ranking problem occurs in certain study programs. To solve this, a new web service was developed. The main part of the service is an algorithm that decides and controls the entire logic of the service.
11. **PROTECTING CHILDREN ON THE INTERNET**
    This paper demonstrate the possibilities of raising the level of knowledge and awareness, and how virtual reality affects children and to what extent it must not engaged in digital a world that is safe and without consequences.
12. **CROSS-LINGUAL APPROACH IN SEMANTIC DISTANCE EDUCATION SYSTEMS**
    Since the underlying concept graph of a lesson can be presented in a formal way, using Semantic Web technologies, it can be translated into any language by means of an appropriate cross-lingual ontology.
13. **WEB 2.0 BASED ASSESSMENT IN E-LEARNING**
    The Web 2.0 concept - strategy can also be applied in assessment: instead of solving multiple choice or other types of predefined tests, student can be put in position to freely (but presumably within certain constraints) construct knowledge in required domain, by means of which they would display the level of competence achieved.
14. **LIFELONG EDUCATION THROUGH E-LEARNING**
    The paper gives a brief overview of lifelong education, then its benefits and effects of organizing these classes via distance learning.
15. **HISTORICAL DEVELOPMENT OF E-LEARNING THROUGH DISTANCE LEARNING**
    This paper provides an overview of e-learning when the first forms as a medium for the transmission of information using paper until today, when computers are used.
16. **ADVANTAGES and DISADVANTAGES of USING SOCIAL NETWORKS in the LEARNING PROCESS**
    In this paper advantages and disadvantages of using social networks in the learning process are given. It is mostly insisted on the development of practical knowledge, and that leads to the need to continue the process of organizing of classes significantly changes, and the role of students and teachers in it. It's necessary for students to become more actively involved in the process of acquiring knowledge so the knowledge acquired tomorrow will be put into use.
17. **USE OF INFORMATION TECHNOLOGY IN EDUCATION**
    This paper discusses the implementation of information technology in teaching, implementation methods, problems and difficulties that can arise when using these methods and the benefits brought by information technology in education.
18. **ASSURANCE AND SAFETY OF CHILDREN ON THE INTERNET**
    This work is a short overview of the dangers which Internet brings, the ways in which they can be overcome, as well as advices which should be followed.

19. **SUBJECT „DISASTER RISK MANAGEMENT“ - SPATIAL CONTEXT**
    This paper describes the possibilities of application of information technology during lectures of the subject "Disaster Risk Management". One of the main goals of the course is to raise awareness among students about the existence of the disaster risks and consequences they can cause.
20. **VISUAL PROGRAMMING WITH SCRATCH**
    This work presents key features of the system for visual programming called Scratch, which was developed at the Massachusetts Institute of Technology from the US.
21. **E-LEARNING IMPLEMENTATION: BENEFITS AND CHALLENGES IN THE DEVELOPING COUNTRIES**
    This paper provides a general conclusion in the form of recommendations to raise the success of e-learning implementation. It is significant for both researchers and practitioners, providing a better understanding for them in their efforts to improve the success to failure ratio of e-learning implementation.
22. **STUDENTS' CLOUD SERVICE OF THE FACULTY OF EDUCATION IN SOMBOR**
    The model of Cloud Service has been developed based on ownCloud open source software.
23. **CLICK SAFELY**
    “Click Safely” campaign educate the youngest members, their parents and teachers. The purpose of this paper is to indicate potential danger of incorrect use of the Internet for children. It also emphasizes how much the role of parents and teachers in education are important.
24. **EVALUATION OF WEB BASED INTELLIGENT E-LEARNING REPORT SYSTEM**
    The paper presents an aspect of the evaluation of an intelligent, web-based reporting system that has been created in order to obtain a report on patterns of behavior of future users of learning management system.
25. **REQUIREMENTS QUALITY ONLINE COURSES**
    In this paper the author point to the conditions and requirements that may significantly facilitate students making their final decision regarding the selection of different forms of online training.
26. **COMPARING ALGORITHMS USED IN SOLVING SUDOKU PUZZLES**
    This paper deals with differences between two algorithms used for solving Sudoku problems. Algorithms used are Brute Force algorithm and Backtracking algorithm. The goal of this project is to show the differences between those two algorithms.
27. **CONCEPT OF ONLINE LEARNING**
    The text strives to provide answers to the following questions: What are the features of the online learning concept? What are the core modules of online learning system? What makes the software and hardware platform of the system? What is the function of LMS and LCMS?
28. **TOOLS FOR E-LEARNING**
    Tools for e-learning are the focus of the general population and is an area that is rapidly changing and progressing. There is no universal tool, which does the job perfectly. Each has its good and bad sides and often used more for the same job.
29. **THE IMPACT OF FOREIGN DIRECT INVESTMENTS IN MODERNIZATION LEARNING PROCESS– E LEARNING**
    The enclosed study shows how much influence foreign investment partakes in educational methods and how the modern communication and information technology are developing with this new expansion.
30. **FACEBOOK IN DESIGN TECHNOLOGY AND INFORMATION**
    This paper presents the role and importance of the social network Facebook, its influence on young generation and how to spend valuable time on the net.
31. **CONTEMPORARY VIEW OF E-LEARNING DESIGN AND IMPLEMENTATION**
    This article compares traditional teaching with e-learning, it gives an account how e-learning could be used as an instrument of educational development of a nation. It is an area of IT that has not been fully utilized by stakeholder in educational sector in sub Sahara Africa.
32. **USING INTERACTIVE WHITEBOARDS IN EDUCATION**
    Success of using this teaching means mostly depends on teachers who should find the best ways of using great possibilities of IWB in their work so students would be more active, comprehension greater thus learning more successful.

33. **APPLICATION EFFECTS OF INTERACTIVE WHITEBOARD IN TEACHING TECHNICAL AND IT EDUCATION**
    This work is an attempt that the idea of active teaching is elaborated through application of interactive whiteboard and to show opportunities and effects of its application in teaching Technical and IT education.
34. **CLOUD COMPUTING IN FUNCTION OF CENTRALIZED LEARNING**
    The purpose of this paper is to investigate the possibilities of centralizing the knowledge pool through Cloud Computing, present the effects and predict the future of this trend.
35. **ETHICAL AND TECHNICAL ISSUES IN NETWORK SECURITY LAB CREATION**
    The importance of research in these fields emerges from the rapid growth and utilization of information and communication technologies in past few years. In this paper are presented ethical and technical issues important for building efficient environments for teaching security experts within bachelor, master, and doctoral courses.
36. **FIELD OF VISION AND BASKETBALL ACTION COVERAGE FROM A POINT OF A BASKETBALL REFEREE**
    The developed solution has been designed and developed with the aim to establish how successfully is a part of a basketball game observed by a referee and to establish whether his or her decision in a particular situation was valid or not.
37. **RESPONSIBILITIES AND POSSIBILITIES OF DISTANCE LEARNING IN CORPORATE SETTINGS**
    The aim of this paper is to indicate the possibilities of distance learning in corporate/ non-educational setting with the responsibilities associated with management and administration.
38. **EFFECTIVENESS OF COMPUTER-ASSISTED INSTRUCTION IN TEACHING AND LEARNING GENETICS**
    This experimental study examined effectiveness of the computer-assisted instruction (CAI) on students' achievement in biology science as compared with the traditional method of instruction.
39. **BY SIMULATING TO THE SOLAR FUTURE**
    The simulation model, with which we want to approach with syllabus from renewable energy sources, includes action of replacement elements of Sun and clouds. With such actions, the student insight into the contribution of solar energy in the development of hot water, and what are the outcomes of bad weather.
40. **M-LEARNING AS A TREND TOWARDS MODERN LEARNING**
    Mobile learning is an e-learning approach in which the learning materials available using PDAs (Personal Digital Assistant, PDA) and smart mobile communicator. Typically, e-learning is described as learning "anytime" and "anywhere" (anytime, anywhere), but with access to a computer and connection to the Internet.
41. **A NEW NETWORKING FEATURE IN COMPUTER CLASSROOMS: HOMEGROUP AND HOMEGROUP PROTOCOL**
    HomeGroup provides methods for easy sharing files and printers in a classroom network without knowledge about computer networks or additional investment in IT equipment. HomeGroup protocol creates a trust relationship between IPv6 configured hosts via peer-to-peer networking with the use of DPWS and Peer-to-Peer Grouping Security Protocol.
42. **SIMULATION OF USING SOLAR ENERGY FOR ELEMENTARY SCHOOL STUDENTS**
    The paper presents the possibility of exposure the teaching topic "Sources of Energy". To close the operation of this complex system the most practical way is to make simulation of the system. In this way, students easily recognize and understand the way of converting solar energy into electricity or heat.
43. **A MODEL FOR OPTIMIZATION OF HIGHER EDUCATION PROCESS WITH DATA ENVELOPMENT ANALYSIS**
    In this paper we present an approach for modeling production units (DMUs) in Higher Education, as a preparation for applying Data Envelopment Analysis (DEA) to measure their efficiency.

44. **POSSIBLE APPROACH FOR WEB BASED EMPLOYEE TRAINING IN GOVERNMENT SECTOR**
    Constant employee education is one of the main characteristics of modern age and industry. Improvement of employee's work skills and ability is no longer present only in private sector, in companies struggling to find their place in the market, but also in the public government sector and administration. Employees must continuously learn and develop their skills, and web based training emerged as one of the most efficient methods of education.
45. **MODELING AND SIMULATION OF INTERNAL COMBUSTION ENGINES**
    The paper presents modeling and simulation of the internal combustion engine so called Combustion engine.
46. **HYBRID CAR WITH INTERFACE**
    In this work, an easy mode of the use of microcontroller is presented.
47. **POSITIVE AND NEGATIVE ASPECTS OF THE PLATFORM FOR DISTANCE LEARNING - MOODLE AND WEBCT**
    In this paper positive and negative aspects of the platform for distance learning - moodle and webct are given.
48. **MODELLING AND SIMULATION IN ENERGY IN TECHICAL AND IT EDUCATION**
    Independent work by students with the help of teachers is one of the main goals of modern teaching. Students should gradually lead to self-employment, systematically and continuously trained. Independent work can be defined as an organized student employment under controlled conditions to solve the tasks.
49. **TEACHING SUPPORT VECTOR MACHINES IN ARTIFICIAL INTELLIGENCE CLASSROOM**
    This paper will present Support Vector Machines and some of their learning methods, analyze their performance in comparison with more popular Neural Networks, hopefully add some insight into teaching them to students, and answer the question of whether there is a place for them in Artificial Intelligence classroom.

SOCIAL NETWORKS FROM THE PERSPECTIVE OF DIFFERENT THEORIES

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Abstract - This article is a survey of essential findings in different research fields ranging from economics, organisational sciences, sociology, psychology, law to exact sciences, all of which have influenced the development of social networks. The paper gives a critical evaluation of the contributions made by different theories to the understanding of interpersonal relationships. At the same time the latest results from these research fields will produce synergetic effects, lead to increasing research on social networks and, finally, identify their influence on education.

I. INTRODUCTION

Personal relationships and reputation among actors play an important role in the simplification and improvement of interpersonal relationships. By working closely together, individuals from different companies create and change the developing partnership. In this process, various phenomena connect: individuals' behavior, their intentions, mutual communication, belief systems, ideologies of different groups, that is, the widest possible range of aspects of a society and its individuals. In the course of social interaction, the characteristics that lie in the very core of human nature are expressed in: individuals' behavior, social values and norms shared by the individuals, as well as the subconscious psychic structures that are reflected in the individuals' emotions and motivation. The system of interpersonal relationships develops through social interaction characterised by trust, loyalty, collaboration and an exchange of information. In turn, the interpersonal relationships strengthen communication and make it possible to resolve a functional conflict and learn from it. This also has a positive effect on the strengthening of trust between partners. We deal with constant interactional influences among the aforementioned socio-psychological variables.

For better understanding of the complexity of the network of relationships, it is essential to know and understand the influence of different sciences as well as the actual contributions of respective theories within these sciences to the explanation and understanding of the theory of relationship networks.

II. NETWORK OF INTERPERSONAL RELATIONSHIPS FROM THE VIEWPOINT OF DIFFERENT THEORIES

We posit that economics, organisational science, sociology, social psychology, politics and law are not the only sciences that research the nature of relationship networks, as it is generally stated by researchers in the business literature [1], [2], [3] but contributions made by exact sciences have to be added to the aforementioned concepts of the interfirm relationships research. Mathematics, for instance, makes the analysis of a relationship network easier by providing suitable mathematical methods; statistics and its models enable us to understand the present state as well as the dynamics of the network of relationships; and computer science contributes to the research with its advanced packages designed for the analysis of large relationship networks.

What is therefore the interdisciplinarity of the an interpersonal relationships network? This is schematically presented in Figure 1.

Agency Theory is one of the subfields within the so-called new institutional economics. It is the research direction of new institutional economics that focuses on the ex-ante mechanisms presumed to guarantee the efficient functioning of a company. The other research direction of the new institutional economics is *transaction costs economics*, which focuses on the ex-post aspect of transactions between the two sides. These two theories have in common that they both substantially contribute to the explanation and understanding of efficiency of the marketing relationships organisation. In addition to the aforementioned theories, we shall present the sociologists' contribution to the analysis of interpersonal relationships network through *equity*

theory, as well asthe contribution made by *social psychology*.

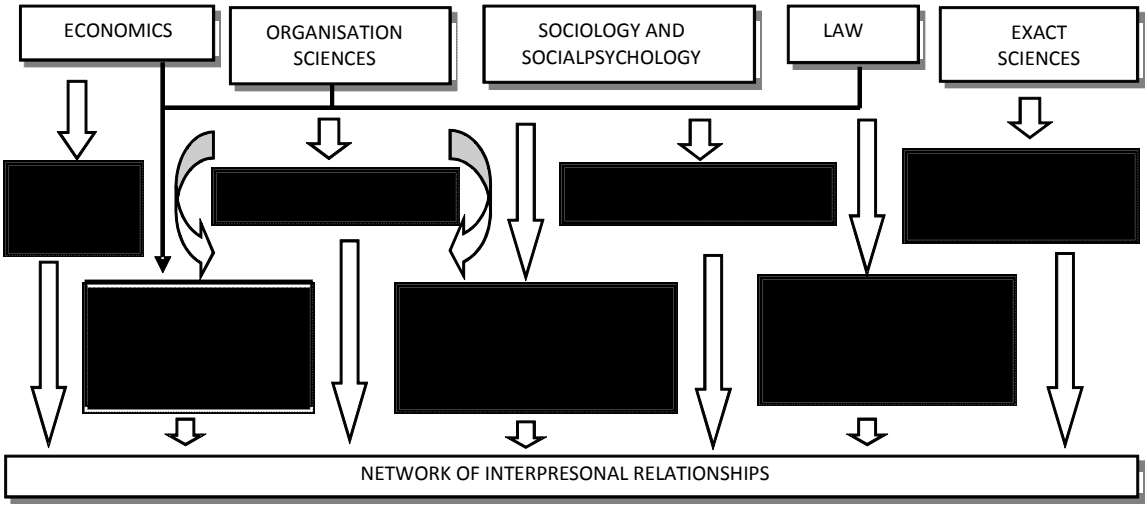

Figure 1. Interdisciplinarity of the Network of Interpersonal Relationships

Moreover, we shall talk discusses *rational contract theory*, which is closely connected to the fields of law, economics, organisation sciences and sociology. In the sequel, we shall describe *network theory*, whose research starting points are predominantly taken from sociology as well asfrom organisational sciences and economics. All these theories have in common that they are based on the assumption that units, meaning individuals, create a network on the basis of their conscious decisions about which relationships they will establish and which they intend to break. The importance of different social processes (in this) is the point of disagreement between the aforementioned theories. In the last section of this paper, we shall present the tools for analysing social network relationships in the form of computer programs with the help of mathematical and statistical methods.

A. Agency Theory

The main reason for the agency relationship develops when the principal and the agent do not follow the same goals, with the principal trying to make the agent act in accordance with the principal's own interests. The agency relationship is a significant component of almost all exchange transactions. From the viewpoint of interpersonal relationships, the critical agency constructs are the uncertainty of economic operations, the individuals' minimal benefits and goals as well as their risk performance [4].

Agency theory focuses on the use of contractual conditions for the *coordination and control of relationships*. The efficiency of control mechanisms is also influenced by the *social norms* shared by the participants [5]. Cooperation norms express the partners' expectations concerning their collaboration and behavior in order to achieve common and individual goals. These norms act as a general protection against the opportunistic behavior.

To summarize, the agency theory focuses on the individuals' interests, explains the dyadic principal-agent relationship and uses control mechanisms for the description of exchange. We can say that these are the crucial starting points which have to be included in the analysis of the interpersonal relationships network. Our reproach to the agency theory is that it pays too much attention to the research of the dyad principal-agent, instead of, in our opinion, to a more important issue relating to the embeddedness of this relationship into a larger network context.

B. Transaction Cost Theory

The transaction cost theory is the intertweaving of two analytical aspects: one stemming from institutional economics and the other from organisational sciences and law. The transaction costs are the cost of search, negotiation, control and enforcement of exchange agreements [2], [6].

Social networks reduce transaction costs, since the information asymmetry is substantially lowered by a higher level of information within a network [7]. The opportunistic behavior in a network proves to be more expensive, since the actors understand that the loss of reputation negatively affects not only the actual relationship, but can also influence all the existent and potential partners.

The transaction cost theory is complementary to the principal-agent theory. Both approaches have in common that they contribute to the explanation and understanding of the relationships among actors.

C. Equity Theory

The definition of this theory is a problem in itself, and so is its evaluation, since each individual has his/her own subjective measure of certain usefulness. According to this theory, people in their interpersonal relationships seek interactional results proportional to their inputs and efforts for the preservation of interaction. These inputs can be a psychical or physical effort, talent, attractiveness, kindness etc. If there exists an inequity between the inputs and the results of interaction, dissatisfaction appears and the possibility of a relationship interaction break-up grows.

Sometimes people stay in relationships that offer them no satisfaction. According to Thibaut and Kelley [8], we can explain this with the notion of dependence in relationships. The level of dependence is defined with the difference between what we get and what the sociologists Thibaut and Kelley call "the comparison level for alternatives". The comparison level for alternatives denotes the best possible results that could be achieved in the first relatively best possible relationship after the break-up of the previously existing relationship. If we lose more than we get in the long run, we become unsatisfied. Why do so many people stay in relationships which bring them nothing but dissatisfaction? That happens because they are dependent on the relationship. In this case, dependence means that they cannot get something better elsewhere.

Research on the equity theory deals with collective processes and a fair distribution of benefits [9], [10]. We can use several different measures for the diminishment of inequity in an interpersonal relationship (see Figure 2). We can increase the inputs, if they are too small in comparison with the results and inputs of comparable individuals; we can decrease the results, if they are too high in comparison with the results and inputs of comparable individuals etc. From the viewpoint of social psychology, we have to distinguish between the categories of "outcomes" and what is "perceived as an outcome" in an interpersonal relationship [11]. The problem is similar to the problem of how to distinguish between "benefit" and "perceived" benefit. The aforementioned distinctions also indicate a very important division within psychology: the division between the so-called objective (benefit, profit) and subjective (perceived benefit, perceived profit). The equality in the relationship should be discerned from the equality of rights, because the equality in the relationship is essentially characterised by the state of balance.

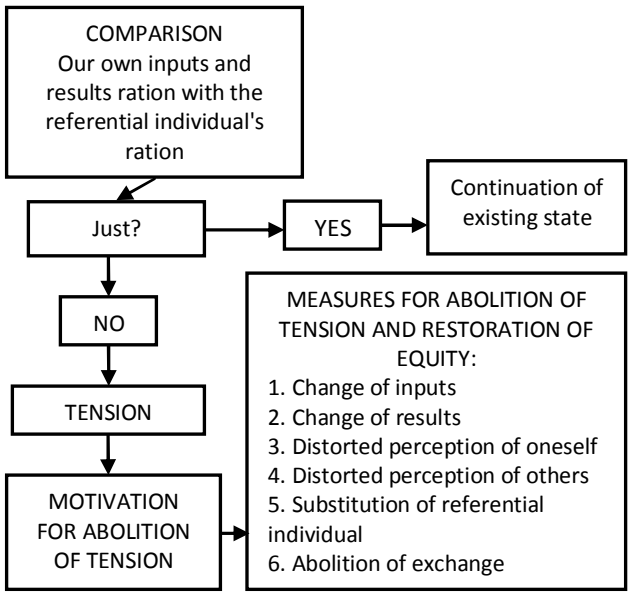

Figure 2. Equity Theory

If one of the relationship partners gains more profit from the total income while investing more at the same time, the partnership is still fair and balanced. Equality in interpersonal relationships should be such a form of social balance to which social interaction would aspire. The equality relationship is also considered a "fair" relationship or the equity relationship.

The equity theory or the exchange theory, according to some researchers, contributes to the explanation of the dyadic nature of relationships. In addition, it brings the following concepts to the social network: the concept of strength in the exchange need for the adaptation to partners, trust, the relationship equality, reciprocity and, last but not least, the importance of values shared by the relationship partners.

D. The Social Psychology Contribution

The relationships among individuals were abundantly studied in sociology, psychology, and communication sciences.

Interactions are socio-psychological processes that are present in human relationships. These

processes take place between two or more people, between an individual and a group, or among different groups, connecting them into a network of mutual dependencies. The most important process of social interaction is the information exchange, meaning *communication*. By communicating, we convey messages, simultaneously define our interpersonal relationship and, by doing so, also determine the behavior of communication participants. We can speak of a content aspect and a relational aspect of communication, which means (1) what we communicate, and (2) how we do that, or in other wors, how we define the relationship by communication. The research and therapeutic experiences show that the relational aspect is surpressed in interpersonal relationships, including a lot of spontaneity and few communication errors. On the other hand, in interpersonal relationships with little spontaneity and many communication errors, there is a constant battle going on between partners concerning the nature of their relationship, whereas the content aspect of their communication is placed in the background of their attention [12].

Each individual holds his own systems of judgment, own values, capabilities and needs that help him/her to determine the result of interaction. The creation and maintenance of interaction depend on three kinds of factors [3]: firstly, the benefits and loses expected from entering a relationship; secondly, the possibility of choosing alternative relationships; and thirdly, the decision and belief that the expected intearction is the best possible alternative for both partners.

The core message of the *social exchange theory* has the following implication for the understanding of a social network: in the event of mutual respect and reciprocal exchange, trust can be expected among participants. This is the basis for a long-term and ever-increasing exchange connected with a friendly relationship among the participants. The philosophy of a network of interpersonal relationships is therefore encapsulated in a belief that satisfaction in a partnership can only be achieved if the satisfaction of exchange partners is also achieved. Such a procedure is a direct result of empathy for the needs of other participants, the respect of their equality, mutual trust and willingness to adapt as well as, of course, the promise of fulfilment.

The aforementioned constructs are the cornerstones of social psychology. Every cooperation and the establishment of relationship can only derive from an interpersonal relationship. A company's employee (e.g. professor), who is more or less successfully involved in social interaction with students, other professors and the company' representatives, plays the central role.

E. Rational Contracting Theory

Contractual relationships have already been mentioned in this paper, which only corroborates our hypothesis that the field of interpersonal relationships is intertwined with many fields, including law. Legal and formal relationships are precise and binding contractual relationships which specify the obligations and roles of the two relationship partners [5]. Legal-formal relationships create two basic benefits; they ensure protection that can be realised through the country's legal system and regulate the partner relationship by creating a plan for the next period. However, the legal relationships can also present a limitation, if they diminish the partners' flexibility in adapting to the changing business environment.

In the modern firm theory, a firm is predominantly a complex group of mutual contractual relationships between the resources' owners. Two or more companies develop a partnership with the aim of sharing and jointly using their unique resources and capabilities, all for the achievement of competitive advantage. A long-term contractual cooperation demands a very high level of the involved parties' mutual trust, and also demands mutual investments in the phase of contract execution [13].

F. Networks Theory

The networks theory, also called the social networks theory or the actors' networks theory, can be broadly categorised as a structural sociological theory [14]. Social networks are defined as groups of people, companies or other social entities that are bound together by a number of socially important relationships; for instance, friendship, cooperation or the information exchange, or other mutual actions undertaken in order to more successfully achieve desired goals by means of experience, information or resources exchange. *A social network* is an ongoing revolution whose participants are its audience at the same time [15]. The network approach uses the social network theory as a tool to monitor how relationships among several participants develop and how the relationship ties strengthen in networks [16]. The network researchers in social sciences therefore

study participants, dyads and the network structure [17]. In the study of organisational networks, the following questions are becoming more and more important. How can an interactional structure ensure a concerted action directed towards the achievement of common goals as well as the goals of each individual organisation? How do network characteristics influence the characteristics of an organisation? [18].

We have to bear in mind that, apart from the choice-making and transformation processes in the exchange, there is always a human interaction process built by individual actors from the companies involved in exchange. We also cannot ignore the fact that the membership in the network is dynamical [19] and that the network is embedded into the environment and therefore subject to changes [20].

Social networks analysis is a separate research approach within the framework of social and cognitive sciences. The approach is based on the supposition that relationships, or the connections, meaning the connections among the participants of a network, are of utmost importance. Apart from the importance of connections in social networks, the following principles are important for the analysis of social networks [21]: participants and their actions are mutually dependent, the connections among the participants serve as a means of the transport of material and non-material resources, the network's structural environment is a source of opportunities and/or limitations for the individual participants' actions, the structural environment of the network determines the permanent patterns of connections among the participants. *Social capital* emphasises the value of interrelationships among people within a company as well as among the company and other companies [22]. Trust, mutuality, common values, network and norms are those that present added value within a company or among companies in a sense that they promote the transfer of information and the development of new knowledge. Bourdieu with co-authors (in [23]) speaks about social capital as the interpersonal relationships among people as well asd the sources embodied in these interpersonal relationships. According to the structural holes theory [24], social capital is defined as a level to which an individual is the only connection between two individuals or groups. The aforementioned theory emphasises that the benefits of social capital stem from the access to different knowledges and opportunities, meaning the asymmetry of information created by the lack of connections among the individuals or the groups in a social network. The more of such unconnected relationships an individual has, the bigger the access to information. Controlled with the measure to which a certain connection represents a “bridge”, strong connections are more important for the actors in order to acquire resources in comparison to weak connections, since they encourage the extent and quality of information, based on greater trust.

Oh, Labianca & Chung [25] add a new aspect to social capital, defining it as the “group social capital”, which is a set of resources made available to a group through the social relationships of group members. The group has relationships within a social group as well as broader formal and informal relationships within the organisation structure. Of course, the group also has relationships without the structure of its own organisation (e.g. social network), using the Internet [26], and it is exactly these relationships that are of crucial importance for the development and maintenance of the social network relationships.

Therefore, social capital represents the contribution or the capital of people to which individuals have access via their social connections and networks. The adjective “social” denotes the relationships or the interactions among the people, whereas the noun “capital” can be understood as the asset of an individual or a group which is formed by cooperation and communication with others.

The network research background. The notion of network is common to numerous research disciplines. The network analysis was used by anthropologists for the research of kinships and relationships within communities, by social psychologists as an approach to the analysis of communication patterns in small groups, by sociologists for the research of opinion leadership and diffusion of innovations and by the consumer behavior researchers for the research of the suitability of brands in interpersonal relationships. The network analysis has also proved to be useful for the research of newly emerging social structures in organisations (For more, see [26]).

In social sciences, there are two main approaches to the study of networks, according to Powell and Smith-Doerr [28]; namely, the networks can be either used as analytical tools or as a form of management. The former group of

research includes the Industrial Network approach (IMP group network approach). In opposition to the sociological and more structural approaches (the social network analysis), the IMP group researchers put more attention to the content of relationships and their dynamics.

Because of *dynamical nature of interactions in the network*, the researchers encounter conceptual as well as empirical challenges [29]. The research approach should take into account not only the definitions of networks and networks' structures, but also the social processes that take place within the social context of the network. The structural theory sets out the theoretical cornerstones for such thinking, since these cornerstones study the interplay between structure and action in creating and maintenaning social systems. “Structuralists see social interactions as a prism, through which the individuals' goals as well as the common goals break and by doing so create the social reality. The organization of society is an unresolvable dialectic between the authonomy and mutual dependence, between action and restraint” ([30], p. 949). This inseparable connection between structure and action is known in the structural theory under the term of structural duality. A great theoretical and methodological contribution to the forms of the network organisationwas made by Contractor, Wasserman and Faust [30]. “The network is an organisation”, they posit (p. 681), and claim that research into networks should be based on “multiple theories” (e.g. theories of self-interest, theories of mutual interest and collective action, cognitive theories, theories of network evolution and coevolution), as well as on the multi-level analysis (actor, dyad, triad and a global level).

The need for the *longitudinal network research* is expressed in the work [32], [29], [33], we can also find it in the Granovetter's [19] early call for research on the consecutive development phases of the network. By saying this, we do not want to posit that no other study has ever addressed the question of development in time. We can find an extensive research survey on the structural and functional field of networks in the paper by Newman [34].

With the advancement in technology, social networks have gradually outgrown the framework of personal interaction amon individuals as well as the technological infrastructure that connected all these individuals. Social networks have evolved into *online social networks* connected by computer networks. Interaction among individuals which has traditionally taken place at the level of personal connections now functions online. By doing so, the individuals benefit from convergent sinergy of online conferences, direct and fast computer communication, common online working space and interactive tables on the internet, such as the HTTP protocol [26]. The online networks play a significant role in business activities, the economic development and education. This type of virtual communities provides an arena where people from different communities can collaborate, interact and exchange knowledge, experiences and common interests.

G. Mathematical and statistical models

At this point, we would like to emphasise, in our opinion, essential findings, achievements, models and tools developed in the fields of mathematics, statistics, physics, computer science, as well as biology and chemistry, which we can use for the analysis of networks of interpersonal relationships. However, we shall not provide detailed explanation of these approaches.

Most models for network evolution deal with the definition of parameters that influence the network structure [35]. These parameters are roughly divided into the networks characteristics and the characteristics of a singular network unit. However, these models pay little attention to the influence of the network structure on the individual's characteristics. This problem is addressed by the model of contagion and selection, presented in [36], which also explains changes in the network structure as functions of the characteristics of network units, and changes in the characteristics of a singular unit as a function of the network structure. This model is a member of the family of stochastic models. Although the use of loglinear models is a prevailing approach, modeling with the help of Markov models for social networks presents a very useful alternative [37]. For the analysis of interaction and the analysis of cross-over effects in the network of interfirm relationships, we can use widely spread logit models, such as the *p* models* ([37], [38]). An extensive survey of approaches to networks in the research field of physics can be found in [39], [40], [41].

We can carry out the analysis of interpersonal relationships by using the type of social network analysis based on the method of *block modelling*. The aim of this important mathematical method is to alleviate the analysis of studied relationships and connections. The block modelling enables

researchers to focus their study on a smaller network or a block model in which the constituent units are clusters of equal units, instead of directing research into a large, too complex network. The obtained structure is much more manageable and suitable for interpretations as well as the checking how well the model structures chosen in advance match with the real network [35].

A very useful software for such an analysis is the PAJEK programme [42], designed especially for the analysis of large networks. It is based on quick algorithms and has a very well designed graphical presentation of the networks. The UCINET [43] package is also very useful for the network analysis. This package is less powerful than the PAJEK package; however, it has a lot more functions. Among other interesting packages for the network analysis, let us also mention the GRADAP and STRUCTURE packages, which have similar working powers than UCINET.

The observation of a network in a certain given moment or in a given time interval gives us very important information about the status of the network in that particular moment as well as the position and meaning of each individual unit within the network; however, it offers only little explanation about how and why the structure evolved. For the explanation of the network structure and its evolution, we have to broaden the notion of network to dynamic or the so-called longitudinal networks. *A longitudinal network* is composed of at least two consecutive observations of the same network with constant or changeable membership [44]. With these networks, the focal point of interest is the understanding how the network develops and changes through time, as well as finding new ways for developing the models of social processes, which would help explain the observed structures [35], [36], [29], [45], [46]. Therefore, the core of interest is the dynamics of interpersonal relationships, which is very important for the understanding of a social network. The following problem arises: this dynamics cannot be presented solely with a static presentation in a satisfactory way. The solution is a *dynamical presentation of networks in time*, which opens the door for researchers in the following fields: discovering the characteristics of the network's evolution, monitoring the evolution of selected parts of the network and discovering the outstanding parts of the network. In recent years, the network analysis and graph theory has been one of the hottest research fields not only in mathematics, but also in physics, biology and chemistry. Almost every complex system can be presented as a graph ([47], [34], [35]). Computer modelling has quickly replaced traditional approaches in mathematical theory and experiments.

III. CONCLUSION

In this article, we presented the widest possible theoretical base for the study of social networks that range from economics, organisational sciences, sociology, social psychology, law to exact sciences. We outlined contributions made by different theories to the development of the theory of interpersonal relationships as well as the interconnectedness of these theories. Each of them is deficient in itself from the point of view of a network of interpersonal relationships; however, put all together, they complement one another. Only a complete overview of all the theories will give us a good explanation of what is going on in the network of interpresonal relationships and a sufficient understanding of these processes. At the same time, it instructs us about all the factors we have to take into account, if we intend to study a social network. It also gives, the basic information on how we should start carrying out the analysis of the relationships network.

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DISTANCE LEARNING – AN INNOVATIVE WAY OF GETTING EDUCATION

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Abstract. The article is devoted to the problems of the learning process organization with the help of distant education. The author examines the main types and models of distant learning, shows the differences between the form of distance learning and the traditional one. The author points out that the effectiveness of distant education is determined by the use of teaching technologies that underlie learning. Distant education is proved to be regarded as an independent form of training in the organization of lifelong learning education.

Experts on strategic issues of education call distance learning the educational system of the XXI century. The urgency of the topic of distance learning is that the results of social progress, previously concentrated in the area technology, today concentrate in the information sphere. The stage of its development at the moment can be characterized as telecommunications. [1]

Distance learning today gives the ability to create systems of mass continuous learning, common information exchange, regardless of the spatial and time frames.

Distance learning system allows gaining the necessary skills and new knowledge with a help of personal computer (PC) and access to the Internet. The location of the PC does not matter, so one can learn at home, at work, at on-line class of one of the centers of distance education, as well as in any other place where there is a PC with Internet connection. This is a major advantage of distance learning over traditional forms.

Moreover, the system of distance education gives equal opportunities to all people regardless of their social status (children, students, civil and military, the unemployed, etc.) in all parts of the country and abroad to realize the human right of getting education and information.

As any form of training, distance learning has a particular component composition: purposes, due to the social order for all forms of training; maintenance, determined by the existing programs for a particular type of school, methods, organizational forms, learning tools. The last three components in distance learning determined by the specific usage of technological basis (for example, only computer telecommunications, computer telecommunications in conjunction with printing equipment, CD-ROMs, the so-called case-technology, etc.).

Consider the difference of distance learning from correspondence and part-time one. It consists in the fact that the distance form provides a systematic and efficient interactivity. Distance learning is constructed in accordance with the same objectives and content as the full-time learning. But the form of the material and forms of interaction between teachers and students are different. Didactic principles of distance education (principles of scientific, system and systematic, activity, the principles of developmental education, visibility, differentiation and individualization of learning, etc.) are the same as full-time training, but their implementation is different, which is due to the specifics of the new form learning opportunities of the information environment Internet, its services.

Thus, on the one hand, distance learning should be considered in the overall system of continuous education, assuming the continuity of its individual units. On the other hand, distance learning is necessary to distinguish as a system and a process.

Distance learning courses require careful and detailed planning of learner's activity, its organization, clear statement of the goals and objectives of training, the delivery of the necessary teaching materials to provide interactivity between students and teachers, the feedback between the learner and the learning material, provide the ability of group training. An effective feedback allows the student to obtain information about the correctness of the progress on the way from ignorance to knowledge. Motivation is also an essential element of any distance learning course.

At the moment, the most common are the types of distance learning based on interactive television; computer telecommunication networks

(regional, global), with a variety of didactic opportunities, depending on the used configuration (text files, multimedia technologies, video conferencing) technology combined CD and the Internet. [3]

The advantage of learning based on interactive television, is its ability to direct eye contact with the audience, located at different distances from the teacher. Its negative side is that such training is like usual class that is made using traditional methods and modern educational technology. This can be acceptable only while demonstrating unique methods, laboratory experiments, in which teachers and students can be witnessed and participated in the use of new knowledge and techniques in the field of new information technologies, participate in the discussion. This form of distance learning is interactive and can be considered promising in the system of professional development and training. But at the moment it is extremely expensive technologies.

The next way of distance learning involves the use of computer telecommunications in mode of e-mail, teleconferences, information resources of the regional networks and the Internet. [2] It is the most popular and inexpensive way of distance learning. Its organization is provided the use of the latest means of telecommunication technologies.

Distance learning, carried out by means of computer telecommunications has the following forms of study.

Chat-classes - training sessions carried out with the use of chat technology. They are held synchronously, all participants have simultaneous access to a chat room. There are such chat-schools in many remote schools where these chat rooms organize activity of distance teachers and students.

Web classes - distance lessons, conferences, seminars, business games, labs, workshops and other forms of training sessions conducted by means of telecommunications and other opportunities of the Internet. For web sessions, specialized educational web forums are used. They are the form of the user experience on a particular subject or problem with the records left on one of the sites with installing of the appropriate program.

Teleconferences are usually held on the basis of the mailing lists via e-mail. Achievement of educational goals is characteristic for educational teleconferences. There are also forms of distance learning in which learning materials are sent by mail to the regions. The method of training, which was called "Natural learning» (Natural Learning Manner) is on the basis of such a system.

Telepresence assumes distance presence, which is, for example, implemented with the help of the robot 100 R.Bot (http://robotor.ru/2011/05/30/r-bot-interview/).

The third method involves a CDs using as the base of the electronic textbook. It encompasses the great teaching opportunities for the university, school education and training for professionals. The advantage of a CD is that it combines the following features: interactivity, multimedia, contains a large volume of information and thereby significantly improves the process of distance learning.

Now it is possible to identify six main models of distance learning [3].

The first model is an external studies training. Education is oriented for school or high school (examination) requirements and is designed for pupils and students, who for some reason cannot attend full-time educational establishments.

The second model is a training on the basis of one of the universities. It is the whole system of education for students who are trained not stationary, but at a distance, part-time (open form) or remotely, on the basis of new information technologies, including computer telecommunications. These programs are used to produce a variety of certificates of education.

The third model is a training based on the cooperation of several institutions. It provides a joint training of distance-learning programs for a number of educational institutions in the leading disciplines (in all parts of the country and abroad). Such co-operation in the preparation of distance learning allows them to make better quality and less expensive. The long-term goal of the program is to enable any citizen of the Commonwealth, without leaving their country and their homes, to get any education on the basis of functioning in the community colleges and universities.

The fourth model is independent educational institutions, specially created for the purpose of open and distance learning, where students can get an education in various fields. They specialize in the creation of multimedia courseware. Education is fully covered by the organizations and firms where the students work. The largest of such institution is the Open University in London, on the basis of which in recent years a large number

of remote students not only from the UK but from many countries of the Commonwealth have been trained.

The fifth model is training according to self-learning systems. Education in such systems is carried out entirely by means of radio or TVprograms, as well as extra printed materials.

The sixth model is informal, integrated distance learning based multimedia programs. These programs focus on training an adult audience, those people who for some reason were not able to finish school.

In practice, the use of distance learning has a number of advantages:

1. The higher efficiency of training compared with the evening and part-time courses at a lower cost of educational services.
2. Reducing the time of study.
3. Possibility of a parallel study at Russian and foreign universities.
4. The independence of the student on the geographic location of the university.

Anyone can get an education remotely. There is no age, territorial, educational, professional restrictions, and practically no restrictions on health grounds. Distance learning students can not only be students in the traditional sense of the word, but also schoolchildren and staff of organizations engaged in corporate training.

Among willing to be educated there are several groups, for which the distance learning is more preferable than the traditional one.

They are the ones who find it difficult to attend classes at a specific place and at a fixed time. These primarily include:

1. Employees of corporations who can pass the necessary training and re-training within their organizations, and sometimes without ever leaving their jobs, which significantly reduces the cost of corporate training.

2. University students living in remote areas, and thus geographically cut off from educational and research centers. In our country, the best of such centers are extremely uneven and concentrated in a few large cities. These conditions make it impossible to obtain the desired high-quality education a significant part of the population, since not only internal, but also the form of the traditional distance learning involves travel to a large university town and paired with these trips and numerous household financial burden for the student (and the organizational challenges for administrators and teachers of the learning process).

3. "Young mothers" and other people who are forced by family circumstances to be present constantly at home, but wishing to work in the future and getting education for that.

4. "People with severe physical disabilities and do not leave their homes. There are few health restrictions. If a person sees the image on the monitor and is able to work with a keyboard and mouse - he can be taught through distance learning. Importantly, recent improvements in connection with the input and output information to a computer practically there are no diseases which can prevent anyone's distance education. In addition, medically developed software products are enable to offset the effects of different (especially neurological) disorders, and even improve the condition of the patient and they can be easily integrated in the distance system. Increasingly, disabled rehabilitation centers and similar organizations are turning to distance learning systems [6].

But along with the advantages of distance learning, there are problems in its organization. Thus, the effectiveness of distance learning is directly dependent on those teachers, who are working with students on the Internet [4]. It should be teachers of the universal training: owning modern information technology, and psychologically ready to work with students in the new learning and cognitive network environment. Unfortunately, in our country there isn't this kind of training. Another problem is the infrastructure to provide the student information in networks. The question of what should be the structure and composition of educational material is still open. Along with this is the question of the conditions of access to distance learning courses. The same issue of organization and evaluation of distance students' knowledge is not resolved too. To solve it, it's necessary to create a legal framework for the assessment of students' knowledge.

Most effectiveness in distance learning can be achieved by using mixed methods of distance learning. The term "mixed distance learning" implies that the training program is constructed as elements of both synchronous and asynchronous elements of teaching methods.

Methods of synchronous distance learning provide communication between student and teacher in real time - on-line communication.

Asynchronous distance learning technique is used when communication between the teacher and the students in real time is impossible. It is the so-called off-line communication.

In conclusion, it should be noted that the continuous education can be implemented in a system where the subject of education may be therein, being in different stages of age. Means of navigation in the educational system is distance learning, which is an important aspect of communication between the participants of the educational process, the mandatory consultation of the teacher. In this case, communication between the student and the instructor is held with the help of telecommunications, computer and Internet technologies, as well as the means of interactive television. The effectiveness of each of these models depends on the distance learning organization and *methodical* quality of materials used, as well as the skill of teachers involved in the process.

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PRACTICE DEVELOPMENT OF ELECTRONIC MULTIMEDIA TEACHING AIDS

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Abstract - The graphic interface and the structure of developed and examined multimedia tutorials on training areas of the institute are described and presented in details. The advantages of using electronic means of learning are studied.

I. INTRODUCTION

The use of e-learning in the educational process is not just a requirement of the time, but an unlimited possibility in improving the quality and effectiveness of educational process. It is impossible to present a model of modern educational institutions without computer labs, multimedia projectors and interactive whiteboards and a modern teacher - without possession of information and communication competence [1].

In order to address issues related to the use of information technology in the educational process at the Department of Computer Science and Management of Taganrog State Teacher`s Training Institute of Anton Chekhov a laboratory of informatization education problems are formed. One of the priorities is to develop information educational environment of the institute, in particular, the development of electronic multimedia tutorials on subjects training institute.

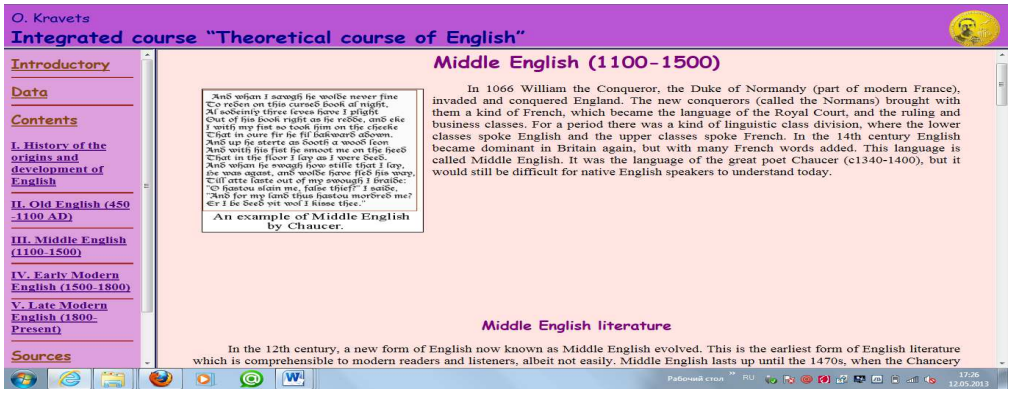
II. RESEARCH

The modern system of training students cannot rely on the use of traditional textbooks and manuals on paper due to their loss of a number of didactic properties. The introduction to the educational process of e-books allows:

- to improve the quality of education through the use of innovative training tools;
- to increase students' interest in the studied subjects;
- to provide students with access to additional sources of information;
- to increase availability of training materials (for example, for students who combine study with work);
- to update the content of teaching material based on the latest achievements of science and technology;
- to set multimedia materials (presentations, video, audio);
- to develop fund assessment tools that allows you to value the quality of educational material development(intermediate, final test).

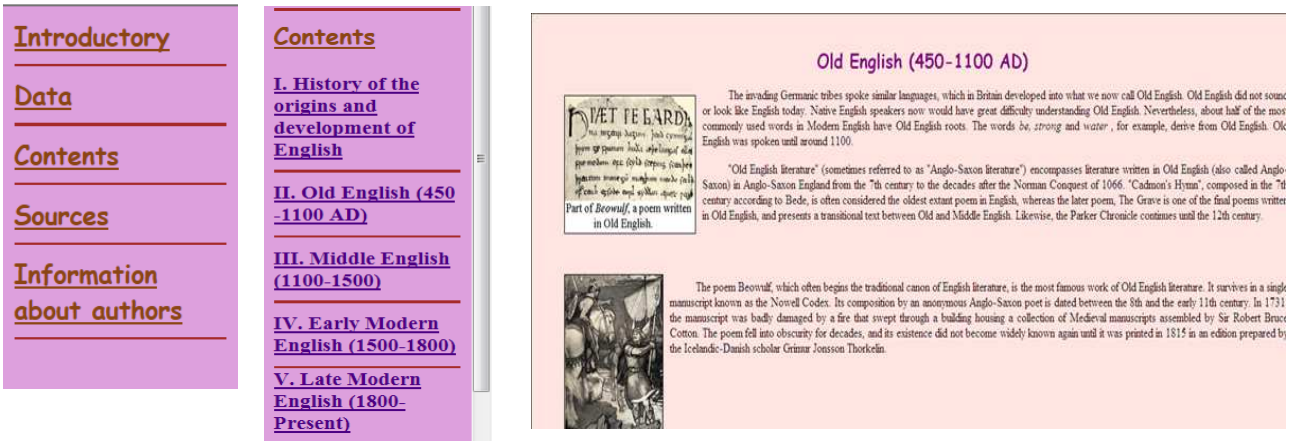
Developed by professors and members of the laboratory of the Institute multimedia electronic textbooks have a unified interface that are presented by three areas. [3]

On the top of the screen there is a title of an electronic manual and the authors` names.



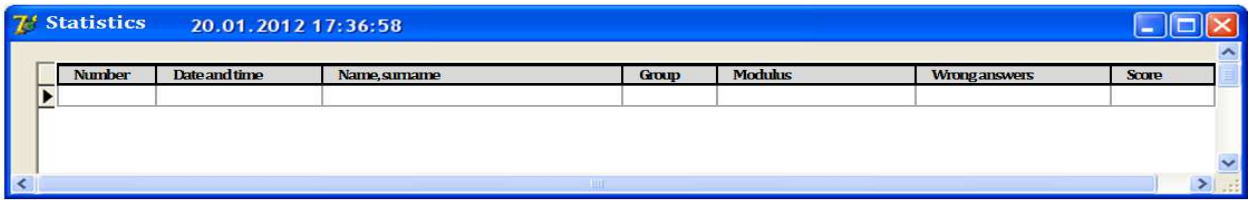
On the left there is a content in which the student can choose a specific section by clicking on it and the left mouse button. "Table of Contents" contains a drop-down list of notes to sections of educational material.

In the central part of the window there is information on the chosen section.



The presence of a testing unit allows control of the knowledge and includes:

- modules offered for topic study ;
- bank of questions to the modules;
- database "Statistics" which fixes:
- surname, first name, middle name of the student;
- date and time of the test;
- the number of a group;
- the name of the module;
- the numbers of questions that have been given wrong
- answers;
- final score.



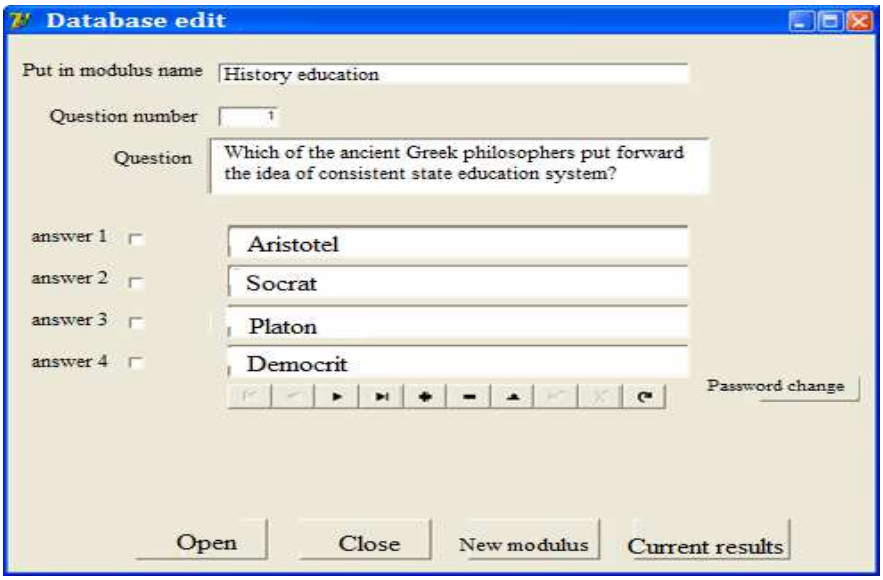
“Wrong answers” allows the teacher to define topics that caused difficulty while studying them.

The work with test program is performed on two levels:

- for students (doing the test);
- for the administrator/teacher.

Teachers can :

- ge password if it is necessary.
- create new modules;
- edit banks of questions;
- analyze the results of the test through access to the base of data “Statistics” and also delete it when complete work with the course;
- chan



Developed manuals contain media blocks in which authors place audio, video, presentations corresponding to the subject of the studied discipline.

One of the advantages is an ability to attract students to the development of e-learning. For example, the most interesting are presentations, modeling results, animations, showing physical, chemical and other processes can enter the structure of the corresponding edition from the point of view of design and presentation content. This approach allows stimulating research activities of students on the one hand and forms information and communication competence of future specialists on the other hand.

III. CONCLUSION

All developed electronic publications are assessed by experts in the field of e-learning and are registered in the Federal State Unitary Enterprise Scientific-Technical Center "Informregistr" by assigning the state registration number.

Development of electronic multimedia training is one of the stages of information formation educational environment of the university which will improve quality, effectiveness and accessibility of education.

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DESIGN OF LEARNING MANAGEMENT SYSTEM WITH USE OF INNOVATIVE WEB BASED 3D USER INTERFACE

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Abstract - This paper deals with the ongoing work on Learning Management System designed as the authoring and publishing tool for application in the field of e-learning. In designing this tool the emphasis was placed on the possibility of collaborative work of groups of authors in the phase of creation of the knowledge base, which is composed of term definitions, different kinds of term relationships and related multimedia represented by pictures, diagrams, video and audio files. Innovative structure of visual 3D user interface was designed with the aim of possibility to visually represent term relationships and to visually navigate through the knowledge base. The paper introduces the idea and implementation details and special attention is paid to the description of visual 3D user interface.

I. INTRODUCTION

The alternative choices for classroom learning are evolving over the decades. With distance learning in the form of corresponding courses in which printed materials were used in the beginning, through the radio and television courses in the past into new, more interactive and effective form which combines the use of computers and telecommunications in our presence with the use of internet as the modern, interactive tool.

Today, not only easy delivery of learning material is possible, but also interactive capabilities of audio and video multimedia and communication are available. Development of the internet and easy accessibility of the internet network with popularity of World Wide Web (WWW) is powering the use of e-learning in education [1][2].

E-learning is representing the opportunity to expand access to the education beyond schools and universities and allows the cost-effective distribution of education to the broad audience. Corporations are for example able to educate employees without travelling, lost of productivity and without other expenses.There are possibilities to deliver learning materials to previously unreachable students in different geographical and cultural environments and in the previously unreachable forms.

New forms of content, including not only text but also audio and video materials as well as interactive forms of content are increasing the efficiency of the learning process.

Opportunities, which e-learning with use of the Internet brings, are however in many cases not completely utilized. The content of learning object is in many cases, copying the structure and content of the paper based teaching material, without adding multimedia represented by audio and video content, or included content lacks the interactivity that is possible.

There is drop of students from electronic courses and many educators feel that this measure is unacceptable. Solution that can overcome described problem is in the increase of the interactivity according to Anido et al. [3] and in socialization of students which was investigated by Ozturk and Mutlu [4].

The interactivity and socialization in the World Wide Web environment can be understand as an interchange of messages and other communication in various forms, for example audio and video calls and conferencing and innovative form of interaction between students and learning materials.

II. AUTHORING AND PUBLISHING TOOL

Authoring and publishing tool introduced in this paper is specialized tool for collaborative work on term definitions in encyclopedic approach that are used in the process of teaching.

It disposes with interface for authors of content represented by definitions of terms and their relations and multimedia and also it disposes with interface for students, which are not allowed to change the content.

In the future this tool will allow interchange of information between authors and students and will allow interactions through the various communication forms like posting of comments, discussion boards, chat, mailing lists and others, and students will have opportunity to participate on the content creation.

Tool disposes with innovative 3D user interface that is developed in this project to allow interactively navigate through the content.

III. GENERAL CONCEPT

In the centre of the scope of this work is the effort to build platform for collaborative work on the creation of definitions of terms in encyclopedic approach with strong emphasize in implementation of relations between terms.

Formal description of relations between terms is the base for creation of visual representation of relations in virtual 3D space, which is also used as the visual user interface of authoring/publishing tool.

Visual 3D user interface is also main navigation system of the tool. It allows to navigate interactively through the knowledge base and to see additional information represented in textual, pictorial, audio and video form.

The strong emphasize is also on the collaboration of authors in the phase of definitions of terms creation and students in the phase of study of this teaching material. Students are also able to communicate to each other and also with the authors and to comment definitions and relationships. They are able to participate in this way on the process of iterative content creation.

IV. IMPLEMENTATION DETAILS

Three layers architecture is used in this authoring/publishing tool.

Common base of knowledge represented by definitions of terms, relations between them and bibliography lists used for creation of the content is stored in database and additional multimedia files are stored in repository.

Separate application and presentation layer for administrators and content authors on the one side and students that are allowed only to view the learning content on the other side is used. (Fig. 1).

Implementation of this authoring/publishing tool is using Apache server, qt the backend is used MySQL database. JAVA and PHP source code is used in the application layer. SQL query language is used to access stored information. Presentation level is HTML based, with use of CSS, JavaScript and jQuery.

Client/Server architecture allows to access authoring/publishing tool via internet with use of the web browser. Interface of the application allows the creation of distributable learning objects, in which the knowledge base is stored with use of XML.

Author's user interface allows WYSIWYG browsing and editing of knowledge base, while student's interface does not allow making changes of knowledge base.

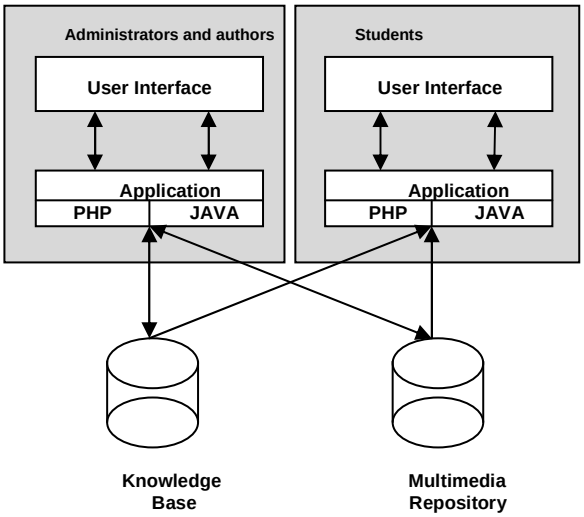

Figure 1. Structure of authoring/publishing tool

V. USER PRIVILEGS

Users of this authoring/publishing tool are divided into four levels according to their tasks and competencies:

- *Administrators* – the role of the administrator is to maintain application and user accounts and to assign privileges to other users.
- *Authors* – the role of authors is to create definitions of terms, their relations and other related multimedia content. In this highly trusted environment all authors are allowed to cooperate on the each term definition and are allowed to change content created by another author without noticing.
- *Students* – users in the role of students are allowed to study published content without ability to change of the content, but are allowed to comment and to use all integrated communication tools to communicate with other students and also

teachers which are authors of terms and related content.

- *Guests* – not registered users are in the role of guests and have restricted access to the system. They are allowed to study published content, but they are not allowed to make comments or to export content in any form. Guests do not have access to integrated communication tools.

Authorization and authentification of the user is based on the LDAP and it is interconnected with the authorization and authentification of users of other information systems at the Technical University of Košice.

VI. COMMUNICATION CAPABILITIES

Very important part of the system architecture is a set of tools dedicated to the interaction and communication between various categories of system users. Communication subsystem consists of several communication tools:

- *Posting of comments* is the basic possibility how users of the system can annotate the work of other authors. Comments are bound to the terms and are very important in the process of content creation. Comments can be posted as publicly visible or private, visible only to author of the respective taxonomical unit definition and related content.
- *Discussion boards* and chat are the opportunities for users of the system to meet each other and to talk about the topics related with published content. There is a great opportunity for socialization of students. Public and private communication is allowed.
- *Mailing lists* are established for possibility to send messages to all users, all authors or groups of authors, by administrators and authors of the content.

VII. VISUAL 3D USER INTERFACE

The main part of the layout of the authoring and publishing tool and distributable learning object is in this project designed innovative and interactive visual three dimensional user interface which consists of:

- Text representations of terms which are distributed in 3D visual user interface in 3 layers.
- Central layer displays central taxonomical unit and other units with synonym, congenial terms and other relations.
- Upper layer displays one or more parental or superior terms, with close relation to the central term.
- Lower layer displays one or more daughter terms that are in close relation to the central terms.
- Relations between terms are represented by vectors binding terms in the same and different layers, with use of different colors for diverse relation types.

To allow interactivity and to ensure the best usability of the tool and understandability of displayed visual information delivered by 3D user interface, user is allowed to:

- Switch on and off visibility of upper and lower layer to enhance visibility of taxonomical units and their relations in central layer.
- Change interactively central term by click on another displayed term. Visual interface displays this term as the central term and displays related terms in their actual roles in all layers. (Fig. 2.).
- Change the point of view to see displayed information in different perspectives.
- Zoom in and out to customize number of displayed terms presented in one view and in all layers.

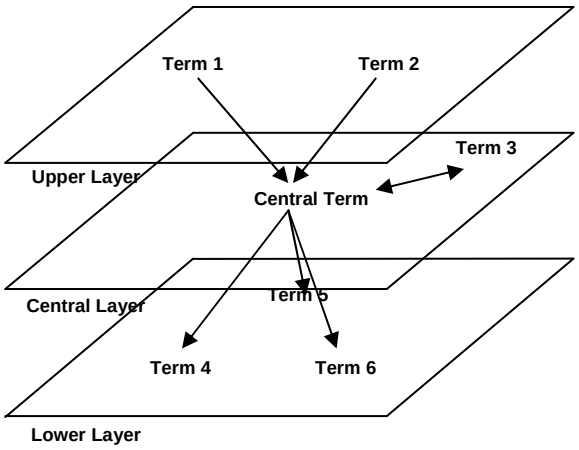

Figure 2. Representation of terms in three layers of 3D space with represented relations of terms.

VIII. CONCLUSION

This paper represents brief introduction of the work on authoring and publishing tool with use of the innovative and interactive 3D user interface, which is meant not only as the e-learning tool, but also as the platform for collaborative work of groups of authors on terms definitions with aim to prepare exact, comprehensive and consistent definitions of terms that will be used in the learning process not only in e-learning applications.

The tool will be used also as the part of the realization of the Project No. APVV-0008-10 that is being solved at the Department of Computers and Informatics, Faculty of Electrical Engineering and Informatics, Technical University of Košice as the knowledge base in the field of computer networks and computer security.

In the future development of this authoring and publishing tool, the stress will be laid on the enhancement of communication possibilities between users of the tool and in the phase of iterative testing in the wild and consecutive improving to find the suitable graphical representation of terms and their relations, with aim to find balance between amount of displayed information and its easy comprehensibility.

IX. ACKNOWLEDGMENTS

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IMPLEMENTING IMPROVEMENTS TO THE "SOFTWARE ENGINEERING BASICS" COURSE

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Abstract - In this paper, we propose the improvements of learning and exercising processes introduced with emphasis on student project assessment and UML language skills. The improved content consists of the basic course structure implemented in LMS Moodle and the extensions (supporting material) implemented as external course material located in our knowledge transfer project depository.

I. INTRODUCTION

Teaching software engineering is a task for the teacher, where the improvement of the learning content is a daily routine.

Software engineering (SE) is a wide discipline, so a selection of topics could be only presented during the course [1]. To avoid significant incompleteness, lower detail is used to have the larger area of the topic covered, mainly using [2], [3], [4] and [5] as referred resources.

As many other subjects, the SE basics course is also implemented using automated testing tools such as LMS Moodle. We decided to assign several tasks to the students to make the semester colorful.

Classical features of the LMS are course material management, assignments and tests; our motivation is to extend this system by e.g. new types of questions. In this paper, we show our improved course and point out the possible extensions of our concept.

The paper continues with the introduction of our SE Basics course. Next, Section III presents an insight to an editor based on the jsUML2 library [6], [7]. Finally, we point out possible merging points between the LMS Moodle and the jsUML2 editor.

II. THE SE BASICS COURSE

Familiarization with the methods and tools used in software projects is the goal of the subject, which is expressed by the content of Fig. 1 where several course materials are shown in the 7th week of the semester related to UML modeling and diagrams, and the (Rational) Unified Process.

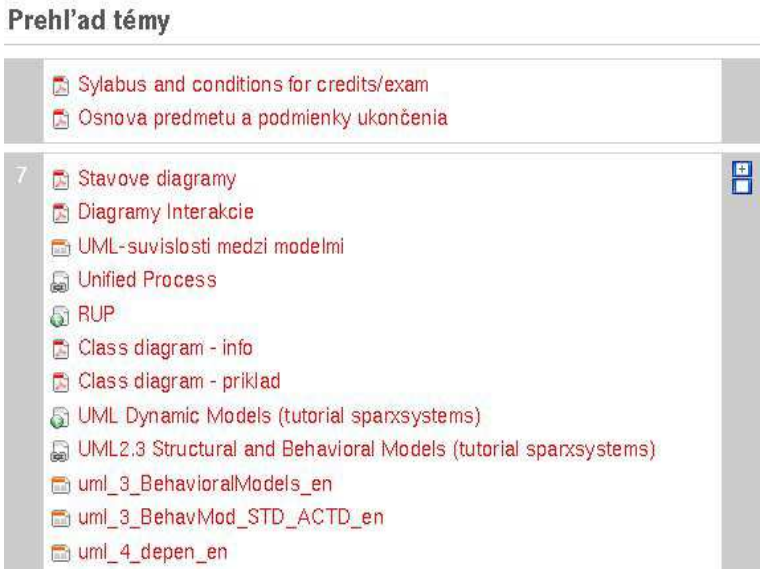

Figure 1. Sample part of the SE Basics course.

A. Lectures

Lecture topics are as follows:

1. Software life cycle models, use and importance.
2. Structured analysis/design tools and methods.
3. Modeling of data, processes and control.
4. Structured methodologies of analysis and design.
5. Object modeling, UML, static and dynamic models, methodologies based on UML.
6. Dependences between models, consistency of models, model driven architecture (MDA).
7. CASE systems, classification and use.
8. Software physics, cost and time estimation, methods for cost estimation, Constructive Cost model – CoCoMo.
9. Project management, planning and development of software systems, formal methods for project planning and evaluation.
10. Project team structure and management.
11. Project documentation.

B. Content of Seminars and Lab Works

1. Analysis of the existing system – specification of user requirements, model of the environment of the system.
2. Introduction to the CASE system - user interface, main functions.
3. The use of modeling tools for creating a data model. Conceptual data model.
4. The use of modeling tools for creating and managing functional and control models of systems, dependences between models.
5. Introduction to the unified process modeling with use of object-oriented CASE system
6. Object analysis of user requirements - use case model.
7. Objects and classes, modeling based on class diagram.
8. Modeling object behavior - interaction diagram and state diagram.
9. Consultations and presentations in project.
10. Final presentation and defense of the project

C. Tasks

1. The project system or subsystem using a CASE tool, create a prototype system or subsystem (team of 3-4 students).
2. Essay on specific topic with the issue of software technologies in the form of presentation (ppt format) with the mandatory sections:
   a. Introduction,
   b. basic concepts,
   c. bibliography,
   d. list of three questions on the topic and three questions to the lecture topic before exercise, which will showcase award. Questions will be drawn up a draft response to the 3-5 test, with at least one answer is correct and at least one wrong.

III. THE JSUML EDITOR

This editor is developed by a small group of programmers in Cordoba, Spain [7]. Our contribution lies in the personalization of the editor interface to the needs of the integration into LMS Moodle. The actually modified interface is presented in Fig. 2. There is no diagram type selection but a selected one is shown to the user with the corresponding toolboxes:

- Diagram actions – delete single object and delete all objects (clear diagram).
- Diagram elements [7] – represent type-specific menu.
- Course actions – the part, which will be reworked in the close future.

IV. CONCLUSION AND FUTURE WORK

We presented our improved course structure that aims to involve students into the teaching process by writing and presenting essays about hot topics in software engineering.

The most important goal is to implement a version of the jsUML2 editor into LMS Moodle as new question type and/or student assignments. This will need interface changes, because the location of the menu (actually on the left side) significantly shrinks the editing area. In the future, the “Send” action will close the question or test, respectively,

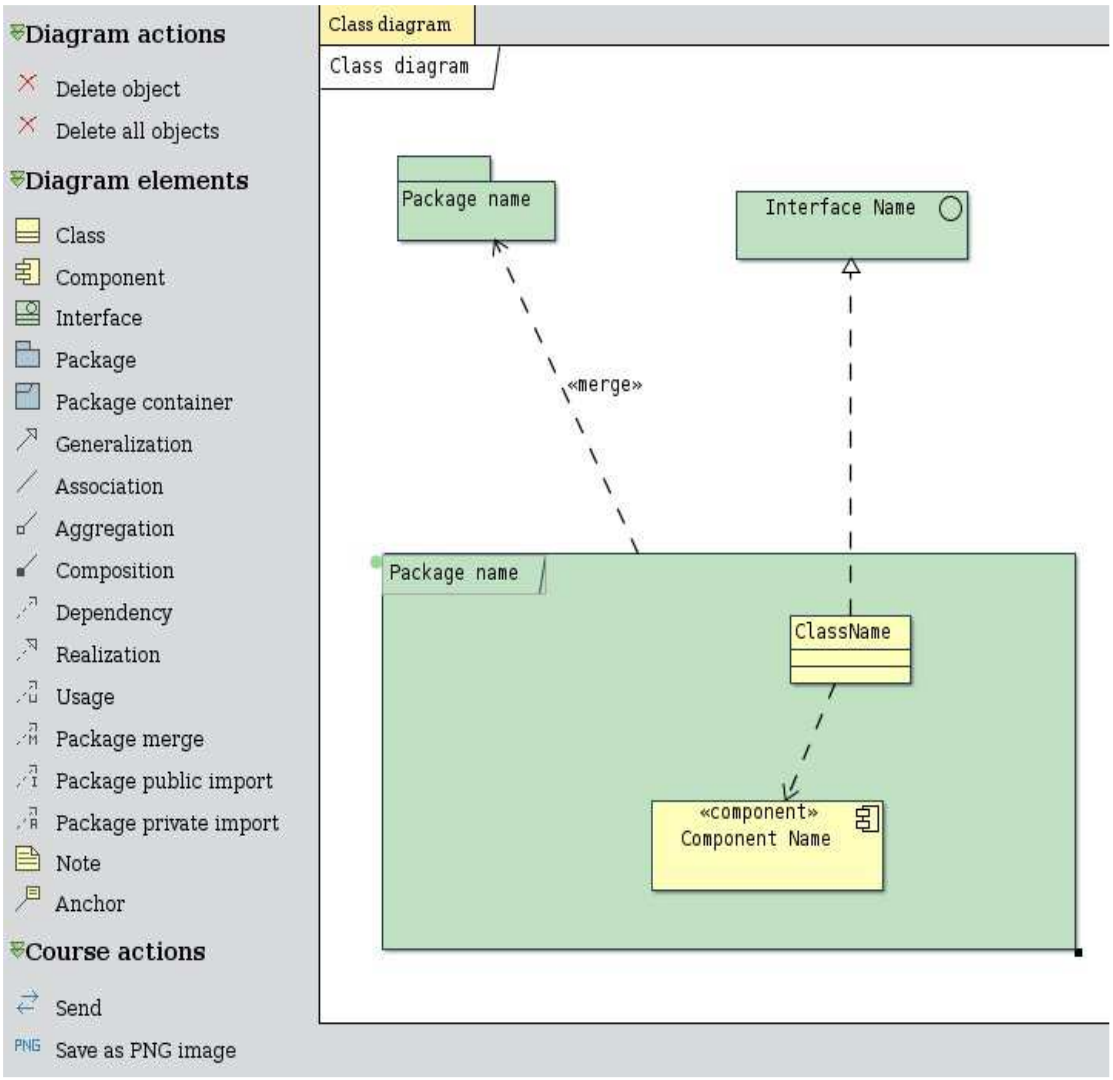

Figure 2. Our version of the jsUML2 editor

and the "Save" button will serve as saving without closing the test.

In the second alternative representing new type of assignment, similar functionality could be associated with the buttons.

ACKNOWLEDGMENT

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This work is also the result of the project implementation "IT4KT – Information technology for knowledge transfer" (project No.: 26220220123) supported by the Research & Development Operational Program funded by the ERDF (80%).

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ACHIEVING HIGHER STUDENT PARTICIPATION ON LMS CONTENT CREATION THROUGH THE CROWD SOURCING AND POSITIVE MOTIVATION

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Abstract - In this paper we present new progressive technique as an extension to existing Learning Management Systems (LMS). We are considering state-of-the-art LMS as inefficient from student perspective. Most LMS allow creating content primarily by teachers, thus the teacher is able to build their own conceptions of lessons. But the ability to create content by students is highly limited. We are not aware of any LMS which deals with this problem. Moreover we present the way where students are motivated to create the content, this content is further shared among class. Motivation is done by evaluating the students. To achieve this model we are using reputation and crowd-sourcing as phenomena of recent years. Our design incorporates several elements which are deployed in one complex solution.

I. INTRODUCTION

Achieving active student participation in learning process and content creation of classes is the difficult task, which is not very widespread in current learning process.

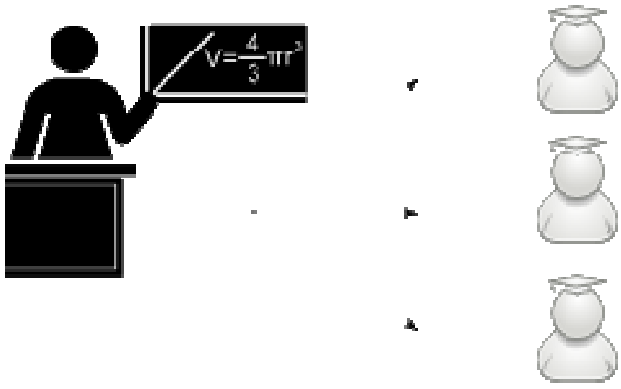

Figure 1. Classical LMS approach

Software solutions which are nowadays available are mainly tailored for teacher purposes and leaves students out of the game. Undoubtedly several questions arises with this idea which addresses main problems (questions) which needs to be solved (answered) during this process, for example; how much content from student can be incorporated into the learning process? Can student ensure the appropriate needed quality of content delivered by him? How actual can be the content delivered by student? Can student ensure on schedule updates of material? Which content should students participate on? Does student disposes with sufficient knowledge base to participate to the learning process? What form should be the student participation? How to motivate the students to create the content? What further benefits it will have for student and teachers? We are confident that those and many more unanswered questions which are related to this problematic simply condemn that this concept is relegated to the sidelines.

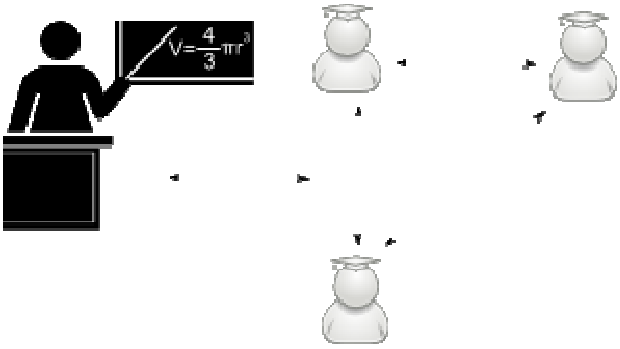

Figure 2. Proposed CSLMS approach

There is no doubt that this concept would be very useful as for students also for teachers (lectors). For example teachers involved into this process would be supplied with additional materials for their lessons. Lessons preparation and material creation is often tedious and error prone task. Student on the other hand can include in materials elements which helps him to better understanding of given problematic, also he has an ability react to lessons using this form of participation. Students will also benefit from fact

that they prepared materials by themselves and therefore are tailored for their needs. In fact both sides will benefit of this collaboration, and gain feedback from other side. Today trend is that communication among student-teacher hangs where it is matter of shame from student or inaccessibility from teacher. Students have nowadays limited ability to express their attitude to what he needs or wants in learning process. This state is shown on figure 1. in contrast to our presented solution shown on figure 2.

II. SOCIAL NETWORKING PROBLEMS

As it was mentioned student-teacher communication lacks, but despite this fact, student often use internet and especially social networks for communication among them. Internet allows people to show their ego and ask question that would not be asked otherwise, for example due to shame of user, thus we can say that internet broke boundaries because of its anonymity and indirect contact among people. For example Facebook [1] is one of the most popular social networks that has 1.11 billion users around the world [7]. Facebook also allows special type of collaboration by creating private groups and share the information within this group. Those information are available only to people belonging to this groups. We see potential in this concept because information shared in group can be used not only for entertain as it is nowadays on Facebook, but also for learning process. This form of communication in recent years is slowly replacing the "old" concept of communication among people, which was mainly based on classical forums, like those built on phpBB engine [6].

We are sure that most of students are creative when they are doing what they enjoy. For example almost all students is posting pictures from various sites, videos from YouTube, writing jokes or linking to other content on internet. However they are sharing the information mainly through Facebook as it was already mentioned and thus the teacher has no ability to control or moderate the shared content.

Another good example opposite to Facebook is StackOverflow, according to [4] we can define Stack overflow as "question and answer site for professional and enthusiast programmers. It's built and run by you as part of the Stack Exchange network of Q&A sites. With your help, we're working together to build a library of detailed answers to every question about programming." This service gains more and more popularity compared to "old" way of communication using traditional internet forums. StackOverflow engine allows people to rate the questions and answers, by liking or disliking. This is one of the elements which ensure that the valuable posts are shown on first places. This also helps to maintain the consistency of data because of its nature. This concept also achieves the faster searching of relevant information.

We see that there is gap in information sharing medium between students which can be controlled and moderated by teacher. We are also confident that this medium would be benefit for both students and also for teacher. For example students often share a lot of incorrect or misspelled information, this result to misunderstanding the problematic among students. Another example is that students are forced (directly or indirectly) to make their own notes (cheat-sheets), however those notes are not further shared and improved. This harms mainly students, because the problematic can be better understood with custom notes created by particular student and tailored for his needs. Nodaway there are many uncontrolled communication channels for information sharing among students. The fragmentation is very high and this decreases information quality, increases information redundancy and time which is needed to find correct information. In the following lines we introduce our conception of collaboration crowd sourced LMS (CSLMS).

III. MAIN IDEA

Based on previous fact we see the possibility to improve the current state-of-the-art in this field and present the concept which improves student-student, student-teacher and teacher-teacher collaboration. We are presenting system where students are positive motivated to gain score by participating in our CSLMS. This process is shown on figure 3. Gained score is part of full score which student can achieve for whole subject. Another motivation for students can be for example that all created materials will become available as official cheat-sheet.

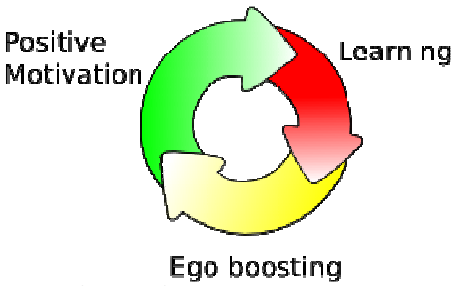

Figure 3. Life cycle of student learning process participation through positive motivation and ego boosting

Availability of materials can be e.g. conditional to user reputation, which means that students who participated more to content creation in our CSLMS can use more of its knowledge base. Materials are thus tailored exactly for student needs, but are under revision of teacher, to achieve correct information or avoid e.g. exact quiz answers, but rather discussing problematic from various point of views which are better understood by students.

IV. TECHNICAL REALISATION

We are considering StackExchange [5] engine as a base idea for our solution. Of course we present several modifications of this engine that need to be done to address our needs.

For example we are considering rating the questions and answers not only by liking or disliking but gaining score on appropriate scale, this should ensure higher granularity of data and offer more precise statistics.

Another benefit we are considering is anonymity of student. Every student disposes with anonymity in the beginning to stimulate them to discussion and not be shamed for asking "stupid" questions. Of course this anonymity is related only to student-student relationship, teacher has full knowledge who is the particular user to be able to rate him. As long as user reputation increases the anonymity decreases, thus the most active resp. successful students presents themselves. This is shown on figure 4.

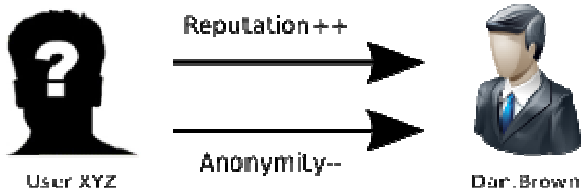

Figure 4. Process of revealing student profile

We are also introducing the ability to generate further knowledge base from our CSLMS, for example several random top rated questions and answers can be part of exams, or internal wiki systems or serve as a best practices e.g. for programming classes. This is shown on figure 5.

There are plenty of modifications and variations which can be done for achieving better student participation. For example StackOverflow engine provides ability to offering reward for best answer. Also crowd-sourcing can be used for various other tasks, such similar way as it is used captcha by Google for street recognition nowadays, as it is described here [8].

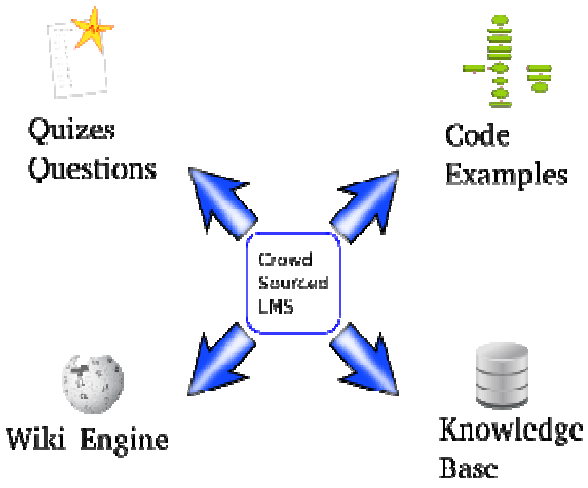

Figure 5. Further knowledge extraction from CSLMS

Also user reputation building can be considering problem, for example answering more difficult questions can be evaluated by more points than answering less difficult questions. One problem with this can be that teacher should decide which question is more difficult and which is less difficult. One of the possible solutions for this can be that students will be asked to rate the question not only by relevance but also according difficulty and possibly according further criteria (e.g. time where the given subject was discussed on lessons). Significant part of this system can be also statistic module which will provide detailed statistics about user progress and preparation from lecture to lecture. As it is shown this concept can be further updated and tailored for particular needs.

V. FEATURES

As it was already mentioned proposed system have several features compared to current solutions. Students are directly involved into content creation and therefore the content often updated, this is shown on figure 6.

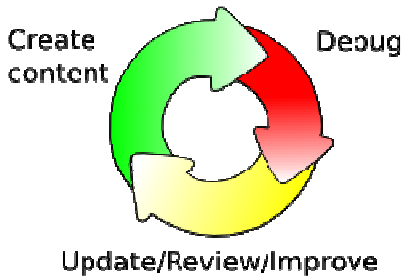

Figure 6. Life cycle of content creation

Several main features of our proposal are following:

- Non invasive creation of materials
- Higher control over created content since more participants are involved into the process
- Non intrusive feedback from students
- Collaboration between student-student and student-teacher
- Obtaining statistics about user progress by questions which user ask
- Accessibility from anywhere where internet connection is available

VI. CONCLUSION

We are considering current state of the art in LMS as not sufficient from student perspective. Nowadays LMS solutions did not reflects collaboration needs and are deprecated. We present new way where student is involved into learning process by his active participation. Our approach combines crowd-sourcing and LMS system into one CSLMS.

The main idea of this work is to give students system for collaboration which will concentrate the topics discussed by students. This can be further processed and moderated by teacher. Information can be extracted and study materials can be created from student discussions. Whole system is conceived as social network because of large popularity of this phenomenon. This article presents just a concept which can be further developed and updated.

VII. ACKNOWLEDGEMENT

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PEX4FUN: A WEB-BASED ENVIRONMENT FOR TEACHING COMPUTER SCIENCE

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Abstract - Programming is a major subject in Computer Science (CS) departments. However, students often face difficulties on the basic programming courses due to several factors that cause these difficulties. Maybe the most important reason is the lack of problem solving abilities that many students show.

This paper describes a web-based environment Pex4Fun from Microsoft Research for teaching computer science. Pex4Fun can be used to teach and learn computer programming at many levels from high school all the way through graduate courses. It provides three very useful capabilities to support testing. First, it can explore code and suggest which tests should be done. Second, if there are parameterized tests, Pex can figure out which combination of parameters needs to be tested in order to give full coverage of possible scenarios. Finally, in Code Contracts, it is possible to fine-tune the unit tests it suggests or generates for user. Pex4Fun finds interesting and unexpected input values that help students understand what their code is actually doing. Pex For Fun (PEX4FUN) can be used to build interesting, engaging, demanding classes and homework on mathematics, algorithms, programming languages or problem solving in general.

I. INTRODUCTION

Programming is a complex mental activity that is defined as an abstract process. Understanding and visualizing abstract processes poses a considerable problem for students when learning programming, as well as other fields with similar characteristics.

Linn and Dalbey [1] define an ideal chain of the learning process of learning programming and suggest it as a standard for comparing programming teaching methods. The three links of the chain are:

- Characteristics of the programming language – in order to log the programming solution of the problem with the given language, the student needs to understand the syntax, semantics, and expressive possibilities of the language.
- The skill of forming the program is the knowledge to use a bundle of techniques which, applied and combined, are used to solve the given problem. The skill is based on the knowledge of stereotypical code samples that combine different characteristics of the language. The models implement complex functions, such as sorting, finding the lowest common denominator of two numbers, counting words in a given text, etc. Programmers design the language and model characteristics to be combined, problems to be decomposed into parts, solving every part independently, and then linking the partial solutions into a unique unit – the program. At the end of the program writing process its correctness is checked by testing.
- The general problem solving skills come to light during learning new formal systems and this is set as the goal to be achieved by studying programming. The same models and procedural skills are common to many, or even all formal systems. Therefore, this approach is used to learn models of logging with one formal system and the rules of transfer to the new one, the subject of the learning process, so it results in mental learning and activation of pre-existing knowledge.

Lemut et al. [2] explain the difficulty of learning programming by the need for implementing complex activities that have to be mastered even by beginners simultaneously. For example, the program is tested by executing it, using carefully selected input marginal values that will result in checking all program paths. The choice of the marginal values requires the knowledge of semantic program instructions. Opposed to this, the beginner programmer learns instructions, so they find it very difficult to choose such inputs on their own. Du Boulay [3] finds that the sources of difficulties are the following:

(1) Orientation – related to the general idea of students about programming and the program.

(2) Abstract engine – related to understanding the computing model that defines the program language.

(3) Notation – related to syntax and semantics of the language.

(4) Structures – knowledge of programming constructions as a composition of instructions with which certain program requirement are met.

(5) Pragmatics – skills implemented in creating the correct program (planning, decomposition, coding, testing, detecting and fixing errors).

II. PEX: UNIT TESTING TOOL FOR .NET

Pex [4] is an automatic white-box test generation tool for .NET, based on dynamic symbolic execution. This tool is integrated into Microsoft Visual Studio in the form of an add-in. It can generate test inputs that are combined with different unit testing frameworks [5]. They have implemented Pex in classroom teaching at various universities (for example North Carolina State University, University of Illinois at Urbana-Champaign, and University of Texas at Arlington), and also in a variety of tutorials both within Microsoft (such as internal training of Microsoft developers) and outside Microsoft (such as invited tutorials at .NET user groups). Further, they have created numerous open source research extensions upon Pex [6].

One of the most important methodologies that Pex supports is called parameterized unit testing, which broadens the scope of today's industry practice which prefers closed, traditional unit tests (i.e., unit test methods without input parameters) [5].

```
// which values will trigger collisions in MyHashSet?
[PexMethod]
public void TestAddContains(int x, int y) {
  var s = new MyHashSet();
  s.Add(x);
  s.Add(y);
  PexAssert.IsTrue(s.Contains(x));
  PexAssert.IsTrue(s.Contains(y));
}
```

Figure 1. A parameterized unit test for testing the Add method of a MyHashSet class

There are useful characteristics that Pex offers to support for testing. Primarily, there is the option of exploring code and suggesting the tests that should be done. Secondly, assuming that it is a parameterized test, Pex can determine the combination of parameters that has to be tested to provide all feasible versions. Lastly, once Code Contracts is being used, Pex uses that information to fine-tune the unit tests that are offered or generated for the user [7].

III. PEX4FUN

Pex for fun on the web is a fundamentally simplified form of the fully featured Pex Power Tool for Visual Studio. There is no need for any installation; since it is handled in the cloud (www.pexforfun.com). Code can either be written in C#, Visual Basic, or F#. Figure 2 shows the user interface of the Pex4Fun web.

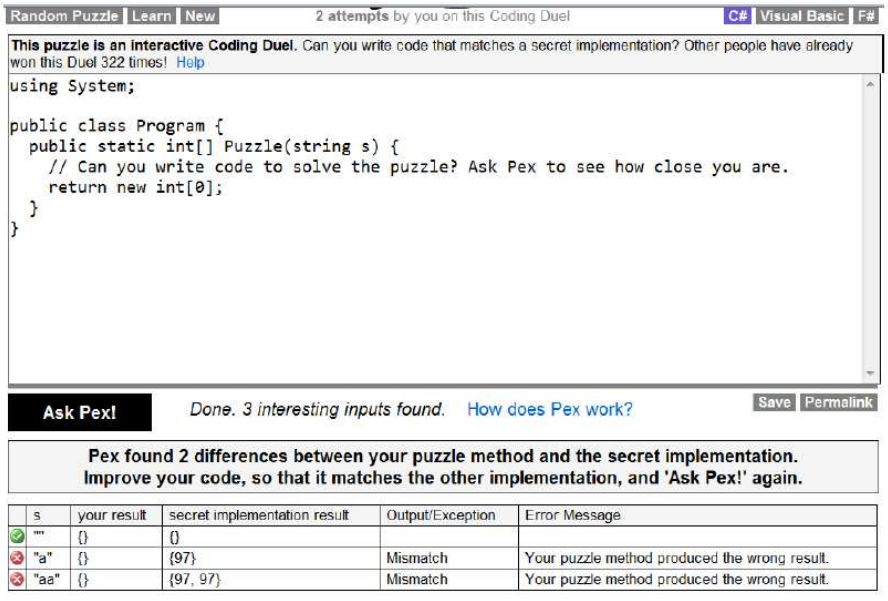

Figure 2. The user interface of the Pex4Fun web [12]

A. *Solve Puzzles*

Pex4Fun has a given set of particular code examples, which are called puzzles; these are displayed in the working area for the players. Every puzzle is focused on a major method named Puzzle. When a puzzle is loaded in the working area, the user will click the "Ask Pex!" button to compile and run it. The compilation and execution takes place on the Pex4Fun server; only the testing results are displayed. The main Puzzle method can take parameters and return values. If one wants to run one of these Puzzle methods, argument values have to be provided. Pex automatically detects interesting argument values as it analyzes the code. A table of input and output values then shows the generated input argument values and produced return values under the working area. The player can click every row of the table for further details, e.g. console output or stack traces [5].

B. *Solve coding duels*

A coding duel is an interactive puzzle. In a coding duel, the idea is to apply the Puzzle method to recreate the same behavior as another secret Puzzle method (e.g., the teacher's specification). In order to set out with a straight-forward coding duel, click an example coding duel from the web site. There is a dummy implementation which does not do much. If you click "Ask Pex!" it will show you how it is different from the secret implementation. Then you run a comparison between your result and the secret implementation result. You make an analysis of the differences and alter the code so as to match the secret implementation result for all input values. Again, "Ask Pex!" is clicked and the whole process is repeated until you win the coding duel. After winning the duel, try another one! The tool "Pex for fun" will track how you progress, but you have to be signed in for that.

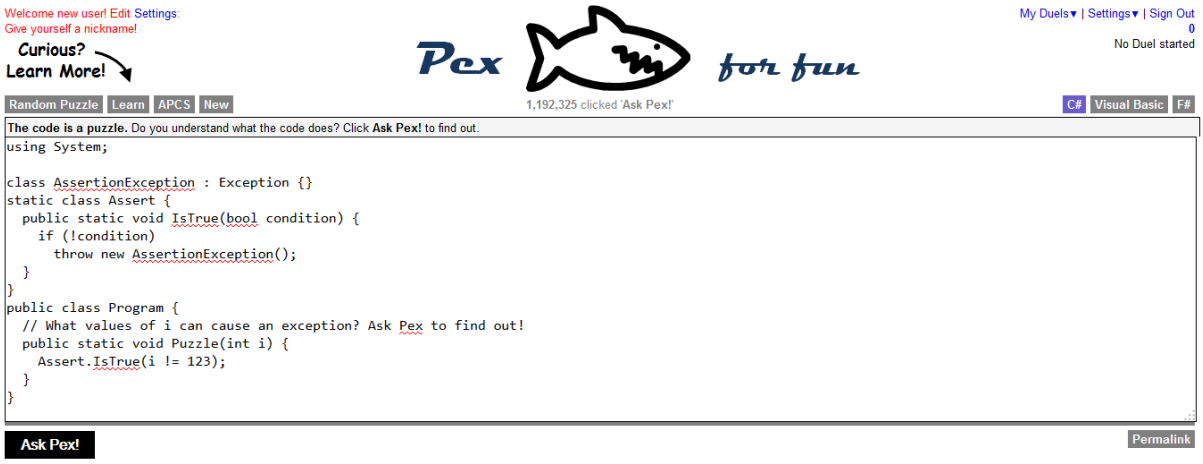

Figure 3. A coding duel

As far as learning and teaching are concerned, such coding duels serve the purpose of helping them to train different skill sets of players. These include the following, among others [5]:

- Abstraction skills - The shown list of generated input argument values is there to exhibit various behaviors and identical behaviors, respectively, though these are just exemplary argument values, which means that these are not a complete set of argument values for exhibiting different or same behaviors. Before realizing how to alter the player's implementation to move closer to the secret implementation, the player is forced to generalize from the seen exemplary values and the same or different.
- Problem solving or debugging skills - In order to solve a coding duel the player needs to run iterations of trials and errors. The player has to decompose the problem on the basis of the observed exemplary argument values and behaviors: grouping exemplary arguments that may show the same category of different behaviors, e.g., because of lacking a branch with the conditional of if (i>0). As a following step the player has to think of a hypothesized missing or corrected piece of code to cause failing tests (different-behavior-exposing tests) to pass as well as passing tests (same-behavior-exposing tests) to still pass. Following this, the player has to do a test to validate the hypothesis by clicking "Ask Pex!". Thus, solving a non-trivial coding duel may require exercising different problem solving skills.
- Program comprehension and programming skills. Assuming that the dummy implementation at the beginning is not that

"simplistic", including non-trivial code, the player has to first comprehend what actions the dummy implementation is performing. This makes it clear that the players must have solid programming skills in order to do well on a non-trivial coding duel.

C. Create and teach a course

The purposes of Pex4Fun are manifold: it can be used to make classes on mathematics, algorithms, programming languages, or problem solving in general seem more captivating. Teachers have at their disposal an embedded wiki to create class materials based on puzzles and coding duels. More specifically, this enables the teacher to integrate existing pages into the course. The author of these pages could either be the given teacher or anyone else. The participation process is the following: students are invited by way of the teacher sending them a registration link. It is even possible to have more than one teacher. A registration for the course through the registration link will make it possible for anyone to become a student. Then the student will go through the pages that are part of the course. In order to pass the course, the requirement is that the student executes the tasks as coding duels. Any time the student wants to leave the course, they simply unregister.

D. Creating and publishing coding duels

There are five steps necessary to create and publish coding duels. The first step is to sign in, so as for Pex4Fun to maintain coding duels for you. The second step is to write a specification setting out from a puzzle template where the specification is written as a Puzzle method that transforms inputs into output. The third step is creating the coding duel by clicking the button "Turn This Puzzle into a Coding Duel" (which appears after clicking "Ask Pex!"). The fourth step is editing the visible program text by clicking the coding duel Permalink URL, which leads to the coding duel. You fill in a somewhat more useful outline of the implementation (as well as adding optional comments) which somebody else will at some point complete.

The fifth step is to publish once you have finished the editing process of the visible Puzzle method text, then you click "Publish".

E. Learning advanced topics behind Pex4Fun

The origin of Pex4Fun is the Research in Software Engineering (RiSE) group at Microsoft Research. It is a testing technique showing great potential, using advances in software verification and automated theorem proving, using dynamic symbolic execution [8, 9]. The user runs the program multiple times using different concrete inputs, and the chosen execution paths are checked at the instruction level, with a symbolic representation created for the conditions controlled by the branching statements. A constraint solver [10] computes new specific test inputs that choose other execution paths. This is an efficient technique if the goal is finding software defects, whose diverting execution paths are triggered by either implicit runtime checks or explicit sanity checks in the code. The following technique is leveraged in coding duels (as well as puzzles) in Pex4Fun [11]: taking a function *f(x)* from the student and a function *g(x)* from the teacher (the secret program), this technique will search the following meta program *h: h(x):= Assert(f(x) == g(x))*. It analyzes this program using the technique of dynamic symbolic execution, so a test suit is generated by Pex4Fun that is customized for both programs. Each time a new program is submitted by the student, a new test suite is generated by Pex4Fun, revealing any behavior mismatches to the secret program, conversely, no mismatches are found, this indicates that the student has won the coding duel.

IV. CONCLUSION

Microsoft Research produced Pex4Fun [13] as a web-based serious gaming environment for teaching computer science. Pex4Fun may be implemented as a tool for teaching and learning computer programming at multiple levels, starting from secondary school up to graduate courses. With Pex4Fun, a student can edit code in any browser – using Intellisense – and Pex4Fun runs and analyze it in the cloud. Pex4Fun is a means to link teachers, curriculum authors, and students in an exclusive social experience, with the ability to track and stream the progress updates in real time. Specifically, Pex4Fun detects captivating and unexpected input values that help students comprehend what their code is actually doing. The real enjoyment starts with coding duels where students write code to apply the teacher's specification. Pex4Fun discovers any discrepancies in behavior between the student's code and the specification.

Teacher participants are encouraged and supported to form their courses under the Pex4Fun web site. In particular, as the teacher customizes the teaching modules from the web site, they can form complete courses, as a combination of explanatory text, example code, and coding duels as exercises. Students can register for these courses, thus the teacher is informed about student progress, including through table that presents the exercises that the student has completed – which actually means that the course assignments are automatically graded.

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E-LEARNING AT UNIVERSITY OF MONTENEGRO

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Abstract – Traditional study nowadays has mostly transformed to electronic studies. All in the purpose of faster learning and faster communication. Development of modern society is developing the need for changes in educational models, as well. The primary goal now in education is to improve the quality of teaching through the use of new technologies. As more people is using them now, the traditional learning is becoming more slower. The University of Montenegro is implementing the electronic learning as additional mode of teaching/learning. The use of computer is no longer the exception, but the rule that every student has to follow. The focus of e-learning implementation into educational process is always giving educators the best tools to promote learning and to improve methods of knowledge transfer. The main aim of digital learning in Montenegro is that every student is on higher level of education, that has almost the same chances and opportunities in education as all others. The University is trying to implement the newest technologies every day, and though to keep up a step with other Universities.

I. INTRODUCTION

This paper examines the e-learning strategies adopted by universities, from the perspective of three common objectives: widening access to educational opportunity; enhancing the quality of learning; and reducing the cost of higher education. The implicit compatibility with institutional aims suggests that the e-learning strategies universities adopt reflect, rather than influence, institutional ethos and that by virtue of the capacity to adapt to different contexts, e-learning may be more adaptable – and ultimately less threatening – to academic mores than some observers fear [7-10].

E-learning (or online education as it is still commonly termed) has been variously defined, but can be simply described as a learning process in which learners can communicate with their instructors and their peers, and access learning materials, over the Internet or other computer network. It therefore provides a means through which the powerful and pervasive computing and communications technologies can be applied to tertiary education – and to some of the key challenges now facing universities.

As a consequence, many of the diverse strategies now in place in traditional universities can be traced to early, often modest, pilot projects and initiatives by individual teachers. While many of these early applications involved little more than making lecture notes, or other instructional materials, available online, some teachers went further, using online technology to communicate with their students, provide access to external resources and – where interest and opportunity coalesced – to develop and teach Web-based courses.

II. UNIVERSITY OF MONTENEGRO AND FACULTY OF MARITIME STUDIES IN BRIEF

The University of Montenegro was founded in 1974 when three faculties (Faculty of Economics, Faculty of Engineering, and Faculty of Law), two colleges (Teaching College, and Maritime Studies College), and three independent scientific institutes (for History, for Agriculture, and for Biological and Medical Research), signed an Agreement on Association into the University in Titograd.

A year after it was founded, it changed its name into the University ”Veljko Vlahović”, and since 1992 it has its present name. The seat of the University of Montenegro is in Podgorica, the capital of Montenegro (www.ucg.ac.me).

The Faculty of Maritime Studies of Kotor (which is a unit of the University of Montenegro) has long lasting tradition being founded even in the medieval times, when captain Marko Martinović’s has his own nautical school for Russian feudal lords (17^{th} century), in Perast, a little seaside town near Kotor. Later on, the nautical school continues to exist in Kotor, and it still works as Faculty of Maritime Studies, educating students and seamen for variety of both ship and port vacations. Also, graduated students can find employment in the agencies and firms which are focused on different maritime affairs. Some of graduated students can find jobs abroad on foreign ships, in foreign shipping companies

and ports, as well. Although the tradition of nautical and maritime sciences in general is long lasting and rather rich one in Kotor, and along the whole Montenegrin littoral zone, we have to be aware of the requirements of the current moment, i.e. of the actual world living and working flows. Accordingly, we came up to the idea of introducing e-learning environment for the needs of our students, seamen, and all other persons being interested in this mode of education and knowledge transfer.

It is to be mentioned in this context that in 2006 we adapted the curricula to the Bologna system that recommends, among other things, presence of the students at almost all classes during the semester. So, if the students are not present, or if they are usually absent from their classes, there is a real option that they will not pass the examinations!

This is particularly case with the students who have to sail, i.e. to work as seamen to earn their salaries, during the semester [1]. Within the past few years we have numerous requirements from their side to organize for them condensed courses several times a year, or to develop and offer them distant learning educational and training modules. Recently, we have decided to meet their needs and to develop and implement an appropriate distant learning module.

III. MAIN GOAL OF THE PROJECT: "DEVELOPING AN E-LEARNING MODULE AT FACULTY OF MARITIME STUDIES"

The University of Montenegro and the University of Graz collaborate, since 2011, within a bilateral OeAD-project: "Developing an E-learning Module at the Faculty of Maritime Studies". The main goal of the project is the development and implementation of Moodle courses to support students, who are studying, and working onboard ships, as seamen.

Since the beginning of the project, colleagues Dr. Michael Kopp and Mrs. Elke Lackner (Uni. Graz) visited the Faculty and gave some very interesting and edifying suggestions for improving our pioneer work in this field. Also, this distant learning module has been accredited by the Council for Higher Education in Montenegro, and the program started officially in September, 2012.It is implemented by Moodle MLS platform, and currently it is partly available at www.moodle.ac.me portal.

The materials for some of the planned courses are still uploaded at the platform and are available for the restrictive number of teachers and students who are testing and improving them on-line. Some additional Moodle tools like Hot Potatoes and Questionnaires are implemented into this distant mode of knowledge transfer. In the second phase of the project, the possibilities of enriching on-line resources by introducing audio and video records shall be considered, as well.

What caused developing e-learning instructional modules at the Faculty of Maritime Studies (FMS), University of Montenegro, besides the enthusiasm of few teachers and their desire to enrich traditional channels of knowledge transfer - are three projects briefly presented below [2].

Project 1: The first one is the Tempus project (2010-2013): "Enhancing the quality of distance learning at Western Balkan higher education institutions" (www.dlweb.kg.ac.rs, last access: January, 2013). The objectives of this project are: to improve the quality and relevance of distance education at Western Balkan higher education institutions and to enable easier inclusion of partner country institutions into European Higher Education Area. These implies the specific objectives, like: to improve, develop and implement accreditation standards, guidelines and procedures for quality assurance of distance education study programs according to EU practices at national level in Western Balkan (WB) beneficiary countries; to establish the framework for improving distance learning (DL) quality assurance and e-learning methodology on higher education (HE) institutional level in WB countries; to provide training for relevant members of HE educational and public authorities responsible for accreditation and evaluation of DL programs and trainers involved in DL from each partner country, etc. The project leader is University of Kragujevac (Serbia). Owing to this big project, University's of Montenegro Center of Information System "set up" Moodle (1.94) server, what creates the opportunity for FMS to use its capacities in preparing and realizing web based educational activities. Through this project a few teachers and assistants from FMS also had opportunities to attend short training courses being dedicated to e-learning, several times, and to participate in discussions with the experts from EU in this domain.

Project 2: The second is the small project of bilateral cooperation realized between FMS and

the Academy for New Media and Knowledge Transfer – ANMKT (University of Graz). This project entitled: "Developing an e-learning module at Faculty of Maritime Studies (Kotor, Montenegro) for the seamen educational needs" had as its main aim: conceiving a new web based educational program at FMS devoted primarily to the seamen (among the students) needs. However, this module should be used by all other potential users, besides seamen, who are interesting in such kind of acquiring knowledge. The University of Graz supported the project by bringing in perennial expert knowledge in novel e-based didactical methods and techniques. In return developed e-learning methods and tools were tested on the basis of a concrete case study. Within this project (2011-2013) experts from ANMKT transferred very useful practical skills on the use of Moodle Management Learning System (MLS) in the effective implementation of e-learning to the teachers and system engineers of FMS throughout several trainings.

Project 3: The third important project within this context is a follow-up of the previously mentioned project of bilateral cooperation between FMS and ANMKT. This project entitled: "Distant learning implementation at the Faculty of Maritime Studies, University of Montenegro, as the additional mode of education" aims effective implementing and developing of web based e-learning at the FMS as additional mode of knowledge transfer, devoted, again, primarily to the seamen needs. ANMKT was the partner in conceiving this e-based instructional module and through this project, it will support its effective implementation. In the mean time, this e-learning module has been accredited by the Montenegrin National Council for High Education, and the study program started officially in September, 2012. This e-learning module is still implemented by Moodle platform, and currently it is available at web portal:

fzp.moodle.ac.me/login/index.php.

The materials for some of the planned courses are uploaded at the platform, and they are currently available to the certain number of teachers and students who can test it on-line and suggest the improvements. In this second phase of the project, possibilities of enriching on-line resources by introducing audio/video/screencapturing records shall be considered, as well. The possibilities of extending this e-learning aid toward the mobile-learning one, by the Windows 7 Phone and some other similar applications, for mobile devices like i-Phones e.g., shall be considered as well. This project is approved and it will be realized in the forthcoming two years period (2013-2014).

These three projects are in fact perpetrators of implementing and developing web based e-learning systems at the FMS as maritime higher education and training (MHET) institution.

IV. ADVNTAGES AND DISADVANTAGES OF THE PROJECT

From the beginning of the WELS project implementation at FMS, several surveys among the students (e-learners) have been conducted in order to examine in a way how their perceptions of the advantages and disadvantages of WELS correspond with the creators' of this course ideas [2-6]. In total, 110 students at the postgraduate level have been involved into the survey. Specifically, the interviewed students were supposed to identify the WELS advantages and disadvantages, according to their visions, among the offered options (Table 1). What is indicative, more than 50% of the respondents agreed that the suggested advantages of WELS: A1, A2, and A3, are *indeed* benefits of WELS, as it was predicted by the creators of this system. On the other side, among the disadvantages of WELS, more than 50% of respondents identified only predefined disadvantage D2 as *real* disadvantage.

TABLE 1. THE WELS ADVANTAGES AND DISADVANTAGES TAKEN INTO CONSIDERATION [2]

Advantages	
A1:	The possibility of learning from home and working place (during the breaks)
A2:	Reducing the traveling costs and time saving
A3:	Easier access to the instructional materials
A4:	Possibility of self-knowledge evaluation through on-line tests
A5:	Ability to communicate via the net with teachers and other candidates
A6:	More effective learning
Disadvantages	
D1:	Lack of *direct* contact with teachers
D2:	Inability to put a question, and get the answer immediately, when there is some ambiguity in knowledge transfer
D3:	A nonstandard form of learning that requires a strong will, self-discipline, and high level of concentration
D4:	Some exams are taken on-line, which is sometimes stressful, due to limited time, and present fear if the technique will/will not function properly

How these test results of the surveys can be interpreted? - Most of the surveyed students are

still not convinced that the possibilities of self-controlling learning process, learning community activities, and more effective learning are the advantages of the WELS. What does it mean? – It means that they should be convents into these WELS benefits, i.e. more intensive communication to the teachers and discussions with other learners should be enabled, as well as more interesting and inciting self evaluation tests and educational games, etc. Consequently, the learning effects should be obviously higher. If we now consider the supposed disadvantages of WELS, the e-learners do not see as big problems: on/line testing, need for a strong self motivation, and lack of direct contact to the teacher otherwise offered through the traditional classroom teaching/learning. But, what e-learners really need is undoubtedly more frequent consultations with the teachers, due to *one-to-one* principle. This conclusion directly corresponds to the recognized disadvantage D2. On the other hand, by achieving this, the WELS will give better results due to uprising learning effectiveness. Since this is only a preliminary study, it is be extended throughout the future research activities planed by the authors, with the aim of scanning e-learners satisfaction, and concerning the directions toward increasing the overall effects of WELS based learning process.

V. E-LEARNING- COMPARING TWO YEARS OF TOTAL ACTIVITIES AT FACULTY OF MARITIME STUDIES

From the beginning of develop of Moodle system on Faculty of Maritime Studies there has been a lot of interests for this.

Every student likes the idea of being in touch with relevant and updated information in any moment. It is obvious that modern technology has effected also teaching. For different reasons students are not able to be at the lessons, but through various tools of modern technique (computer, iPod, mobile, smart phone) they can be a part of it. It was the main purpose of developing such a system. That everyone can participate in hearing new theses.

Such system is became very popular through students and teachers, but also through civilization that is learning forward.

In Figure 1. the readers can see how the implementation of the e-learning is growing from month to month. These are the data from Faculty of Maritime Studies and it shows the difference between nine months of usage of the e-learning system. As you can notice, the modern system of teaching is more and more effective.

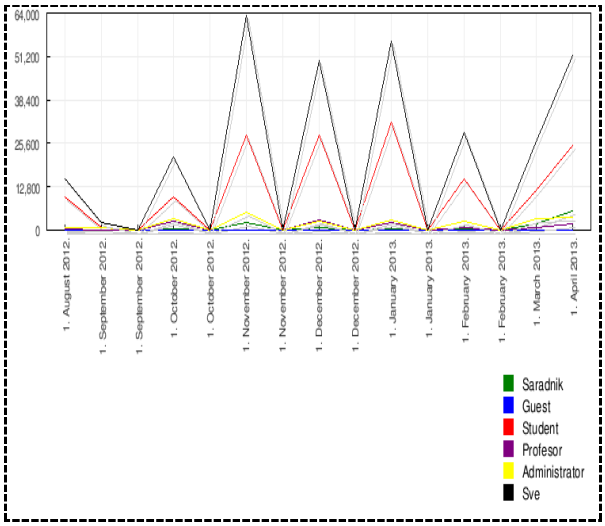

Figure 1. Total activity of students and professors at FMS during the previous nine months (August, 2012 – April, 2013)

VI. CONCLUSION

This paper describes in brief Moodle implementation into the educational and training processes at the University of Montenegro - Faculty of Maritime Studies of Kotor, due to the requirements of both regular students and seamen who need knowledge and skills refreshments through the adequate training. Basic Moodle features are explained in brief, as well as some additional tools like hot potatoes and questionnaires. What makes the paper original is the statistical analysis of the students/seamen responds to the questionnaire being conceived and presented to them through Moodle itself. The results consider the consistency of the responders in their answers, and enable thus making some general conclusions, like: there will be in the front line the great demand for such learning program, mostly among seamen; including more people in the process of getting high education shall be undoubtedly achieved; reducing the costs of commuting shall be gained, as well.

Finally, people (in such case seamen) shall be in position to work and earn money, and to study during the off-hours simultaneously. Besides, professors shall be forced to prepare additional materials and to refresh previously made ones, being aware that their handouts and lectures will be available on-line. By making this kind of acquiring knowledge available, the social and pedagogical principle will not be lost, since the students (seamen) may still hang out and exchange

their thoughts. On the other hand, they will have direct contact with educators through classical education, which will be organized at the Faculty partly during the hours of consultations, and in that way all quality factors of educational and moral teaching will be fulfilled. Additionally, this pioneer project at the Faculty of Maritime Studies of Kotor should become the sound base for developing greater, joint projects of the similar type, in the Adriatic region, and wider.

Acknowledgement: The paper is based on the projects being previously mentioned in the paper, and led by Ass't Prof. Sanja Bauk. It also contains the segments of her invited speech: "E-learning with Moodle in Montenegro" given at the University of Grac (June, 2012), and being post-produced by the UNI-Graz Academy for New Media and Knowledge Transfer (Available at URL: http://gams.uni-graz.at / fedora / get / podcast: pug – akademie / bdef: Podcast / get; Last accessed in April, 2013).

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POSSIBILITIES OF IMPLEMENTING WEB 2.0 TOOLS IN EDUCATION

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Abstract - Modern pedagogical efforts, the information society and changed mental structure of new generations require the implementation of web 2.0 tools in education. Web 2.0 services and sites allow users to interact and collaborate with each other. To implement web 2.0 services in education, it is necessary to have Internet connection and technical and methodical knowledge. Web 2.0 tools, such as online documents, social networks, wikis, blogs, social bookmarking and online presentations are interesting possibilities with interactive and multimedia support, which motivate students and fit their mentality and everyday lives.

I. INTRODUCTION

Web 1.0 was characteristic to the Internet until the middle of the first decade in the new millennium, mostly meaning passive content servicing and one-way communication. The following Web 2.0 environment – beside "content consumption" – also meant creating and sharing of contents, emergence of online applications, as well as of interactive and collaborative activities.

In the following work, we want to present – without completeness – the Web 2.0 tools that can be successfully used in education and for scientific research purposes.

II. FACEBOOK

Facebook, the most popular social networking site, which reached the number of over a billion registered users by the end of last year, is more and more frequently used for educational purposes as well (most often over creating student groups). We can experience the blurring of professional and private lives of both teachers and students, which is the result of continuous activities performed within a single system (Facebook). Though Facebook was not created for educational purposes, but the number of those, who use it in education, is growing with the utilisation of its advantages (students are registered in the system, known environment, customisable groups, easy sharing, interactive communication, possibility of implementing self-developed applications in the system). In case of students, this means the extension of their learning time and space, since there is no possibility (or only circumstantially) of registration for only learning purposes while the other registrations for different Facebook activities to be done separately, therefore notifications on new events and group activities are being clicked almost automatically. On the other hand, in case of teachers, the definition of working hours is being changed with accelerated communication and with registration to a single system. Namely, non-linear browsing determined by individual interests often results in contents relating to work (and profession). Beside that, the growing generation Z's attitude to deadlines also intensifies this "urge" of communication (if the deadline is at midnight, the papers will arrive after 11:30 p.m., however they want to get feedback from their teacher instantly). Beside their positive features, these learning groups may often experience some inadequate comments, sharing of inappropriate contents and inactivity of some members.

III. CLOUD-BASED DOCUMENT EDITING

With the spreading of online contents and the expansion of the Internet, there has evolved a growing need for online, cloud-based document editing. Just as it was experienced with the expansion of webmail, the most important aspect is continuous accessibility. Moreover, collaborative (common) document editing is more effective than it has been in the traditional, offline (Microsoft Office) environment. A further advantage is the possibility of determining the constraints of sharing (which users have access to read, to edit etc.), as well as the automatic saving provided by the surface. The most popular such environments are Google Drive (www.drive.google.com) and Microsoft SkyDrive (www.skydrive.live.com). In order to enter these surfaces, it is necessary to have an electronic mailbox of the given firm, which also involves this

service. Within these environments, it is also possible to edit documents similarly to doing it in Microsoft Office (in a simplified form): word processing, spreadsheets, presentations, and preparation of questionnaires in addition.

These tools should be presented in parallel with the Microsoft Office environment, to call attention to their advantages and deficiencies. For the experience of collaborative document editing and the possibility of exact definition of the constraints of sharing, cloud-based systems must be involved in educational processes anyway. Furthermore, teacher candidates often have to perform some surveys with questionnaires. This task is much easier to perform using the Google Form application, which enables filling out questionnaires online and processing the data.

IV. MOODLE

MOOLDE (Modular Object-Oriented Dynamic Learning Environment) is a free source e-learning system shell (LMS - Learning Management System), written in PHP.

It is an important tool for e-learning and blended learning, which provides a framework for preparing courses and for learning over it. There are the following levels of permissions in the system: system administrator (highest level of permissions), course creator (permission to create courses), teacher (may teach in the assigned course – create contents and score), student (learns and performs tasks within the chosen course). Users may define the permissions of other users below their level (the course creator assigns teachers to the course; the teacher registers students to the course).

Various content is provided over this system shell (texts, pictures, optional files, links, multimedia etc.), but the tasks related to them that can be scored are also important (assigning tasks in the form of online text, file, varied types of tests, offline tasks etc.).

This system unifies and presents in a single surface all the services that are otherwise applied by teachers on parallel surfaces, often offline (sharing documents and information, sending messages, evaluation etc.).

It is important that teacher candidates get acquainted with and have experience in learning with these systems, as well as to possibly prepare their own courses within a seminar work, which enables them to meet the other side of the "virtual teacher's desk" as well.

V. PREZI

Just as many other activities, the creation of presentations is also moving towards online, cloud-based services. Prezi (www.prezi.com) is an application developed in Hungary that has opened new horizons to creating presentations. The biggest advantage of this application is its cloud-based operation, which means that the presentations can be edited at any time and they can also be shared online with sharing a link. In case of an entirely online application, it is much easier to show images or video files (YouTube) from the Web, in comparison to offline presentations.

The ready presentation can be downloaded in a form of a compatible structure, so that it can be presented even in an environment with no or unsecure internet connection.

With the help of Prezi, our students can get acquainted with one more surface for creating presentations, beside PowerPoint. They can try its functioning, they can compare it with the already known software, they can utilise those online features that are not available in offline programmes for creating presentations.

VI. SOCIAL BOOKMARKS

The biggest advantage of social bookmarks, among which Delicious (www.delicious.com) is the best-known, is their cloud-based and browser-independent appearance. It supports retrieving links, while tagging links enables more effective retrieving and grouping. Beside individual work, the forms of collaborative work are also very important in this surface.

With the help of social bookmarking, students can share and save the sources that they have used for their researches or seminar works, so that a whole group or the entire generation may be involved in editing this "database".

VII. ONLINE MIND MAPPING

Online mind maps provide a surface that can be edited jointly, and they map a concept and the connecting concepts. These applications are well-suited for processing new topics, classification, revision, but also for planning new topics/activities, as well as in research.

One of the most famous such surfaces in MindMeister (www.mindmeister.com).

VIII. URL SHORTENING

It is often a problem when printing out Internet links that the address is too long. For example, we get the following URL after a simple search with Google (for the "oktatásinformatika" keyword):

https://www.google.hu/#q=oktat%C3%A1sinformatika&safe=off&ei=58KIUZDEEMmO4ATp8YA4&start=0&sa=N&bav=on.2,or.r_qf.&fp=397bd23770057352&biw=1920&bih=989

It is extremely hard and time-consuming to retype such links. Another actual problem is the limitation of the number of characters with some communication channels (140 characters with Twitter).

Applications that shorten Web addresses provide solution for such problems, among which bitly (www.bitly.com) is one of the most popular. With this application, the URL shown above will be shortened to: http://bit.ly/15mpoFy.

After registering to bitly, we will have the option to use this application as a collection of links, a bookmark and to share our links.

IX. MAKING WEBSITES AND BLOGGING

User-friendly Web 2.0 applications enable users with average knowledge to prepare websites on their own.

WordPress is one of the most popular and best-known surface of this kind, which is also available in Hungarian and it can be uploaded to any location (to download: http://hu.wordpress.org/releases/#latest). Beside the downloadable version, we can also use the online surface after registering to the site www.wordpress.com.

WordPress was originally created as an environment for preparing blogs (series of entries and the responses to them, lined up in chronological order), but nowadays the contents developed here (thanks to numerous add-ons and flexible content management) meet the requirements of modern websites.

Another popular surface for blogging is run by Google, called Blogger (http://www.blogger.com). The blogs created over this system are published on the Internet with the blogspot.com ending.

Websites and blogs enrich contents on the Internet, especially if they are created with a specific content. Following professional websites and blogs may be an important element of self-education, or even of the process of formal education. Preparing websites or writing blogs could be an interesting task and exciting challenge to students. A class or a group may edit an entire website or some parts of an institutional site, as well as they may publish their research results over such surfaces.

X. WIKIPEDIA

Wikipedia is a multilingual (in Hungarian: www. hu. wikipedia. org), world wide encyclopaedia.

Although it is often criticized, mainly because of the inaccuracy of some articles, this surface is one of the most frequently used online information resources (which fact is also proven by Google search results' order where most keywords get the Wikipedia article in the first place). In addition, the sources contain only a small percentage of inaccurate information, and a precondition of all activities in the information society is to verify the authenticity of information found in online space.

It is also not much welcome among some teachers because (beside its inaccuracy) students often copy texts for accomplishing their tasks. However, this problem could be resolved with giving out more specific tasks (for example: instead of "utilisation of computers in schools", it should say "utilisation of computers in your school"), individually customised tasks or the task of editing the articles (creating information instead of retrieving it).

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DEVELOPMENT OF SYSTEM FOR AUTOMATED RANKING

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Abstract - A solution of an automated system for ranking is presented in this paper. When candidates are registering to study at Subotica Tech, a ranking problem occurs in certain study programs. To solve this, a new web service was developed. The main part of the service is an algorithm that decides and controls the entire logic of the service. During the decision-making process, the algorithm takes into account a number of parameters. The paper describes in detail the implementation of the algorithm and created web service.

I. INTRODUCTION

When candidates are registering to study at Subotica Tech, a ranking problem occurs in certain study programs. When applying, the candidates can choose a study program and for each of them the program assigns a priority. In order to speed up and automate the whole process automate web-based information service was implemented. This service is a part of a complex system of E-administration Office (Elektronska referada). The service is implemented using several internet techniques and methods. The main part of the service is an algorithm that decides and controls the entire logic of the service. During the decision-making process, the algorithm takes into account a number of parameters (priority date, wish list, type of funding, the number of vacancies, the number of (seats) places filled).

II. USED TECHNIQUES

This web service is developed with the use of several web techniques: PHP as server side programming language, MySQL as relational database management system, Javascript with Query library as client side programming language, XHTML for designing the layout of the pages, CSS for styling pages, and Ajax to get more user oriented functions. The Service uses Zend Framework. Passing through the stages of development and testing, the team worked also on the optimization of the code. Useful information are obtained from the users of this service. Based on those, further optimization was done on critical parts.

III. FRAMEWORK

Using frameworks in the world of software development has long been known. However, in the world of web development it is new. A software framework is a set of libraries, and an execution environment that allows programmers to develop web applications faster and more organized. The main idea of the framework is observed after the use of frequently used functions and basic structures upon which programmers can develop their applications. The greatest advantage of using frameworks is that all developers in a team working on a project should follow the same rules and conventions when developing web applications [1]. This current system uses Zend Framework.

A. Zend Framework

Zend Framework is an open source framework for the development of web applications and it is based on the PHP programming language. It contains a group of tools for design and implementation. Zend Framework also provides a complete implementation of the Model-View-Controller (MVC) pattern. Using modules with MVC is referred as HMVC (Hierarchical Model View Controller) pattern. MVC is a widely recognized design pattern that separates our database and business logic from the presentation layer [1].

IV. DESCRIPTION OF SYSTEM

A. History

The first version of the E-administration Office that is in use at Subotica Tech was developed in 2000. The Service was developed with ASP programming language, VBScript and MS SQL server. This version allowed students to apply for exams, reviews and evaluation of students' marks

and other liabilities. The system was experimentally used only by the students of the Informatics study programs. The Web service was in offline synchronization with the desktop version of E-Administration. The use of this version has contributed to the development team so that the design of the new version became much easier and was carried out without initial problems.

B. Existing solution

The existing solution, which is now in use, contains an overall solution for E-administration Office. It controls all data about students, teachers, stuff, curriculums, exams, etc. The solution contains all necessary data to be able to serve each party from the moment when a potential student registers to study at Subotica Tech, to the moment when a diploma and a diploma supplement is generated for the student who finished their studies.

Additionally, the communication between students and teachers, teachers and staff is also incorporated into the system.

V. RANKING PROCEDURE AND ALGORITHM

At Subotica Tech, students can apply for 5 different study programs (Mechanical Engineering, Electrical Engineering, Information Technologies, Mechatronics, and Technical Management), and within these programs for eight different modules (Product Development, Thermotechnics, Electronics, Automation, Technical Informatics, Internet and E-business, Mechatronics, and Technical Management). When applying, students can select up to three different modules, sorted into three levels of priority (1st, 2nd, and 3rd).

The main rule that is taken into consideration while performing the ranking of the students is defined by the following sub-rules:

- If the student is ranked within budget for the 1st priority module, they are removed from the rankings for 2nd and 3rd priority modules regardless of their rankings;
- If the student is not ranked within budget for the 1st priority module, but is ranked within budget for 2nd priority module, they are removed from ranking for 3rd priority module regardless of their ranking;
- If the student is not ranked within budget for the 1st and 2nd priority modules, they are not removed from any ranking.

To be able to perform the ranking, the following input data is needed:

- Available study programs – modules;
- Application term;
- Study year;
- Capacity for study programs –modules (Budget and self-financing);
- Required points (Budget and self-financing);
- Student's name;
- 1st priority study program – module for each student;
- 2nd priority study program – module for each student;
- 3rd priority study program – module for each student;
- Points for each student;
- Status for each student.

The ranking procedure is initiated manually to obtain the current rankings (Fig. 1). When initiated, ranking is performed for each study program – module, according to the points of the students who applied for it and whose status is unregistered, taking into consideration the remaining available capacities. After this ranking, a sub-procedure is initiated. For each study program – module, all students who applied for it with the 1st priority and are ranked within budget are one by one removed from all study programs – modules where they priority is higher than the checked priority. After that, the sub-procedure is repeated for the 2nd priority. The developed procedure takes into consideration whether at least one removal from any study program - module occurred during the sub-procedure. If at least one removal occurred, the sub-procedure is initiated over again. The ranking procedure ends if the sub-procedure is ended without any removal from the study programs – modules. At the end, the ranked students for all study programs – modules within budget, self-financing and outside available capacities are presented.

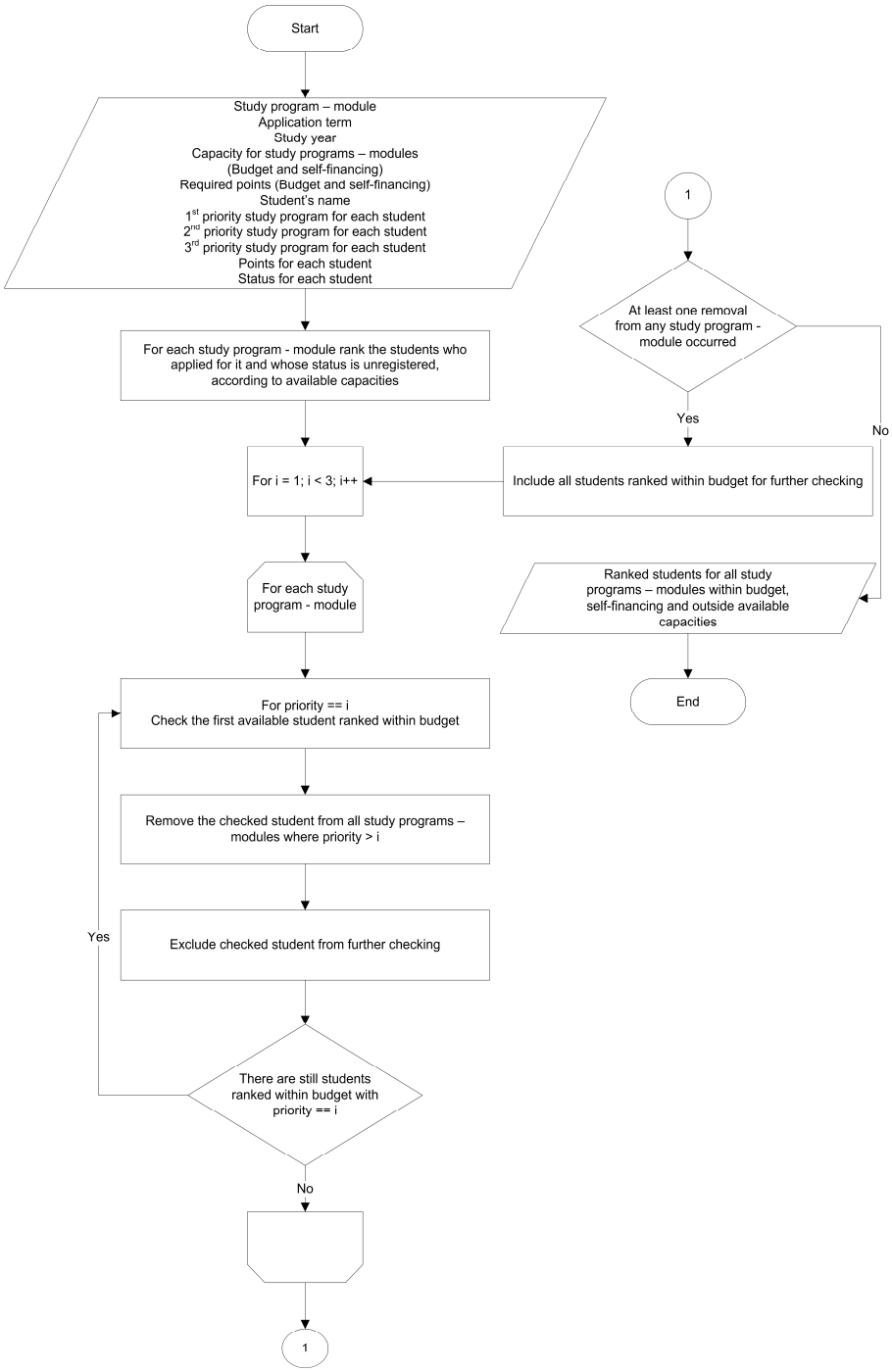

Figure 1. Ranking procedure

VI. IMPLEMENTATION

This section shows some screenshots of the implementation. First the students have to be added. In order to speed up the process, only the most basic information about them are asked. That is shown on the image below (Figure 2).

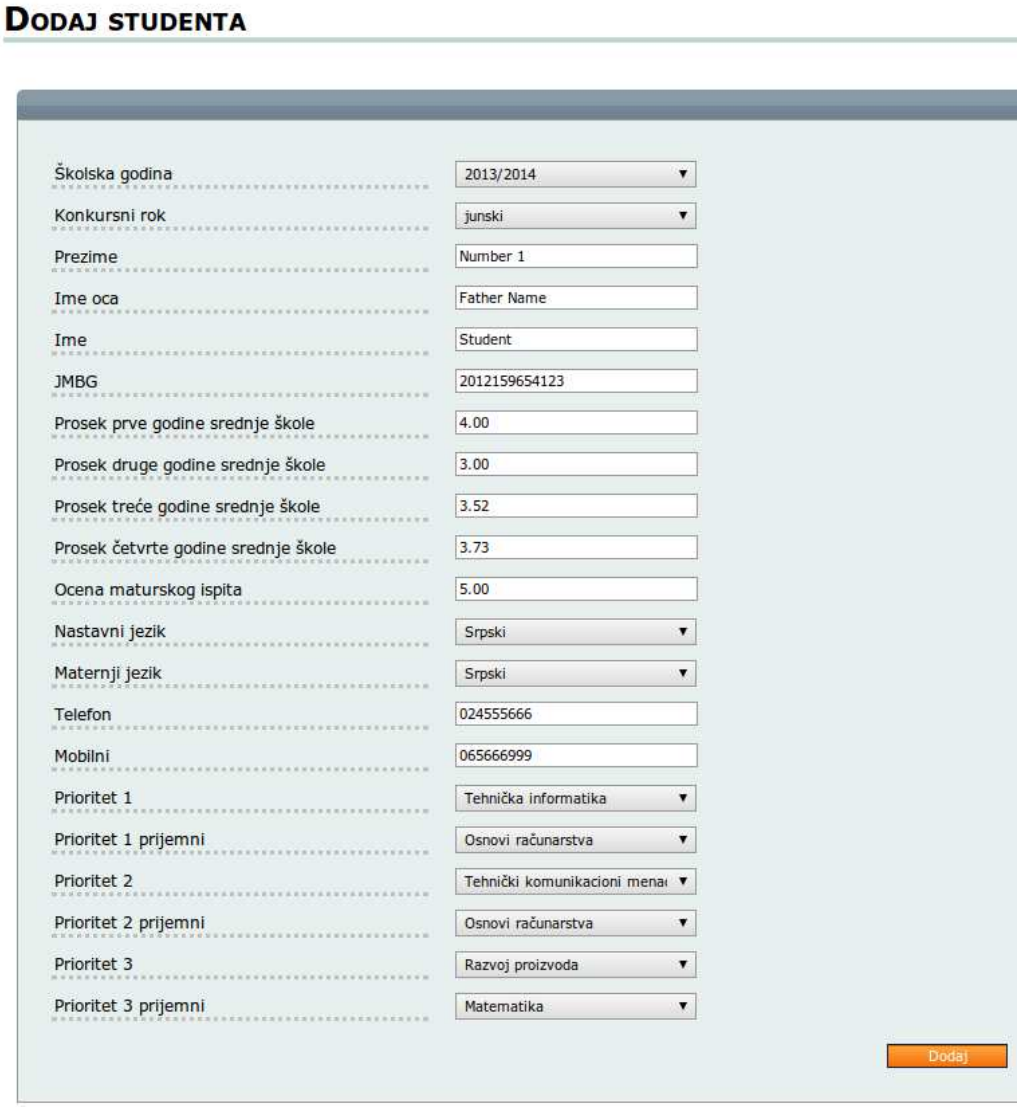

Figure 2. Basic information about the student

In the current case study 5 fictional students are added. When the students are in this database, the lecturer needs to insert the points that they achieved on the exam. The student list is shown below (Figure 3), and the interface for exam points inserting in Figure 4.

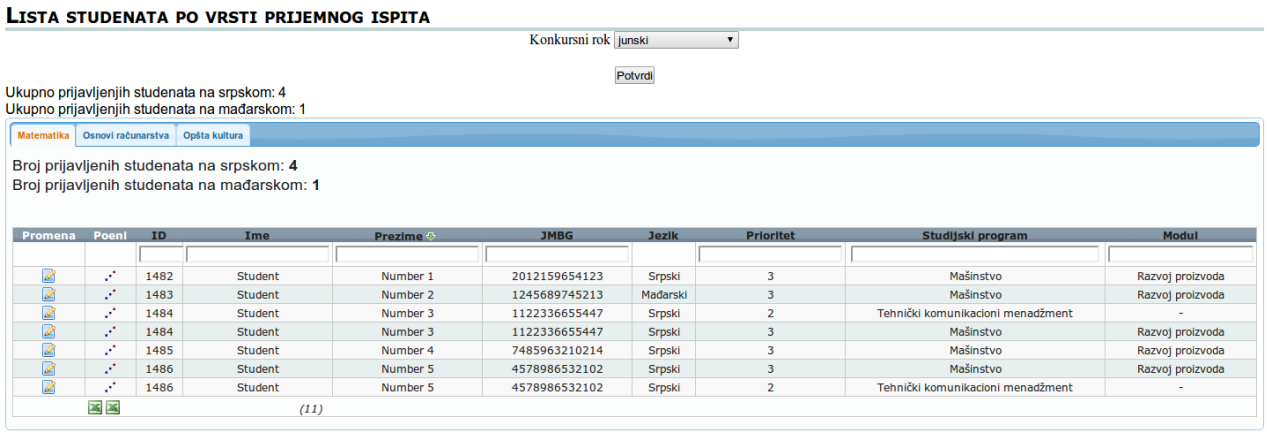

Figure 3. List of new students

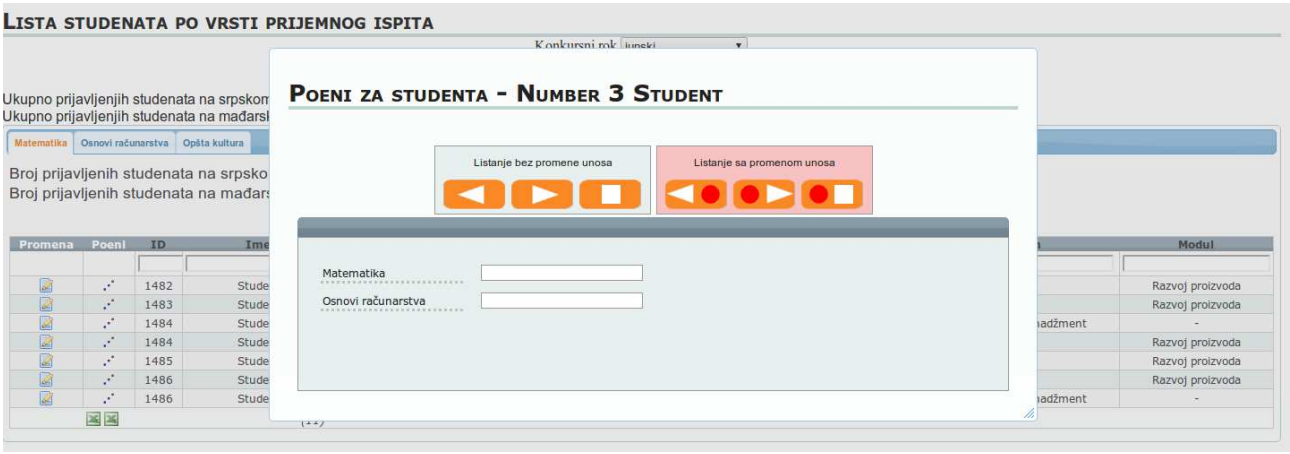

Figure 4. Inserting student exam points

When the points are inserted one can check out the ranking of students listed according to study programs (Figure 5, 6 and 7).

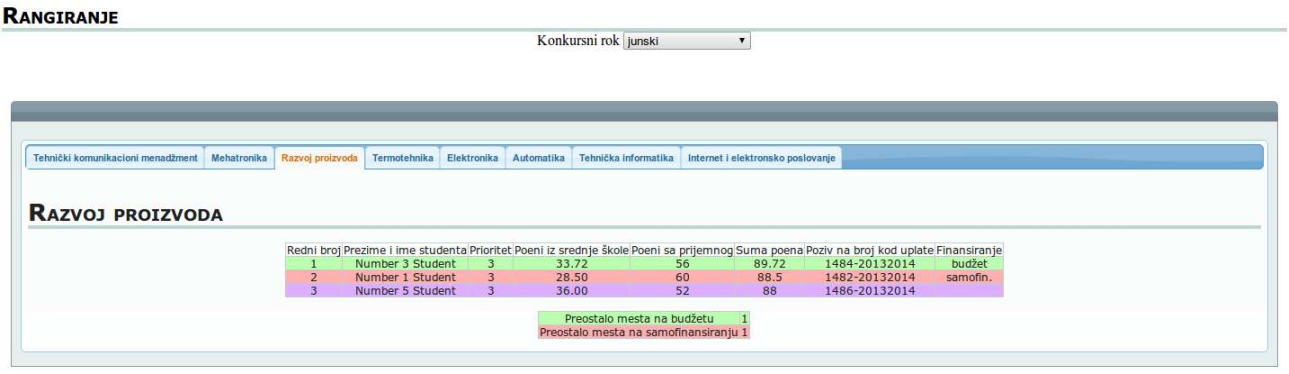

Figure 5. Students ranking by study program

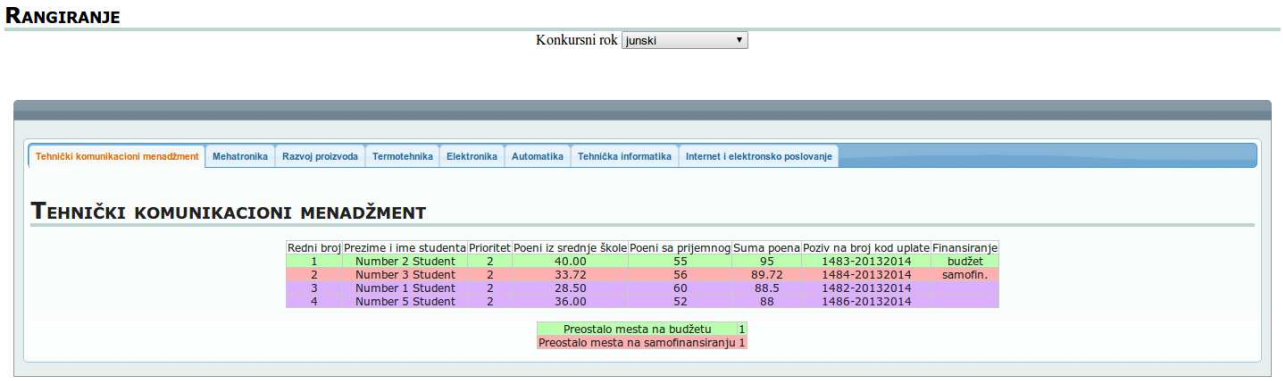

Figure 6. Students ranking by study program

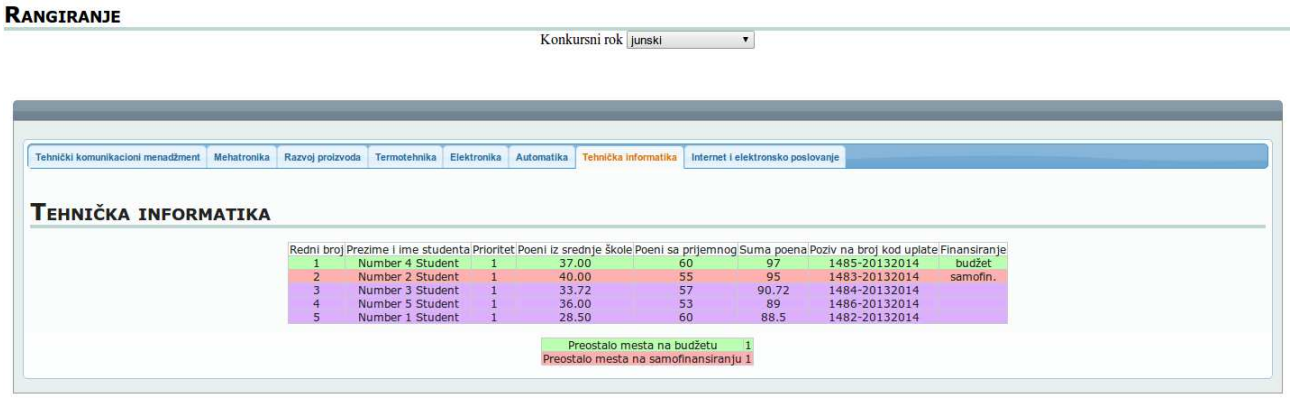

Figure 7. Students ranking by study program

From the images 4, 5 and 6 one can notice that Student number 4 got ranked on his first priority (Image 6). If one tries to find him on the other study program, we will notice that he does not appear there. That is because he achieved his first priority on a budget financed place.

With Student number 2 the situation is slightly different; he appears on 2 places, first in Image 6 where he is ranked to a self-financed place. Because that is not good enough, he is ranked again in Image 5, his second priority on budget financed place, because this happened he is not ranked anymore.

VII. CONCLUSION

This paper presents the ranking procedure algorithm that is developed for the use in the complex web based information system E-administration. The System is implemented at Subotica Tech – College of Applied Sciences. Some of the parts of this system are also described.

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PROTECTING CHILDREN ON THE INTERNET

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Abstract-This paper aims to demonstrate possible ways to protect children from the negative effects of using the internet. Also, in this paper demonstrate the possibilities of raising the level of knowledge and awareness, and how virtual reality affects children and to what extent it must not engaged in digital a world that is safe and without consequences.

I. INTRODUCTION

The Internet is a large and important source of information, some of which is very useful some are dangerous to children. Information on the opportunities and dangers that it brings and in talking to children certain rules of behavior and the precautions should be taken by adults and children in the family. Use common sense in planning and decisions, be in constant contact with children, listen to them and talk to them, this is the best advice for the protection of children on the Internet, as well as other problems with which children may encounter. [1]

Child protection involves the physical, mental and moral security in the performance of daily activities on the Internet (surfing, chatting, using social network games). [2]

Children in Serbia know about computers and the Internet more than their parents. In a way, it is normal because they were born with computers, while their parents may first contact computers at work or when they bought their child. How new technologies are necessary and desirable in the development of the child, there must be some limit to which children are allowed to go. That is what computers are often unknown to the older generation may be an opportunity for those who do not mean well for children. [3]

Therefore, it is necessary to learn about the dangers that lurk on the Internet. One of them strangers, friends and only child.

II. SECURITY ON THE SOCIAL NETWORK FACEBOOK

The most popular social network to virtually mangle, to find there those that you are not really friends with. Therefore, it is important to protect. One of the first things that every young person will do when you start using the Internet is to open a Facebook account, because "they're all at it." Indeed, the majority of the Internet users in Serbia joined the hundreds of millions of Facebook users in the world. Socializing on the social networking people like for several reasons. First of all Facebook allows you to stay in touch with loved ones who really cannot see each other often, to learn more about the activities of his acquaintances and friends, once more people know about something you think is more or less important. Also, there can be chatting to chat directly (chat), to play games and cooperate or compete with friends. Through interest groups can connect with like-minded people and discuss common issues, connect with people who go to same school, or like the same music group, or the same football team. Facebook users love to share their photos and videos, send links of interesting content on the Net, exchanging jokes and all other entertainment facilities. Also people who are working on a joint project use this network for communication and collaboration, bringing together so about the same things regardless of where they are physically located.

A. Friends and "friends"

Not in real life, are not we all just acquaintances, friends, and so on the social network. With that being on Facebook, for example, those that you cannot be friends with it is much easier for you to "approach." Young people can easily think that the number of friends that will connect with your Facebook profile should be the larger, the more Facebook "friends" means more popularity in society, and thus produces a kind of racing in who will have more friends. It is true however that the activities of hundreds or thousands of people simply cannot be monitored simultaneously, and among all the people will be those whose actions you do not match. Simply, the first advice is just not accept anyone as a friend on Facebook. Among the hundreds or thousands of people, even those who are "friends of friends", which may sound reliable, sure there will be those who do not have good intentions. Tip for parents: If your child has hundreds or even thousands of Facebook friends, it means that in this way he is in contact with strangers and, more importantly, these people have a channel of communication with your child.

B. Privacy Notice

First, your Facebook account password should have known no one but you and, in the case of children, their parents. All information about himself the Facebook user can detect others, even complete strangers, unless the detail is not set their privacy settings. There are three main categories of "friends," "friends of friends" and "everybody (else)." For any information you post to your profile (photo, email address, birth date, preferences and interests, education and employment ....) in particular it can be set which categories of Facebook users will be able to see this information. For example, your email address should certainly be visible only to "friends" (or even them, because you already know someone who should know), which school you go to does not have to see every Facebook user, as the Internet in general. For example, suffice your photos and information about school and to find someone completely unknown if it really wants for its own reasons.

The privacy settings can be defined and whether and how your data will be made available if a simple search on the Facebook and via general internet search engine such as Google. Useful option in privacy settings is one that allows you to view your profile as seen by everyone so check how much data you actually "paid".

C. Personalization

Nature of Internet communications is such that in most cases you can not be sure as to who really is the "other side." Misrepresentation on Facebook is very easy: some will put someone else's picture, enter a false name and date of birth, the male becomes a female and easily reversed, and the adult will easily be represented as a teenager. In our country we had, unfortunately, the case of an adult rapist who posed as a teenager to a peer who is thus able to come. Therefore, we give basic advice: do not easily add another individual for a friend, and even if you attract by what looks like a beautiful person of the opposite sex and the corresponding years. If nothing else, check the intentions of the person before you give more information about yourself (and you will give her more information and therefore it to a friend). For example, Facebook allows you to exchange a few messages with strangers and before you add them as a friend. Most importantly, if you suspect this to be a person falsely represents that you can sign up, and sign up for the appropriate team will react.

D. Harassment

People with evil intentions are available several ways to harass Internet users, including users of Facebook. Someone might send you unsolicited messages in the "mailbox" to be published in the "wall" of your profile, to write messages in Facebook groups in which you are a member. Some of this can be prevented by the very security settings, but Facebook certainly allows for any unwanted activity prevented by the concerned users will simply "block" and put it on so called blacklist. Of course, the one whom you have blocked can again disturb you by simply opening the new face profile for his actions, but in this case it is possible to apply the respective phenomenon. Reaction correspondence and discussions with such people are usually not advisable - they need to close channels of communication. In severe cases this will be addressed and the police, and they are already experienced some offenders in the country.

E. Indecent contents

Facebook can apply, and any other objectionable activities, including those that do not threaten people directly. For example, one can set as your photo something you can get in the way as above, so that may be sanctioned. This has prevented or indirectly imposing unwanted content and messages to other users.

Serbian police have recently announced that a team of people who monitor the activities of our citizens on Facebook, because there are several indications of offenses (criminal organization, libel, hate speech, and even death threats). Recently, prevented a suicide by a teenager is a plan on how hinted on Facebook. [4]

III. GOLDEN RULES

Communication, privacy and security.

The first step in protecting your personal information is forming (open) the safe profile. Please choose carefully the information you provide in it. Teach your child to use a neutral email address and name.

Password always keeps your account confidential. Teach children to accept messages only from people you know and off the Internet.

Try to protect children from negative experiences - show them how to protect their own privacy and respect the privacy of others.

Teach children not to respond to offensive messages.

Help children to understand what messages can cause unpleasant sensations.

Make sure the kids know how to block messages from a particular sender.

Save offensive messages, I can serve as important evidence.

The suppression of traditional bullying on the internet collaborates with teachers and other parents.

Be in touch with the people surrounding your child - you can listen to his friends, their parents, teachers and general environment.

Teach your child to notify you of any experience from the virtual / real world, which worries him. Reassure him that you can rely on when inadvertently done something wrong and you will look for a solution together!

Explain to your child that if someone bothers you, it is never his fault.

Teach your children the proper search techniques. Tell them not to believe everything you find on the Internet. Someone looks for information on at least three different sites and compare them with each other. When written homework, some cite the source of information.

Make sure that your children are visiting websites, which content does not violate the law. You explain that in reality not all the way on the Internet shows.

Explain to them what they are threatening risks when taking material from the Internet.

Make sure that your computer is well protected. Always have a working version of antivirus software.

Teach children that before taking on the hard disk file by checking the antivirus program.

Before you install anything on your computer, read the privacy policy and statement users. Check the reliability of the software on the Internet that you intend to download.

Close the suspect hopping window by clicking the cross in the upper right corner. Never click in the middle window.

Protect your PC. Install a firewall, anti-virus and anti-spyware software, which should be automatically activated as soon as the computer is turned on.

In his e-mail program you are using a spam filter. Keep your email address please do not post to the web. Avoid e-mails from unknown persons and must check before opening attachments antivirus program.

The extent using parental control tools, which allow the software.

If your computer starts to behave strangely, it may indicate a virus.

Immediately call your service provider or other specialist. Provider should also provide advice to parents.

If the Internet finds inappropriate websites, log on to this site.

Security policies related to both your children and you. Teach children to inform you always on the Internet noticed anything suspicious. [5]

IV. RESEARCH METHODOLOGY

The research that has been conducted every Republican Institute for Statistics say that more than 50 percent of households in Serbia have computers, and more than 40 percent have some kind of internet connection. More than 2.5 million inhabitants of Serbia have a Facebook account, which is at least quarter of a juvenile. Unfortunately, we do not have data for the country as children use the Internet, but we can take the analogy with research in the European Union. There, more than 90 percent of children use the Internet every day.

However, a devastating figure in the same study says that as many as one-third of underage Internet users experienced some kind of "Internet abuse." If we consider that we are not at such a level of technological development as a member state of the European Union, we can estimate roughly that about every fifth or sixth child in Serbia certainly once been a victim of abuse on the Internet! Under the abuse here does not mean the physical torture of the child, as it is difficult for individuals (although not impossible) because there is usually no physical contact provided the child does not agree to meet with his "internet friends". Torture is mainly focused on the mental level, in children at a young age can sometimes be even worse than in the case of physical torture because there are no physical marks on the basis of which it could be relatively easy to detect. [3]

V. INTERNET ETIQUETTE

Recommend them to follow etiquette and behave towards others as we would like others to treat us. Children are often not aware that the Internet can inadvertently hurt someone. Warn them about it. Keep track of how your kids spend time on the Internet. Ask them to show you how to communicate with their friends.

Teach them how to protect their safety on the Internet.

People who meet on the Internet are not always who they are representing. Teach children to protect their own privacy on the Internet in the same way as they do in life, I really. [5]

VI. CONCLUSION

The only sure way to protect children on the Internet complete ban on Internet communication, but something causes more harm than good.

Knowledge of and ability to use independent information technology today is placed in the same rank with the knowledge of reading and writing. In the future, navigate the Internet and use a computer to be the basis of any further development of the child. It is illusory to expect that someone will be able to "cleanse" it ofunwanted content. After all, it is difficult to distinguish what is spam.

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[3] http://www.zastitapodataka.com/zastita-dece-na-internetu-1-porazavajuce-statistike/
[4] Ministry of Telecommunications and Information Society "Archive"
[5] http://www.kliknibezbedno.rs

CROSSLINGUAL APPROACH IN SEMANTIC DISTANCE EDUCATION SYSTEMS

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Abstract - In this paper we present a distance learning framework with a semantic layer aimed at crossing the language barrier. Since the underlying concept graph of a lesson can be presented in a formal way, using Semantic Web technologies, it can be translated into any language by means of an appropriate cross-lingual ontology. This approach builds upon the existing semantic approach (DSi), developed at the Faculty of Electronic Enginnering Niš, thus allowing the existing framework to be used in a language independent way.

I. INTRODUCTION

Semantic Web vision, dating back in 1994 [1], has brought about a new dimension in the World Wide Web as we know it. Originally concieved as a tool for interchange of notes and documents at CERN, it has gone viral and was adopted in numerous spheres of computer application. However, due to its simplicity and intent, it was strictly human-readable and not processable by machines. The dimension of *meaning*, as brought by the Semantic Web concept, introduced a vast array of new applications and fueled the growth of a number of existing - probably the best example of the latter being the e-learning. Though it can be speculated upon its the definition, be it the learning scenario in which the learner is detached from the teacher and and some intermediate technology is being used [2], or the real-time delivery of individualized, dymanic learning material [3], e-learning, close to how it is defined today, has been developing ever since the Web was adopted, dispite its enterpreneurial ups and downs. [4] Semantic web has proved to be the dominant enabling technology for e-learning, for multimle reasons discussed in the next chapter. Along with the internationalization of Web, the need for internationalization of e-learning grows, posing another challenge - which again appears to be most efficiently overcome through Semantic Web technologies.

II. SEMANTIC E-LEARNING

The true quantum leap of e-learning, compared to the traditional one, is twofold: the distance (both in space and time) between teacher and learner, and the autonomous component of contemporary machines - their programmability and (limited, but present) power of decidion and inference. Thanks to the latter facility, e-learning can be performed as an on-demand activity, and customization of both learnin material and teaching style can be customed to the individual user. If we consider the foundations of Semantic Web - ontologies, ontology languages, semantic markup etc, the possibilities to use these technologies to achieve the exact e-learning objectives are apparent. To achieve personalization and on-demand content generation, repositories of small learning objects are needed, as well as rules for their aggregation into lections and courses. To achieve this, rich semantic markup of those is required - exactly what Semantic Web offers through languages such as RDF and OWL. These and others was of Semantic Web application in e-learning are thorowly documented in literature. [5]

III. CROSS-LINGUAL WEB SEMANTICS

With the internationalization of the Web, the issue of multilingual contents has posed new challenges to Semantic Web. Cross-lingual problem has been tackled from various angles. In e-commerce, ontologies can be used to perform mapping between languages for product comparison. [6] The 3-level ontology is used: the meta-conceptual and conceptual levels denote the concepts free of language, while the instance level there are lexical instances that connect lexical items (words of the language) with concepts. This implementations supports four languages, and can even parse regular expressions for multiple

synonims. On the other hand, attempts to create a general-purpose system for mapping ontologies from different languages also exist. [7] Approaches like this use machine learning techniques to translate labels from one language domain to another, and show some promising results after testing on the SWRC ontology. [8] A slight touch of Web 2.0 induced multilingual issues is brought by [9]. Internationalizion of Web causes lingual fragmentation in user-generated content - in specific case, data in user accounts. EuroWordNet ontology was used to map different language terms and concepts, as well as detect synonyms, in order to extract user profiles for effective targeted advertizing.

IV. CROSS-LINGUAL E-LEARNING FRAMEWORK

The central topic of this paper is the DSi e-learning framework [10] based on the RDF language for expressing the semantics of the learning material and with the aim of accelerating the learning process by making the text semantics ubiquitous over the span of a lesson and easily accessible at any point. More precisely, this paper discusses the possibility of expanding the framework in the direction of multi-lingual ability with least possible changes in its architecture.

A. The DSi concept

The DSi e-learning framework was first presented (as the concept) in 2007. [11] Its first implementation (proof of concept) was completely client-sided and implemented using custom JavaScript and a simple JS framework [12] to access and manipulate RDF. However, this architecture showed both functional and security issues. Therefore, the framework was re-implemented from scratch in the client-server fashion, following the model-view-controller design pattern. This way the semantic layer was secured on the server, since this part of the framework may contain copyrighted material. The redesigned version is labeled 1.5.

The user experience with DSi 1.5 is the following:

- the learner accesses the textual material
- text is coupled with appropriate semantic document (in RDF/XML format), invisible for the user (learner), which expresses relations between specific notions in the text
- the learner can drag certain words from the text onto certain other words
- whenever the learner drags and drops a word onto another, the semantic document is queried for any relations between the two words, and they are displayed.

A typical situation with the usage of DSi is shown in Fig. 1. The word "key" is dragged and dropped over the word "frequency". For clearer visibility, the cursor has been removed from the picture.

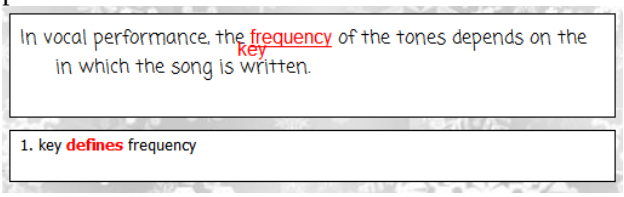

Figure 1. Adding a new relation and marking the previous ones.

The framework operates with single words and relations are purely lexical, expressed in natural language. A typical RDF triple from the semantic document, denoting that a processor is a part of a computer, is shown in Fig. 2. As the figure shows, it is a straightforward RDF. The semantic document itself is designed by the course authors and is available to learners as read-only (accessible through drag-and-drop actions in the lecture text). This approach has been chosen primarily for simplicity of the user interface and possibly easier acceptance among teachers and learners.

```
<rdf:Description rdf:about="key">
<defines>frequency</defines>
</rdf:Description>
```

Figure 2. An example of an RDF triple from semantic layer.

However, the chosen approach is language dependent - semantic document can only be developed in one language. Translating can only be done manually, and no support for multilingual learning is present (using multiple RDF files for multiple languages is not considered a true multilingual support).

B. Multilingual Support Architecture

As mentioned in the previous chapter, relations between notions (words) are given in a pure lexical form - as strings (upon adding to RDF all spaces are changed to underscores and vice versa). An example of such notation is given in Fig. 2. Instead of this, semantic document is split into two, hierarchically layered ontologies: a concept ontology and a lexical ontology (this is a temporary

label, since it may contains not only words, but also phrases).

```
xmlns:dsi="http://martin.rs/relation/
"

<rdf:Description rdf:about="key">
<dsi:000001>frequency</dsi:000001>
</rdf:Description>
```

Figure 3. Concept ontology with numerical id within an URI.

Concept ontology contains a unique label for each relation, expressed as URI. This URI may or may not contain words in a natural language; each URI may contain a unique identifier (e.g. a number) which denotes any relation, as shown in Fig. 3. The URI is formed by concatenation of the namespace prefix and the relation's id (000001).

However, since this URIs only need to identify relations in a unique way, no notation is better than any other. For merely practical reasons, URIs may contain words in natural language that provide description of the relation. For the URI descriptions, English is the most reasonable choice, for possible future interchanges of concept ontologies. This approach is shown in Fig 4.

```
xmlns:dsi="http://martin.rs/relation/
"

<rdf:Description rdf:about="key">
<dsi:defines>frequency</dsi:defines>
</rdf:Description>
```

Figure 4. Concept ontology with symbolic id within an URI.

The other ontology maps URIs with natural language formulations. When text is queried for a relation (by drag-and-drop), the conceptual ontology is queried first. Once the general (conceptual) relation is denoted, by its URI, the lexical ontology is queried for the specific natural language relations to be displayed to the user. The lexical ontology is shown in Fig. 5. Each conceptual relation is related to the natural language one as an RDF triple, where the predicate denotes the natural language used.

```
<dsi:defines rdf:nodeID="defines">
<foaf:name>defines</foaf:name>
<lang:english rdf:nodeID="defines"/>
<lang:serbian rdf:nodeID="definiše"/>
</dsi:defines>
```

Figure 5. Lexical ontology with mapping to English and Serbian.

With this architecture multiple benefits are achieved. Firstly, the semantic layer of the learning material becomes purely semantic, language independent. This way, any reasoning over semantics can be performed language-free. In other words, a situation where some information is inferred in one natural language but not in another, due to ill formulation, is not possible. Secondly, due to the generality of the concept ontology, mapping to other similar ontologies can be possible - using the lexical ontology as a dictionary. Relations created for other courses, expressed in natural language, can be mapped to general ontology and merge with it. Moreover, by accessing the general ontology and narrowing down to one group of triples in the lexical one, switching between languages is a low-cost procedure, since all the supported languages are contained in that tripe group.

V. CONCLUSION

The contemporary e-learning systems rely mostly on the Semantic Web technologies. With the worldwide acceptance of WWW, the issue of localization and language fragmentation of data brought new issues - an area in which the Semantic Web again shows the most potential to solve. This paper proposes an e-learning system architecture that applies a Semantic Web based solution to enable multi-language support. This is done through layering the semantics to two layers: a general layer - an ontology of conceptual relations, and a linguistic layer, which maps multiple language formulations of relations from the concept layer, including multiple formulations within the same language. This might affect performance in a minor way, but enables fast switching between language, or even multi-language responses within one single page load. Proposed extension to the DSi framework opens possibilities for detecting synonym-relations, automated reasoning and discovery of implicit relations.

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WEB 2.0 BASED ASSESSMENT IN E-LEARNING

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Abstract - The focus of this paper is a Web 2.0 approach to assessment in e-learning applications. The Web 2.0 concept is in its very nature compatible with the constructivist theory of learning, where the learning process is facilitated by the student creating - building their own knowledge, as the central agent of learning. This strategy can also be applied in assessment: instead of solving multiple choice or other types of predefined tests, student can be put in position to freely (but presumably within certain constraints) construct knowledge in required domain, by means of which they would display the level of competence achieved. Proposed system offers one way of formalization and automation of such approach.

I. INTRODUCTION

Any learning scenario, be it computer-aided or traditional, consists of two fundamental activities: the transfer of knowledge to the learner and the opposite path - assessment of learner's achievements. In traditional learning, both of these components are teacher-centered and though various types of objective assessment methods are used, they still serve as partial input to the teacher, who performs the core assessment process. Moreover, based on the Bloom's taxonomy, [1] higher levels of students' abilities cannot be assessed through objective methods, but rather in an open conversation or, in case of written tests, through freeform answers to questions.

Evaluation of natural language answers requires the use of Natural Language Processing tools for the extraction of meaning. However, once the semantics have been extracted and formalized in a chosen way, mechanisms for assessment (i.e. comparing the level of mapping of processed student's answer to the pre-formatted expected knowledge) requires both highly expressive formal representation methods and inference rules. The technologies of Semantic Web (namely ontologies and rules) are the most promising solution in this aspect, since they can both express semantics (machine-processed students' answers and the expected knowledge, predefined by course designers) and rules for mapping.

One of the most common definition of ontology, in the context of Semantic Web, is a formalization of a conceptualization.[1] As such, it fits the visualisation of knowledge as a web (or a graph) of entities (or concepts), interconnected by relations. This approach isn't new. Before the growth of Semantic Web, research has been done on possible visual organisation of knowledge (both in teaching and assessment) through concept maps, [2] or cognitive maps. [3] With Semantic Web, these representations have been replaced with ontologies - data structures with inherent means to express meaning.

II. E-ASSESSMENT

There are various approaches to knowledge representation and assessment with Semantic Web technologies. Some researchers [4] attempt to represent the entire assessment domain in the form of ontology network. SWRL[2] language has been used to represent rules of assessment, and a network of educational domain specification, educational resource specification, assessment, assessment instrument and LOnto (LOM-based) ontologies are used to form the ontology network, and the general structure has been instantiated to cover different university courses. This approach is aimed primarily at automated generation of assessment modules. The other approach [5] is aimed at processing student answers to open questions, since these questions allow assessment of higher levels of student's knowledge. Natural language processing is used to extract meaning and semantically annotate student's answers, and then compare them to predefined expected results, also expressed as ontologies. A simple, but none the less useful approach is offered in [6]. The described system generates multiple choice questions on the basis of knowledge ontology, providing the student with a set of questions and

[1] http://www-ksl.stanford.edu/kst/what-is-an-ontology.html
[2] http://www.w3.org/Submission/SWRL/

offering different difficulty levels, knowledge competition between learners, user statistics etc. The system is implemented as a Protégé[3] plugin. [7] All these approaches face different challenges. Objective testing is in general easier to implement, while the open question assessment, though technically more difficult, offers more in-depth knowledge measuring. The approach presented in this paper aims at a "middle" solution: semi-automated assessment oriented towards Web 2.0 or peer assessment.

A. Web 2.0 E-Assessment - DSi 2.0A

In order to tackle the problem of e-assessment in a constructive and peer-oriented fashion, The DSi 2.0 e-learning framework [8] has been developed. This framework is able to parse html documents and enable drag-and-drop functionality upon every word in text (using the JQuery[4] JavaScript framework). A text-case is shown in Fig. 1 and Fig. 2 - an excerpt from a Wikipedia article ("Automobile") before and after parsing by the DSi 2.0. On Fig. 2 drag-and-drop operation of a random word is presented.

Figure 1. An excerpt from a Wikipedia article before parsing.

The DSi 2.0 has two modes of operation: read mode and edit mode. In edit mode, each word can be dragged onto another or dropped onto, as shown in Fig. 2. This is achieved by recursively traversing the DOM tree up to every single word from the text nodes and wrapping it into a span tag of certain class. The source of the text shown in Fig. 2 (after being parsed by DSi 2.0) is as shown in Fig. 3.

Figure 2. Drag-and-drop operation over the parsed text.

DSi 2.0 framework operates with two documents: the learning material (in plain text or HTML) and an accompanying semantic document, expressed in RDF/XML. Each loaded document, even parsed for drag-and-drop ability, may or may not have the semantic counterpart. If the semantic document is not present, upon the first drop action, the user is prompted to enter the relation between dragged and dropped onto word. This triple (word, relation, word) will form the first RDF triple and will be written to a newly created semantic document. Each new drag-and-drop action, if any relation is entered by the user, forms a single RDF triple. This way, each user (learner) is able to enter any number of relations in the document.

However, if there are relations present (the semantic document does exist), upon the drag-and-drop action the user is presented with all existing relations, with the option to mark them with one to five stars. This way, each relation passes a peer review and are sorted in the descending order - the relations that peers are most satisfied with surface to the top. This is shown in Fig. 4.

```
<p><span class="dsi2">An</span>
<b><spanclass="dsi2">automobile</span>
</b>,<b>
<span class="dsi2">autocar</span></b>,
<b><span class="dsi2">motor</span>
<span class="dsi2">car</span></b>
<span class="dsi2">or</span> <b>car</b>
<span class="dsi2">is</span>
<span class="dsi2">a</span>
<span class="dsi2">wheeled</span>
<a href="/wiki/Motor_vehicle"
title="Motor vehicle">
<span class="dsi2">motor</span>
<span class="dsi2">vehicle</span></a>
```

Figure 3. Drag-and-drop operation over the parsed text.

[3] http://protege.stanford.edu/
[4] http://jquery.com/

This approach allows students to build knowledge into the text material from which they learn, adding the constructivist component to learning. On the other hand, it provides peer-reviewing platform, enabling the natural selection of the most accepted semantic relations. These relations are not per se the most accurate ones; however, with the increasing number of reviews, the collective mind of students is expected to achieve the objectiveness needed.

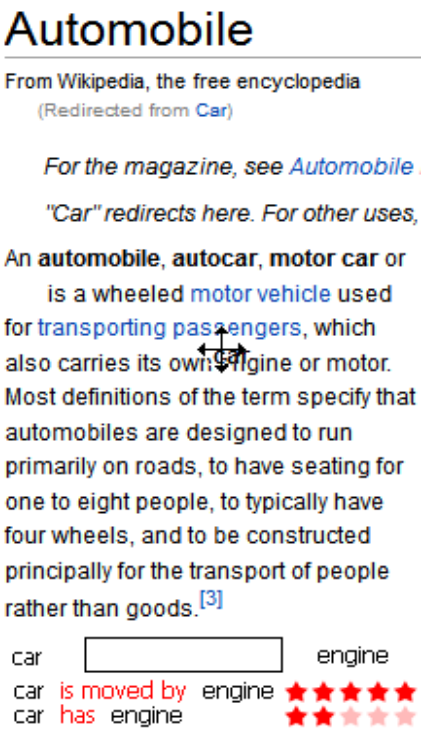

Figure 4. Adding a new relation and marking the previous ones.

Further to the collaborative - constructive learning with elements of peer-assessment, the implemented DSi 2.0 framework is aimed at clean assessment. In this scenario the student is presented with chosen portions of the learning material, formulated in a different way from the one they learned from. Student is required to define as many relations as they can (via drag-and-drop action) which can then be assessed in quantitative and qualitative manner. Quantitively, the number of relations between specified pairs of words can be measured and a conclusion about the number of concepts retained. Qualitively, relations can be compared to the predefined expected answers. In case of open answers, since these relations are small, simple statements, processing is not expected to be challenging. Other than open answers, learners can be offered multiple choice questions automatically generated from the relations in the semantic document. These relations can be predefined by the contents author, or based upon the user-generated and peer-sorted relation base.

III. CONCLUSION

This paper described the DSi 2.0 Web 2.0 based collaborative framework in the context of assessment. This framework has been developed up to the testing phase and is expected to be subject to real-life university situations. Its development is expected to go in two possible directions: towards building a wiki-type relation base upon which the assessment would be implemented, and towards automated assessment usage based on predefined expected and distracting answers, with the questionnaire in form of drag-and-drop enabled snippets of textual teaching material.

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LIFELONG EDUCATION THROUGH E-LEARNING

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Abstract - Lifelong learning activities make learning throughout life, with the aim of improving knowledge, skills and abilities within the core, civic, social and business prospects. One way to achieve lifelong learning is distance learning. The paper gives a brief overview of lifelong education, then its benefits and effects of organizing these classes via distance learning

I. INTRODUCTION

In today's age of economic and social change, and quick transition of society into 'knowledge society', and the demographic situation in Europe where the population is getting older, there are challenges for a new approach to education and learning. Therefore there is much discussion about the so-called lifelong learning, which is the learning activity throughout life with the aim of improving knowledge, skills and abilities within the basic civic, social and business perspective.

Learning takes place on a daily basis, sometimes on purpose while sometimes the learning process is unplanned, often unavoidable.

A human learns on a daily basis much more than he is aware of that. Even organizing our daily activities involves continuous learning, so we can say that life is unthinkable without continuous learning.

The term lifelong learning is understood and accepted different in different cultures and countries. In English speaking countries continuing education generally refers to the continuing professional education of adults, while their permanent (lifelong) unprofessional education is called adult education.

Lifetime (permanent, continuing) education is often occurred as a synonym for the concept of lifelong education. The difference between lifelong education and lifelong (permanent) education is that the lifelong education refers to education throughout life (from birth to death), while the lifelong (continuing, permanent education) refers to education after the end of a degree of formal education (usually after compulsory education) until death or until the end of working life. While lifelong learning encompasses and coordinates the education of children, youth and adults (according to the principle of vertical relatedness), with lifelong education are adjusted only forms of formal, non-formal and informal education (according to the principle of horizontal relatedness, which means education in a variety of forms, not just formal).

II. LIFELONG LEARNING

Lifelong education, as the word says, is an active learning which does not stop on completion of schooling but goes on lasting through until the human is capable of assimilating new concepts and connecting them logically. It includes:

- **Formal learning** takes place in chronological graded system from primary school to university. It leads to the acquisition of a specific qualification in a profession or vocation.
- **Non-formal learning** means conscious and organized education, learning and training adults in order to cater for their educational needs.
- **Informal learning** is a lifelong process in which information, attitudes, skills and knowledge are assimilated. It may be deliberate or unintentional, and it is encouraged by the development of technology and engineering. This education is assimilated through experience in a variety of situations in life through reading, travelling, using the Internet and so on.

Scientific disciplines such as Andragogy (Adult Pedagogy) and Gerontology are related to the concept of lifelong education. Andragogy is the science that studies the problems of adult education. Gerontology studies education and self-education of elderly.

Lifelong, continuing or permanent education is often used as a synonym for lifelong education. However, this equalizing is not correct. Lifelong education refers to education throughout life (from

birth to death) while the continuing, permanent education refers to education after the end of a degree of formal education until death or working life.

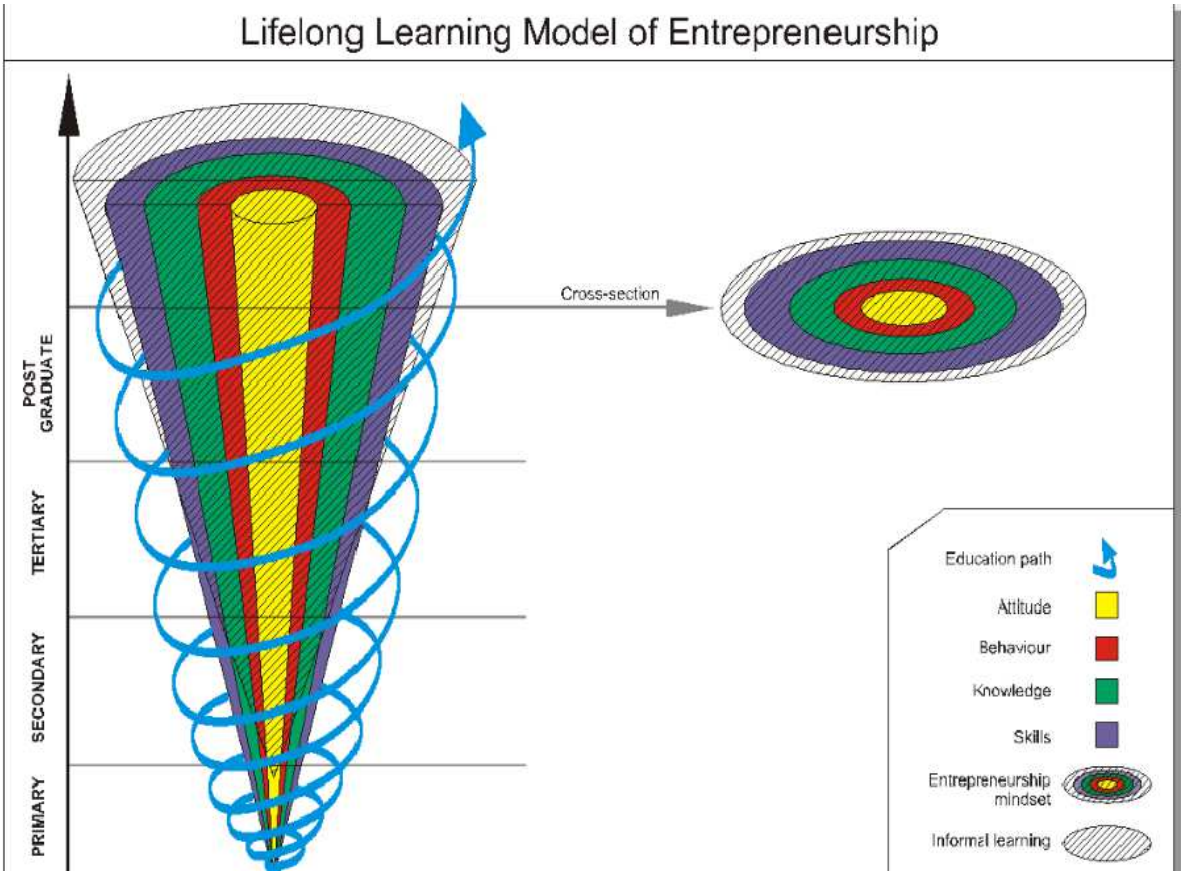

Chart 1 Simplified concept of lifelong learning

III. BENEFITS OF LIFELONG LEARNING

The way of lifelong education is a basic assumption of growth and development and it becomes essential in a time of rapid change in required skills and knowledge. The idea of lifelong learning comes from the assumption that the human is the greatest wealth of the society and that is why it should be invested in. The fact that European population aging rapidly means that the need for new knowledge and skills cannot rely on a workforce who are new entrants to the market because it will be too few young people, and the rate of change in technology is increasing.

Education and training, more than ever, have become an important factor in determining an individual's opportunities to progress and succeed in life. Employment opportunity is evidently a major success of successful education, but social integration rests on more than just paid work.

IV. WHAT IS THE DISTANCE LEARNING?

In the context of technological fast-developing and market conditions that are constantly changing, the education system is forced to provide an improvement in educational opportunities without increasing costs. In response to this challenge, educational institutions have developed a program for distance education.

Distance learning means that the teacher and the student (or students) are physically separated and technology (i.e. voice, video, data and printed material) is used to bridge the gap that exists in the classroom. These programs are very useful for the education of those who could not afford it because of the limited time, distance or physical disability, and to provide updating and brushing up knowledge of workers in their workplaces. They also can give adults a second chance for a higher education.

V. HOW DOES THE DISTANCE EDUCATION WORK?

A person who performs distance education has a wide range of technical possibilities. These possibilities can be summarized in four main categories:

Voice – Instructional audio tools include interactive technologies such as the telephone, audio conference and the short-wave radio. Passive audio tools include tapes and a radio.

Video – Instructional video tools include immovable images such as slides, pre-prepared movable images (eng. film, videotape) and movable images in real time combined with an audio conferences (one-way or two-way audio communication).

Data – Computers send and receive information electronically, and therefore, the term 'data' is used to describe this broad category of instructional tools. Computer applications for distance education are varied and may include:

- Computer assisted teaching – it uses computer as a stand-alone machine to present individual lessons.
- Computer controlled teaching – it uses computer for organizing instruction and observing student's accomplishments and progress.
- Education mediated by computers – it represents computer applications that enable beaming of instruction. For example: e mail, World-Wide Web applications, fax, etc.

Printed material – is the basic element of distance education and also the basis from which all other delivery systems have evolved. There are printed materials at disposal in various forms: course books, manuals, programs of courses, materials for detailed study.

VI. E –LEARNING CONCEPT

Distance learning is:

- providing access to learning materials, various course texts (scripts) and educational resources on the Internet, with a strong possibility of testing and knowledge testing, electronic communication with teachers and also with other students on the course,
- the process of convergence of educational resources – providing the conditions for learning from more distant places from the school classroom or centre in multimedia form,
- formalized teaching and learning system specifically designed to be functional at a distance using electronic communication,
- convergence and merging the Internet and learning, actually that is an Internet enabled learning.

VII. E-LEARNING IN LIFELONG EDUCATION

Living and working skills that people used to have are not enough nowadays. Lifelong learning means that people are given the opportunity to learn at all ages and at numerous contexts: at work, at home and through the activities during their spare time and not just the usual way as, for example schools. Lifelong learning is the ultimate result of computer literacy.

E-learning enters our educational system. What have been done concretely so far is introduction of Informatics and Computing science as a subject into primary and secondary schools and into colleges. However, other subject are still taught in the traditional manner or with the possible use of presentations in classes and particularly with teachers who are mostly on their own initiative enrich their teaching by introducing ICT (Information and Communication Technologies) in their own teaching.

Good support for investing into the sphere of lifelong education will be passing into law that is currently in the drafting stage.

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HISTORICAL DEVELOPMENT OF E-LEARNING THROUGH DISTANCE LEARNING

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Abstract – E-learning is increasingly used in all levels of education and life in general. This paper provides an overview of e-learning when the first forms as a medium for the transmission of information using paper until today, when computers are used.

I. INTRODUCTION

To realize the history of e-learning and it's beggining we have to know the definition of e-learning and describe of what it developed. Electronic learning is relatively new form of distance learning. What, in fact, e-learning means?

There are many definitions of e-learning. The most common one is: e-learning implies every form of education where education content is delivered in electronic form (Fallon; Brown, 2003). The others are thinking that e-learning is communication between mentor and a student supported by some technologic form (Keegan, 1986).

Some researchers are thinking that e-learning is the combination of the best and progressive achievements pedagogical technology. It is based on the principles of free learning, using computers in education and modern telecommunication (Internet) for teaching. Learning is organized as a process of dialogs in virtual classrooms. It marks the apartness of mentor and student in space and/or in time (Perraton, H.1988).

II. E-LEARNING

One of the biggest problems in definition of e-learning is the difference in understanding this complex form of studying and attempt of classification numerous solutions. New internet technologies are allowing using of text, audio and video material, which are combined in multimedia content and as so are presented to student. Learning is a process which implies many possible activities, from simple reading of text to more complex forms, such as audio-video content or active participation in learning, cooperative learning, etc. Amount of received knowledge is in relation with different forms of presentation education content of e-learning.

E-learning is one of the most famous computer generated communication services. As a useful tool it has founded its place in learning programs. E-courses through mailing list are representing the most simple form of delivering education content to student. Materials needed for certain courses are delivered to e-address as needed, daily, weekly or on a certain schedule. Student doesn’t have to visit the web site of education institution. All communication is bounded to e-mail.

If a system of electronic learning is to be used, we use a communication in which base is a computer with different services. The most famous service is e-mail. Component part of using new information technologies is a software named Browser for viewing and searching of Internet (Google Chrome, Mozilla Firefox, Internet Explorer, Opera, Netscape, etc). Internet browsers with new graphic solutions and sophisticated interactive communication technology allowed us that e-learning becomes available to the student all around the world.

E-learning, known as distance learning, has crossed international borders and our country is entering the international market of electronic learning. USA is the competition market in e-learning and education. Experience which America, Canada, Australia have on this field is dated since the end of 19th century. Today, e-learning is a common appearance even on the most famous faculty (Harvard, Oxford, MIT) which in their virtual classrooms provide many accredited academic courses. Political and public interest for e-learning becomes greater especially in domains where student population is scattered (Australia, Canada). There is a great motivation for implementation of this new education model, when there is no way to maximize capacity of known education institutions, or the budget is

insufficient for using new education programs. Many academic institutions have already made their shorter or longer step in use of virtual classrooms.

III. THE HISTORY OF DISTANCE LEARNING (EARLY E-LEARNING) AND LATER E-LEARNING

Communication between professor and a student is a key element of successful distance learning. The medium has essential role in substantiation communication on teacher-student relation. There must be a sender, receiver and a message to achieve the minimum of communication. If that message is an instruction than, beside student, professor and content, we have to consider the environment where learning is placed.

A. Early e-learning

In using education materials, distance learning is developed. As technology developed, so was the system of distance learning. At first, printed materials were used. The development of technology has enabled the introduction of new "instruction" media, such as pictures, slides, movies, etc. The radio, TV and interactive computer technologies and dynamic web sites are contributing to the popularity of this form of learning. Therefore, we could better understand system of electronic learning; we need to know the historical development of this complex form of education. It is believed that the first pioneer was Englishman, Sir Isaac Pitman. He was a teacher of stenography by correspondence. The students were studied to rewrite short parts of Bible, and the materials were returned for marking by mail system called "New Penny Post System".

In 1873 Anna Eliot Ticknor has established the association in Boston, where she wanted to help "home studying". That association had more than 10.000 users. First correspondent course has officially started in 1883 on Chautauqua College of Liberal Arts in the state of New York. College had the licence to publish diplomas which replies acquired academic degree to student which successful ends academic year. This course lasted until 1891. Pennsylvanian state university introduced correspondence course from agriculture as official academic program.

Appearance of film has brought a lot of optimism of correspondence course. New media was introduced in form of slides and motion pictures.

Popularity and efficiency of correspondence course was growing rapidly. Therefore there was a need for higher quality and ethics. That's why in 1915 was established the Association of National Universities for extended study. Association dealt with the quality of standard course and educator. New pedagogical model and harmonization of university policy of accepting credits from correspondence courses was solved. In America was formed a National council for studying at home in 1926. The council was responsible for the professional courses.

The University of Chicago is in one of our research in 1933 concluded that the correspondence courses should be introduced as an experimental base to create innovations and help in improving the teaching methodology. The first forms of distance learning were represented only through correspondence courses. The educational institution is the material for the course (complete references) sent by mail to the student. The student was learning alone, and sending back resolved tests by Post. Complete correspondence between the mentor and the student was done in writing, by exchanging traditional mail. The final test was done in the educational institution.

This form of learning has existed until the advent of new technology. It was the radio. New media quickly found its place in the correspondence course. Between the 1918 and the 1946 in United States, the federal government approved 202 radio licenses to colleges, universities and schools.

Radio has introduced a new feature in the system of correspondence courses. Lessons were listened on the radio. Small radio station allowed for the first time two-way communication between students and tutors. Two-way communication by radio mentor-student was in some areas (Australia, Canada, USA) the only way for education.

The concept of correspondence courses that was used on the radio was the starting point for the introduction of educational television in correspondence courses. In the late fifties of the last century seventeen mailing program were used on the television as a tool in courses at a distance. The use of "educational television" was ascending. In 1961, 53 stations were affiliated to national educational television network of the United States (NET). The main objective of NET was the distribution of films, scheduling and coordination. In those years, a television production technology was limited to the studio and it transmitted that

signal Live. That is how the course instructor was holding a public class. Students were able to follow the lessons on the TV. The first television was educational program "Sunrise" was founded in Chicago. Since 1959 until the early sixties, he was the only program of its kind. The concept of the program was based on a static camera, which was filming the teacher in the classroom.

B. Later e-learning

In the early sixties one of the TV Stations launches the "flying classroom" from the airport near Purdue University of Lafayette , in the state of Indiana. The program was intended for public schools in Indiana and five neighboring states. At its peak, the television broadcast educational programs in approximately 2,000 schools and universities, reaching the number of nearly 400,000 students in 6500 classrooms in Indiana and the surrounding five states. This learning experiment was the educational vision of some educators and the result of help by Ford Foundation. The project has inspired others who wanted an educational television in his region. Many schools are starting to use their own closed circuit television systems. In the late seventies, cable and satellite television are used, as the media is a correspondence course.

Late seventies brought a television post-production, such as video recorder and video tape. New medium allows the student to receive educational content, or lessons on videotape. Professionally designed series of lessons with new facilities offered to the students. This was an important point for the qualitative and distance learning. At the International Conference on distance education, held 1972 the new term appears. It was Distance Education.

End of the seventies and the beginning of eighties brought modest first personal computers. The emergence of a kind of electronic wall papers (Bulletin Board Systems - BBS) further increases the interest in distance learning, and electronic exchange of information. Another new medium CD (compact disc) facilitates the exchange of material due to the specifics of the media. In the second half of the nineties, it came to the expansion of information and communication technology (ICT), and the result is the rapid development of the Internet. Distance learning is transformed from paper forms into electronic. Such a change has made a new name - electronic learning (e-Learning). Lessons are now being sent to the user only in electronic form (using e-mail or FTP protocol). Completed tests the user returns to the educational institution by e-mail.

IV. CONCLUSION

Thanks to the new Web technologies, conditions were created for the implementation of e-learning sites. The rapid expansion of this new Internet technology makes room for a completely new comparative way of education around the world. The result of this development was the increasing number of universities in the world with e-learning as an offer in its academic programs.

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ADVANTAGES AND DISADVANTAGES OF USING SOCIAL NETWORKS IN THE LEARNING PROCESS

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Abstract – It is mostly insisted on the development of practical knowledge, and that leads to the need to continue the process of organizing of classes significantly changes, and the role of students and teachers in it. It's necessary for students to become more actively involved in the process of acquiring knowledge so the knowledge acquired tommorow will be put into use. The passivity of students during educational process can be reduced to a large extent using different types of interactive and educational techniques.

The objective of these techniques is to transfer the activity from the teacher to the student, helping students to study together, solve problems and evaluate their work. Accordingly, there comes a change in the definition involving the teacher in the educational process, in this case he is more like a planner, facilitator and mediator. In the interactive teaching, the teacher is an innovator, an organizer, his activity during class reflects on directing students to cooperation and usage of different sources of information.

I. INTRODUCTION

Education is the key to functionlity of a society, which brings us to a better and fulfilled life. It gives us the ability to perceive things in the right way, recognize the possibilities to take our chances that are given to us, and also our skills how to solve things. But, education that we have today is not good enough for a better tommorow. We are witnesses of big changes in the domain of education. Books, notebooks, pencils, chalk and blackboards are rarely being used in educational processes. The development of educational process today mostly evolves around using touch screen technology and tablet computers.

New technologies and global computer networks have made out of a computer a device without which we can't imagine our everyday life on this planet. Life using computers, in fact, becomes an everyday thing. In the last couple of years using computers in schools, conditions are met for a more better introduction of educational technologies. The need for modern schools and modern teachers is much more imposed than ever.

II. SOCIAL NETWORKS

A social network is a social structure made out of many nodes comprised of individuals and an organization which are connected with one or to a greater number interdependences: financial interests, sport interests, conflicts, similarities, differences, transmission of diseases and other. Nodes are actors inside the network, while relations are bonds between nodes, and that's how a social network works. Social network is shown in the form of diagrams, where the lines connect bonds, and also the nodes of a big dot (shown on Figure 1. [7]).

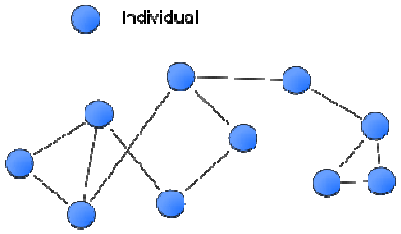

Figure 1. Display social networks

Social networks are mostly used for socializing, but lately they find their purpose in bussiness, and also in educational surroundings. If social networks are surroundings that willingly and gladly choose a significant number of individuals, then bussiness and education will find a way and tools to be available to them in that, conditionaly speaking, new enviroment.

Virtual surroundings have become, and it seems like, will be a polygon of electronic study which will enable nearly free education for people around the world. That's how, for example, it became possible that a course may be taken on Facebook, in this case in a totally free web surrounding which is the biggest social network in the world. A chance for free additional education, in the imperative era of lifelong study, represents a chance which rarely anyone would miss. In a such created Facebook group, not only that teachers communicate, but also students and other people.

The level of privacy and tightness of a group will depend of the objective of lecture, and the most made choice of a creator of a group is for the group to be of a closed type. The model that is mostly practiced in the last time is the engagement of users from educational programs.

The most frequently used social networks in Serbia are: Facebook, Myspace, Flickr, HI5, Tagged, Karike, Neogen, Poznanici, Furka, Dodirni me. Of course, the most frequently used social network in Serbia, and around the world is Facebook.

III. USE OF COMPUTERS IN THE TEACHING PROCESS

A. Models of computer usage in education

Computers have many functions during education. It also used as a teaching tool. A computer can be a substitution for most teaching tools (televisions, videos, overhead projectors). Using computers, shortcomingsof traditional teaching can be avoided, and in this way a student is not a passive receptor, but he studies actively and independently, he knows what's correct and what's wrong in his answers, and he gets feedback about acurracy of his answers.

Computer programs, that are used in education, are divided into:

- Programs for practising – that develop student's habits, skills.
- Programs that inform about new knowledge, programs for learning.
- Programs for solving different problems – student works independently works and tries to solve problems given by the computer.

Computer can be used with his input and output devices in many ways:

- The use of computers as an aid (preparation and printing of tests, averaging, preparation of timetables, calendars)
- Sources of information that are necesarry for maintaining the class (using online encyclopedia, web sites to search for information)
- Means of communication (e-mail, video conferencing, distance learning)
- The means by which we achieve programmed teaching (hypermedia software)
- Computers can be used instead of classical teaching tools (overhead projector, CD player, DVD player).

B. Usage of software in the learning process by teaching staff

The most well-known softwares are softwares of Microsoft Office package. This package is used primarily to satisfy the needs in different activities. With the help of these softwares, we can work efficiently in the following areas:

- Microsoft Word (word processing software, development of curriculum, sketches etc.)
- Microsoft Excel (software for creating spreadsheets, in which it can be programmed for calculating, various processes, preparation of timetables etc.)
- Microsoft Power Point (software for creating presentations for classes, seminars)
- Microsoft Front Page (software for creating Web sites and Web pages).

IV. ADVANTAGES OF SOCIAL NETWORKS IN THE PROCESS OF TEACHING

The advantages are huge, Prednosti su velike, both in methodological and in organizational aspect, and in terms of investment, as seen in a longer time perspective, and certainly in terms of increasing the interactivity and dynamism of the educational process, in a word, quality. Besides saving paper and to facilitate arrival at school students, as the student does not have to carry a bag full of books and notebooks that are heavier than him, this approach offers many didactic advantages. All documents on which the student works are constantly available to him, as it were, in one click. No forgotten homework or textbooks at home. Students now have computers with access to all the facilities that they need during school hours. This allows easy connection to different subjects, not to mention that there is the Internet, which is today one of the main allies in the learning process, if properly used.Also, we should have in mind that kids today are starting early with the use of computers, mobile devices and iPhone, are constantly using social networking and YouTube content. So that the process of teaching that uses touch screen technology and tablets, is a natural environment for the students.The teaching process is modernized with the use of computers by students in the teaching process, along with the use and display the contents of the lecturers on the interactive board. This allows them to continue to be enriched by numerous practical examples, the dynamic place to work together on solving problems and problem situations, and to use different materials available via the Internet, for making the teaching process

more interesting and adapting the real needs of students in the process of acquiring knowledge.The most important thing is that this way of teaching puts students in the middle of the educational process, makes it active, making the knowledge gained more applicable. Today there are known many techniques that can be used to encourage students to participate in the learning process, and every day to develop new, primarily driven by a variety of possibilities for the use of modern technology in the classroom. Some of the techniques are better suited for working with younger students, while others are better suited for working with students, some are designed to work with large groups, others to work with small groups or individual approach. A large A number of techniques is easy to apply with the help of modern technology, and encourage the use of the given technology in ways already familiar to students, leading to a reduction in the aversion and fear of learning. The bottom line is that proper selection of techniques that will enable the easiest way for students to achieve planned outcomes of learning.

V. DISADVANTAGES OF SOCIAL NETWORKS IN THE PROCESS OF TEACHING

One of the main disadvantages is the lack of activity of the children in the learning process, as well as the dependence of the student. The acquisition of knowledge is commonly reproductive, the student reproduces the knowledge that is transferred by his teacher. If a student is not passive, but actively participates in the teaching, learning will be more effective. Another disadvantage is that the student does not receive feedback on the results of operation. Tests show that the learning is more effective, if the student is informed of the results of learning. Explanation of teachers on assessment contributes to the great success of learning.

Even some of the disadvantages of social networks are the lack of interpersonal communication and neglection of the real world. Most of the communication starts and ends virtually, as it is fast and there is no need to continue in the future that will require interpersonal communication. Many people have become addicted to social networks. They spend a lot of time using social networks and thus neglect the real world in which they live.To remove these disadvantages, a search for new methods of teaching is needed. One possibility is the programmed instruction. Programmed instruction includes programmed textbooks and the use of computers in teaching. The student is active because the teaching plans make him work independently. Although programmed textbooks showed good results, they cannot replace the lectures of teachers.

VI. CONCLUSION

Conclusion: Social networks make the world more connected and enable easier communication.

Social networks are, without a doubt, important part, not only in the world of IT, but also in the daily life of all of us. They are primarily used to connect people and enable better communication among people. Their number is rapidly growing, also is their development of emerging new technologies. Millions of people use them. It offers great capabilities but it can also bring many serious problems. Social networks should be applied in a moderate way. They bring an advantage for people who use them in a rational manner, and negatively affect those who do not know their time use in the right way. In the future we expect the technology advances that social networks are used precisely in order to improve communication possibilities.

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USE OF INFORMATION TECHNOLOGY IN EDUCATION

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Abstract - This paper discusses the implementation of information technology in teaching, implementation methods, problems and difficulties that can arise when using these methods and the benefits brought by information technology in education.

I. INTRODUCTION

A society in which educated, flexible and creative people who can be trained using information technology and to learn throughout life, to be later employed a task that depends on the ability of the current educational system is goal. The task of information technology in education is on institutional level and depends on Ministry of Education and Ministry of Science, the National Council of Education and the National Council for Higher Education. One of the goals is to raise the general level of literacy in information technology, to ensure that people are able to apply and develop information technology.

Raising the quality of teaching and education using new technologies is a major goal of modern education. Integration and synchronization of knowledge is also an important objective towards which tend all.

Information technology is considered as one of the key factors and the major driving force for changes in the modern world. In one hand, information technologies provide new opportunities for countries, companies and individuals that they allow unimpeded flow of information at each level, extensive transparency of data, information, knowledge and a significant presence in every segment of the market, both large and small, and those secondary participants, [2].

At the other hand, the availability of resources and availability of information technology leads to a separation between those who understand the importance of adequate and began to implement a new IT tools, and those who have not. In today's development, information technologies play a very important role in many activities. Information technology is the basis of modern economics. They facilitate and support the global flows of information, capital, goods, services and people. In this way, information technology completely change the very modern business organization works and market them. In addition, they change drastically the way of learning, promotion and acceleration and the development of human intelligence, [2].

Distance education not only improves the quality of education but also provides the opportunity to learn regardless of the location of a person. As a subset of IT education appear online education and mobile education. Mobil education is the most advanced form of learning. Using mobile devices, such as laptops and tablets, mobile phones, wireless Internet means abolishing all restrictions on the location.

II. IMPLEMENTATION OF IT

In addition to the hardware structure necessary to organize this studying, software solutions that will benefit all the advantages of modern hardware and data offers are also needed to provide a reliable, easy to use and maintain the product. Electronic education requires interactivity, dynamism, creativity of the participants, [2].

Information that forms the core of education must always be at hand, and not just at the right time and the right place but also for the right people. For example, informing students when exams, lectures and consultations are, through a bulletin board, is not the best way to timely information. The automation in informing students as much as possible is getting over old ways. Mailing lists are one of the main solutions to this problem, and are very popular, [2].

Solution that is more popular could be the use of cell phones and SMS service. Number of mobile phones is higher than ever, and every day the number of mobile users is increasing.

Unfortunately, introduction of information technology is expensive and therefore their introduction in our education system is going very

slow. Because of the financial problems, we are facing a situation that the subject of IT, in primary schools, is studied as an optional elective course, which is unacceptable in the 21st century.

States vary in application of information technology in education. We distinguish between two approaches to the introduction and application of information technology in schools in countries in Europe. These are the introduction of a specialist subject in the field of information technology, and the use of information technology as an auxiliary tool in other subjects and projects.

Sweden is a country of information technology and its success and expertise enable rapid socio-economic development. Sweden has established a nine-member commission as an advisory body in the field of information technology.

Its aim was to analyze the impact of information technology on society and the promotion of information about the new features and issues in the information society. The Commission is working intensively on improving and increasing the use of information technology.

Information technology at the Swedish education is an integral part of all subjects, and exists as a separate subject in schools. In addition to highly qualified a staff who teaches just the subjects that deal only with information technology, all the teachers are qualified to teach their subjects with the extensive use of information technology.

III. BENEFITS OF IT

Information technology is used on a daily basis, and computer literacy is one of the basic literacy. Digital literacy has become an important factor of socialization of each individual.

Learning can be individually or in groups, regardless of the time and without geographic constraints to widespread application of the Internet. More important, it allows student interaction through forums and other educational materials and participation in various activities, which are also essential for training and education. An integral part of education should involve finding solutions to problems using information technology as the networks are always available and are becoming more and more necessary.

Constant improvement of the education system and compliance with modern technologies in teaching inevitably requires improvements in the systems, which are the main carriers of the educational function. The aim of this study is to assess the level and method of application of information technology in the management of schools, with special reference to their application in quality assurance management processes that take place at school.

For that purpose, a survey of secondary vocational schools in the Republic of Serbia is conducted in order to determine the degree of application of information technology. The results show that "the degree of application of information technologies in the schools varies widely, from complete inactivity to the daily application of a number of processes. It also identified opportunities for further improvement of institutional quality assurance in school management using modern information technology. There was a correlation between the degree of development of schools and their ability to adapt in terms of adaptation of educational

supply market needs with the level of application of information technologies in the schools ", [5].

Thanks to the development of information technology, the preconditions for the improvement of the teaching process have been created, but it is also possible to improve the development of schools as agents of educational functions. In recent years there have been significant changes in all spheres of society and are expected to be major changes in education. Information technologies create the potential for changing the position of students and teachers to free teachers of routine tasks related to the presentation and evaluation of the productivity of students. It is expected that the students will receive information from various sources and thrive based on his knowledge and abilities.

Necessary conditions are constant interaction between students and resources, as well self-evaluation and monitoring of students. Education in the information age means changing the organization of work and the gradual loss of traditional teaching.

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ASSURANCE AND SAFETY OF CHILDREN ON THE INTERNET

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Abstract - Nowadays, children quickly master using of computers, especially the Internet. Internet, unless it brings revolutionary change in everyday life, carrying with it certain dangers, which, unfortunately, have the greatest negative effect on children. For that reason, there are a lot of websites that offer advices to children, and also to their parents and teachers, who are supposed to prevent prospective risk that children may unwittingly be exposed. This work is a short overview of the dangers which Internet brings, the ways in which they can be overcome, as well as advices which should be followed.

I. INTRODUCTION

Internet as a global "network of all networks" has brought revolutionary changes in people's lives and the functioning of society. First of all, it brought new ways of informing, communication, and business activities. According to recent data, the Internet is used by about two billion inhabitants of the planet. Among the beneficiaries are, of course, children. It is believed that today's children learn to use the computers mouse before they learn to walk. The situation is different with parents and older generation. Many older people rarely use computers and the Internet. The fact is that all IT developments are closer to the younger generations. That leads, among the other things, to the problem which will be considered in this work.

II. DANGERS OF THE INTERNET

Every Internet user, whether belongs to a younger or older generation, must know the dangers which the Internet brings and how to protect of them in proper way. The main factors of the problem are viruses that can harm your computer or data, spamming or other forms of abuse of one's e-mail address, user misuse of private information, identity theft via social networks or in other ways, abuse-related payments over the Internet.

Regarding children, the range of hazards that come from the Internet is very broad. There are sites that contain harmful topic of pornography, to promote various forms of destructive behavior. Child Abuse on the Internet can encourage both the legal and registered organizations and the informal groups and individuals. The most common forms of abuse of children via the Internet are: trafficking, theft, adultery, suggestions, bullying.

Recent researches says that children mostly use internet for fun-primary for chat on some social networks (Facebook and MySpace) and forums, for watching music videos or surfing without any particular goal. Those who want to harm them know that. That’s why it’s not surprising that these are the most dangerous points. There are a set of advices, intended to children, parents and teachers, which can be found in various languages, in all countries of the world

A. Forms and examples of abuse

Social networks bring possibilities for children to get in touch with strangers who can endanger them. Also, on social networks there is a possibility that children be harassed or insulted. For example, on Facebook can be found groups which “hate” people that are fat, poor, nerds, which can lead to psychic and emotional problems at children who see themselves as a member of one of these groups. There are cases of calls for destructive behavior (for example collective suicide) that are placed by social networks.

Internet channels are popular places where numerous videos. Despite administrating and censorship, there can be found that affect negatively on all users, especially on children. There are numerous examples of videos of bullying on YouTube.

Pornography through internet becomes available to children, whether it is on sites that have exclusively these contents or sites that have commercials, links for these sites. Internet has brought a problem of promotion and dissemination of children’s pornography.

B. Consciousness about problem

Specificity of children’s of 21. century it that they use computers better than their parents. This is a problem because parents, even they want, they can’t monitor which sites they children are visiting

or how they behave on internet. On the other hand, many parents are not aware of all dangers, so they don't even try to monitor their children. They are content with the fact that children are in the room, not on the outside world where dangers they are conscious of are.

This is a big problem because different experts say that role of parents in protecting they children on internet is critical. Teachers know more about dangers on the internet, but since the children access to the internet in their free time, they don't have possibility of direct control of their pupils. Community, at Serbia or in the world talks sporadically about this subject. We can say that legislation on national and international level covered this topic only during the past 2 decades, although the entire negative thing on internet is not in general legislated.

Professional public-Different IT professionals and companies are most aware of the risks and responsibilities to which the Internet can bring, both children and adults. There are numerous resources and there are a lot of them in development that should eliminate and minimize this danger. In addition, it is seen that beside development of technical tools, experts in the field actively participate in educational and information programs, to perceive and try to solve problems in general. At the sites of companies in the IT sector can be found detailed articles dealing with this issue, both at the software maker (Microsoft), and the maker of the antivirus (Kaspersky).

III. THE WAYS OF PROTECTING CHILDREN

A. Web browsers for kids

There are many software makers who have made specialty Web browsers for children. It's not just the classic browsers as Internet Explorer or Firefox, but represent a whole closed world that is designed to be safe for children, and they still let them (some wise) surf the Internet. These programs typically are colorful and have lots of sound effects to attract the attention of children and full of content - from access to online Flash games, using predefined portal for children, to the list of trusted web sites with the contents of a given age appropriate.

Access beyond the prescribed content of these browsers is impossible. They are normally activated in full screen, do not allow the switch to Windows and ask for the password for any adjustments (which should be done by the parent, not the child.)

B. Tools for parents

There are software tools which will follow the instructions even then they are not with the children. These are Parental Control programs (tools) that allow parents to define the parameters for the use of computers. These programs allow you to define what time and in what time of day your child can use the computer, but also what may (or may not) work on it. All child activities are recorded in the log files, so you can check what has been done, which sites has been visited, which they send emails, with whom and what has been chatted. Programs of this type usually allow and define which software installed on the computer can be run and which do not (figure 1, [1]) so you can allow your child access to an encyclopedia installed on the disk, but not games.

Najpoznatiji Web čitači za decu		
Naziv programa	**Adresa**	**Cena**
Buddy Browser	www.buddybrowser.com	Besplatan
PikLuk	pikluk.com	Besplatan
My Kids Browser	www.mykidsbrowser.com	30 dolara
KidZui	www.kidzui.com	besplatan
AT Kid Browser	at-kids-browser.smartcode.com	30 dolara
Kido'z	kidoz.net	besplatan
KidRocket	kidrocket.org	besplatan
Surf Knight	www.surfknight.com	besplatan
Zac Browser	www.zacbrowser.com	besplatan
McGruff Kid Safe Web Browser	www.mcgruffbrowser.com	besplatan
KidSurf	www.kid-surf.com	besplatan
Shrek Browser	www.shrekbrowser.com	7 dolara

Najpoznatiji programi za roditeljsku kontrolu		
Naziv programa	**Adresa**	**Cena**
Net Nanny	www.netnanny.com	30 dolara
CyberPatrol Parental Controls	www.cyberpatrol.com	40 dolara
Safe Eyes	www.safeeyes.com.au	50 dolara
PC Tattletale	www.pctattletale.com	50 dolara
SentryPC	www.sentrypc.com	50 dolara
KidsWatch	www.kidswatch.com	50 dolara
Sentry Parental Controls: Total Family Protection	www.sentryparentalcontrols.com	4 dolara mesečno

Figure 1. Web browser for kids

The problem of existing tools is that children are very handy and capable to outwit some of them. Besides that, many of them are not free, and also, kids can access the Internet from computer or mobile phone, which is not controlled by parents.

IV. EXPERTS' RECOMMENDATIONS FOR CHILDREN AND PARENTS

There exists a set of recommendations for children, parents and teachers and can be found in various languages in all countries of the world. They are based on the following messages.

A. For children [7]

- Make yourself secure profiles.
- For chatting and quick messaging, best use websites that are oriented for younger audiences.
- Do not send messages, photos or any other material that might cause harm.
- Only send photos to individuals you trust.
- Learn how to block messages sent by unknown individuals.
- Ignore unknown individuals that want to get in contact with you.
- Do not get together with unknown individuals, even if they are your "friends" on the internet.
- If you do arrange a meeting with somebody, inform your parents, being cautious pays off.
- Once you stop your activity on the internet, make sure you log out.
- When using web cameras, only communicate with individuals you know. As soon as you stop using it, turn it off.

B. For parents[11]

1. Install software that will protect the safety of your computer!
2. Use pop-up blockers and SPAM filters!
3. Tell your children to NOT respond to SPAM messages!
4. Maintain the websites you and your family use with great care!
5. Establish rules of safe behavior on the Internet that are valid for the entire family so that the child feels that all family members can be in a variety of ways exposed to the risks of abuse and harassment online and it is equally involved in the protection of this invasion of privacy!
6. Explain to your children that rules for behavior in the virtual world are the same as in the real world!
7. Be involved, in discrete way, in the online life of the child and have an open conversation with them about it!
8. Get to know the websites your children are using!
9. Make a time limit for how long your children can be online.
10. Be careful when you are denying children access to a computer / internet and explain to them why are you doing it, because it can lead to the opposite effect (if you restrict them from using the Internet at home, they can do that in any other place - with friends, in play, at school, etc., totally out of your control)!
11. Teach them to take care of their passwords!
12. Discourage children from disclosing personal information over the Internet (first and last name, home address, school name to go by, etc.)!
13. Explain to your children that photos and videos are a private matter and that if they want to post them, they must consult you before doing so!
14. Explain to your children the risks associated with the communication with unknown individuals on the internet, as they do not know the real intentions of those individuals!
15. Tell them that they should never get together alone with individuals they met over the internet!
16. Explain to your child that their best friends online are the ones from real life!
17. Talk to your children about abuse over the internet - cyber bullying (teach them to always respect others and that others are responsible for respecting them)!
18. Teach your children that, if they feel offended, should stop any contact with the individual, avoid responding to the offence, and consult you (their parents).

C. Teacher and psychologists

Teachers and other professionals who work with children play an important role in the prevention of cyber bullying. Below are several messages for teachers to take into account in order to efficiently protect children from cyber bullying.

1. be positive towards technology!
2. Ask the children about the technologies they use!

3. Go on MSN, Skype, Facebook...etc

4. Teach children to protect themselves and to not give anyone private information!

5. Make your own profile and see how secure your own privacy is!

6. Talk about good habits on the internet!

7. Tell children to READ before confirming anything!

8. Include parents in classes regarding a safe and secure Internet!

V. ACTUAL EXPERIENCE

A. Serbia- Project „click safely“[7]

Ministry for telecommunication and informational society has done research through this campaign which included 16 cities in Serbia in which 509 pupils from elementary and high school participates.

A large number of the students, 31%, responded that their parents have no idea what they do on the Internet. It is interesting that up to 12% of the students in Serbia have their parents as "friends" on Facebook.

Children on internet are exposed to risk behavior just like in a real life, and as evidence is a fact that 31% of them has met personally with a person that has met for the first time on the internet.

Although 85% of respondents answered that did not experienced any inconvenience on global network, other 15% as the most common inconveniences cite insults, falsely representation and making advance by elder persons.

This activates are now in jurisdiction of The Digital Agenda, and beside the actions for children, parents and teachers, project includes site, brochures, presentations, education quiz, games.

B. European Union - EU Kids Online [7]

Project EU Kids Online is organized by the department for media and communication of Faculty of Economics, London, and includes 33 European countries. Primarily, project is about comprehensive researches that bring current data on how and how much children use internet, what are the problems, what is the attitude of parents, and what the legislation is in certain countries. Beside the research, there are useful advices, publications, observations and instructions for the individual or a country. This research draws parallel between level of internet use among children, risks arising and cases of discomfort, where a risk is not reciprotial pro rata of discomfort.

According to research from the 2011th year, 60% of children in the EU aged 9-16 use the Internet. 12% stated that they had seen some of the content that were upsetting, but significantly lower% of those who have experienced the inconvenience. For example, only 1 of the 12 children who made contact with strangers has met that people alive.

Germany- -with regard to children, data on internet usage and content using are range below the European average. Parents are extremely aware of the dangers that come from the Internet and significantly control the use of the Internet by children. As for exploits, German children encounter them in a lower percentage than others. In this case, the recommendations for adults to put the emphasis on the positive aspects of the Internet, in children education.

UNICEF - also pays great attention to the safety and security of children on the Internet, bringing together experts from the fields of education, sociology, psychology, IT, security and so on. There are recommendations for children, teachers and parents, and the emphasis placed on international conventions, declarations and protocols, which formally regulate these problems. UNICEF also highlights the importance of cooperation of governmental and non-governmental organizations at the global level.

UNICEF’s conclusion is that the influence of the internet on the lives of children will grow in the future; we also should take into account that there is an increasing level of accessing the internet via mobile phones and we have to define the responsibility of both the negative and the positive aspects of Internet use.

USA-as far as USA, it is obvious that in this country there are far more discussion about the issue of children's safety on the Internet, the involvement of all structures, from education to security to solve the problem and expressed an active attitude of all members of the community.

Russia - 2012th year in Russia was marked by a number of activities in solving the problems of safety of children on the Internet. Among them are recorded numerous conferences, educational programs for children and parents, organized live

or online. Very active approach during the 2012th was recorded in the Ukraine.

VI. CONCLUSION

The problem of security and safety of children on the Internet can be viewed from different angles, and requfor its solution the participation of various experts. Cooperation between children, parents and teachers, based on mutual trust is the key to progress. As with other potential problems, the best way of resolving the preventive action, which will include both the development of technical tools, and educational programs, websites, campaigns. Another important premise of the security agencies in solving the problem is, that parents and teachers are where the children, or online. They need to know the virtual environment in which children are "moving" to be active in social networks, to identify themselves and the hazards that can occur. Sites with information, online or by phone SOS centers, brochures, presentations, education, are all actions that produce results and their society has to endure. Experience of individuals and groups should be shared with others, at the national and global levels.

As technical support prevention and resolution of these problems is concerned, it has to go in the development, monitor the emergence of new problems and dangers, practically, as it does anti-virus technology that often has a broader solution or forestall negative effects of the virus. This is a serious, yet challenging task for IT professionals, in which they will be sure to know the answers.

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SUBJECT „DISASTER RISK MANAGEMENT“ - SPATIAL CONTEXT

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Abstract - This paper describes possibilities of application of information technology during lectures of the subject "Disaster Risk Management". One of the main goals of the course is to raise an awareness among the students about the existence of the disaster risks and consequences they can cause. As the risks of catastrophic events require to be kept to a minimum it is necessary to implement disaster risk management activities before hazard realization.The initial phase of the disaster risk management process is identification of potentially harmful events in Southeast Europe region. Data acquisition is performed by searching the available databases: EM-DAT, GLIDE, GDACS. Students are introduced to the possibility of data acquisition by searching the database. The identification of historical events is performed by analysis of data about the geographic origin of the events. The vector layers associated with the atribute tables are obtained by using the geografic information systems. Created layer presents map of hazards in the area of interest and suitable database for the purpose of disaster risk assesment.

I. DISASTER RISKS

Effective disaster risk management is a requisite for sustainable development and it is paramount to include a wide range of stakeholders to manage risk in this context.

Students at the Department for Environmental Engineering and Safety at Work who chooses study program “Environmental Engineering” have possibility to attend course “Disaster Risk Management”. This course introduces students to the principles of managing disaster risks. Students acquire the knowledge they need to understand the complex processes of managing disaster risks (Disaster risk management cycle; Readiness and early warning systems; The answer to the disaster, rehabilitation and reconstruction; Monitoring, evaluation and improvement of accidental risks management; Disaster risks management and sustainable development).

A disaster is an unusually severe and/or extensive event that usually occurs unexpectedly and has such a severe impact on life and health of many people and/or causes considerable material damage and/or impairs or endangers the life of a large number of people for a long period of time to such an extent that resources and funding available at local or regional level cannot cope without outside help [1].

Defining risk is difficult because it vary from different viewpoints. The most widely accepted theory is that risk is probability of harmful consequences or losses resulting from a given hazard over a specified time period [2]. Perhaps more understanding definition is that disaster risk can be viewed as a function of several components: hazard, vulnerability, exposure, and resilience [3].

Hazard is a potentially damaging physical event, phenomenon or human activity that may cause the loss of life or injury, property damage, social and economic disruption or environmental degradation [4]. Usually, when it is referring to hazards, it deemed to the natural hazards (earthquake, tsunami, volcanic eruption, flood, drought, tornado and hurricane, tropical cyclone, etc.) Manmade hazards are chemical, industrial and nuclear accidents. Still, many of natural hazards can be described like human induced hazards, because their root causes are human activities that cause climatic hazards or amplify existing natural threatens (heat and cold waves, desertification, landslides, floods, drought, etc.).

Vulnerability of populations/areas can be seen as damage potential in terms of intensity of unwanted event on the population/area that is exposed to disaster risk, while exposure to the risk

creates the final level (amount) of damage. Understanding who is vulnerable, and why, can help us to prevent ourselves and our environment from disaster event. All of us are vulnerable to some risk, though to varying degrees.

Risk is the probability of an event multiplied by the consequences if the event occurs [5]. Probability of the event is crucial for decision making (damage-frequency, return period), while vulnerability informs about the consequences of possible adverse events and it is a forward looking variable. The probability of occurrence of adverse events is beyond human control, but on consequences it can be influenced.

Holistic management of disaster risk requires action to reduce impacts of extreme events before, during and after they occur, including technical preventive measures and aspects of socio-economic development designed to reduce human vulnerability to hazards [6].

Risk identification provides an essential baseline for any disaster risk reduction application, from response preparedness to measures for reducing existing risks.

Spatial and temporal indicators are essential for monitoring hazardous events, both preventively and correctively. This data are extremely important because they allow assessment of the nature and population vulnerability to the hazardous events. They also, indicate the possible outcomes of risk realization and raise global awareness about this issue.

Hazard mapping have purpose to integrate hazard exposure and vulnerability information in order to generate risk information, accessible to decision makers who manage risk.

II. DISASTER RISK MANAGEMENT

The risk of catastrofic event is not possible to completely eliminate, but it can be reduced to an acceptable level. Bringing the risk of a catastrophic event at an acceptable level is achieved through timely implementation of risk management activities.

Risk management is a process of analysis, selection, implementation, and evaluation activities to reduce risk. It takes place in five stages: problem identification, risk assessment, risk evaluation, risk control and risk monitoring [7].

Disaster management involves a cycle which should consist of an organized effort to mitigate against, prepare for, respond to, and recover from a disaster [8]. Therefore risk management activities can be carried out before, during and after the occurrence of a catastrophic event. In order to minimize the effects of the occurrence of a catastrophic event ,it is necessary to shift from hazard-related defense to disaster risk management, as well as from emergency management only, the disaster prevention, preparedness and mitigation activities [9]. Therefore, it is necessary to manage risk before it comes to fruition hazardous events in terms of taking proactive measures.

One of the proactive measures whose implementation significantly contributes to effective risk management is the transfer of risks prior to the occurrence of events, i.e. insurance. Smartly designed insurance instruments can provide powerful incentives for reducing risks [10]. The inclusion of insurance in risk management process creates the awareness of the population of the risk and opportunities of each individual's own behavior and actions contribute to the reduction of risk. As part of the study program Engineering and Management Insurance Faculty of Technical Sciences in Novi Sad, students gain practical knowledge on how to with help of insurance effectively manage risk.

The complete disaster management cycle includes the shaping of public policies and plans that either modify the causes of disasters or mitigate their effects on people, property, and infrastructure [11].

III. COLLECTION AND PROCESSING OF DATA NECESSARY FOR THE PROCESS OF DISASTER RISK MANAGEMENT

Despite the fact that effective disaster risk management is paramount in our effort to reduce disaster losses and it is not always easy to implement such processes [12].

The identification of the problem is an important step in creating risk management. If we want to identify, what was the problem, first of all, it is necessary to examine the state of the monitored area or community where problem was. Special attention should be paid to identifying potential adverse drug events in the area of interest. It is necessary to gather information about the events that took place on the area of interest in

the past (historical events) in order to identify hazards that have been occurred. For an accurate assessment of probability of occurrence it is necessary to have the largest possible number of measurements (historical registry) for every hazardous event. According to the law of large numbers, with the increase of the sample, the deviation will decrease, which results in more accurate frequency of an event [9].

Using the Web and the development of on-line database make it much easier, fast, and affordable data collection implemented of catastrophic events. EM-DAT (Emergency Events Database), GLIDE (Global Identifier Number) and GDACS (Global Disaster Alert and Coordination System) are available, organized and timely Web data sources on a variety of parameters generated hazard. The available data are data on the frequency of occurrence of catastrophic events, the number of vulnerable, injured, dead, homeless, material damage as well as area that was affected. Center for Research on the Epidemiology of Disasters and Emergency Relief Coordination Centre (United Nations) are just some of the institutions that manage the maintenance of the above Web sources. Therefore, based on the competence of these institutions, correspondent Web sources can be considered a highly reliable source of accurate information necessary for the process of disaster risk management.

After the acquisition of data on potential hazards it is necessary to collect information about the level of observed preparedness of community for eventual achievement of hazardous events. It is necessary to find out whether there are evacuation plans, whether the rescue teams equipped and trained for a given emergency situation, what the capacity of the community to take care of the affected population, the structure of the population (the percentage of the elderly, children, people with special needs) [13]. A variety of collected data need to be processed in accordance with the requirements of this process. Only after processing the data we obtain information that is still possible to create a risk management strategy that will be most effective for a given case study.

IV. INFORMATION TECHNOLOGIES AS A TOOL FOR DISASTER RISK MANAGEMENT IN EDUCATION

Innovative (information, communication and satellite) technologies are very useful and helpful in every segment of the disaster risk management cycle. One of the possibilities of information technology, which significantly facilitates the detection of problems and making decisions aimed at solving the problem is to bring the collected data in a spatial relationship.

However, practical knowledge of geospatial technologies does not necessarily enable us to effectively deal with uncertainty, such as a disaster, unless we also learn to think spatially [14]. In simpler terms, Bednarz and Bednarz defines spatial thinking as "the knowledge, skills, and habits of mind to use concepts of space (such as distance, direction, distribution, and association), tools of representation (such as maps, graphs and diagrams), and processes of reasoning (such as Cognitive Strategies to Facilitate problem-solving and decision-making) to structure problems, find answers, and express solutions to these problems. "

The entry point for enhancing spatial thinking in disaster risk management is in the diagnosis and analysis stage. Joining the spatial component with data available in the above stages facilitates determining the activities to be undertaken in order to efficiently manage the risks of catastrophic events.

During the teaching of the subject "Disaster Risk Management", students were trained to use the spatial data (spatial thinking) for the purpose of identifying problems and finding solution the practical part. Of the course students are given the task of joining the spatial component data events with catastrophic consequences in South-Eastern Europe, analyze the possibility of establishing cooperation between the Republic of Serbia and the countries of the region for the joint implementation of risk management activities.

For the performance of this case studies it is necessary to collect data about natural hazards that have occurred in the area of interest during the period from 2006 to 2012. year. Bringing data into a spatial relationship is done with the help of QGIS.

It is necessary to carry out the following steps to perform a set of case studies:

1. Identify and collect the data relevant to the case study that’s presented through publicly available databases;

2. Form a vector representation (layer) of South-Eastern Europe for each parameter of each identified event using the geometry of polygons in QGIS;

3. Select one of the identified potentially harmful event in the Republic of Serbia;

4. To query the database to QGIS (advanced search) identify states, comparing with Republic of Serbia, that have the same / or more/s frequency and consequences (total affected, injured, deaths, homeless, property damage) the occurrence of selected events during the specific period;

5. Based on the search results make conclusion by which neighboring countries Republic of Serbia might propose cooperation, i.e. joint implementation of risk management activities to reduce the risk of observed event.

One of the results of this case studies is presented in Figure 1. and gives a visual overview vector frequency of potentially harmful events in South-Eastern Europe. In the same way it is possible to show all the other parameters of the identified hazards.

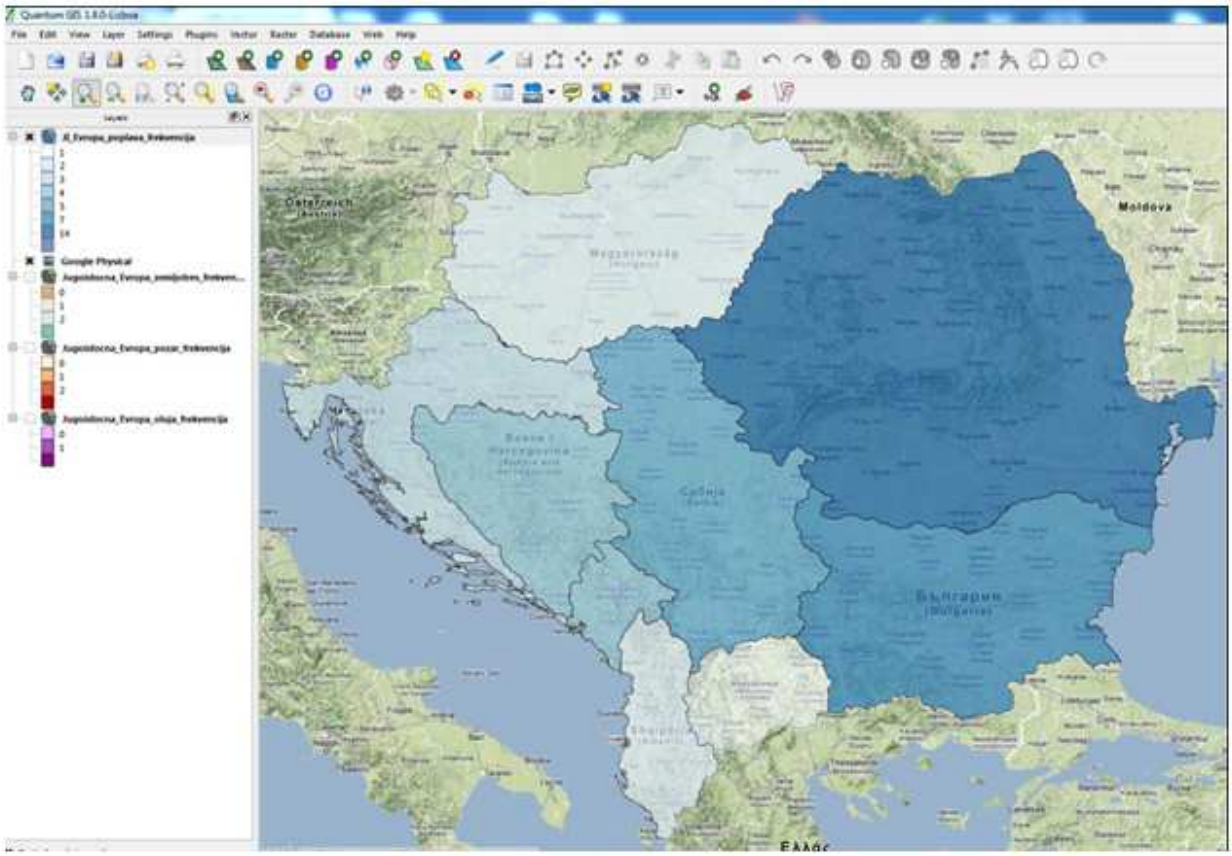

Figure 1. Vector layer in QGIS

Created vectors represent a model of the real system whose analysis it is possible to make decisions during risk management process. By analyzing real team environment in QGIS, we can identify a set of attribute values that satisfy defined criterion.For example.if we want to identify the state of South-Eastern Europe compared to the Republic of Serbia that have greater or equal of the frequency of flooding, the analysis of a given visual display shows that there are only two countries that meet the set criteria - Romania and Bulgaria. Also, in this way we recognize data that are not relevant to solving the problem and therefore will not be subject to further analysis. Only files that have been identified as appropriate will be considered when making the final decision. The desired data set we can come and search data within the established base by putting questions to the QGIS. Search results provide insight into the information we need to determine the vulnerability and exposure to areas of interest on which is still possible to carry out a risk assessment of a catastrophic event.

V. CONCLUSION

By using of GIS as a supplementary tool in the process of risk management, geospatial data and information can be visualized and shared among

stakeholders in ways that they can relate to and understand its context and implications.

Bringing data into spatial relations, concept maps, diagrams, graphs and other forms of visualization would be very effective in communicating disaster risks to policymakers and the general populace.

Spatial thinking is a skill that we have developed and used in everyday life to solve problems using concepts of space, visualization and reasoning. The importance of bringing the data to the spatial relations in teaching of the subject "Disaster Risk Management" is reflected in to create a generation of students who learn to think spatially in an informed way. Introduction, application and demonstration of appropriate geospatial technologies in the process of teaching can reinforce learning and facilitate absorption of new cognitive skills. Training student to use geoinformation technologies in the field of risk management is encouraged engineering mindset aimed at identifying and solving problems.

ACKNOWLEDGEMENT

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VISUAL PROGRAMMING WITH SCRATCH

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Abstract - The past several years have shown that among students who choose to continue their studies at Subotica Tech – College of Applied Studies there is a growing number who did not study any programming language or technique in high school. These students have to gain some experience in a very short time if they want to participate effectively in the college system where previous knowledge of programming is a requirement. The authors suggest the application of a so-called visual programming method for the inclusion of those students. Visual programming provides an opportunity for students to write applications with any pre-knowledge in this field. The result of such programming is displayed in the form of an animation or game, so it could also serve as additional motivation for the student. This work presents key features of the system for visual programming called Scratch, which was developed at the Massachusetts Institute of Technology from the US.

I. INTRODUCTION

Learning how to program is a key objective in most introductory programming courses, yet many educators have voiced their concern over whether their students are learning the necessary programming skills in those courses. [1]. Next, we can see some of the facts which can have a negative influence in the knowledge transfer efficiency in introductory computer science (CS) courses:

Not all students have a ready access to computer science courses before they arrive at college. The difference between the "novice" students and those who already had some experience with CS courses, is not only the pre-knowledge, but also a motivation that comes from the fact that the "experienced" students also know what the practical importance of the curricula is.

Theoretical topics that would enhance the students' understanding of the practical material are deferred to later points in the curriculum, when they no longer have the same immediate relevance. This means when the student take only introductory course from CS, he/she cannot see how it can be used for developing for the modern IT achievements.

It must be pointed out that programming courses tend to direct their attention towards the syntax and the particular characteristics of a programming language, so influencing students to focus on these relatively unimportant details instead of the underlying algorithmic skills. By zooming in on details many students are likely to fail to grasp the crucial algorithmic model that transcends particular programming languages. What's more, by focusing on the mechanistic details of programming constructs students are left to find their own way through the programming maze and develop their skills of programming through drilling and correcting errors.

According to David Evans [2], introductory programming courses often oversimplify the programming process to make it accessible to beginning students, giving too little weight to design, analysis, and testing relative to the conceptually simpler process of coding.

He further claims that programming-intensive courses disadvantage students who have no prior exposure to computers while giving the illusion to those who have previously used computers that they know more than they really do. As a result, students who are new to computing are often overwhelmed, while students who have a prior background often simply continue bad habits.

Focusing on programming to the exclusion of other topics, gives students a limited sense of the discipline. They write programming code without knowing what lies behind, for example how CPU process the data or how the data is stored in the memory.

The introductory Computer Science courses are frequently characterized by:

- Much learning frustration;
- A considerable student drop rate;
- Now well-defined exit behaviors (i.e., what the students are expected to be able to do at the end of the course) and insufficient evaluation tools to establish if the students learned enough.

II. VISUAL PROGRAMMING LANGUAGE (VPL)

Visual programming is the creation of a computer program by using a visual representation such as graphics, drawings, animation or icons, partially or completely. Traditionally, a program is a sequence of text statements used to achieve a certain result or solve some problem. In VPL the user creates programs by manipulating program elements graphically rather than by specifying them textually [3].

Many VPLs are based on the idea of "boxes and arrows," where boxes or other screen objects are treated as entities, connected by arrows, lines or arcs that represent relations. It can be stated that the visual language is a set of spatial arrangements of text-graphic symbols with a semantic interpretation used for performing communication actions in the world.

Programming languages frequently have peculiar methods of representing the task to be performed resulting in complexity. Visual programming tries to simplify the creation of programs.

Visual Basic and the entire Microsoft Visual (tm) family are not, despite their names, “visual” programming languages. They are textual languages that use a graphical GUI builder to make programming decent interfaces easier on the programmer.

The implementation of the VPLs has the following benefits:

- The program consists only from necessary concepts (parts).
- The relations and connections between parts are clearly defined.
- There are no intermediate steps in the process of “writing“ the program.
- The parallel computation can be presented easily.

Apart from advantages with VPLs, they also have a number of drawbacks (wiki). The main concern is the so-called “Deutsch limit”. This refers to an adage regarding information density of visual programming languages, which originates from L Peter Deutsch. It states:

The problem with visual programming is that you can’t have more than 50 visual primitives on the screen at the same time.

The following list shows situations where text has superiority:

- Project documentation;
- Naming to distinguish between elements that are of the same kind;
- Expressing well-known and compact concepts that are inherently textual, e.g. algebraic formulas.

There are a huge number of VPL developing systems. Many of them are not well known because they are used only for specific purpose. Here is a list of some of the more popular visual programming languages:

- Blockly: this is an open source web-based, graphical programming language where users can connect visual programming blocks that look like interlocking jigsaw puzzle pieces. It is developed by Google [4].
- LabVIEW: it is a graphical language designed for engineers and scientists [5].
- Microsoft Visual Programming Language, dataflow language for robotics programming that is a component of Microsoft Robotics Studio [6].
- Flowcode is a graphical programming language for microcontrollers [7].

III. SCRATCH

Developed by the MIT Media Lab [8], Scratch is a visual programming language for children aged 6 and up. Since its release in 2007, over 800,000 users have joined the Scratch website and have shared over 1.7 million projects — from games to animations. That sharing aspect is an important part of the Scratch community, so the projects that are uploaded to the site are licensed under the Creative Commons attribute and share alike license so that others can download and remix them. Scratch is available free of charge and runs on Mac, Windows, and Linux computers.

Despite the fact that the Scratch development environment was created for children, the simplicity and independence of a specific programming language can be used for other age groups. Many university implements an extracurricular lab and workshop where the program Scratch is presented.

Scratch can be an answer for those freshmen students who come from a high school in which

they were not offered programming courses. In the introductory CS course lecturer face a huge difference in the pre-knowledge and motivation between students. Those differences raise some of the problems described in the Introduction part, but for example, it was observed that the "novice" students are preoccupied with the "learning the syntax of the programming language" part of the process, or the "learning the elements of the language" part. But on this level these parts are only of secondary importance. The most important issue is for the student to learn how to analyze the problem and make an abstract concept of the solution. After that the solution can be implemented in most programming languages.

Algorithmic thinking is also important in the other CS courses which follow after the introductory courses. Knowing how to analyze the problem and build the solution make the student free to concentrate for the concrete implementation of the solution and building modern IT application.

The authors of this paper intended to use the Scratch parallel with introductory CS course. It is expected that through playful experimentation and creating projects, such as interactive animations and games, the students can develop a knowledge and programming abilities in an easy and fast way. It could help to narrow down the gap between "novice" and "skilled" students.

IV. SCRATCH AND EXAMPLES OF VPL CODE

This paper does not intent to present the complete Scratch developing environment. The focus is on Scratch's visual programming characteristics. In Fig. 1 the Scratch main window is displayed:

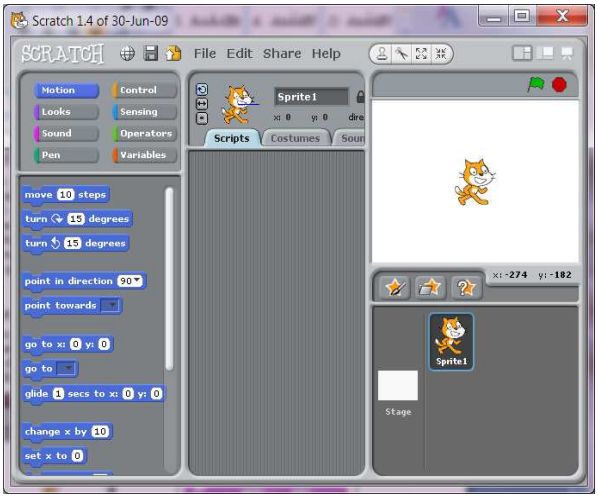

Figure 1 . Scratch environment

Scratch has components that are common for most programming languages. For example, the control structures which are represented in Fig. 2:

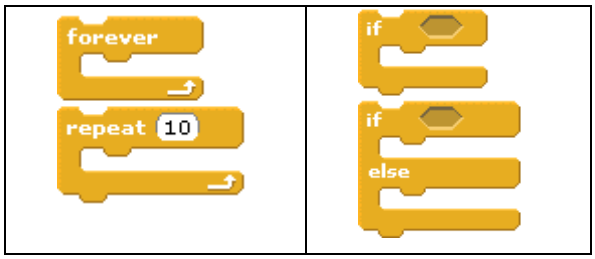

Figure 2. Some of the control structures in Scratch

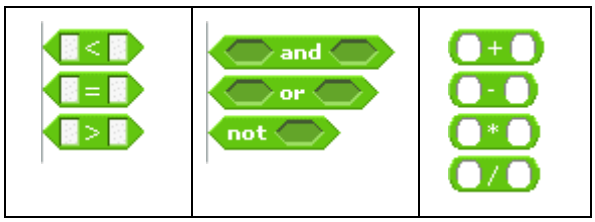

Figure 3. Some of the available arithmetic operators

In Scratch it is also possible to define variables, arrays etc, but what makes the programming easy and even fun can be found in the other group of options. For example commands for moving the object (Fig. 4):

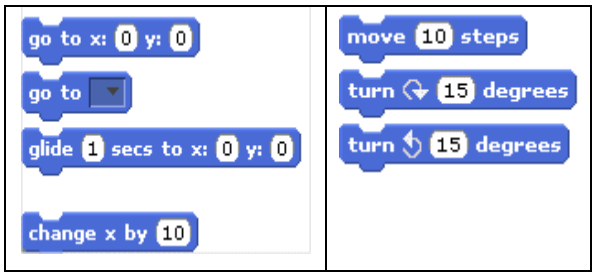

Figure 4. Some of the available option to move the sprite

Further captivating options are provided the command for playing sound (Fig. 5):

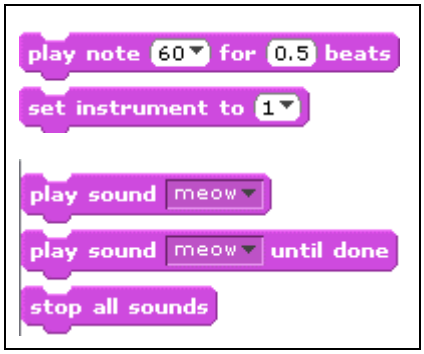

Figure 5. Some of the available arithmetic operators

Scratch users also found it useful when the program inputs (interactivity) come from the computer's microphone or from the attached webcam.

The next two examples present how the visual elements are connected in one VP application. The first animation has two sprites (a sprite is a computer graphic that may be moved on-screen and otherwise manipulated as a single entity). The first is a yellow cat that goes from one edge of the animation background to the other. When he hits the edge, he sounds a "Meow", says "Hello" and turns back and goes in the opposite edge. This is done in a limited number of time, so there will be a moment when the cat stops and no further moves are performed. The second sprite of the animation is an object represents the Sun. This is a parallel threat, so the „code" of the Sun which continuously rotates this graphical object is independent from the cat sprite. Fig. 6 presents the screenshot of the animation.

Figure 6. Screenshot of the first example

The Scratch code for moving the cat from one edge to the other is shown below (Fig. 7):

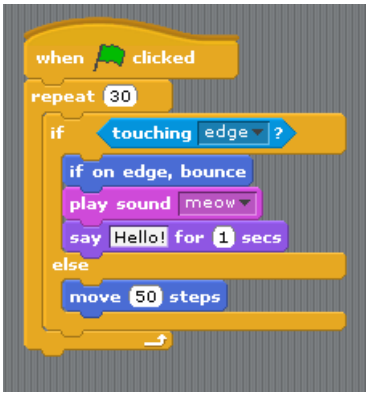

Figure 7. Code for moving the cat

The Scratch code for rotating the Sun sprite (Fig. 8)

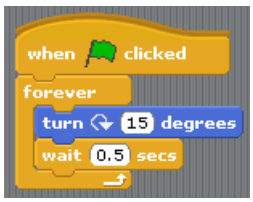

Figure 8. Code for continuous rotation

The second example is partially presented. The focus is on the possibility of creating a complex interactive animation. The example is a maze game. The player uses cursor buttons to move a "hero" in the maze. Figure 9 presents the screenshot of the application, and Figure 10, the code which controls the motion of the "hero" [9].

Figure 9. Screenshot of the second example

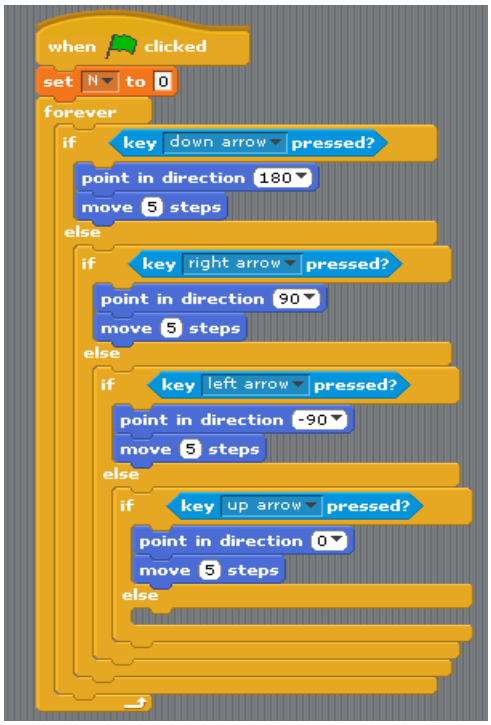

Figure 10. Code for moving the hero through maze

V. CONCLUSION

The students with poor programming knowledge can benefit from using Scratch. The visual programming language allows them to gain insights into the programming activities, showing elements and logic which can be used in solving a problem. The simplicity of the used VPL and the type of the result (interactive animation or game with multimedia) can encourage the students to practice more and to improve their programming ability.

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E-LEARNING IMPLEMENTATION: BENEFITS AND CHALLENGES IN THE DEVELOPING COUNTRIES

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Abstract—E-learning is emerging as the new paradigm of modern education. Educational institutions either willingly or reluctantly, will increasingly embrace the e-learning in order to remain competitive or improve services. Advances in e- learning technology have formed grand opportunities and threats to institutions in education sector. With particular reference to e-learning, absence of accurate information on key challenges that have influences on the implementation of e-learning in developing countries could mislead an institution into failure implementation. The extant research tends to be specific to developed countries, with little undertaken in developing countries, especially the implementation process. Therefore, this study investigates challenges that hinder the implementation of e- learning in developing countries. It also presents the benefits emerging from the implementation of e- learning. The positive perception of these benefits should provide an encouragement for education institutions to adopt it. Finally, this paper provides a general conclusion in the form of recommendations to raise the success of e-learning implementation. It is significant for both researchers and practitioners, providing a better understanding for them in their efforts to improve the success to failure ratio of e-learning implementation.

I. INTRODUCTION

Over the years, Information Communication Technology (ICT) has been perceived to be important in transforming and modernizing most organizational functions and operational practices (Beynon-Davies, 2005; AlSobhi et al., 2009). ICT has performed as an intermediary in enabling effective interaction between a wide range of stakeholders (Grimsley et al., 2007; Zhang et al., 2005; AlSobhi et al., 2009). Recent technologies are revolutionizing the practices of teaching and learning at education institutions around the globe. With the emergence of internet and web technologies, education institutions have been seeking to exploit the use of e-learning technologies to cater for the ever growing demands of flexible teaching needs in distance education (Nanayakkara and Whiddett, 2005). Rajoo and Krishnan (2013) reported that "Growth in e-learning is rapid as institutions race to compete for a share of the increased and changing demand for education. E-Learning could have potentially major effects on the way education is designed, implemented and delivered". More and more educational institutions around the world pursue this phenomenon aiming to cut costs, enhance services and to improve effectiveness and efficiency in the education sector. Advances in electronic learning technology have formed grand opportunities as well as threats to organizations in education sector. Sun et al., (2008) stated that "E-learning characteristics fulfill the requirements for learning in a modern society and have created great demand for e-Learning from businesses and education institutions". The e-learning market Worldwide has a growing rate nearly 36%, but failures occur (Arbaugh and Duray, 2002; Wu et al., 2006; Sun et al., 2008).

In the information age, the gap between the developing and developed nations raised due to the ease of access to new technologies and the usage of ICT (Zaied et al., 2007). Developing countries have been mainly exemplified by low living standards, high rates of population growth, low income per capita, and general economic and technological dependence on developed economies (Bakari, 2005; Kahiigi et al., 2011). Developing countries are still faced with several issues pertaining to the implementation of e-learning in their countries. The literature available on e-learning implementation and growth in developed countries is relatively extensive and wide. However, interestingly, the literature documenting e-Learning implementation and diffusion in developing countries is limited (Kahiigi et al., 2011; Bhuasiri et al., 2012). Absence of accurate information on key challenges that have influences on the implementation of e-learning in developing countries could mislead an institution into failure implementation.

This paper aims to explore challenges that hinder the implementation of e- learning in developing countries. In addition, this study also investigates the benefits emerging from e-learning implementation. The understanding of these benefits can help decision-makers appreciate the success and risk factors in e-learning implementation.

II. E-LEARNING

E-Learning is represented by the interaction between the learning process and ICT (Demiray, 2010). E-learning includes two concepts: firstly ICT as the means of this transformation, and secondly learning as the environment of implementation. There are various definitions of electronic learning (Marfo and Okine, 2010). This due to the different perspectives of experts especially since the term itself is new in the field of knowledge. Elhamy (2013) defined e-learning as the use of ICT to improve and/or support learning. Accordingly, it consists a wide range of tools and technologies including e-mail, the internet, video streaming, virtual classrooms, etc. (Elhamy, 2013). Marfo and Okine (2010) refers to e-learning as "a learning process in which learners can communicate with their instructors and their peers, and access learning materials, over the internet or other computer networks". In addition, Mushin (2008) pointed out that e-learning is the use of internet technologies to deliver a broad array of solutions that enhance knowledge and performance. E-learning also can be perceived as the delivery of course content via electronic media, such as internet, intranets, extranets, satellite broadcast, audio/video tape, interactive TV, and CD-ROM (Urdan and Weggen, 2000; Engelbrecht, 2005; Selim, 2007). Al-Harbi, (2011) stated that e-learning "can take place totally online in virtual environments or in a mix of virtual and face-to-face environments; a mode entitled 'blended learning'".

E-learning has the potential to influence positively on education sector (Al-Harbi, 2011). According to Marfo and Okine (2010), "e-learning can be used by lecturers to improve the efficiency and effectiveness of educational interventions in the face of the social, scientific, and pedagogical challenges". Rosenberg, (2001) reported that e-learning is based on the following three major criteria:

- E-learning is networked, which makes it capable of instant updating, storage/retrieval, distribution, and sharing of the instruction or information;
- It is delivered to the end-user via a computer using standard Internet technology;
- It focuses on the broadest view of learning that goes beyond the traditional paradigms of training.

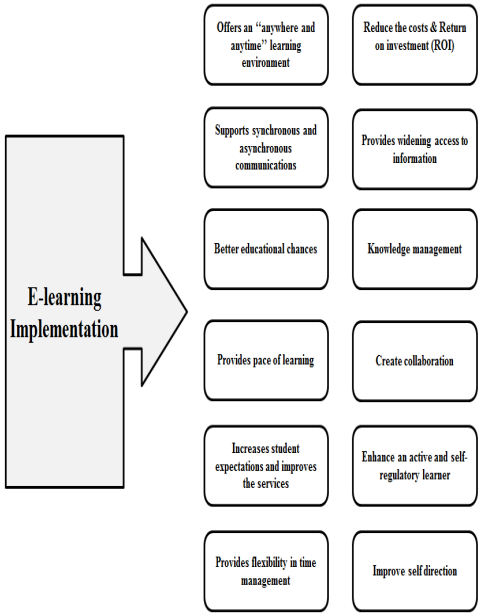

Figure 1. Benefits of e- learning.

III. BENEFITS OF E-LEARNING

E-learning will be promptly adopted if their merits can be identified and presented to the stakeholders. Understanding the benefits of e-learning raises the possibility of the allocation of the managerial, financial and technological resources required for the implementation process. Like e-business, e-learning provides various benefits to its stakeholders. It has the potential to influence positively on education field (Al-Harbi, 2011). The education sector is characterized by a growing interest in e-learning with a significant trend of improved application of e-learning technologies (Cech and Bures, 2004; Gronlund and Islam, 2010; Bhuasiri et al., 2012). Holmes and Gardner (2006) noted that e-learning delivers great opportunities for both educators and learners to develop their educational experiences. The most significant benefits of e- learning according to the literature are: offers an ''anywhere and anytime'' learning environment, independent of the pressure of time and the constraints of distance (Holmes and Gardner, 2006; Al-Harbi, 2011 ; Liaw et al.,

(2007); Macpherson et al., 2005; Graves, 2001; Nanayakkara and Whiddett, 2005; Marfo and Okine, 2010), Supports synchronous and asynchronous communications in various formats ranging from text, voice and audio (Al-Harbi, 2011), better educational chances for individuals who were disadvantaged for geographic, physical or social circumstances (Al-Harbi, 2011; Galagan, 2000; Macpherson et al., 2005), reduce the costs incurred by the traditional educational institution in providing services (Marfo and Okine, 2010; Liaw et al., 2007; Hall 2004; Cech and Bures, 2004; Koprowski, 2000; Sora, 2001). Accordingly, the cost advantages centre on the costs saved in travel and time away from the work, cutting the costs for teaching materials, equipment and classroom and other facilities, and the capability of e-learning to serve vast numbers at one time, or over time, with relatively tiny added cost. Moreover, e- learning increases student expectations and improves the services (Liaw et al., 2007), provides flexibility in time management and pace of learning (McVeigh, 2009), create collaboration and enhance an active and self-regulatory learner (Marfo and Okine, 2010; Liaw et al., 2007; Al-Harbi, 2011; Graves, 2001; Nanayakkara and Whiddett, 2005), improve Self direction and widening access to information (McVeigh, 2009), knowledge management (Swanson, 2001; Marfo and Okine, 2010).

In addition, there is high expectations in organizations that present e-learning in terms of both the range of the return on investment (ROI) and the period over which the payback will be (Macpherson et al., 2005). Many organizations are using, or intending to use, e-learning, and expect a significant ROI (Hammond, 2001; Macpherson et al., 2005; Nanayakkara and Whiddett, 2005). Ultimately, Fig. 1 below illustrates a summary of the e-learning benefits presented by the researcher.

IV. CHALLENGES OF E-LEARNING

Many educational institutions in the developing countries are slow in adopting e-learning technologies and that is due to a set of challenges hinder the implementation process (Andersson, 2009; Almusawi, 2010; Elhamy, 2013). Overcoming these challenges therefore would be one of the biggest tests for the educational institutions who planning to implement the concept. Research on e-learning has identified issues such as lack of ICT infrastructure (Cech and Bures, 2004; Nanayakkara and Whiddett, 2005; Selim, 2007; Koponen, 2008; Marfo and Okine, 2010; Hasasneh, 2010; Kahiigi et al., 2011), lack of awareness (Al-Khalifa, 2010; Hasasneh, 2010), access to internet (Nanayakkara and Whiddett, 2005; Marfo and Okine, 2010; Selim, 2007; Cech and Bures, 2004), lack of trust and security (Demiray, 2010), quality assurance (Sun et al., 2008; Al-Khalifa, 2010) lack of training (Cech and Bures, 2004; Marfo and Okine, 2010; Demiray, 2010), lack of support and funding (Marfo and Okine, 2010; Al-Khalifa, 2010), computer literacy (McVeigh, 2009; Al-Khalifa, 2010; Gulbahar and Tinmaz, 2006; Selim, 2007; Kahiigi et al., 2011), Regulatory issues (Demiray, 2010; Deepwell, 2007), lack of technical support (Marfo and Okine, 2010; Deepwell,2007; Rajoo and Krishnan, 2013), and lack of strategy and frameworks (Al-Khalifa, 2010; Hasasneh, 2010) are hindering the implementation of e-learning in many educational institutions.A summary of the e- learning obstacles presented by the researcher can be seen in the following Fig 2.

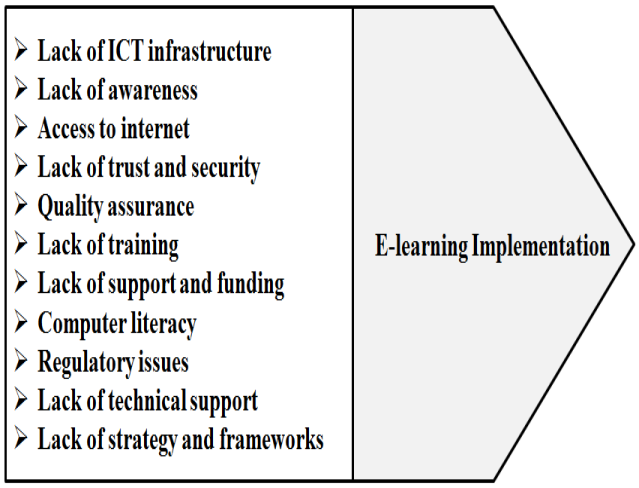

Figure 2. Challenges of e- learning.

Some authors have also classified the above mentioned challenges under the broader context of organizational, technical and social dimensions (Cech and Bures, 2004). The vital goal for educational institutions therefore must be to ensure that e-learning efforts successfully overcome these obstacles and deliver to users (both educators and learners) systems that are easy and suitable to use and most of all meet their expectations.

V. CONCLUSIONS

The outcomes of this study contribute to both theoretical and empirical knowledge on the implementation of e-learning. This paper helped to fill some gaps by providing insights into the phenomenon of e-learning from the perspective of

a developing country. It is noted that the extant research tends to be specific to developed countries, with little undertaken in developing countries. The paper identifies the most pertinent obstacles likely to be faced during the implementation of e-learning in developing countries. Absence of accurate information on key challenges that have impacts on the implementation of e-learning in developing countries could mislead an institution into failure implementation. In addition, the paper also presents the benefits which emerge from the implementation of e-learning. The benefits of e-learning are various, including social, economic, technical, cultural and managerial advantages. These benefits represent the milestone for the acceptance and smooth implementation of e-learning. The e-learning is at an initial stage in developing countries and therefore, it is envisaged that the findings of this study would be useful for the education institutions leaders in developing countries.

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STUDENTS' CLOUD SERVICE OF THE FACULTY OF EDUCATION IN SOMBOR

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Abstract - With the purpose of upgrading and enhancing the cooperation, communication and the exchange of teaching material between the students and the professors of the Faculty of Education in Sombor, a model of Cloud Service has been developed based on ownCloud open source software. File exchange is possible through the usage of web clients, workstations or usage of mobile clients of different software platforms (Microsoft Windows, Linux or Mac OS X operating system). The mobile client is available on most Android and Mac OS X clients from cellular to tablet devices (iPhone, iPad).

I. INTRODUCTION

In a variety of publicly accessable services for sharing and exchanging data (chart number 1), a model of Cloud service based on ownCloud has been developed to meet the needs of the students and the professors of the Faculty of Education in Sombor. The service has a primary task of providing access to the teaching material and the data no matter where you go or where you are. Teaching material and data have to be accessable from all platforms and devices. The service was concieved and realised in a way that you can easily access, post, delete, download and sync your teaching materials by using your own computer (PC) through web interface or ownCloud application. Teaching material can consist of files, folders, photos, photo galleries, contacts, calendars, and audio or video recordings. Some of the advantages of this service are:

- The service is available through web interface of FILE EXPLORER.
- Adding new teaching material and foldres is possible by simply dragging (drag and drop) between the application and the ownCloud diretory.
- Organizing the files and folders is very simple, like any regular directory.
- Creating a separate directory for the needs of data sync on your PC and on ownCloud service is available.
- Sharing teaching materials and folders is possible between users of the service also outside the service.
- Deleted files can be restored.
- Search of the teaching material is simple.
- Within the service, browsing and reading without downloading are the options at the user's diposal as well as automatic recongition of the file extension and the launch of an appropriate reader.
- Application Store is also at the user's disposal, which, by simply truning it on, adds, installs and runs a new ownCloud application.
- A high lever of safety and security of the teaching material as well as sensitive files and documents can e achieved.
- Service administrators can now use groups and users through LDAP and active directory.

TABLE 1: SOME OF THE PUBLICLY ACCESSIBLE SERVICES

Web host	***Storage size***	***Maximum file size***	***Direct access***	***Bandwidth limit***	***File expiration***	***Remote uploading***
DropBox	2 GB (max 18) for free users, unlimited for subscribers	300 MB (Unlimited for app users)	-	20 GB for free users, 200 GB for subscribers	90 days for inactive free users	Yes
Amazon Cloud Drive	5 GB	2 GB	No	Amazon limit	None	No
Cloud Safe	2 Gb for free users, 150 GB for subscribers	2 GB	Yes	None	None	Yes
Google Drive	5 GB for free users, 16 TB for subscribers	10 GB	Yes	None	None	Yes
SkyDrive	5 GB (upgradeable up to 25 GB)	4 GB	Yes	None	None	Yes

II. SERVICE ARCHITECTURE

The heart of ownCloud service is the server (picture number 1). With a role defined in this way, the server has many important tasks. Some of the tasks:

- Managing the data and providing security and safety of the data within the system
- Integration of the server and the stored data in the existing infrastructure
- Proper and safe execution of all the initiated processes on the server side
- Administration and management of users and security sertificates

In the very centre of the ownCloud service there is a PHP web application which can be initiated on all popular web servers (Misrosoft IIS or Apache), which are run on different platforms (Windows or Linux).

PHP application is in charge of managing all the aspects of the service, from control to user management all the way to the very storage of the teaching material and files on the memory media. In order to speed up the data access within the service, the PHP application has a data base addition which stores all the user, contact and shared information data. The data base is realised through a wide range of base types: Oracle, MySQL, Postgres, Microsoft SQL server and SQLite. Implementation of the data base on the memory media and the memorised data can be kept in different storage protocols: NFS, GFS, XFS,... If you need to expand storage capacities of the ownCloud service, it is possible to optionally add external file systems such as: FTP, WebDAV, DropBox, Google drive...

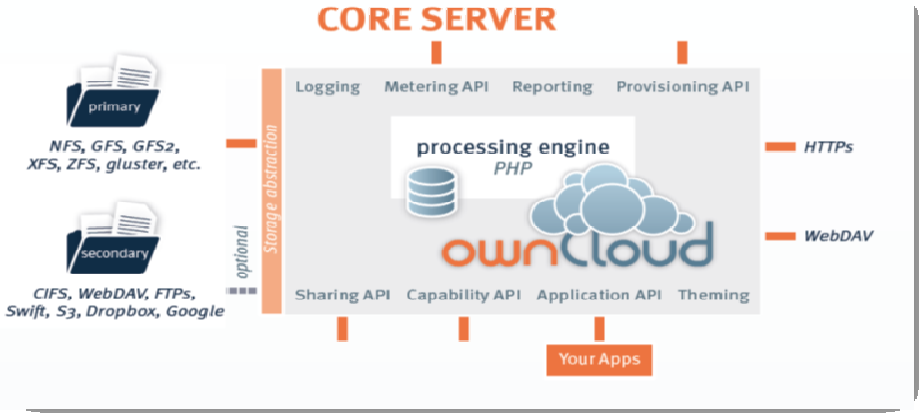

Figure 1. The architecture of ownCloud service

The functioning of the service is based on the execution of ownCloud application on the server side of the service while on the client's side the user can approach and post teaching material by using web browsers or specicfic client application for desktop computers and application for all the leading mobile platforms and devices. Service application for the execution on the server side is developed for the leading web softwares (MS IIS or Apache) with the acitve usage of PHP. Client application is available on all MS Windows (Windows XP, Windows 7, Windows 8, Windows Server 2008), Mac OS X or Linux (openSUSE, Red Hat, CentOS, Fedora, Debian or Ubuntu)operating systems.

In order to launch the server side of the service, the server must have a web server installed (Apache or MS IIS server) with a support for FastCGI and installed support for the following:

- PHP (5.3 or a bigger version)
- Data base (MySQL, Postgres or SQLite, while support for MS SQL server is not yet available)
- Configurate the maximum file size which can be uploaded to server (default size is set to maximum file size of 2 MB, which is not enough even for uploading MP3 files) and set the right directorium permissions needed for unobstructed functioning of the server.

OwnCloud service uses a desktop application for synchronization of the contents of local directories on the desktop computer with the

server itself. Constant propagation of the files guarantees constant syncronization between these two repositories. It means that if a file is uploaded on one side, the syncronization process is launched which syncs the new condition with the condition on the server. If one file deleted (or edited) in one repository the same one is also automatically deleted (edited) in the other repository. Basically, ownCloud application is not a standard client-server apllication where the server is always the master.

Student (client) accesses the content of the ownCloud server, through the system of the service log in. There is no independent client account creation on the server, for opening access accounts and passwords there is an ownCloud administrator responsible. After logging in on the server the student gets work surfaces from multiple units:

1. Navigation bar: provides navigation among different sections of ownCloud (sections for files, music, calendars, pictures...)
2. Application view: section where the content of the launched application is shown. For example, if you run a pdf file, it automatically launches pdf viewer which shows the content of the pdf file.
3. Upload/Create button: Posting new files.
4. Search/Logout: Searchin for specific files under a specific criteria and
5. Settings: Menu access key for adjusting server work setting. For example: setting language localization, selection of working threads, user and active application administration.

Access to the files and teaching materials is possible in various ways. Either by using the file manager, WebDav protocol or the client application. The application is also in charge of executing the process of file syncronization between the client (user of the server) and the ownCloud server. An application was developed for launching on PCs and mobile platforms (tablets or mobile clients/cellular phones). The application can also be installed on Android, iPhone and BlackBerry mobile platforms while on PCs it is intended for Windows, iOS and Linux operating systems.

III. CONCLUSION

The main task and objective of ownCloud service is to get the users accostumed to the usage of cloud technologies. By using ownCloud service we make it easier for our clients and students to access the teaching material, data and folders from various different platforms. Institutions which use this service are liberated of great costs of expensive server hardware, software and their maintenance. Even the end-user and the institution which uses this server eliminate the problem of data privacy and their security. Some of the advantages of the usage of this server are:

- File accessibility from all platforms: desktop computers, laptop computers, tablet computers, smart phones and other mobile devices.
- Guaranteed syncronization of files between different devices and locations.
- Controlled file sharing among service users as well as outside the service.
- Automatic data backup.
- Browsing or editing uploaded files, without using additonal applictaions other than the ones integrated within the service.
- It is possible to syncronize and access addresses, calendars, files, photos, albums, music files.

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"CLICK SAFELY"

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Abstract - Development of modern information technology and telecommunications improve every day, gets new dimensions in a certain scale can be called revolutions. That revolution had influence on children and they use the Internet from school and home. Children go online because of learning activities, playing games and many other activities. Some of the content on the Internet might have bad influence on children. Campaign "Click Safely" was initiated in order to protect the safety of children on the Internet. Through organized trainings for teachers, as well as overall information campaign of Ministry of Telecommunications, shows the importance of proper and safe use of the Internet. "Click Safely" campaign educate the youngest members, their parents and teachers. In this way, children are encouraged to use new technologies appropriate to their age, to recognize and properly respond to challenges of modern communication and meet only a useful and entertaining side of communication via new media. The purpose of this paper is to indicate potential danger of incorrect use of the Internet for children, and how much the role of parents and teachers in education are important.

I. INTRODUCTION

The Internet offers a lot of useful and funny information, but also it can have a bad influence on the users. The Internet provides opportunities for new knowledge, for socializing, and entertainment. Because of that, on Internet can be found content which are not provided for children.

Risks may arise when children are sophisticated; they gain the Internet access in advance of an infrastructure of awareness-raising, parental understanding, regulation and safety protection.

Children can be exposed on much bad content, like violence, sexual content, deceptions and many other things.

Virtual social networks can be useful for children and adolescents; it can be used for presentation of literary content, development of social skills. Social networks can be useful for children; it can help them to avoid inconvenience caused by the communication in physical reality.

It is very important for children to be informed about potential danger on the Internet. Campaign "Click Safely" is very important project in our country that gives some information about "smart" use of Internet.

II. RESESARCH ON THE USE OF THE INTERNET AMONG CHILDREN

European Union has a survey conducted of how often children use the Internet and to what purpose. A survey was conducted among children from 9-16 years in the whole Europe.

Levels and patterns of usage are very important for all to understand potential risks and opportunities of Internet. They shape the context within which children are exposed to risk factors and for which policy needs to ensure appropriate safeguards are in place. Policy will need to respond to new improvement and protection needs arising from children starting to use the Internet at an increasingly young age.

A. Where children use the Internet?

With the widening of mobile and personalized devices, the ways in which children use global network are more privately. That means that parents do not have a lot of control on their children.

During the survey, children were asked in which location they use the Internet and researches got the next answers: 85% of children use the Internet from home, 63% use the Internet in school or college and only 12% of children use the Internet in public places. Multiple responses were allowed.

TABLE I. WHERE CHILDREN USE THE INTERNET [4]

% of children who use Internet on the next locations:	
At school or college	63
Living room or other place at home	62
At a friend home	53
Own bedroom	49
At a relative's house	42
In an Internet cafe	12
In a public library or other place	12

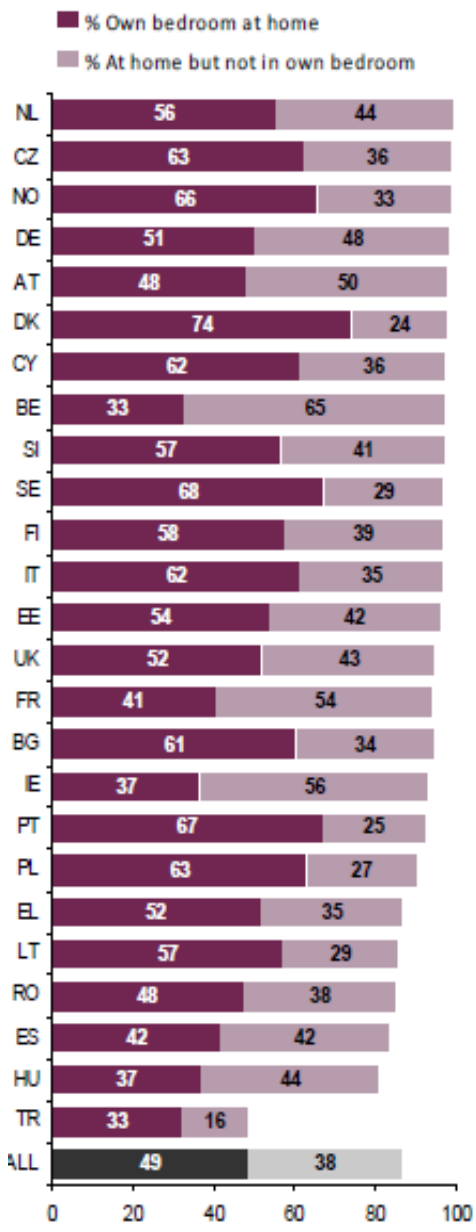

Figure 1. Children' s use of the internet at home, by country [4]

B. How children access the internet

Children can access to Internet by using many devices: 58% use personal computer, 31% by using a mobile phone, 26% by use of game console, 24% use a personal laptop, 22% use shared laptop and 12% use some of portable devices.

C. How much children use the Internet?

Children in their everyday live use the Internet. It can be at home, school, or with their friends. Less use may reflect the choice not to use the Internet; it also can indicate social exclusion. Since children approach to the Internet at younger ages, internet safety campaigns must be more important in the society.

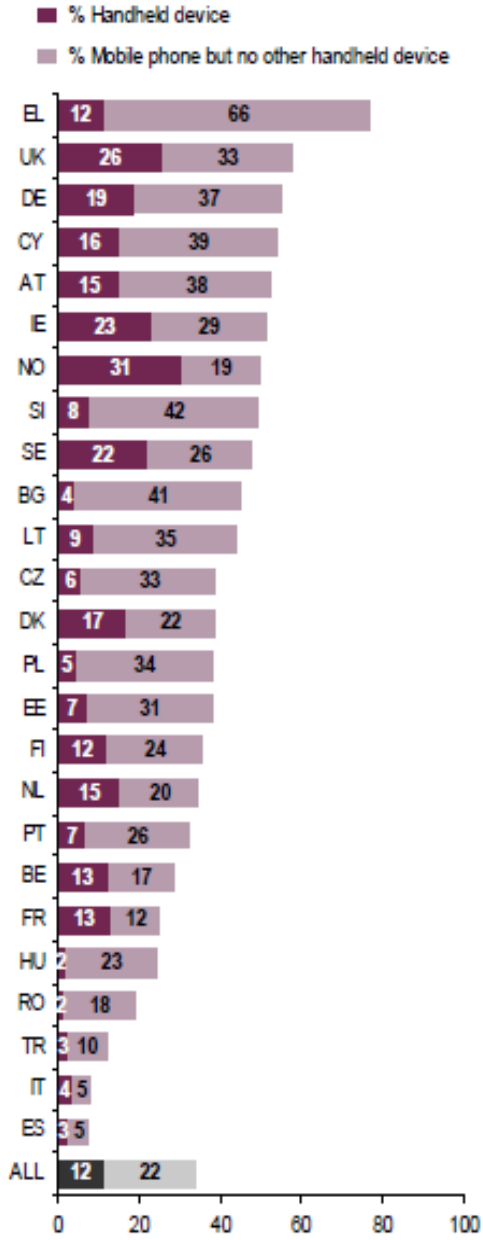

Figure 2. Accessing to the internet by using a mobile phone or handled device, by country [4]

D. Digital literacy and safety skills

Digital literacy has a very important role in children's use of the Internet. If a child is more literate, it will gain from the Internet while also it will be better prepared for potentials dangers.

III. RISKS AND SAFETY ON THE INTERNET

Potential dangers for children can be observed when using the Internet in the following aspects:

- Using of social networks and chat;
- Illegal trade;
- Human trafficking;
- Violence between the same ages;
- Facing problems.

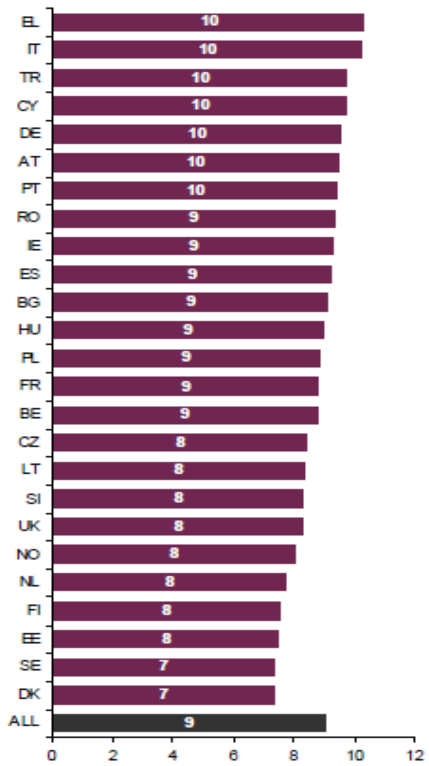

Figure 3. Average age when children start to use internet by contry [4]

A. *Using of social networks and chats*

Children do not have the opportunity to know with whom they communicate by social networks. They easily give personal information about them, which someone can abuse. On that way, attacker has a lot of information about person who want to attack. The most frequent target is children who are lonely and search for friends.

B. *Illegal trade*

Some organizations or persons are dealing with illegal trade. That means that they sell weapons or drugs by Internet. Those organizations usually have slogan witch is very attractive for the most of young people, like "earn a lot of money" or something else. Everyone can become a member of those organizations. When member understand that all business was fake, they want to leave organization and in that period start the problems. They get threats because the criminals want to member continue with job. If children believe in "easy money", their problems start. They may even end up in prison.

TABLE II. CHILDREN'S DIGITAL LITERACY AND SAFETY SKILLS

	11-12 year old		13-16 year old		
% who say they can...	Boys	Girls	Boys	Girls	All
Bookmark a website	52	45	72	70	64
Block messages from someone you don't want to hear from	45	46	72	72	64
Find information on how to use the internet safely	51	43	71	69	63
Change privacy settings on a social networking profile	34	35	65	66	56
Compare different websites to decide if information is true	43	37	64	62	56
Delete the record of which sites you have visited	37	29	63	59	52
Block unwanted adverts or junk mail/spam	36	32	61	56	51
Change filter preferences	15	12	41	29	28
Average number of skills	3.0	2.7	4.9	4.6	4.2

C. *Human trafficking*

Human trafficking is the most common criminal activity on the Internet. Criminals usually have offers for well-paid job or they play a role of good friend. Mostly victims of these criminal attacks are young people between 12 and 22 years. Young people who became victims usually arrive in some of European countries and get in prostitution.

D. *Violence between same ages*

Peer violence including group hate, insults, threats, etc. Victims get some photography or video that indicates on abuse. Social networks are mostly used for this form of Internet criminal.

E. *Facing with problems*

The first step of solving the problems is to facing with them. Mostly victims are persons who

do not have confidence and unhappy persons. Parents must have a significant role and they must prepare children for eventually risks and dangers during use of Internet.

IV. PORTAL "CLICK SAFELY"

The Ministry of Telecommunications and Information Society organized a lot of discussions and roundtables in 2009. That was a year of protecting children on the Internet. Since then the portal "Click Safely" started to work and offers children a lot of information and tips about protection on the Internet.

It was defined four items during the campaign "Click Safely":

- Physical safety,
- Psychological safety,
- Protect your computer-protect yourself,
- Protect yourself with knowledge.

Physical safety covers:

- Never give your personal information by the Internet,
- When you finish activities on social networks, you must log off,
- Never arrange meeting by the Internet, especial with unknown persons.

Physiological safety implies:

- If gusts on uncomfortable content, child need to close browser and tell parents for that,
- Children do not need to gossip their friends by the Internet because they can see that.

Protect computer-protect your child mean:

- You must install antivirus software,
- Downloading of contents can be dangerous.

Protect yourself with knowledge mean that you need direct children on some useful contents that can be interesting.

Portal "Click Safely" contains: surveys for primary school children, information for young people, information for parents and teachers, free antivirus software, expert advises. Also, you can exchange experiences with the same age children, play learning games and learn a lot of useful things.

Figure 4. PORTAL "CLICK SAFELY"

Figure 5. BROCHURE FOR CHILDREN [3]

Figure 6. BROCHURE FOR PARENTS [3]

V. CONCLUSIONS

Children must have some information about potential treats on the Internet. Many organizations perform criminal works. They use economic situation in Serbia to develop human trafficking, drugs trade, etc.

Social networks are the biggest problem because children make profile in early period of life and usually give personal information to other persons on social networks. Children do not understand potential risks and they do not care about safety.

Because of that, parents and teachers must cooperate and give education to children. They need to direct them on the right way, and they cannot allow criminals to hurt their children.

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EVALUATION OF WEB BASED INTELLIGENT E-LEARNING REPORT SYSTEM

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Abstract - The paper presents an aspect of the evaluation of an intelligent, web-based reporting system that has been created in order to obtain a report on patterns of behavior of future users of learning management system. A "subjective" aspect of the evaluation conducted by surveying teachers who use existing reporting system is presented in this paper. Suggestions for improvement have been determined and will be implemented in future work.

I. INTRODUCTION

E-learning, in the broadest sense, entails the use of information and communications technologies (ICT) as an aid in the process of education. The notion of E-learning nowadays implies the use of wireless and mobile technologies, as well as virtual worlds [1].

The expansion of E-learning has led to an increased use of Learning Management Systems (LMS).

The use of these systems has resulted in a need for monitoring the patterns of behavior of LMS users, with the aim of continuous improvement of the educational process.

Virtual learning environments such as Learning Management Systems are becoming more and more prevalent at universities. In addition to providing a wide range of possibilities in the process of blended learning, they also enable the planning of the whole teaching process by electronic means and facilitate the process of lifelong learning [2]. These systems are a good pedagogical basis for most of the activities that a student is expected to perform, since they require less effort, time and money and they are not limited in terms of the access point [3, 4].

Each learning management system contains a database with a record of the activities of each participant. This feature is of paramount importance because it allows a large amount of data to be retrieved in a fairly short period of time. However, many of these records require specialized tools for the extraction and processing of useful information. These tools have limited possibilities and their use is mostly reliant on the choice of administrator, depending on the type of information that needs to be extracted.

Data mining techniques provide a universal solution to this problem, with the possibility of enhancing the E-learning system [5, 6]. Data mining (also referred to as knowledge discovery in databases (KDD)) provides automatic extraction of implicit and interesting patterns out of very large databases [7]. The application of data mining techniques with the aim of discovering patterns from the Web is called Web mining.

In addition to the problem of analyzing the record of participants' activities, there is a need for improving the part of the learning management system which relates to reporting. This entails the use of intelligent possibilities in the analysis of user behavior patterns.

Since the intelligent system for predicting future behavior patterns has already been created [8], this paper presents only an aspect of the evaluation of the created system.

II. RESEARCH METHODOLOGY

A subjective evaluation was obtained by means of a survey conducted among the teaching staff of the Faculty of Technical Sciences in Čačak who use the Moodle system. The teaching staff use the system by designing one or more courses, depending on the number of courses they are teaching. They use electronic courses as a complement to the traditional teaching method. It remains upon the teachers to determine the measure in which the students will use the courses and the way they should be used, in terms of time, type and scope of the activities, as well as students' obligations with respect to this method of teaching.

The survey included 30 teachers who use the Moodle Learning Management System.

Table I presents the basic characteristics of the respondents.

TABLE I. INFORMATION ABOUT RESPONDENTS

Gender	Frequency	Percentage	Valid percentage
Male	16	53.3	53.3
Female	14	46.7	46.7
Total	30	100.0	100.0

III. RESULTS AND DISCUSSION

The results of the conducted survey are presented in this section in the form of questions and answers.

Question 1

Have you ever used/Are you using the current report system within the Moddle learning management system?

a) Yes b) No c) I don't know

The purpose of the first question is to determine the proportion of use of the existing report system.

The analysis of the results has shown that the majority of respondents (76.7%) use the report system, as shown in Table II. The analysis has been conducted using SPSS 17 program [9].

TABLE II. INFORMATION ABOUT RESPONDENTS REGARDING THE USE OF THE REPORT SYSTEM

Use of current system	Frequency	Percentage	Valid percentage
Yes	23	76.7	76.7
No	7	23.3	23.3
Total	30	100.0	100.0

Question 2

To what extent are you satisfied with the current report system?

1. Completely satisfied
2. Mostly satisfied
3. Cannot tell
4. Not thoroughly satisfied
5. Mostly dissatisfied

The second question refers to satisfaction with the current report system and its aim is to ascertain whether there is a need for enhancing the said system. Since 23.3% of teachers do not even use the current report system, only the answers of those who use it have been subjected to analysis.

The results are presented in Figure 1.

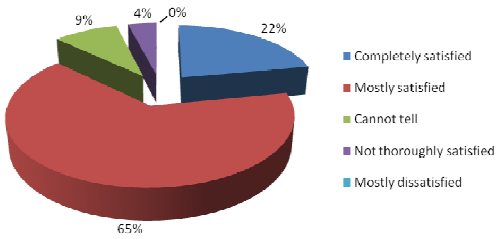

Figure 1. A graphic representation of respondents' satisfaction with the current system

As shown in Figure 1, the greatest percentage of teachers who use the report system is either completely or mostly satisfied with it, which leaves room for improvement.

Question 3

Would it be useful for the teaching process if you could predict future behavior patterns of your students?

a) Yes b) No c) I don't know

In order to analyze adequately this question, the teachers were divided into two groups - those who use the report system and those who do not.

A statistical method of bivariate correlation has been applied in order to determine the correlation between the two variables. The Pearson's coefficient of linear correlation has been calculated [10].

The results are presented in Table III.

TABLE III. CORRELATION AND PEARSON'S COEFFICIENT FOR QUESTION 3

		Usefulness of prediction	Use of current system
Usefulness of prediction	**Pearson** **Sig.** **N**	1 30	0.559 0.000 30
Use of current system	**Pearson** **Sig.** **N**	0.559 0.000 30	1 30

As shown in Table III, N refers to the number of respondents. Pearson's coefficient is 0.559, but there is a positive correlation between the use of the current report system and the usefulness of the system for predicting behavior patterns.

The value of Pearson's coefficient of correlation can range from -1 to 1.

According to Cohen [11], if the value of this coefficient exceeds 0.5, as it does in this case, the correlation is strong. This means that there is a strong relationship between the previous use of the report system and the need for introducing prediction of user behavior patterns.

The coefficient of determination in this case is 31.2% which shows the common variance of the two variables.

Since the Sig. value is 0.000, it is possible to say that the results are reliable, but as the sample was drawn from 30 respondents, the obtained correlation is moderate.

Question 4

4.1 To what extent is the newly created program useful in predicting activities within different modules?

1. Entirely satisfies the needs
2. Mostly satisfies the needs
3. Cannot tell
4. Mostly fails to satisfy the needs
5. Totally fails to satisfy the needs

The correlation has also been determined for question 4.1. It is the correlation between the need for predicting behavior patterns and the level of satisfaction with the newly created system.

A statistical overview of answers to this question has previously been provided (see Figure 2).

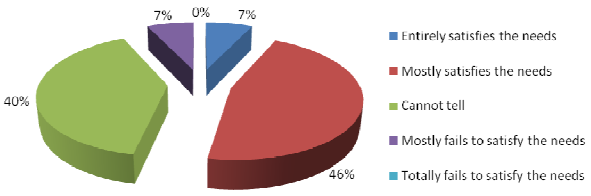

Figure 2. A graphic representation of respondents' satisfaction with the current system

As shown in Figure 2, the greatest percentage of users is mostly satisfied with the created system, but a significant percentage of users (40%) cannot decide whether or not they are satisfied.

In order to determine the correlation between the users who cannot decide whether they are satisfied with the report system and the need for predicting user behavior patterns, Pearson's coefficient has been calculated for both correlations (see Tables IV and V). 7% of the total number of respondents is completely satisfied with the newly-created system, but the same percentage claims that the use of the current system would fail to satisfy their needs. These users have also suggested ways of improving the system and their suggestions will be considered separately in the "Improvements" stage.

TABLE IV. CORRELATION AND PEARSON'S COEFFICIENT FOR QUESTION 4.1

		Satisfaction with newly-created system	Use of current system
Satisfaction with newly-created system	**Pearson** **Sig.** **N**	1 30	0.190 0.314 30
Use of current system	**Pearson** **Sig.** **N**	0.190 0.314 30	1 30

According to the results given in Table IV., Pearson's coefficient of correlation is 0.190, which implies a positive correlation between the use of the existing system and satisfaction with the newly-created system.

According to Cohen [11], if the value of this coefficient ranges from 0.10 to 0.29, the correlation is small, which implies a weak relationship between the use of the existing system and the results referring to satisfaction with the new system.

Since the Sig. value is 0.314, the obtained results should be viewed with caution.

TABLE V. CORRELATION AND PEARSON'S COEFFICIENT FOR QUESTION 4.2

		Satisfaction with new system	Need for prediction
Satisfaction with new system	**Pearson** **Sig.** **N**	1 30	0.390 0.033 30
Need for prediction	**Pearson** **Sig.** **N**	0.390 0.033 30	1 30

Pearson's coefficient in Table V is 0.390, which means that there is a positive correlation between the need for predicting user behavior patterns and satisfaction with the new system.

According to Cohen [11], if the value of this coefficient ranges from 0.30 to 0.49, as in this case, the correlation is moderate, which means that the relationship between the need for prediction and satisfaction with the newly created system is moderate.

Since the Sig. value is 0.033, the obtained results should be viewed with caution.

4.2 To what extent is the newly-created system user-friendly?

1. Completely user-friendly
2. Partly user-friendly
3. Not at all user-friendly

In order to determine whether there is a need for providing training in the use of the created system, the users have been surveyed in the

section which refers to user-friendliness. The obtained results are shown in Figure 3.

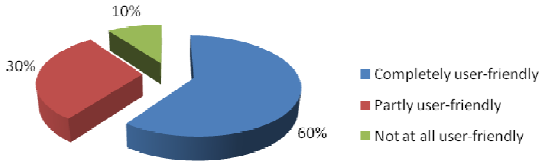

Figure 3. Users' opinions about user-friendliness of the created system

Figure 3 shows that 60% of respondents find the system completely user-friendly. However, the remaining 40% of respondents find the system partly user-friendly or not at all user-friendly.

IV. CONCLUSION

The paper presents an aspect of the evaluation of the created intelligent system for predicting user bahavior patterns. The results indicate a need for the improvement of the existing system and a wholehearted acceptance of the new system. Since the newly-created system provides access probabilities, the teacher is in a position to organize the teaching process according to these results. Future work relates to the authorization of the system and the addition of other modules.

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REQUIREMENTS QUALITY ONLINE COURSES

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Abstract - Every day on the Internet online courses appear (good, bad, free, expensive, legal, illegal, ...). They can be of great benefit, especially to people who, because of a lack of free time cannot attend face-to-face teaching, and have duty of continuous professional development. In this great offer it is really difficult to choose the right one that will fully meet the strict criteria. In this paper we point to the conditions and requirements that may significantly facilitate students making their final decision regarding the selection of different forms of online training.

I. INTRODUCTION

Suffice it to connect to the Internet and in a short time I have lavished on advertising on various online courses from foreign to domestic ones. Whenever I see them I think that you can just fill out a registration form, enter your information and sign up for some of them in a matter of days the certificate is obtained. Certificate of having passed the course, which everubody will of course recognize. Therefore, I decided to go a little further to analyze this topic. First, I found that a large number of platforms that allow authors courses quickly and easily (sometimes free, sometimes not) create and deploy courses. As with everything in this area is dominated by a few companies that original solutions are no longer on the market, with most of its clients, which collaborate with the most eminent universities around the world, and that her career prescribed rules and establish standards to be met by online courses, because this issue very seriously. The hypothesis of this paper will set so that it can help all future users and student to choose the best possible quality of course, that is to recognize those who truly meet the necessary standards. Hypothesis: standard courses are an important factor in raising the quality of online courses, without respect there is no quality standards and a recognized course. That means that anyone who wants to attend the course should keep in mind that they will not succeed if you expand your knowledge of the chosen course does not meet basic standards that will be discussed in this paper.

II. COURSE DESIGN

Course Design addresses elements of instructional design. For the purpose of this program, course design includes such elements as structure of the course, learning objectives, organization of content, and instructional strategies.

A. Goals and Objectives

Exemplary: Goals and objectives are easily located within the course; Goals and objectives are clearly written at the appropriate level and reflect desired outcomes; Goals and objectives are written in measureable outcomes (students know what they are expected to be able to do); Goals and objectives are made available in a variety of areas in the course (within the syllabus and each individual learning unit).

Accomplished: Goals and objectives are located within the course syllabus or the individual learning units; Objectives are written to reflect desired learning outcomes, although not all are written as measureable outcomes; Students have some understanding of what is expected of them.

Promising: Goals and objectives are not easily located within the course; Goals and objective are not clearly written in measurable learning outcomes Students may be unsure of what they are expected to be able to do; The level does not match the desired outcomes.

Incomplete: Goals and objectives are not easily located within the course; Some are missing and others poorly written; The level does not match the desired learning outcomes.

B. Content Presentation:

Exemplary: Content is made available or “chunked” in manageable segments (i.e., presented in distinct learning units or modules); Navigation is intuitive; Content flows in a logical progression; Content is presented using a variety of appropriate mechanisms (content modules, single pages, links

to external resources,); Content is enhanced with visual and auditory elements; supplementary resources are made available and are well-integrated with other course materials (integrated publisher resources, e-textbooks, course manuals, etc.).

Accomplished: Content is made available or "chunked" in manageable segments (i.e., presented in distinct learning units or modules); Navigation is somewhat intuitive, but some "exploring" is required to determine the flow of content; Content is presented using a variety of mechanisms (content modules, single pages, links to external resources, RSS Feeds, print material); Visual and/or auditory elements occasionally enhance the content; supplementary resources are made available (course CDs, textbooks, course manuals, etc.).

Promising: Some content segments are overly large (or possibly too small) for the specified objectives Navigation is only occasionally intuitive, thus the flow of content is sometimes not easily determined; The design does not avail of the content presentation tools (content modules, single pages, links); Few or no visual and/ or auditory elements are used to enhance the content; Supplementary resources may be made available (course CDs, textbooks, course manuals, etc.).

Incomplete: Content is not "chunked" into manageable segments; Navigation is not intuitive and the flow of content is unclear; The design does not avail of the content presentation tools (content modules, single pages, links); No visual or auditory elements are used to enhance the content; Supplementary resources are not made available (course CDs, textbooks, course manuals, etc.).

C. Learner Engagement

Exemplary: It is clear how the instructional strategies will enable students to reach course goals and objectives; Course design includes guidance for learners to work with content in meaningful ways; Higher order thinking (e.g., analysis, problem solving, or critical reflection) is expected of learners and explained with examples or models Individualized instruction, remedial activities, or resources for advanced learning activities, such as integrated publisher resources, are provided.

Accomplished: Instructional strategies are designed to help students to reach course goals and objectives, although this relationship may not be obvious to learners; Guidance is provided, but could be improved with greater detail or depth Higher order thinking is required for some activities but is not well-explained or supported (e.g., by providing examples of "good answers") Differentiated instruction (such as remediation) may be available on a limited basis

Promising: It is not clear how the instructional strategies will help learners achieve course goals and objectives Guidance in using content materials may only be provided on a limited basis Higher order thinking is not required or encouraged Differentiated instructional opportunities are not provided, although there may be supplementary content resources available

Incomplete: Instructional strategies do not provide students with skills needed to achieve course goals and objectives Content is provided but it is not clear what students are expected to do with it Higher order thinking is not expected from students No supplementary resources or activities are provided for remediation or advanced study

D. Technology Use

Exemplary: Tools available within the LMS are used to facilitate learning by engaging students with course content LMS tools are used to reduce the labor-intensity of learning (e.g., providing links to needed resources where they will be used in the course, integrating publisher resources that are tailored to the course materials, and providing streamlined access to supplementary materials) Technologies are used creatively in ways that transcend traditional, teacher-centered instruction A wide variety of delivery media are incorporated into the course

Accomplished: Tools available within the LMS could be utilized more (or more creatively) to engage learners with course content LMS tools are made available to assist students, but could be organized or arranged for even greater usefulness Technologies within the course are used in many cases merely to replicate traditional face-to-face instruction There is some variety in the tools used to deliver instruction

Promising: Tools available within the LMS are not used to their full extent or not used when it would be appropriate to do so Only a few tools (of those available within the LMS) are used in a way that streamlines access to materials and activities for students Technologies within the LMS are used primarily by instructors and not students ("students as recipients of content" model); There

is little variety in use of technologies within the LMS.

Incomplete: Technologies used within the LMS do not engage students with learning; Tools that could reduce the laborintensity of online instruction are not utilized; Students are not expected to use technologies available within the LMS; Only a few technologies available within the LMS are used.

III. INTERACTION AND COLLABORATION

Interaction and Collaboration can take many forms. The ECP criteria place emphasis on the type and amount of interaction and collaboration within an online environment. Interaction denotes communication between and among learners and instructors, synchronously or asynchronously. Collaboration is a subset of interaction and refers specifically to those activities in which groups are working interdependently toward a shared result. This differs from group activities that can be completed by students working independently of one another and then combining the results, much as one would when assembling a jigsaw puzzle with parts of the puzzle worked out separately then assembled together. A learning community is defined here as the sense of belonging to a group, rather than each student perceiving himself/herself studying independently [1].

A. Communication Strategies

Exemplary: There are plentiful opportunities for synchronous and/or asynchronous interaction, as appropriate; Asynchronous communication strategies promote critical reflection or other higher order thinking aligned with learning objectives; Synchronous communication activities benefit from real-time interactions and facilitate "rapid response" communication (i.e., students gain practice discussing course content extemporaneously without looking up basic, declarative information).

Accomplished: Several communication activities are included to reinforce the desired learning outcomes; Asynchronous communications sometimes require reflection or other higher order thinking; Synchronous interactions are meaningful but may not take full advantage of the realtime presence of instructor and/or peers.

Promising: Communication strategies are included, however, they may not consistently reinforce desired learning outcomes; Asynchronous communications are focused primarily on lower levels of thinking (e.g., summarizing, describing, interpreting, etc.); Synchronous interactions are used mostly for instructor explanation or clarification of content, or other instructor-focused activities.

Incomplete: Little to no attention has been devoted to communication strategies; Interaction activities that are included do not invoke critical thinking, reinforce learning, or take advantage of the specific strengths of the communication tools used.

B. Development of Learning Community

Exemplary: Communication activities are designed to help build a sense of community among learners Student-to-student interactions are required as part of the course; Students are encouraged to initiate communication with the instructor; Collaboration activities (if included) reinforce course content and learning outcomes, while building workplace-useful skills such as teamwork, cooperation, negotiation, and consensus-building.

Accomplished: Communication activities may help learners build a sense of community, but do not appear to be designed with this in mind; Some student-to-student interaction is built into the course Students interact with the instructor, although primarily as a result of instructorinitiated contact; Collaboration activities (if included) support some team-building skills, but may not purposefully integrate these elements.

Promising: Effort has been devoted to fostering a sense of community in the course, but only minimally; More focus is needed on designing activities and a course climate that foster student-to-student interactions as well as student-to-instructor interactions.

Incomplete: Little to no attention has been devoted to building a sense of community in this course.

C. Interaction Logistics

Exemplary: Guidelines explaining required levels of participation (i.e., quantity of interactions) are provided; Expectations regarding the quality of communications (e.g., what constitutes a "good" answer) are clearly defined; A rubric or equivalent grading document is included to explain how participation will be evaluated; The instructor actively participates in communication activities, including providing

feedback to students; The instructor uses communication tools to provide course updates, reminders, special announcements, etc.

Accomplished: Expectations of student participation in communication activities are given, but would benefit from more detail; Expectations regarding the quality of communications are included, but may be sketchy and lack detail or illustrative examples; Minimal information may be provided regarding grading criteria for communications activities; The instructor is occasionally involved in communication activities; The instructor sometimes takes advantage of LMS tools to post announcements, reminders, etc.

Promising: Instructor expectations of student interactions are not made clear; Little information is provided regarding what constitutes a "good" response or posting; Students are not given a clear set of criteria for how communications activities will be graded; The instructor appears to be largely absent from communication activities.

Incomplete: Few announcements, reminders, or other updates are provided; Few or no guidelines are provided to students regarding the desired quantity or quality of communications/ interactions within the course; The instructor does not participate in communications activities with students.

IV. ASSESSMENT

Assessment focuses on instructional activities designed to measure progress towards learning outcomes, provides feedback to students and instructor, and/or enables grade assignment. This section addresses the quality and type of student assessments within the course[2].

A. Expectations

Exemplary: Assessments match the goals & objectives; Learners are directed to the appropriate objective(s) for each assessment; Rubrics or descriptive criteria for desired outcomes are provided (models of "good work" may be shown, for example); Instructions are written clearly and with sufficient detail to ensure understanding.

Accomplished: Assessments match the goals & objectives; Rubrics or descriptive criteria for desired outcomes are included for some assessment activities Instructions are written clearly, with some detail included.

Promising: Students are assessed on the topics described in the course goals and objectives; There may be some explanation of how assessments will be scored/ graded; Instructions lack detail that would help students understand how to complete the activities.

Incomplete: Assessments bear little resemblance to goals & objectives; Expectations or grading criteria are not provided; Instructions are limited or absent.

B. Assessment Design

Exemplary: Assessments appear to measure the performance they claim to measure (e.g., activities are explained using appropriate reading level and vocabulary); Higher order thinking is required (e.g., analysis, problem-solving, etc.); Assessments are designed to mimic authentic environments to facilitate transfer; Assessment activities occur frequently throughout the duration of the course; Multiple types of assessments are used (research project, objective test, discussions, etc.).

Accomplished: Assessment activities have "face validity" (i.e., they appear to match the curriculum); Some activities involve higher order thinking; Assessment activities may focus on tasks similar to real-world application of skills; Multiple assessments are included; at least three different types of assessments are used.

Promising: It is not clear whether the assessment activities actually measure the desired skill; The vast majority ofassessments require only low-level thinking (memorization, for example); Assessment activities typically do not include tasks that are relevant beyond the scope of this course; multiple assessments are included; Two types of assessments are included, at a minimum.

Incomplete: Assessment activities appear to lack validity due to bias, lack of clarity in questions or tasks, or because students are evaluated on performance unrelated to the stated objectives; No higher-order thinking skills are required to complete assessment activities; There is little or no evidence of authenticity built into assessments; Assessments are too few and far apart for the course content.

C. Selfassessment

Exemplary: Many opportunities for self-assessment are provided; Self-assessments provide constructive, meaningful feedback.

Accomplished: Some self-assessment activities are included; Self-assessments provide feedback to learners.

Promising: There may be selfassessment activities, but they are limited in scope and do not offer useful feedback.

Incomplete: A few self-assessments may be included, but they offer little more feedback than flash cards.

V. LEARNER SUPPORT

Learner Support addresses the support resources made available to students taking the course. Such resources may be accessible within or external to the course environment. Specifically, learner support resources address a variety of student services[3].

A. Orientation to Course and LMS

Exemplary: Clearly labeled tutorial materials that explain how to navigate the LMS and the specific course are included; Tutorials are found easily (few clicks) whether internal or external to the course, with easy return to other areas of the course; Tutorial materials support multiple learning modalities:audio, visual, and text based.

Accomplished: Clearly labeled tutorial materials that explain how to navigate the LMS and the specific course are included; Tutorials may not be easily accessed, or require the learner to leave course site without an easy return; Tutorial materials support multiple learning modalities: audio, visual, and text based.

Promising: Tutorial materials that explain how to navigate the LMS and/or the specific course may be evident, but not easily found; Materials do not support multiple learning modalities and are textbased only.

Incomplete: Tutorial materials explaining how to navigate the LMS or the specific course may be included but are difficult to find, lack detail, are not well organized, or are incomplete; Tutorial materials that are included do not support learning modalities

B. Supportive Software (Plug-ins)

Exemplary: Clear explanations of optional and/or required software including any additional costs are provided within the course; Software required to use course materials is listed with links to where it can be captured and installed; Links are located within the course where learners will use the software (i.e., near the materials requiring its use).

Accomplished: Clear explanations of optional and/or required software (in addition to the LMS) are provided within the course; Software required to use course materials is listed but links to where it can be captured and installed are not found near where it will be used.

Promising: Software (in addition to the LMS) required to use course materials is mentioned, but not explained; Links to where it can be captured and installed are provided, although they may not be conveniently located.

Incomplete: The need for additional software required to use course materials may be mentioned; Links to software may be missing or incomplete.

C. Instructor Role and Information

Exemplary: Contact information for the instructor is easy to find and includes multiple forms of communication (for example, e-mail, phone, chat, etc.); Expected response time for e-mail replies is included; The instructor's role within the course is explained (for example, whether he/she will respond to "tech support" type questions); The instructor's methods of collecting and returning work are clearly explained.

Accomplished: Contact information for the instructor is included but may not be easy to find; contact information includes more than one type of communication tool; Expected response time for e-mail replies may be included; Instructor's role within the course is not clearly spelled out to students; The instructor's methods of collecting and returning work are clearly explained.

Promising: Contact information for the instructor is provided but not easy to find; Contact information includes only one way to reach the instructor; Information concerning response time for e-mail replies is not included; Little or no information is given regarding the instructor's role in the course; The instructor's methods of collecting and returning work are evident but not clearly explained.

Incomplete: Contact information for the instructor is sketchy, at best; Lacks information concerning response time for e-mail replies is included; Information regarding the instructor's role in the course is not included; Instructor's methods of collecting and returning work are confusing or non-existent.

D. Course/Institutional Policies & Support

Exemplary: Links to institutional policies, materials, and forms relevant for learner success (for example, plagiarism policies) are clearly labeled and easy to find; Links allow easy navigation from the course to the information and back; course/instructor policies regarding decorum, behavior, and netiquette are easy to find and written clearly to avoid confusion; Links to institutional services such as the library, or writing center, are clearly labeled and easy to find.

Accomplished: Links to institutional policies, materials, and forms relevant for learner success (for example, plagiarism policies) are included but may require searching to find; Links allow easy navigation from the course to the information and back; Course/instructor policies regarding decorum, behavior, and netiquette are included and are written clearly to avoid confusion; Links to institutional services such as the library, writing center, or financial aid office may be included but require searching to find.

Promising: Links to some institutional policies, materials, and forms relevant for learner success (for example, plagiarism policies) are included but are difficult to find; Course/instructor policies regarding decorum, behavior, and netiquette are included but are not clearly written or would benefit from more detail; A few links to institutional services such as the library, writing center, or financial aid office may be included but require searching to find.

Incomplete: Links to some institutional policies, materials, and forms relevant for learner success (for example, plagiarism policies) are not included; Some course/instructor policies regarding decorum, behavior, and netiquette may be included but are not clearly written or would benefit from more detail; Links to institutional services such as the library, writing center, or financial aid office are not included.

E. Technical Accessibility Issues

Exemplary: Course materials use standard formats to ensure accessibility; If specific software is required to which some learners may not have access, alternative file types are provided; Large files are identified to help learners consider download times; Alternative (smaller) files are provided where appropriate; Videos are streamed whenever possible; graphics are optimized for web delivery and display without needing extensive scrolling.

Accomplished: Course materials use standard formats to ensure accessibility; If specific software is required to which some learners may not have access, alternative file types are sometimes provided; Large files are not identified as such; alternative (smaller) files are not provided; Video files are streamed in some cases; Graphics are not be optimized for web delivery but display without extensive scrolling.

Promising: Course materials use standard formats to ensure accessibility; If specific software is required to which some learners may not have access, alternative file types are not provided; Large files are not identified as such and alternative (smaller) files are not provided Video files are not streamed; Graphics are not optimized for web delivery and may require extensive scrolling.

Incomplete: Course materials sometimes use standard formats to ensure accessibility; If specific software is required to access course materials, no mention of this is included and alternative file types are not provided; Large files are not identified as such and alternative (smaller) files are not provided; Video files are not streamed; Graphic files are not optimized for web delivery and require extensive scrolling.

F. Accommodations for Disabilities

Exemplary: Supportive mechanisms allow learners with disabilities to participate fully in the online community; The design and delivery of content integrate alternative resources (transcripts, for example) or enable assistive processes (voice recognition, for example) for those needing accommodation; Links to institutional policies, contacts, and procedures for supporting learners with disabilities are included and easy to find; Design factors such as color, text size manipulations, audio and video controls, and alt tags reflect universal accessibility considerations.

Accomplished: Supportive mechanisms allow learners with disabilities to participate in the online community for most activities; The design and delivery of content integrate some alternative

resources or enable assistive processes for those needing accommodation; Links to institutional policies, contacts, and procedures to support learners with disabilities are included but may not be easy to find; Design factors such as color, text size manipulation, audio and video controls, and alt tags have been considered in some cases.

Promising: Supportive mechanisms allow some learners with disabilities to participate fully in the online community; The design and delivery of content do not include alternative resources nor enable assistive processes for those needing accommodation; Links to institutional policies, contacts, and procedures to support learners with disabilities are not evident; Design factors such as color, text size manipulation, audio and video controls, and alt tags have not been considered.

Incomplete: Supportive mechanisms allow some learners with disabilities to participate in the online community for some activities; The design and delivery of content do not apply alternative resources nor enable assistive processes for those needing accommodations; Links to institutional policies, contacts, and procedures to support learners with disabilities are not evident; Design factors such as color, text size manipulation, audio and video controls, and alt tags have not been considered.

G. Feedback

Exemplary: Learners have the opportunity to give feedback to the instructor regarding course design and course content both during course delivery and after course completion; Feedback mechanisms allow students to participate anonymously in course evaluation.

Accomplished: Learners have the opportunity to give feedback to the instructor regarding course design and/or course content, but only after course completion; Feedback mechanisms allow students to participate anonymously in course evaluation.

Promising: Learners have the opportunity to give feedback to the instructor regarding course design or course content, but only after course completion; Feedback mechanisms do not guarantee privacy to the student.

Incomplete: Learners do not have the opportunity to give feedback to the instructor regarding course design or course content; Feedback mechanisms do not guarantee privacy to the student.

VI. CONCLUSION

All this leads to the conclusion that it is not easy to choose a course. It is certain that the work hypothesis was confirmed, and a conclusion on this issue is: no respect these standards there is no quality onlaj course. This would be especially be of great value to teachers, professors, educators , with a duty of continuous professional development, because the changes in the field of their work commitments often occur, and they need to be in constant touch with the latest developments. Hence, the development of even more necessary. However, this does not mean that it should be abuse, so these courses and seminars charging schools and educators at enormously high prices (most would even supposed to be free). Because the platform used for creating online courses and seminars are free of charge can be found on the internet. This, however, could be the subject of a new study.

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COMPARING ALGORITHMS USED IN SOLVING SUDOKU PUZZLES

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Abstract - This paper deals with differences between two algorithms used for solving Sudoku problems. Algorithms used are Brute Force algorithm and Backtracking algorithm. The project is done in Java programming language. The goal of this project is to show the differences between those two algorithms.

I. INTRODUCTION

Search algorithms can be compared with different parameters: speed, memory consumption, ability to work with heuristics and others. Comparison between two search algorithms will be shown in this paper using a Sudoku solver that was created on TF "Mihajlo Pupin", by us, for this project.

For solving a Sudoku problem, we investigated two search algorithms: Brute Force algorithm and Backtracking algorithm. These two were chosen because even if they are similar there is still a very distinct difference in speed.

The goal of this project is to show the difference in speed between these two algorithms based on the difficulty of the Sudoku problem given. Since they work similarly, it is expected that the speed would be similar too but that is not the case.

II. SUDOKU

Sudoku is a logic-based puzzle. The objective is to fill all the fields so that rows, columns, and boxes contain all of the digits from 1 to 9. Any digit can not appear twice in any row, column or box.[1]

Many variants of the original Sudoku include letters, different rules and so on. Completed Sudoku puzzles are a type of Latin squares with the additional property of no repeated digits in rows, columns, and boxes.

The number of classic 9x9 Sudoku solutions is 6.67×10^{21}. If we take into account that you can apply rotation, reflection and permutation to any solved Sudoku, the number of essentially different solutions drops down to 5.47×10^{9}, which is still a lot [2].

Figure 1 shows a typical Sudoku problem for a 9x9 Sudoku puzzle. On Figure 2 there is a solution to the same Sudoku puzzle.

5	3			7				
6			1	9	5			
	9	8					6	
8				6				3
4			8		3			1
7				2				6
	6					2	8	
			4	1	9			5
				8			7	9

Figure 1. An example of a typical Sudoku puzzle

5	3	4	6	7	8	9	1	2
6	7	2	1	9	5	3	4	8
1	9	8	3	4	2	5	6	7
8	5	9	7	6	1	4	2	3
4	2	6	8	5	3	7	9	1
7	1	3	9	2	4	8	5	6
9	6	1	5	3	7	2	8	4
2	8	7	4	1	9	6	3	5
3	4	5	2	8	6	1	7	9

Figure 2. The solution to the puzzle in Figure 1

III. BRUTE FORCE ALGORITHM AND BACKTRACKING ALGORITHM

A. Brute Force algorithm

First algorithm that we are going to talk about is Brute Force algorithm. It is basically an algorithm that tries every possible scenario in a problem until it finds a correct one.

Brute Force algorithm first fills all the fields with ones (1 - one) and then starts changing the first number that isn't locked (locked numbers are ones that were a part of the puzzle). Every time it increments that number it checks to see if the puzzle is solved. If it is not, then it continues incrementing that same number until it reaches number 9, then it resets to 1 and increments the number in the next field. Since it checks for solutions after each step, it is really slow and can take from minutes to days to complete a puzzle considering the difficulty. It is going through every possible solution until it finds the right one. Example of Sudoku puzzle and the start of solving one with Brute Force using Java was shown in Figure 3 and Figure 4.[3]

Advantage of Brute Force is that a solution is guaranteed (as long as Sudoku is valid).

The disadvantage is that it is much slower than other algorithms including Backtracking.

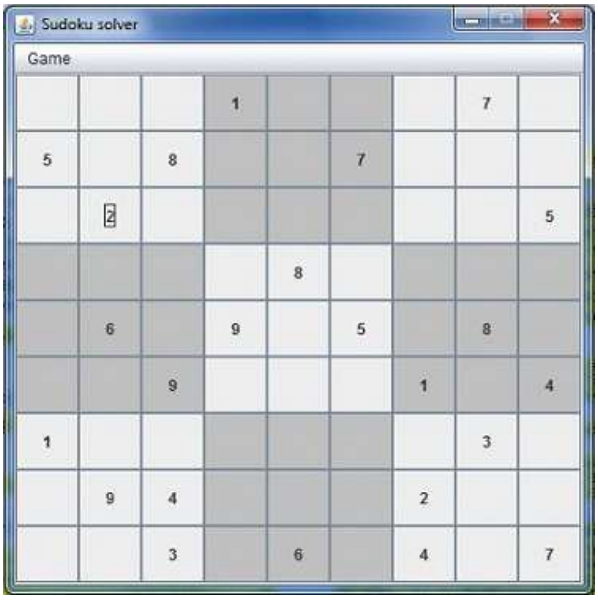

Figure 3. Example Sudoku

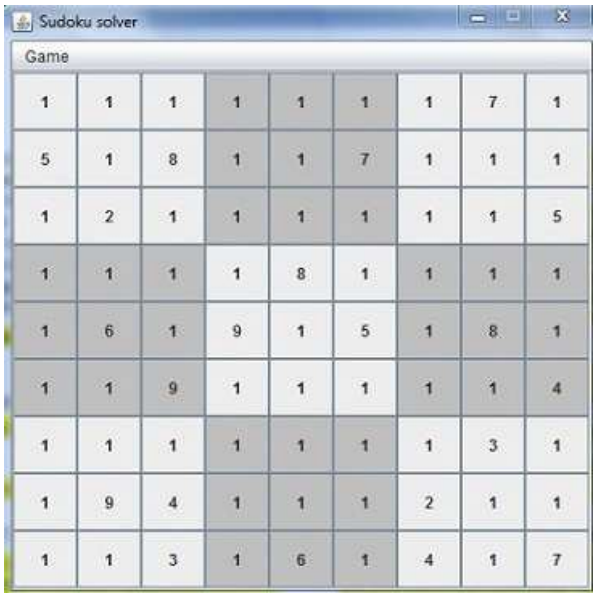

Figure 4. Start of solving the puzzle in Figure 3

B. Backtracking algorithm

The second algorithm is Backtracking algorithm.[4] This algorithm is a form of a Brute Force but it is much faster.

The way it works is that it starts from the first empty field and starts filling it with digits from 1 to 9. If the digit can be written it writes it and goes on to the next empty field and starts doing same. If no numbers can be written to one field it then clears that field and backtracks to the previous field and increments that number by one. Then it goes on to the next field and repeats all the steps. It will backtrack any amount of times it is necessary to fill the fields correctly.[3]

It finishes when it fills the last field in the puzzle with the correct number.

The advantages are that a solution is guaranteed (same as with Brute Force algorithm) but also that it is much faster for this kind of problems.

There are no disadvantages that we encountered for this algorithm while solving Sudoku puzzles.

IV. PROJECT SUDOKU SOLVER

This project was done in an IDE "NetBeans" (see Figure 5) using Java programming language. The project helped in understanding Object Oriented Programming while developing this Sudoku solver. The development process was not hard but there were some setbacks. Several methods were used until satisfactory one was found.

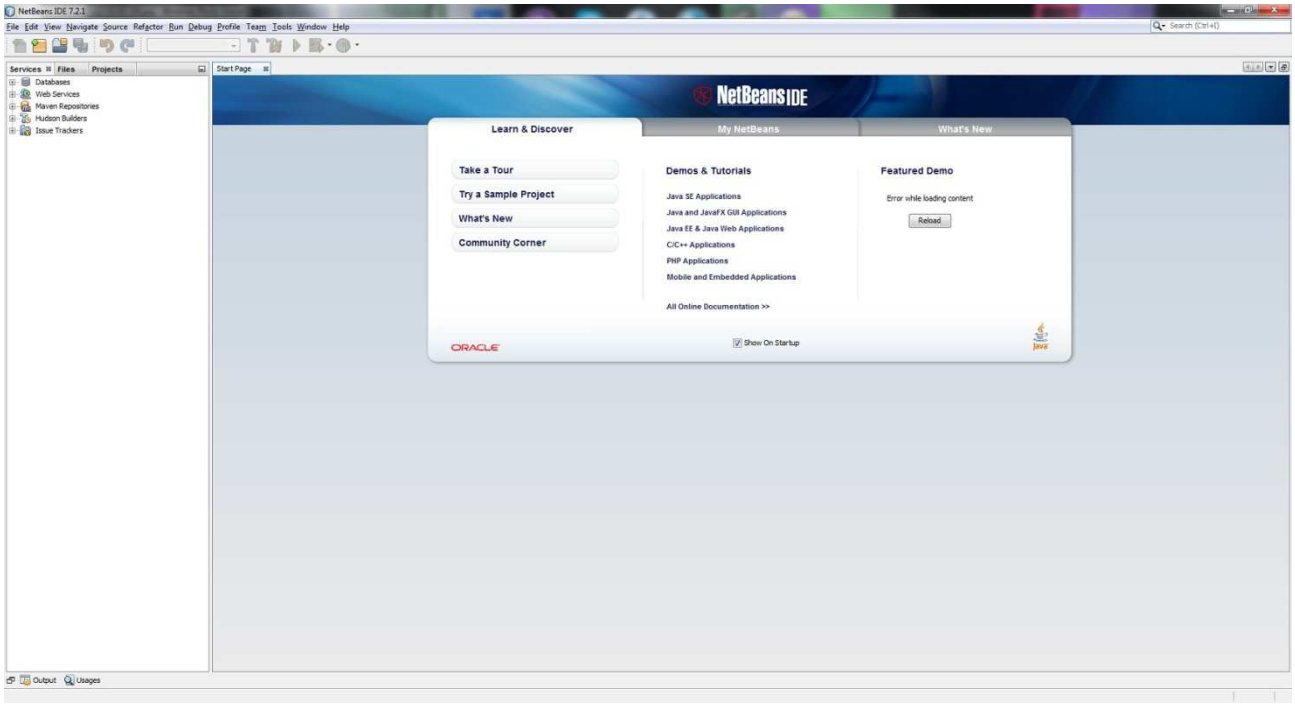

Figure 5. NetBeans IDE

V. COMPARING ALGORITHMS

The goal was to compare the speed of solving specific Sudoku problems with those two algorithms on three levels of difficulty, easy, medium and hard.

Three levels of difficulty are as following:

- Easy: An entry level Sudoku. Number of given digits ranges from 36 to 49. For these tests we chose one with 36.[2]
- Medium: A standard level Sudoku. Number of given digits ranges from 32 to 35. For these tests we chose one with 32.[2]
- Hard: A difficult level Sudoku. Number of given digits ranges from 28 to 31. For these tests we chose one with 28.[2]

Sudoku puzzles where chosen using a random puzzle generator found on the internet using the number of given digits as a reference.

In the Table 1 you will see the time needed to solve each of the three Sudoku puzzles using these two algorithms. Tests were done three times with each puzzle and an average time was taken as a result.

Times are in milliseconds (ms) and minutes (min).

TABLE 1. AVERAGE TIME NEEDED TO FINISH THE PUZZLE

Name of the algorithm	Easy	Medium	Hard
Brute Force algorithm	> 90 min	>90 min	>90 min
Backtracking algorithm	6ms	42ms	46ms

Brute Force is very slow for this type of problem. The time needed for it to finish rises exponentially depending on the number of givens. More givens means less time to finish. If we were to try and use it to solve a Sudoku with 17 givens (the minimum number of givens which give a unique solution) it would mean that it needs to calculate $1{,}179 \times 10^{61}$ possible combinations which would take a very long time.[3]

There is also a difference in memory consumption between Brute Force and Backtracking algorithm.

Since Brute Force after each iteration checks if the puzzle is solved its memory usage can be high considering it does a lot more computations than Backtracking algorithm.

VI. CONCLUSION

This project showed the results of comparison of two different search algorithms, Brute Force and Backtracking algorithm, used in solving complex mathematical problems. It is shown that there is a big difference in speed between the two algorithms and that Backtracking algorithm is much more suited for solving Sudoku puzzles than Brute Force algorithm. Project Sudoku Solver will continue to develop and in the future it will incorporate Sudoku Generators and other features.

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CONCEPT OF ONLINE LEARNING

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Abstract - Modern society is characterized by dynamic changes and rapid development of information and communication technology, which creates preconditions for qualitative changes in all spheres of society, and inevitably in education. The explosion of new types of knowledge presents the feature of information society in which archiving, processing and transmission of information are based on contemporary technologies and methods of information era. The influence of information and communication technologies resulted in the appearance of new teaching and learning models. The following text defines the basic concepts of online learning system. Starting from the definition of online learning, by emphasizing and highlighting the differences between the terms of e - learning, online learning and blended learning as well as distant learning, this paper explains the core online learning system components and infrastructure, considering both software and hardware platform of the system. Furthermore the text strives to provide answers to the following questions: What are the core modules of online learning system? What makes the software and hardware platform of the system? Answers to those questions explain the online learning concept for all the teachers and students who are involved in this new and challenging way of learning.

I. INTRODUCTION

Modern way of life is dominated by the omnipresence of modern technologies and globalization, resulting in rapid changes in every aspect of human life. New technologies have been used more and more often in the educational field, be it in the academic environment or in a corporate context. They brought about the advantage of delocalization and flexibility, allowing a departure from the "classroom paradigm" and using the virtual space as a facilitator of knowledge and information exchange.

Distance learning systems were developed alongside the development of technology. From printed materials, as the initial form of teaching materials, the development of technology has enabled the introduction of new instructional media such as images, slides and films. The popularity of this type of learning has been enhanced by the progression of the electronic media, from radio and television, to the interactive computer technologies and dynamic websites.

As learning technology and its associated fields continue to evolve, practitioners and researchers have yet to agree on common definitions and terminologies. This contributes to convicting findings about distance learning, e-Learning, and online learning environments. In addition, terms are often interchanged without meaningful definitions. As an initial step, we reviewed the relevant literature to determine how these learning environments were defined.

II. DIFFERENCES BETWEEN DISTANCE LEARNING, ONLINE LEARNING AND E – LEARNING CONCEPTS

"Tell me and I forget. Teach me and I remember. Involve me and I learn."

Benjamin Franklin

A. Distance Learning

Distance Learning is a type of education offered to learners separated in space that most typically implies the use of new technologies and new interactive teaching methods. Forms of tuition that do not imply a direct contact between the tutor and the learner are generally called Distance Learning or Distance Education. "It often describes the effort of providing access to learning for those who are geographically distant." [10]

One of the definitions of Distance Learning states the authors' idea that "Distance Learning is an institution-based type of education, where the educational body is separated in time and space, with a system of interactive telecommunications serving the purpose of connecting the students, lecturers, teachers and the learning material." [12]

The above definition therefore implies that there are four main components that determine the Distance Learning:

- Institution based education
- Separation of participants in the tuition process
- Interactive telecommunication
- Interconnection

The assertion that this type of education is institution based points to the fact that there is a clear difference between distance learning and

self-education, as a distinctive form of non-institutional education.

The second important feature is the separation of participants in the tuition process. Most typically, separation means spatial or geographic separation of participants (since these can be living in different parts of the world), but time-separation is also very important (since the participants in the tuition process do not have to access the learning content at the same time, but can choose to organize their individual learning timetables in accordance with their preferences and their needs).

Interactive telecommunication is the third major component of Distance Learning. The interaction among the participants in the process can be both synchronous and asynchronous. Asynchronous interaction refers to the type of communication among the learners and the e-teacher where each participant actually chooses their own individual time for interaction. Typical channels of this kind of interaction are forums, e-mail, exchange of documents, text messages. Synchronous interaction, on the other hand, refers to real-time, simultaneous communication between the learners and the teacher. Synchronous communication may take on the form of chat-forums, use of technical support (Web cameras, microphones, phones), video-conferencing communication.

The final determinant of Distance Learning according to the above definition is the inter-connection of tutors, students and materials, effected by the means of the learning medium. [16]

B. E – learning (Electronic Learning)

Electronic Learning, also referred to as e-Learning is defined as any use of information-communication technologies in the process of teaching/ learning, to the purpose of encouraging and/ or improving the process as such. E-learning includes numerous types of media that deliver text, audio, images, animation, and streaming video, and includes technology applications and processes such as audio or video tape, satellite TV, CD-ROM, and computer-based learning, as well as local intranet/extranet and web-based learning. E-learning can occur in or out of the classroom. It can be self-paced, asynchronous learning or may be instructor-led, synchronous learning. E-learning is suited to distance learning and flexible learning, but it can also be used in conjunction with face-to-face teaching, in which case the term blended learning is commonly used.

In order to reach a more precise and fuller definition of the concepts of Distance Learning and e-Learning, it is important to point out to their interconnection. E-Learning can be a kind of Distance Learning (when taking place within online environment) and then we could talk about on line learning, while Distance Learning as such cannot be taken as e-Learning, since it implies the use of other media as well (printed materials, radio, television).

C. Online learning

The third term is known as online learning. On line learning is structured learning activity that utilizes technology with intranet/ internet-based tools and resources as the delivery method for instruction, research, assessment, and communication.

This type of learning makes use of various Web-based materials, multimedia contents, systems for managing the learning context, Web laboratories, computer-based testing and similar. Online learning is a term used to describe distance or correspondence courses that are offered over the Internet.

Online learning is described by most authors as access to learning experiences via the use of some technology. Benson and Conrad, identify online learning as a more recent version of distance learning which improves access to educational opportunities for learners described as both nontraditional and disenfranchised [1], [3]. Furthermore, Hiltz and Turoff make a clear statement that online learning is a newer version or, and improved version of distance learning. "Online learning is a new social process that is beginning to act as a complete substitute for both distance learning and the traditional face-to-face class" [5].

III. INFRASTRUCTURE OF AN ONLINE LEARNING SYSTEM

"Online learning is primarily a human activity. The role of the technology is reduced to support the established principles, not the other way round."

Davis, A.

According to Davis [4], each online learning project assumes that a certain school, faculty or institution will have a mission, as well as certain objectives and values that must be taken into consideration when planning and designing an ideal environment for online learning. Online learning environment is a complex system,

comprising a series of organizational, administrative, instructional and technological components.

An online learning system is made of a certain number of different modules. Each module of a system functions as a separate unit, independent of other modules. However, it is only when the modules are used as inter-connected unities that they create the whole environment of the given online learning system. It can therefore be concluded that modularity is a key component of an online learning system

The following modules can be perceived as the basic modules in an e-Learning system:

Infrastructural module (hardware, software and communication infrastructure for online learning)

- Module of e-Learning tools (specific tools, mechanisms, services, media and software that are used in the development and presentation of an online learning environment)
- Module for administration (administrative jobs related to development, implementation and management of a system)
- Module of instructional interface (incorporation of teaching material in e-Learning environment, together with methods and procedures that secure effective interaction between the e-Learning environment and the learner)
- Quality-assurance module (securing continual evaluation and quality control of e-Learning environment) [7]

Within the published standards for online learning, the IMS Global learning Consortium, defines the logical architecture of an online learning system. According to the IMS standardization, the architecture of an online learning system is made of the following components:

- Users – (students, administrators, teachers)
- User Agent – users access certain online earning services by the means of a User Agent
- Tools - enable access to various services contained in the system
- E-Learning Services
- Digital Repositories (store e-Learning contents)
- Communication infrastructure – enables transfer of information among users[4]

In order to enable the users to make use of various online learning tools, it is necessary to secure pre-conditions in the form of hardware, communication technologies and software.

A. Hardware Requirements

A basic hardware platform of an e-Learning system includes:

- E-Learning server
- Processor: Processor dictates how fast your computer can perform particular functions. Most courses require a Pentium processor that operates at 300 MHz or higher.
- Memory: In order to store information on computer, including files and software programs, you will need to have a good amount of available memory. Most courses recommend at least 128 MB of RAM memory (random access memory).
- Disk Drive: CD-ROM, DVD, or floppy disk drives are necessary in order to download course materials and save information.
- Modem: A good internet connection is very important for an online course. A modem with a baud rate of at least 56 K (baud rate measures the amount of information processed per second) is usually the minimum requirement for connecting to the internet.
- Sound Card and Speakers in order to hear sound clips on audio and video files
- Printer for printing out course materials
- Multimedia classrooms
- Multimedia devices (audio, video)
- Multimedia terminals [6]

B. Software Requirements

Software requirements can vary greatly from course to course. Basic software for any online course includes:

- Operating System (Windows 95, 98, NT, 2000, or XP. If you are using Macintosh, you will need System 8.1 or higher).
- Word Processor (Microsoft Office (Word, Excel, PowerPoint, Publisher, Access) For word processing and data analysis projects, you'll need programs that can create text documents and spreadsheets.

- Email Account, Skype account for collaborative work
- Plug-Ins: Plug-ins are bits of software that allow you to see, hear, or manipulate an image (Flash, QuickTime, Windows Media Player, Real Player, etc.) Some version of a media player or flash player is necessary for streaming videos. And Adobe Reader is necessary for opening PDF files.
- Software testing and evaluation tools
- An important element of the software platform for e-Learning is the Web server, which supports the communication between the user and the LMS system, by the means of a suitable Internet browser

C. *Learning Management Systems*

LCMS (Learning content management system) is a vital component in many e-Learning implementations. It is more precisely defined as a software used by teachers for creating and posting learning contents, where all the participants are assigned respective roles in implementing various forms of synchronous and asynchronous learning. Its users access it via the Internet, using the classical-type web-reader.

An example of a LCMS with an open code can be found in the 'Moodle' , while the best known commercial solution is probably the 'Black Board'.

On the other side, there are the LMSs (Learning Management Systems), whose primary function is to control the activities contained within a single course. Most of the modern LCMSs integrates the qualities contained in LMSs, so that the classification is a fluid one [7].

A Learning Management System (LMS) is a software application for the administration, documentation, tracking, reporting and delivery of e-learning education courses or training programs. An LMS is the infrastructure that delivers and manages instructional content, identifies and assesses individual and organizational learning or training goals, tracks the progress towards meeting those goals, and collects and presents data for supervising the learning process of organization as a whole. [17] Classical L(C)MS systems are mainly made of the following elements:

- course contents
- administrative information, including timetable, detailed requirements for course participants, methods of evaluation and instructions
- notices conveying important information
- modules for registration and monitoring of students
- basic learning material, that can be presented in a variety of forms (text, audio/video material and similar)
- additional resources, including additional material and links to external contents
- tests used for assessment and self-assessment
- electronic communication based on e-mails and chat rooms [7]

Bailey (1993) presents the following general characteristics for an LMS in education:

- instructional objectives are tied to individual lessons;
- lessons are incorporated into the standardized curriculum;
- courseware extends several grade levels in a consistent manner;
- a management system collects the results of student performance;
- lessons are provided based on the individual student's learning progress [17].

It is important to portrait that the concept of online learning as such can adopt its full meaning only if certain pre-defined standards are applied in the definition of e-Learning objects and objects of exchange of various e-Learning systems. The exchange of contents of study courses and other structural elements of these courses are subject to implementation of the SCORM standards (Sharable Content Object Reference Model). Sharable Content Object Reference Model (SCORM) is a collection of standards and specifications for web-based e-learning. SCORM is a specification of the Advanced Distributed Learning (ADL) Initiative, which comes out of the Office of the United States Secretary of Defense.

SCORM represents a correlation between the standards and acts as a defining element for the development of the e-Learning contents and the software. Namely, in order for a content created within a L(C)MS to be exported to another L(C)MS, it is necessary that both of the systems support certain standards.

IV. CONCLUSION

The paper focuses on defining the basic concepts of modern learning systems. The main objective is to emphasize the difference between distance learning, online learning and e – learning terms as well as to point out the main characteristics of each of these concepts. In era of information expansion and communication technologies and their use in education it is extremely important to make teachers aware of the basic terms as well as basic concepts of distance learning systems. Introduction of the system infrastructure presents the starting point for all those whose work has contributed to the development of future education. To this end, the second part of the paper focuses on defining and understanding the online learning system infrastructure as well as Learning Content and Learning Management systems as a essential part of e learning systems.

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TOOLS FOR E-LEARNING

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Abstract - Today, e-learning is not within the domain of science fiction, but has affected all aspects of education, in non-formal and formal. Tools for e-learning are the focus of the general population and is an area that is rapidly changing and progressing. There is no universal tool, which does the job perfectly. Each has its good and bad sides and often used more for the same job.

I. INTRODUCTION

E-learning is a very broad term under which the means and methods of learning techniques use computers and the Internet [1]. Its development started in 1840 and is linked to the master Isaac Pitman. He mailed his students passages from the Bible that were supposed to sign. Students finished their work and sent the passages back to their master for evaluation. Pitman established the first recognized form of distance learning by the way how he communicated with his students

With technological development, there were new opportunities for distance learning such as: educational programs on radio, teaching television, the use of satellites and cable television. For fast data transfer educational multimedia materials were used remotely. A common feature of all these systems is that they were one-way and asynchronous. Students listen to or watch educational courses, but there was no way to ask the teacher any questions or to exchange views with students on the other side of the world who at the same time follow the same classes. This situation has been changed by the system of video conferencing. At that time the system was very expensive and available to close circles.

With the advent of low-cost personal computers, the learning materials, tutorials carry audio, video and film clips, and interactive educational materials and tests knowledge and skills. The advent of the Internet and the ability to share these facilities around the world have created opportunities to multimedia educational content. Learning with the help of computers was named e-learning.

E-learning has shown many advantages over the traditional method of learning [2]

- Individual approach to pupils and acceptance of different learning styles;
- better interactivity teachers and students;
- increasing the quality of teaching and the possibility of adopting curriculum;
- inclusion of students with different profiles;
- simple training or retraining;
- simple organization of lectures by world experts using video conferencing.

The disadvantages are as follows [2]:

- There are areas that cannot be studied only electronically.
- There is still adequate "electronic textbook" that would meet students' needs with different types of materials necessary for specific topics.
- There is a loss of human contact, body language, the occurrence of misunderstanding.
- Lack of oral examinations is noticed.
- Problems caused by insufficient knowledge of technology to implement e-learning,
- Abandonment of learning after a certain time appears - the problem of maintaining interest in the topic.

E-learning is not a replacement for the existing models and forms of learning, but it is certainly important in an environment of limited resources, when participants of the educational process are away or when there is a goal to work in a multimedia and dynamic information environment. For example, promote information literacy and practice the use of modern information media [3]. Professional education recommended e-learning as learning in situations where access to learning is simplified and turned to the person who teaches and the one who conveys knowledge. In this sense, there is no difference between e-learning and any other learning. We expect that further development of media as a learning environment and the use of modern technological innovations impart information and multimedia content. E-learning as

a primarily distance learning will be increasingly used.

II. TOOLS FOR E-LEARNING

According to the definition, **tools for e-learning** are all tools that allow you to make or deliver any content for yourself and for others. They bring many advantages in comparison to conventional doctrine, some of them are:

- flexibility in time and place of attendance – students can review the lectures whenever it suits them, and for geographically distant students it is not a problem for successful participation in the classes,
- interactivity in the classroom – teacher cannot devote equal attention to all students, there are many modes of interaction among participants, such as chat, forums, email, simulations, etc.
- individual approach – some students learn faster, some slower and students progress at different rates; the teacher pays attention to all the students individually as much as they need to catch up with the more advanced students.

However, there are some disadvantages of e-learning:

- isolation – there is no direct contact between teacher-student,
- fear of failure – there is a growing progress information environment,
- low motivation – which in my opinion is the biggest minus of this type of learning,

Many people are surprised why we have a very wide range of tools for e-learning. There are several different classifications of the most important being [4]:

1. Free tools

   Moodle - www.moodle.org

   ATutor - www.atutor.ca

   Claroline - www.claroline.org

   Dokeos - www.dokeos.com

2. Commercial tools

   ANGEL_Learning

   www.angellearning.comB

   lackboard - www.blackboard.com

   eCollege – www.eCollege.com

   WebCT - was withdrawn from the use of the 2011

Due to the fact e-learning has beeing becoming important the question of how to make a selection of the best tools is arousen. First you should know that there is no best tool. You cannot select a tool for learning and expect it to fulfill all the requirements and that everything to work perfectly and flawlessly.

Today there are over 150 manufacturers of software. A large number of companies and institutions, as well as experts select the most suitable software by comparing the features and functions of the software with each other. Thus, the conclusion is that the most worth thing is money. Before you even start looking for your future e-learning platform, you need detailed knowledge of the needs and requirements of your organization. It must not be discouraged by the fact that almost no tools for e-learning will completely satisfy all your needs.

On the other hand, custom made software that is fully able to meet your needs can cost a lot. Its production may last for a long time. The solution to these problems, many people see in the Open Source software solutions. The Open Source software is an open source software that offers free gaff under the GNU/GPL license. A large number of software can be copied, modify source code as you wish provided that you have to change the code to make available and the rest of the Open Source community under the same conditions under which you use the code above.

For us, the key issue is that the tool is equipped with the letters of our alphabet and if it is possible to localize - translated into Serbian. If the tool does not have this support, it can become a great problem after a while. It is a good idea from the start to choose tools that support the input of our characters. In such a case it is a very good to estimate the correspondence to a tool that is needed. Most free software has full support for the Serbian alphabet characters.

Localization can become a great problem if the manufacturer is not predicted in advance. Part of the commercial tools supplied in the form of the finished program does not allow any changes in the text, which will be printed by both students and teachers. There can be such problems with free programs, when it many of the source code to be localized may be necessary to change.

If you cannot be fully customized with a tool for learning the language area, then there is a possibility that students and teachers away from each other might not govern foreign language well.

The goal of e-learning is to facilitate the absorption of the curriculum, and not to impose the need for mastering additional skills - how to use it.

A. Free tool – Moodle

Moodle (Modular Object-Oriented Dynamic Learning Environment) is a software package for producing Internet-based courses and web sites [5]. It is an online application, which is installed on a server and is accessed from any computer in the network via a web browser.

Moodle has quickly become one of the most popular free and open source systems, which brought together a community of over 100,000 registered users who speak over 70 languages and come from more than 150 countries. Once a year in the UK are organized days Moodle users (with accompanying conference workshops). Support for professionals in the field of education who wish to use this system is organized through a forum on the website of Moodle. The creator of this program is Dugijamas Martin from Australia, but the list of those who contributed to the development of this

The system grows every day. The Open University in the UK developed the first course in computer-mediated communication in 1988. A decision was made in the year 2005 to use Moodle as an environment for electronic acquirement remotely. The use of this software has started at our universities through a variety of initiatives and projects.

Moodle is not only free, but it also supports the Open Source philosophy, so that with it anyone can get the source code. The website http://www.moodle.org/ offers direct links to the online demo version and a version for downloading. The advantage of this tool and the open source philosophy will see most people who want to adjust the tool to their needs. Although this tool may not provide all the features as their commercial rivals, its open access allows you to customize all your needs. However, for that, you need a large amount of programming knowledge as each change means changing the source code. Therefore, such a solution would not be advisory for users who are not skilled programmers and who have limited experience in industry.

This does not mean that the free tools will not be able to do anything without programming intervention. Moodle will allow you to enter easily the content you want and show it to your students. Beside displaying learning material there are discussion groups and knowledge tests. It has the support of two databases: MySQL and PostgreSQL. It also has support for many languages, and there is a localization into Serbian. This system is designed on the base of clear pedagogical principles to help teachers to create more easily effective virtual communities.

Moodle provides teachers a full computational support for the organization and implementation of on-line courses. Some of the important features of Moodle are [6]:

- development of a large number of courses on a single system in a variety of forms,
- planning courses - schedule, calendar,
- management of user roles and user groups in courses,
- work with existing files and educational facilities,
- development of different types of on-line tests,
- monitor all user activity,
- numerous tools for communication and collaboration,
- create a vocabulary of technical terms,
- system Management - backup, statistics, approaches
- a comprehensive system of assistance in exporting classes.

One of the great features of Moodle is its extensibility. There is a huge variety of activities that can be added in the form of so-called Moodle. Module. With the addition of modules the creation of mathematical formulas or easier demanding lessons in chemistry from the module that allows printing of chemical formulas. There are modules that enable the delivery of tests on students' mobile phones, inserting flash files, creating multiple copies of courses and many others. Each module will be additionally installed.

In addition to scalability, the most important thing about Moodle is its possibility of localization to different languages. It provides the interface available in 65 languages and used in more than 210 countries. Currently translation into the

Serbian language is available in both cases (cyrillic and latin).

If you just want to see if you can use e-learning tools as a help in the classroom, make sure you select one of these tools. If it can help you, you can always opt for the commercial solutions are very expensive.

B. Commercial tool – Blackboard

Blackboard unlike the previous tool is an open source solution [7]. It is a commercial LMS, which is sold in its two variants. Vista Campus and the solution, such as their names imply a solution for smaller schools and universities all over. Blackboard Building Blocks can be used to add new functionality.

The Blackboard is considered one of the most LMS's tools, which have been accepted and it made a lot of educational material many to world-renowned universities. It appeared on the market after the company was founded Blackboard in 1997. To gain insight into the complexity of activities it should be noted that the company after five years had about 400 experts and consultants who were involved in education, hardware components, creating teaching materials, software development, and the like.

Large commercial tools such as Blackboard typically justify their commerciality [8]. There are several reasons why you should choose a commercial tool, but the most important is that, unlike the free, the standards for data exchange. In addition, manufacturers of commercial tools often can provide better support and faster answer to your question 'how do ... "as opposed to free based on voluntary support.

With a good customer support commercial tools offer opportunities for free now but not yet in a position to offer: a private space and setting, a better asynchronous and synchronous communication, internal e-mail, use the calendar, select the interface, the more opportunities to check the knowledge, support for audio and video, more information on the participation of students, support for content sharing. ...

The focus of Blackboard is on three key areas of the platform includes a variety of tools and facilitate the management and use of the content [9]:

- Content Management:
  The objective is to provide efficient and effective creation, setting filed content;
  - authorization content - a tool to edit the content with rich user interface;
  - customizing content - content activation when needed;
  - teaching unit - connecting lessons and control navigation through the lessons.
- Communication:
  - asynchronous communication - connecting
  - content from different forums, the topic of the whole;
  - synchronous communication - virtual classrooms, synchronous interaction via chat;
  - group work - each group can have their own space for data exchange, virtual classroom, group e-mail which allows easy de messages sent within the group.
- Assessment and Reporting:
  - professors can automate the process of evaluating and presenting results, or create students' own database of questions.

More than 1,500 educational institutions of higher education in the world use these software packages and services according to the latest data license. Considering the price of the service utilizing the software package more institutions opt for free software. If you compare the functionality of Blackboard and Moodle LMSa commercial, you see that Moodle in the field of content creation, evaluation discussions, review of assignments of peer and self-assessment has a significant advantage, since Blackboard does not have the functionality. Finally, the reasons for Moodle are as follows [10]:

- free,
- it is not difficult to install it,
- adaptive,
- easy,
- popular,
- confirmed,
- content and visually well-connected.

However, if you decide to purchase a commercial program as Blackboard, we recommend that you first good consider your needs and the resources that are available to such tools. Many commercial tools have a very high amount for a license, and most of the licenses must be

renewed every year. These high costs could affect very easily the decision on the use of this category of tools.

III. CONCLUSION

Modern teaching only with a book or only with the speakers is difficult to imagine. It is so hard to imagine distance learning without the use of tools for e-learning. They will operate a clearer presentation of the material, another way of systematization of knowledge, but also as a place for communication. This does not mean that they will completely replace communication with "human being". These tools depend on the teacher. Lecturer who is not interested in the classical form of teaching will probably make any additional changes and will no be interested even in e-learning tools. Besides working on the materials, the media, the method of presentation, adapting to a new way of working, teacher using e-learning tools can improve significantly the quality of teaching and the results of his work with students'.

A variety of ideas and the possibility of rapid exchange and distribution through the Internet have improved significantly the quality of educational material, interest in the use of new individualization of the learning process. There is opportunity to display and design educational materials adapted for students with special needs. For example, use print very large letters on the screen to visually impaired students or broadcasting sound through PC speakers and carries read text instead of printing the text. Talented students interested in areas where there are very few qualified teachers through the Internet can learn from teachers who are on the other side of the world. Opportunities to learn and adapt to the needs of an individual predisposed acted unlimited.

Reality has shown that many of the expectations of e-learning have been overstated. Although the introduction of e-learning, especially in a college education, many educational institutions will have a good economic opportunity for some of the legal obligation, the possibility that this type of learning provides an under-utilized.

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THE IMPACT OF FOREIGN DIRECT INVESTMENTS IN MODERNIZATION LEARNING PROCESS– E LEARNING

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Abstract – Foreign direct investment i.e. its impact on the overall education system (in Montenegro/our country) has gradually changed over time. In particular, foreign investment has brought in new ways of management, organization and insight into employees' characteristics. The subject form of investment has grown in its importance in comparison to other forms of international capital flows, and as a result its share of world output increased. Educational model is influenced by an enormous force of foreign investment and therefore traditional learning has developed in a more popular form widely known as E-learning. Besides this, the communication within and outside a foreign organization, especially in West European countries, is now carried out electronically. Bearing this in mind, electronic learning i.e. E-learning has become a necessity worldwide and foreign investment has a significant contribution in its more rapid development. Learning process is now, in general, a more efficient process and its modernization is evident. The enclosed study shows how much influence foreign investment partakes in educational methods and how the modern communication and information technology are developing with this new expansion.

I. INTRODUCTION

Foreign direct investment (FDI) is an integral part of an open and effective international economic system and a major catalyst to development. Yet, the benefits of FDI do not accrue automatically and evenly across countries, sectors and local communities. National policies and the international investment architecture matter for attracting FDI to a larger number of developing countries and for reaping the full benefits of FDI for development. The challenges primarily address host countries, which need to establish a transparent, broad and effective enabling policy environment for investment and to build the human and institutional capacities to implement them.

Developing countries, emerging economies and countries in transition have come increasingly to see FDI as a source of economic development and modernization income growth and employment. Countries have liberalized their FDI regimes and pursued other policies to attract investment. They have addressed the issue of how best to pursue domestic policies to maximize the benefits of foreign presence in the domestic economy. There for the learning in schools is set on higher level in order to increase the level of studying and working in foreign companies. The overall benefits of FDI for developing country economies are well documented. Given the appropriate host-country policies and a basic level of development, a preponderance of studies shows that FDI triggers technology spillovers, assists human capital formation, contributes to international trade integration, helps create a more competitive business environment and enhances enterprise development.

Moreover, beyond the strictly economic benefits, FDI may help improve environmental and social conditions in the host country by, for example, transferring "cleaner" technologies and leading to more socially responsible corporate policies.

II. DEFINITION OF FOREIGN DIRECT INVESTMENTS

Foreign direct investment (FDI) is a direct investment into production or business in a country by a company in another country, either by buying a company in the target country or by expanding operations of an existing business in that country. Foreign direct investment is in contrast to portfolio investment that is a passive investment in the securities of another country such as stocks and bonds.

The outward survey for 1950 (U.S. Department of Commerce, 1953) provided a more precise definition, covering four categories of FDI:

1. "Foreign corporations, the voting securities of which were owned to the extent of 25% or more by persons or groups of affiliated

persons, ordinarily resident in the United States."

2. "Foreign corporations, the voting stock of which was publicly held within the United States to an aggregate of 50 % or more, but distributed among stockholders, so that no investor, or group of affiliated investors, owned as much as 25 %."
3. "Sole proprietorships, partnerships, or real property (other than property held for the personal use of the owner) held abroad by residents of the United States."
4. "Foreign branches of United States corporations."

Foreign direct investment has many forms. Broadly, foreign direct investment includes "mergers and acquisitions, building new facilities, reinvesting profits earned from overseas operations and intercompany loans" .In a narrow sense, foreign direct investment refers just to building new facilities. The numerical FDI figures based on varied definitions are not easily comparable.

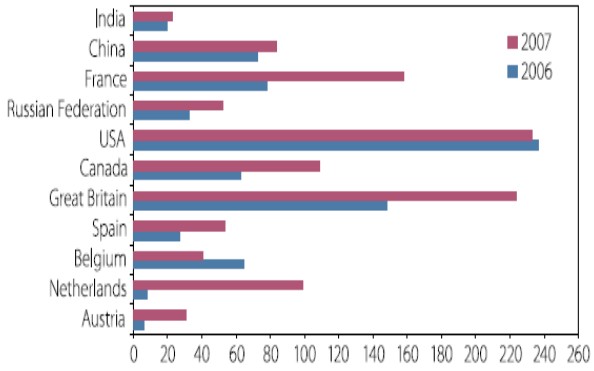
As a part of the national accounts of a country and in regard to the national income equation Y=C+I+G+(X-M), I is investment plus foreign investment, FDI is defined as the net inflows of investment (inflow minus outflow) to acquire a lasting management interest (10 percent or more of voting stock) in an enterprise operating in an economy other than that of the investor. FDI is the sum of equally capital, other long-term capital, and short-term capital as shown the balance of payments. FDI usually involves participation in management, joint-venture, transfer of technology and expertise. There are two types of FDI: inward and outward, resulting in a *net* FDI *inflow* (positive or negative) and "stock of foreign direct investment", which is the cumulative number for a given period. Direct investment excludes investment through purchase of shares. FDI is one example of international factor movements.

III. FOREIGN DIRECT INVESTMENT AND THE DEVELOPING WORLD

A recent meta-analysis of the effects of foreign direct investment on local firms in developing and transition countries suggests that foreign investment robustly increases local productivity growth. The Commitment to Development Index ranks the "development-friendliness" of rich country investment policies.

Local firms are also impacted with the foreign investments. New firms are better in knowledge of using modern technologies and so local, firm has to follow those methods. With this impact, employees have to learn using of modern technology, new administration work, and new methods of working in a team... Every development of foreign organization in a local country it is an ignition for need of better knowledge and better sense of modern work. Country, as it is, needs to follow modern ways of negotiation and to develop better environment for their employees. It is in purpose of better work of local firms and modernization process of learning. Traditional learning therefor is changed by new ways of learning; this learning becomes E-learning.

At the end of this part it should be emphasized that the countries have become aware of their responsibilities for the creation of a more attractive business environment for the investors. Creation of sound and competitive business environment and flexible labor market are just some of the elements for attracting FDI.In the table below it is shown how FDI are groving from year to year; example 2007 year .



Source: World Investment Report 2008

Figure 1. FDI inflow in selected countries in 2006 and 2007,bill.dollars.

IV. FOREIGN DIRECT INVESTMENT DEVELOPMENT IN MONTENEGRO IN PAST YEARS

Foreign direct investments are one of the most important drivers of economic development in Montenegro. Prior to 2005, Montenegro was not an attractive destination for the foreign investors, however, from 2005, it became one of the most attractive European destinations. In the past couple of years foreign investors have been interested in

the sector of so called non exchangeable goods – real estate, banking, telecommunications, retail trade, which all have a very small impact on the Montenegrin export (except the investment in tourism). From the development perspective, most important are the investments that are encouraging growth of productivity and technology, which are still small in Montenegro. With this influence of technology, local people has to be trained and learned better so they can work in those companies with foreign signature.

Montenegro has recorded a very high inflow of FDI in the past couple of years.(Picture 2). Since the comparison of absolute amounts of FDI inflows can lead to the wrong conclusions, considering a different number of inhabitants, different level of GDP and different size of the countries, it is better to use some of the relative indicators, such as inflow of FDI per capita, or share of FDI in the GDP in selected economies in transition in the past three years.

FDI country of origin	Inflow in mill. Euro
Russian Federation	348.5
Hungary	323.4
Great Britain	257.2
Switzerland	227.4
Cyprus	213.5
Austria	199.2
Slovenia	115.3
Germany	112.7
Serbia*	110.3
USA	77.1
Total 10 countries	1984.6

Figure 2. Ten biggest foreign investors countries in Montenegro

V. FROM TRADITIONAL TO ELECTRONIC LEARNING

During the past ten years the Internet has changed the practice of teaching and learning. The impact of FDI influenced the old methods of learning to transform into electronic way. The computers are now the first tool of communication in the professional world. The difference between classical learning and electronic learning (E – learning) is in the level of education and willingness of persons to learn forward. Classical teachings contain interaction between the student and the teacher, and in E-learning you have interaction between more than two persons (they are all connected through computer online learning). Traditional education, also known as back-to-basic, conventional education or customary education, refers to long-established customs found in schools that society has traditionally deemed appropriate.The chief business of traditional education is to transmit to a next generation those skills, facts, and standards of moral and social conduct that adults deem to be necessary for the next generation's material and social success. As beneficiaries of this scheme, which educational progressivism John Dewey described as being "imposed from above and from outside", the students are expected to docilely and obediently receive and believe these fixed answers. Teachers are the instruments by which this knowledge is communicated and these standards of behavior are enforced .Historically, the primary educational technique of traditional education was simple oral recitation. In a typical approach, students sat quietly at their places and listened to one student after another recite his or her lesson, until each had been called upon. The teacher's primary activity was assigning and listening to these recitations; students studied and memorized the assignments at home. A test or oral examination might be given at the end of a unit, and the process, which was called "assignment-study-recitation-test", was repeated .Possessing the opportunity to gain knowledge anywhere says that all people should take advantage of the educational programs and institutions that are made for us. The reason for that statement is that there is another option for learning besides the traditional classroom. Distance learning, online learning is a new popular way to attend school and receive a college education or degree in the comfort of one's own home. This paper will further look into the world of online learning with insight on feedback about the experience and its' benefits and flaws within it system. With the advances in technology, some believe that online learning does not compensate for what one can gain from traditional learning. Therefore, the aspects of traditional learning versus online learning will be analyzed throughout the paper. Distance learning does not compensate for what one can gain from traditional learning. These days in time, there is another option to learning than besides the traditional way of learning in classrooms. Distance learning is the other option for learning and a student can have an instructor or teacher, but it is not the same as traditional learning. Distance learning may also be known as online learning. The definition of distance learning is courses in the home; education for students working at home, with little or no face-to- face contact with teachers and with material provided remotely, e.g. by e-mail, television, or correspondence. With distance learning, courses can be taught entirely or partly

online making use of a variety of technological elements. There are three types of distance education models, synchronous, asynchronous, and the combination of both.

We have entered an era in which children, teens, adults are exposed to digital technology. This rapidly evolving information technology has become a driving force of great change in all social institutions. Digital technology revolutionizes many of the ways we receive and use information every day. The advent of digital technology touches almost every aspect of modern life and it has transformed the means of communication immensely. Perhaps no area holds more potential for such transformation than education. Digital technology makes informative content easier to find, to access, to manipulate and remix, and to disseminate. All of these steps are central to teaching, scholarship, and study. Together, they constitute a dynamic process of digital learning.

Indeed, one of the most exciting features of digital technology is its capacity to permeate society unrestricted by the walls of a school or the formal roles of teachers and students new technology allows everyone to become teachers and students creating digital learning tools, disseminating them broadly through the internet, and learning from digital content promulgated by others. A traditional organization can be defined as a formal, common, and pyramid-like organization where one person at the top is in charge of all functional areas with subordinates handling all the other sub-functions. It is hierarchical where the higher levels have complete control over all the levels below, have greater superiority and domination, and the chain of command goes from the top to the bottom.

With the present of distance learning and modern technology, these organizations tend to change. Now, the computer is the main tool of communication. Many local companies are sending their employees to foreign country to learn new ways of working and to develop their own knowledge. But with the possibility of online learning it is also easier to train a person and also to get it know the new ways of work. Modernization of companies is influencing the modernization of learning such as a person has to develop their possibilities in work.

VI. ADVANTAGES AND DISADVANTAGES OF E-LEARNING

Teaching and learning in traditional schools, from kindergarten to graduate school benefit from digital technology that enables new pedagogical methods and allows easy access to vast quantities of educational content. Examples of changes that capitalize this potential include:
* A planned online network for high school history teachers, allowing them to share advice and classroom resources;
* Classroom teaching enhanced with new media such as PowerPoint slides or video and audio clips (including the use of DVD clips in film studies classes).

Figure 3. http://blog.commlabindia.com/elearning/adoption-of-elearning

There are many advantages of online and computer-based learning when compared to traditional face-to-face courses and lectures :

- Class work can be scheduled around work and family
- Reduces travel time and travel costs for off-campus students
- Students may have the option to select learning materials that meets their level of knowledge and interest
- Students can study anywhere they have access to a computer and Internet connection
- Self-paced learning modules allow students to work at their own pace
- - Flexibility to join discussions in the bulletin board threaded discussion areas at any hour, or visit with classmates and instructors remotely in chat rooms -
- Instructors and students both report eLearning fosters more interaction among students and instructors than in large lecture courses

- E Learning can accommodate different learning styles and facilitate learning through a variety of activities
- Develops knowledge of the Internet and computers skills that will help learners throughout their lives and careers
- Successfully completing online or computer-based courses builds self-knowledge and self-confidence and encourages students to take responsibility for their learning
- Learners can test out of or skim over materials already mastered and concentrate efforts in mastering areas containing new information and/or skills

Disadvantages of online or computer-based learning are defined as follow:

- Learners with low motivation or bad study habits may fall behind
- Without the routine structures of a traditional class, students may get lost or confused about course activities and deadlines
- Students may feel isolated from the instructor and classmates
- Instructor may not always be available when students are studying or need help
- Slow Internet connections or older computers may make accessing course materials frustrating
- Managing computer files and online learning software can sometimes seem complex for students with beginner-level computer skills
- Hands-on or lab work is difficult to simulate in a virtual classroom

Since nowadays a big effect on learning have foreign direct investment, E-learning advantages and disadvantages are defined through companies view.

From the company's point of view these are:
Advantages:

- "Mass" training (unlimited number of learners)
- Savings relative to classroom-based training indirect costs (travel, accommodation, etc.)
- Flexibility and adaptability according to learner availability (time, location)
- Customization and adjustment of training courses to predefined skills and teaching goals
- Low logistical constraints (no room booking, employee travel, accommodation, etc.)
- Precise course reporting and automated results analysis thanks to tracking
- Durable and updatable teaching materials
- Disadvantages :
- Companies sometimes ill-informed and hesitant with respect to new technologies
- No control over motivation, involvement and course management by learners
- Investment in computer hardware and software
- e-learning content occasionally difficult to design for training in highly specific fields (to be checked)
- Change management to implement within the training department.

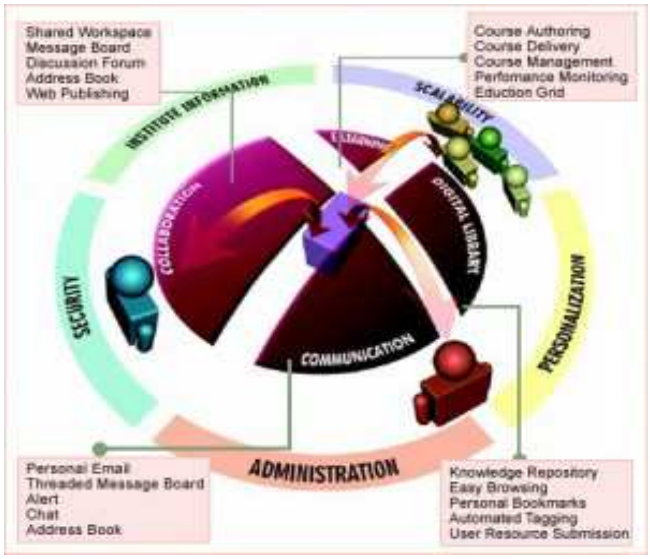


Figure 4. www.yourtrainingedge.com

VII. CONCLUSION

Technology has revolutionized business; now it must revolutionize learning.

In the 21st century, people have to learn more than ever before. Especially for global organizations, live classroom-based training is becoming too costly and cumbersome. Even if employees had the time to attend all the courses and seminars and to read all the books and reports

they should to remain up-to-date in their area of work, the cost of such learning would be prohibitive. The need to transform how organizations learn points to a more modern, efficient, and flexible alternative: eLearning. The mission of corporate eLearning is to supply the workforce with an up-to-date and cost-effective program that yields motivated, skilled, and loyal knowledge workers.

The Internet can offer the logical solution for a company's education and training objectives. Approximately 80% of the professional workforce already uses computers on the job. Technical obstacles, such as access, standards, infrastructure, and bandwidth, will not be an issue in a few years. The growth of the World Wide Web, high-capacity corporate networks, and high-speed desktop computers will make learning available to people 24 hours a day, seven days a week around the globe. This will enable businesses to distribute training and critical information to multiple locations easily and conveniently. Employees can then access training when it is convenient for them, at home or in the office.

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FACEBOOK IN DESIGN TECHNOLOGY AND INFORMATION

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Abstract - In the world of information and technology, our needs and attitudes are changing radically. In order to answer to the needs of modern society, there is a need to work continually on personal training. Working on ourselves we give young generation a good model of behavior. Because of that, people working in education sector must listen to their needs and interests and based on that information obtained, adjust their style of teaching.

This papers presents the role and importance of the social network Facebook, its influence on young generation and how to spend valuable time on the net.

I. INTRODUCTION

The word social network relates to online communities, whose outcome is connecting people of similar interests. Because of that, it is a good idea to include educational institutions in so-called "online" social communities.

New "digital" generation of pupil demands radically changes the approach to education. There is a need to pay attention on specific needs, demands and new styles of studying. New generations of pupils express themselves differently and also the way they exchange information. What is expressed is that they study easily together, and one from another, and they develop the atmosphere of support for improvement among group members. This type of learning is a consequence of interaction of social network. Educational institutions must develop ways of use of social networks and support such way of learning. Teacher must accept the fact that pupil is the main component of a process and it is needed to listen to their needs and interests. Traditional approach of teaching must be put away.

Many teachers highlight the interaction among pupils and teachers as an important element in the process of learning.

Social networks are made up as services that support interactions of its users. That fact makes them suitable for educational system.

With the use of Facebook, and other social networks, everything gets another dimension. It accomplishes better communication between pupils and teachers, preparation for class is also better, and improved evaluation of pupils.

Facebook can become ideal platform for obtaining new knowledge. Teacher is capable to present its work in much faster way and also pupils their work and projects. Different quizzes can awaken among pupils interests to participate actively, in this competition or to give their comments about answers. Through Facebook it is possible to increase the use of other web pages that are appropriate for their age, it is possible to develop research mind and be able to work independently.

Facebook unable its users interaction and inter-communication through so-called wall, status comments pictures and video clips, events, groups, web pages and chat. By the use of Faceebok it is possible to increase the numerous styles and learning where traditional way of teaching is replaced. The possibilities of Facebook are numerous, it is just important to use them in right way, [1].

Traditional way of teaching where frontal style is dominant does not give much space for creativity or for independence. So that can be solved introducing "online" activities.

II. FACEBOOK IN DTI TEACHING

Having in mind the influence of Facebook on young generation it is good to use it in the education in schools. If we make a good use of Facebook pages, we can reduce the time that they spend on useless games and comments.

As a teacher, I tend to modernize teaching process. Seeing the numerous log on pages, I have made a secret group "DTI", where we have class presentations, interesting information that are not included in text books. This group enables me to have better communication with my pupils.

Figure 1. Layout of the page

This project is still at the beginning, but I hope it will give positive results.

Pictures below show my contribution to teaching, but its contribution to a teaching process is condition dependent on many factors. In order to contribute there is a need to get to know that pupils are ready for this kind of teaching, to have an internet, but also role of teachers is very important or their capability to use computers and innovations.

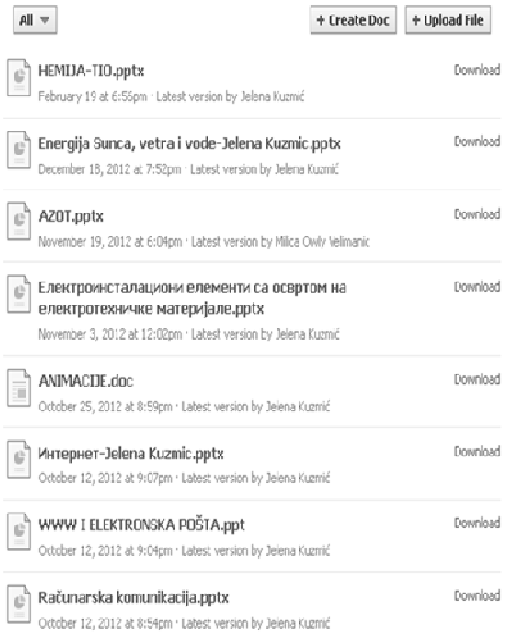

Figure 2. Layout of the page

Thanks to this group, I am able to show the useful links, to inform pupils about various events related to science and education.

Figure 3. Layout of the page

Figure 4. Layout of the page

Figure 5. Layout of the page

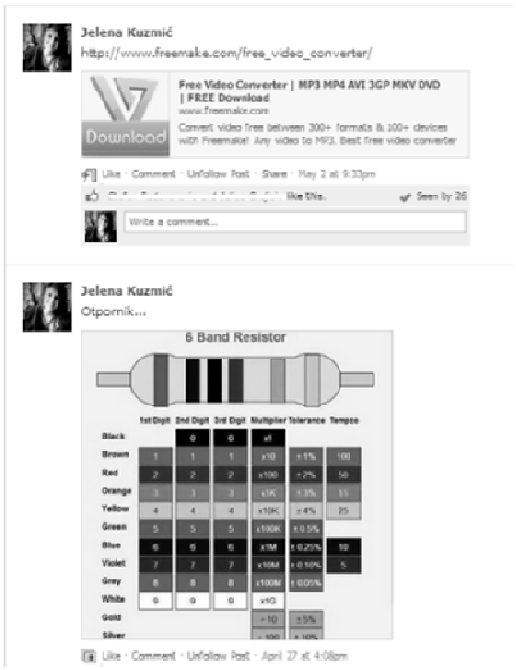

Figure 6. Layout of the page

III. DISADVANTAGES OF FACEBOOK

Facebook has its advantages but also its disadvantages. Problems that we see today are that children sometimes do not know the difference between real and virtual life. Something that is very important but neglected is fact that children very often use social network for adults such as Facebook, MySpace and others. It is very important for both children and parents to realize that all these web pages can be seen by anybody that has access to Internet. Unfortunately, there is an increase in the misuse of internet, stealing the identity so it is important to give good advice to children and parents. We will make a mistake if we assume that students use the internet with great motivation.

"Study Hargittai (2008)" showed that great number of students use the web applications partly or not at all (on contrary to the thought that all students are almost dependant of web applications), Hargittai and Hsieh,2010.) In that sense it is not a good idea to assume that motivation, interests or affinity of students will be improved if technology of social networks is included in any education context. Actually various experts are against the trial of motivation and engagement of students through simple introduction of the use of modern ways of technology of social media in the process of education and practice (Tapscott&Williams,2007:54)",(Arsovic Branka, Social network- challenge and possibilities for education, page7).

During one research, a twelve year old girl claimed that she can't wait to come back from school so she can chat with friends on Facebook. When they asked her what would happened if they forbid her the use of Facebook. She answered that she would be unhappy and would not know how to use free time. Also, she has answered that she spends few hours on the Internet and that she has better communication with friends from school through Facebook. [2]

Despite all these facts, Facebook and other social networks can contribute the quality of teaching. The use of Facebook leads to pupil to become "active coproduce" of knowledge instead of "passive consumer". (Lee&McLoghlin,2010) [2]/

IV. CONCLUSION

It is evident that social networks are one of the most used examples of communication technologies and they tend to become valuable resources that will support educational work and better cooperation of pupils with teachers. With the right use in the process of teaching we can create working atmosphere that supports students for intensive participation in the process of learning. Every little step we take can give positive results.

Despite numerous discussions about social network, number of teachers that consider the possible importance and influence of social network in education is in expansion.

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CONTEMPORARY VIEW OF E-LEARNING DESIGN AND IMPLEMENTATION

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Abstract - This article compares traditional teaching with e-learning, it gives an account how e-learning could be used as an instrument of educational development of a nation. Education is an essential factor that plays a key role in evaluating socio and economic development of a country.

It is an area of IT that has not been fully utilized by stakeholder in educational sector in sub Sahara Africa.

Benjamin Franklin said 'an investment into knowledge always pays the best interest'. E-learning is essentially the computer and network-enabled transfer of skills and knowledge to the end user or student who are designated to receive instructional materials or guide on chosen line of subject. E-learning applications and processes include web-based learning, computer based learning, and virtual education benefits. Instructional tutor is administered via the internet, intranet/extranet, audio or video tape. It can be self-paced or instructor-led and include media in the form of text, image, animation, streaming video and audio. In some part of Africa, it is extremely difficult to implement ICT for teaching process- educational medium for instructional guide because it requires products and services supplied by a variety of vendors, leaving end user to connect to platform.

I. INTRODUCTION

This paper explores deployment and benefits attached to e-learning against traditional learning methods that have been used by stakeholder in the industries to design effective eLearning programs that can transform education in sub Sahara countries

The 21st century will continue to be marked by advances in computing and communication hardware by the advance s in wireless broadband solutions, technology-based pedagogy, and user-friendly integrated software systems. These advances impact the education processes namely the modalities and mechanism for e-learning and the emergence of virtualization of academic campuses and delivery of academic programs in the developing countries. This paper is an extended software of the key technological and pragmatic methodologies for designing and implementing IT infrastructure, and an outlined approach, for delivering e-learning content.

E-learning comprises all forms of electronically supported learning and traditional teaching. The information and communication systems, whether networked or not, serve as specific medium to implement the e-learning process.

There has been a great rise in e-learning through use of ICT at every level of education sector.

Also it has helped some countries of the world to educate their farmers for using the latest technology in farming that have been used by developed countries of the world. At same time, it has made a positive impact in health by providing web based instruction materials on health and other related areas of ICT.E-learning projects in enterprises, universities and schools have become more widespread but in the retail market, sales figures of courseware have slackened. Policy makers have freed budgets for more internet connections for all learners and to have them connected in networks.

As an integral part of higher education, Information and Communication Technology (ICT) has made positive inroads into learning and education. This is evident in a number of studies indicating that integration of ICT can have positive effects on learning outcomes (Diochon and Cameron 2001; The Pew Internet & American Life Project, 2002; SEUSISS Project, 2002; Saunders and Klemmif 2003; SPOT PLUS, 2004)

Learners and trainers have widely started to use the Internet for their own communication, information, practice and testing but how much of the e-learning supply has found its way in a systematic application?

E-learning finds itself at the tipping point of massively taking-up, but there is some hampering. The ICT community itself is convinced of the usefulness of ICT and so is a majority of management and end-users, but the work and study force at large apparently is not. E-learning

has not yet delivered the promises made in its earlier years.

We argue, though, that e-learning has matured into a next stage, beyond the initial image of silver bullet. We call this evolution a transition from first to second generation. We will first map out this evolution and indicate some pitfalls.

From this comparison, we will derive the dimensions that are critical for making e-learning more successful.

II. BACKGROUND INFORMATION

The internet and education are the two great equalizers in life, leveling the playing field for people, companies, and countries worldwide. President Nelson Mandela.

Information and communication technology helps to record, store, process, retrieve, transfer, and receive information. IT and ICT are dependent on each other. IT may refer to the machine and ICT to its products(Asnafi 2005).The concept of IT has been expanded to include electronic communications, and the use of term ICT reflects that("information Technology"2008).IT may implies one-way communication, while ICT implies interaction between the user and the data (Zamani 2005).

Developed countries in ICT/IT like India, Malaysia, Turkey, Columbia are actively creating and using eLearning programs to accelerate the use of information and communications technology (ICT) in school classrooms. And the reason is clear: eLearning programs equip students with twenty-first century skills that enable them—and the countries they live in—to thrive and be successful in today's global economy. The 21st century skills include technology and media literacy, effective communication, critical thinking, problem solving, and collaboration. These are the skills necessary for students to thrive and be successful in today's global economy.

We have seen considerable number of countries that have tapped deep into e-learning, and it has been used to aid education development of their country.

Right there in India, there are quantum number of institutions that deliver their lecture via the cloud. Many have used it to educate their teeming youth and all other sectors that are directly attached to the government.

However, sub Sahara Africa are still far from what other emerging countries have benefited from e-learning. Open and Distance Learning institutions have seen the need of their students to participate in education programmes through a well structured delivery of instructions. For developing countries, ICTs have the potential for increasing access to and improving the relevance and quality of education. It thus represents a potentially equalizing strategy for developing countries.

[ICTs] greatly facilitate the acquisition and absorption of knowledge, offering developing countries unprecedented opportunities to enhance educational systems, improve policy formulation and execution, and widen the range of opportunities for business and the poor. One of the greatest hardships endured by the poor, and by many others, who live in the poorest countries, is their sense of isolation. The new communications technologies promise to reduce that sense of isolation, and to open access to knowledge in ways unimaginable not long ago.

However, the reality of the Digital Divide—the gap between those who have access to and control of technology and those who do not—means that the introduction and integration of ICTs at different levels and in various types of education will be a most challenging undertaking. Failure to meet the challenge would mean a further widening of the knowledge gap and the deepening of existing economic and social inequalities.

III. HISTORICAL PERCEPTION OF TRADITIONAL LEARNING

A. Traditional Learning

Everyone in his or her life has experienced somehow traditional learning, the face to face learning. Traditional learning is an ancient method of learning that conducted by a teacher gathering students in places such as classes, labs or seminars to study and learn about different subjects. This method of learning has been practiced around the world in all levels such as kindergartens, primary, secondary, high schools, colleges, and universities. In Traditional learning environment, teachers and professors have various teaching styles but the most popular traditional teaching style is teaching by telling [Schroeder (1993) quoted by Ebrahim Ali (2004)],

Traditional learning method similar to any other method has its own advantages and disadvantages that are more or less similar in many cultures.

Below are some of the important advantages and disadvantages of traditional learning.

Advantage of Traditional Learning

- Immediate feedback
- Being familiar to both instructors and students
- Motivating students
- Cultivation of a social community

Disadvantage of Traditional Learning

- Instructor-centered
- Time and location constraints
- More expensive to deliver

B. E-Learning

The traditional context of learning is experiencing a radical change. Teaching and learning are no longer restricted to traditional classrooms (Wang et. al., 2007). It is obvious that in traditional learning the way teachers teach is very critical in students learning process.

Delisle stated that it's how we teach, not what we teach that makes a lasting impact on our student [Smith (1990) quoted by Ebrahim Ali(2004)].

The strength of traditional classroom comes from face to face interaction among students and between students and instructors; this face to face interaction enables students to ask questions and make comments according to their understanding of the subject, allowing students to meet with other students in study groups and creating friendship between them that makes students more social.

The quality of traditional learning always influences the size of classrooms (number of students) and knowledge of lecturers, its boundary to the time and location are the other weaknesses of traditional learning. With today's world population increasing, the people's trend to study is rapidly growing; education environments are changing and universities are looking to reach more and more students who bring them more marketing.

Nowadays many college and university students are married, have children, involved in part time or full time jobs and other responsibilities to follow in their lives, the size of cities are growing and many students are living far distance from college and universities.

The need of new learning method becomes really necessary to facilitate today's students learning and educational trends.

The growth of the Internet and its impact on education system has created a new learning model called e-learning. It is considered as a new revolution in the world of education; e-learning refers to the type of learning that people take a professional or educational course without the use of traditional methods; taking a course or going to school remotely, using the web as a classroom (Talbott et. al., 2002).

According to Tastle, et. al. (2005) for the purposes of study and education e-learning or electronic learning refers to the delivery of educational material via any electronic media such as internet, intranet, extranets, satellite broadcast, audio/video tape, CDs and computer-based training.

E-Learning currently is a one of the popular models of learning, like any other idea it has its own advantages and disadvantages.

The most important advantages of e-leaning are that participants can access programs anywhere at any time compared to the traditional learning students who are bounded to the time and location.

Below are the advantages and disadvantages of e-learning in addition to what was mentioned in last paragraph.

Advantages of E-Learning

- Learner-centered and self-paced
- Time and location flexibility
- Cost-effective for learners
- Potentially available to global Audience
- Unlimited access to knowledge
- Archival capability for knowledge reuse and sharing
- Available anytime anywhere

Disadvantages of E-Learning

- Lack of immediate feedback in asynchronous e-learning
- Increased preparation time for the instructor
- Not comfortable to some people
- Potentially more frustration, anxiety, and confusion
- Needs Internet Access

Although e-Learning is becoming more widely spread for education and training still many online courses are poorly designed. Some are little more than electronic versions of paper-based materials; overall the reputation of online courses is not good and the exception of well-designed course that effectively teach a topic to its target students is high (Neal et. al., 2004).

The most important strengths of e-learning courses for students comes from its indecency to the time and unbound to location, beside that, the number of students in virtual classrooms is not an issue since e-leaning courses are student oriented compared to traditional learning courses that are instructor oriented. Some researchers believe that interaction is an important element in learning Vygotsky, (1978), quoted by Hay et. al. (2004). Indeed, interaction has been proposed as one of the key parts of any learning experience, some other researchers suggest that on-line education adversely affects interaction, therefore lowering the quality of the educational experience (Abrahamson, 1998;Rahm and Reed, 1997; Sonner 1999, Hay et. al., 2004).

Further studies on-line learning indicated that dissatisfaction with online courses resulting from feelings of isolation and lack of interaction with students and instructors (Hay et. al., 2004).

According to Labay and comm (2003) e-learning produces the better learning outcomes than the traditional methods. The Internet and the World-Wide-Web have become the predominant media for distance education offering degrees at bachelor's, master's, and doctorate levels. Countries today increasingly recognize that educated citizens are critical to its chances for success in the digital economy. Students need to develop 21st century skills to be best prepared for this reality, and to have the opportunity to succeed. These skills—technology and media literacy, effective communications, critical thinking, problem solving, and collaboration—are best developed in effective eLearning environments that include information and communications technology (ICT).

In order to bring 21st century skills to students, governments around the world are using eLearning programs to implement the education environments that are best for their students.

C. Design Methodology

The solution of the e-Learning is one of the most discussed priorities of modern educational institutions. The whole problem lies in the global approach of which strategy must use to create e-Learning system.

E-Learning systems are applications that enable the creation of education/learning environments, integration training material, documentation and communication tools, collaboration, interaction and educational management. Such applications normally reside on a Web server in which they carry out the training actions.

This type of applications allows students to connect to download contents, use the learning program to communicate with their tutors, etc. In addition, these systems and platforms allow for a better monitoring of students progress. Organizations take advantage of applications that address education, administration, continuous formation, and defining roles. At the same time, employees need easy access to information to conceive, maintain, and improve their professional development.

With the evolution of the Technologies of Information and Communication (TICs), new education/learning development strategies appear. Where e-learning strategy, is one of the major education strategies to, use the TICs with traditional learning elements. That leads us to view the e-Learning strategy as a cornerstone for technological, pedagogical, and educational development. The goal of an e-Learning system is to achieve knowledge transference in an efficient way. To do so, it is necessary the adoption of an appropriate methodology that tackle the particularities of the development of e-Learning systems.

D. System Implementation

An E-Learning Portal database needs to store information pertaining to its users (Learners, Instructors & Administrators). The portal course content, log users and track learners progress with end of course examination.

This system will have three levels of users

- Administrator (IT Specialist)
- Learner
- Instructors

E. Administrator

The users at the level must be an IT specialist who will be responsible for creating and managing users account, updating of course content and other technical issues on the e-learning portal.

F. Learner

Learners are end-users, students who wish to take courses available on the portal. They choose from courses available on the e-learning portal for study. They can easily register themselves on the portal and start studying.

G. Instructors

The users at this level are instructors who provide course content for the portal, and, also track student/learner progress.

H. Success Stories:

India-India has recorded significant number in application and use of e-learning in delivering their educational guide. Example stem from Sikkim Manipal University, Mahatma Ghandi University, not to mention but real player in e-learning in India-Koenig Solution which has used its technical expertise to give instructional training on IT via internet or other reliable medium.

America-Example from this continent is courser-which is administered by a university in Michigan,USA. Coursera platform has been used by renowned professors to lecture students that are physically distanced from the USA. This platform has been used to teach course relating to medicine, informatics, philosophy, computational linguistic and a host of industries required courses.

Malaysia-The ministry of education partner with Intel on a plan to improve teaching and learning supported by technology. The program included increased access to PCs, teacher integration of technology, teacher professional development, and the deployment of wireless networks in schools throughout the nation.

I. Result:

Greater access to technology, information and content nationwide

Increased students' interest in their education, and development of 21st century skills

Malaysia is now seen as a regional leader in education policies and programs- and a choice-of-study destination for close 100,000 international students from more than 100 countries

IV. CONCLUSION

With the present paradigm shift in information technology for educational advancement, it is pertinent for developing countries and sub Sahara Africa countries to take lead from what developed countries have implemented .Present days education must be technological driven, must be capable of given industries standard training. There is no doubt that introducing and incorporating digital technologies into educational provision is a complex process. Many factors have to come together to ensure that e-learning programmes are successfully implemented. E-learning also has the benefit of opening up greater interaction between learners' study, work, home and community environments, simply because the learning environment can be extended into those places.

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USING INTERACTIVE WHITEBOARDS IN EDUCATION

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Abstract - Paper discuses the advantages of using Interactive Whiteboards (IWBs) in education. Use of accomplishments of information technology becomes extremely important for development of modern pedagogical science creating educational politics and enhancing direct teaching practice. Change of pedagogical practice reflects increase of teachers' and students' interactivity toward subject position, respectively students' activities and IWB technology initiates just that. Positive influence of interactivity on successful learning and teaching using the IWB technology reflects in: the use of principles of the obvious because well conceived material and interaction of users with objects on the board using a pencil, a finger or some other device influence positively in understanding the content; game elements make the use of this board fun for students, and when something's fun it's easier to learn and remember; using colours, movements, emphasized things and other visual effects reflects positively on students' learning; creating multimedia material on the subject stimulates interaction between students through discussion and direct manipulation of the media. Success of using this teaching means mostly depends on teachers who should find the best ways of using great possibilities of IWB in their work so students would be more active, comprehension greater thus learning more successful.

I. INTRODUCTION

The documents of UNESCO that deal with issues of education, created during the last decade, states, inter alia, that the policies and strategies of education under the strong influence of scientific and technological revolution. Modern technical and technological developments important factor in the democratization of education and improving its internal and external efficiency. The application of modern information technology advances, it becomes extremely important for the development of modern pedagogical science and for immediate improvement of teaching practices. We are witnessing a time in which information technology is becoming a key factor in the overall human and social existence causing the readiness of the entire educational system for the rapid transformation and adjustment with new requirements and changes, so that the traditional role of education in the individual acquisition of knowledge and the development of his abilities getting new features. In these processes, the role of the teacher does not lose its importance, on the contrary, there is a need for the development and improvement of its competence to work in new conditions [1]. Using modern approaches to organizing teaching in which students are active are beyond the traditional forms of teaching. The use of modern teaching aids contributes to the adoption of permanent knowledge and developing skills of students for lifelong learning and professional development, developing the students' creativity and sense of success.

IWB technology initiates changing pedagogical practice to increase interactivity of teachers and students in the classroom. Since this technology is relatively new, there is little scientific research on its impact on teaching and learning. The researches carried out in the UK, Australia and New Zealand where the IWB technology significantly represented in teaching, unambiguously significant influence IWB technology in learning performance of students, but no recorded negative impact of these teaching tools. Most of the existing scientific researches states that the most important variable in improving the quality of learning in students lecturing. The technology itself is not a guarantee that we will achieve better results in their work and we will be more efficient. Although the IWB technology with great potential, it is still just a tool, a teaching tool, but a tool that will allow teachers who passionately committed to doing their job, to do it even better.

All the reviews and praise of this technology cannot be taken seriously without looking at the learning process and the way in which the teacher used the IWB. Efficiencies IWB technology varies from teacher to teacher. Thus, the only relevant way that the teachers will have a clear picture of this technology is to begin to use it and try to improve their practice and also increase the possibilities of using new technologies.

Most of the presentations that are used in teaching are linear, with lots of information and very little interaction with the student. Furthermore, the majority of teachers manage the process of presenting while sitting at the computer. Consequence of this kind of actions by teachers, presenting lesson while sitting at the computer is such that students can be confused, which is not the case when the teacher presenting lesson by using IWB, students do not have the dilemma on of what they should paid attention, because they see where teacher's finger or stylus pointing.

From this point of view, we can say that IWB are developed from the need to directly manipulate with objects on computer while teacher is in front of the working surface of the IWB (interaction with projection surface), while preserving all the possibilities we were use before IWB (multimedia materials in combination with computer and projector).

Although the interactive whiteboard is just another teaching tool that is used in teaching, IWB technology has brought a lot of possibilities. If we consider only the possibility of manipulating the computer at projection surface, we have an advantage compared to pure presentation, because we can now use integrated software tools (as a ball pen or highlighter in a Power Point) directly on the projection surface.

If we leave aside the PowerPoint for a moment, we can see a number of software that we can use in the classroom (GoogleEarth, GeoGebra, 3DCabri, MS Mathematics, Sketchup etc), and we can see that the possibility of direct manipulation with objects in these software's really is a big advantage over the current use, projecting image without the possibility of interacting with the software on the projecting surface.

All interactive boards have a set of tools that provides interactivity and sensitivity of the projection surface on user command. IWB technology offering except cursor control and interactive tools that allow you to use the projection surface as we once used a plain whiteboard, such as writing notes or drawing over the content currently visible on the screen, using a "sponge" to delete the objects or lines. IWB technology offered much more than simulating ordinary whiteboard. It is also possible to record all or part of the lecture, the audio or video format, to make photographs of part / full-screen, to use handwriting recognition, shape recognition, the magnification of the screen, ... With each object (line, geometric body, complex illustrations, video and audio facilities) can be freely manipulated.

All of these tools open up a range of possible uses in the classroom, and most boards these tools integrated into the flipchart software that are essentially software very similar to Power Point, arising from the need to overcome the limitations of existing presentational software and work with interactive boards make it easier, more beautiful and elegant. Flipchart software applications are now serious great features that come with large libraries of ready-made teaching materials that are literally at your fingertips text, images, charts, diagrams, video, audio, interactive animation, ... required to work in class. Flipchart software also allows us to use the interactive whiteboard, organize material through the slides or pages that are not visible at the same time, but it is easy to show again, with or without notes created during the class, and with the capability of multimedia and interactive materials.

Using flipchart software with interactive whiteboard is not necessary. With interactivity that brings IWB technology during using existing presentations made in Power Point or with use software such as GeoGebra mentioned, can be achieved very much. However, to we waive the flipchart software completely, would mean not to use full potential of the IWB technology.

II. TEACHING WITH IWB

Teachers who just began to use IWB in their work, usually in the early stages of use the IWB as a tool to carry out the basic objectives and learning. In this context, teachers use the IWB as a replacement for the previously used teaching resources (using projector and ordinary projection screen), or carry on the current practice with using a new method of presentation. At first, teachers use the IWB software that provide various forms of writing and drawing and in that way extend their lecture. As confidence grows, teachers are exploring new possibilities of using the IWB with familiar software, such as Power Point. The teacher is then able to use generic software features, such as writing notes and comments to a slide presentation, usually using the tools built into PowerPoint. Of course this type of activity can be taken by students, and it supports interactive learning. As time progresses, teachers increases confidence in the use of IWB, and then they starts to research the possibilities offered by the IWB technology. Teachers' skills in the use of IWB

technology can be described by the following steps:

- hand-written text on the board in the same way as the traditional board
- The use of pre-prepared text and graphics - making use of flipcharts
- Save a flipchart for future use
- Using Power Point with IWB included using directly from the desktop panel and use markers for notes on the slide
- Using drag and drop techniques with text and graphics on the desktop board
- Moving back and forth between pages to create an effective learning sequence
- Import digital photos and audio recordings
- The use of hyperlinks to switch between pages / use of resources on the Internet
- The use of hyperlinks to launch different software
- Preparation and effective use of galleries / library of ready-made resources
- Sharing galleries and resources with other teachers

As a teacher progresses in steps and these skills, linear passage through the lesson (presentation) changes to the "bouncy" where exactly IWB technology allows movement through the lesson in different directions. Teachers use hyperlinks to follow different ideas (but without moving away from the goal of the lesson), so learning materials can be modeled and prepared using the links to the programs, to documents, web sites and materials available over the Internet.

With the progress of students' understanding of the functioning of hyperlinks and IWB technology, the teacher encourages them to create their own versions of "work" that will be presented using the IWB and will be part of a lesson and/or activity in the classroom. These “works” are usually students answer the task set by the teacher on a specific topic in the form of Power Point presentation with hyperlinks to resources. Students present their work using the IWB, and then discuss the results that are stand. The teacher may at any time put a note with the essential parts of which are currently present to direct the attention and/or pointing to correction of errors in the students’ work (or can encourage students to take on this role).

Of course, the teacher can plan ahead and align with students the time of presentation of their work and even participate in students work and adjust it if it is necessary with curriculum before student present his work on IWB to the class. Students present their work and discuss the results with classmates; Teachers during these presentations can gain insight into the knowledge and understanding of individuals or groups of students. Presentations are themselves evidence of student work, and can also be printed out with the comments of teachers if necessary.

With the implementation of these activities, the potential of the IWB becomes obvious and teachers are beginning to slowly change their pedagogical practices towards better use of IWB technology features:

- The teacher introduces the class with the objectives of the lesson at beginning and and bring students attention to them at key moments of lesson
- The teacher uses the board to present information to students through various resources (audio, video, simulations, animations, images, ...) but mainly in manner that students manipulate with these resources
- The teacher encourages class discussion and follow them by making notes on the IWB
- Activities such as naming, drawing and graphic design teacher takes using IWB
- Arguments and explanations for certain aspects of the IWB are written by students on IWB
- The teacher and/or students write on the board the text, such as the conclusion of a discussion, and then analyze it and try to improve it

The speed and magnitude of changes in teachers' work depends on the teacher himself. Essentially, only adjusting the current way of teacher work using new teaching tool will not bring significant benefit to the teacher or the students, except for higher student motivation during the initial period of using IWB technology in which students are still fascinated by the new technology. With time, teachers will use their experience and knowledge with the introduction of new teaching resources to develop new strategies and to change their own pedagogical practices.

Changing pedagogical practice is a process in which teachers need to change their current way of working to increase interactivity, not only in terms of IWB technology, but also the mutual interactivity of teachers and students in the class. In that way use of IWB technology will be given

its full meaning in the classroom. We can highlight key reasons for the positive impact that interactivity have on successful teaching and learning with the use of IWB technology:

- Obviousness. Well-designed materials and user interaction with the objects on the board using a pen, finger or other device positively influence understanding.
- The elements of the game. The elements of the game used with IWB technology are interesting and funny for the students, and when something is fun it's easy to learn and remember it. Integrating sound, animation, video, text, and other interesting resources for lesson has a positive effect on attention and learning. Elements of Game can appear in different forms when it comes to IWB, as computer games with the educational potential, as designed game knowledge competitions between students that are divided into groups ... In this case interaction exists between players and IWB, between students and the teacher as the leader of the game, between team members, i.e. students, ...
- Visualization. The use of color, movement, emphasis, and other visual effects has a positive effect on learning for all students. Student interaction with the visual world of the media is intuitive and effective.
- Students' work. A wide range of possible media that can be used and the ability to students can manipulate them is a big plus for IWB technology. Creating multimedia material on the topic by students stimulate interaction between students through discussion and through direct manipulation with media. The interaction between the students has positive effect on learning. The teacher in this case is the mentor for resource developing and mediator of discussion.
- Interactivity in teaching with the IWB is not a one-way process, but a process where teachers modify their approach to the needs of students. For a successful learning there must exist student interaction with the teacher, resources and other students. Under the interaction is considered not merely physical use IWB by the students, but also the interaction in terms of the exchange of views and ideas with other students and the teacher.

The use of IWB technology encourages more active participation of students in the teaching process. What is certainly important is that the teacher must carefully choose and create teaching resources and successfully manage teaching process in order to avoid the negative connotations of the active participation of students (for example, when a student is exposed to bad comments of his classmates while working drag and drop exercise on IWB). The teacher therefore has to create resources that can present a challenge for the students, but in that way that tasks set before the students are solvable.

The most important factors of effective use of the IWB in teaching are:

- Availability. Some kits interactive whiteboard are mobile and small, practically fit in a small purse. If a teacher wants to use IWB, and bag with the equipment is locked somewhere in school, same teacher will quickly lose interest in using IWB. Without access to the IWB, teacher can't have practice, and consequently the effective use of IWB
- Proper positioning of the IWB in the classroom. If any part of the table is not at hand and not properly positioned, the IWB will not be used efficiently
- Teachers training. Without timely and continuous training there is no effective use of IWB. Teachers who do not have enough self-confidence in using IWB rather will continue to operate as they did before the opportunity to use the IWB. For each IWB takes time to invest in the knowing equipment and practice. In order to use IWB routinely, it's needed at least 10 to 15 hours of using and experimenting, except the initial training. A good part of that training time waste in exploring opportunities of flipchart's software and its capabilities.
- Equal percentage utilization by students as from the teachers. If only teacher uses the IWB, students will quickly lose interest and teaching will be reduced to a situation as same as where we have a computer and a projector, with the difference that teacher stands at the board instead in front of the computer. Using IWB in this way is like driving a new Mercedes with 60 Km/h speed at highway. In this way we do not use half the possibilities of vehicle and path, and further we disrupt other users of highway by driving too slow. Students should be encouraged to use IWB. Students are more attentive in case that one of their friends use IWB, much more than in case

that teacher using IWB, they are more willing to communicate, help, discuss.

- The exchange of materials and ideas among teachers. If this exchange does not exist, teachers must prepare learning materials for each topic properly which requires a lot of designing and time. Lately, IWB manufacturers have realized that their products sells better if they offers hardware with resources gallery. These galleries are resource collections of images, multimedia and articles are very similar to the ClipArt in MS Office applications. Each new software version has bigger and richer resources galleries.
- Technical support. All IWB boards have their own problems. Hardware failures are possible, but in particular, software failures and moodiness are more often case. The first time when teachers encounter a problem and there is not available technical person to help them to solve the problem, self-confidence and the desire to uses IWB dramatically decrease. The existence of technical support is particularly important in the early stages of IWB use while teachers are still not familiar with the IWB technology.

III. BENEFITS AND PROBLEMS OF USE IWB TECHNOLOGY IN TEACHING

What IWB brings to students?

- Students are motivated to work thanks to new technology at the very beginning and later because of its advantages
- Easy understanding of complex concepts (with the IWB we have the ability to highlight and emphasize important parts and manipulate video from your desktop and engage students in the process. Animations are also important resources which often include the ability to change input parameters that cause change output parameters and the analysis of the differences in the results can be a lot to learn).
- Increased capacity to meet different learning styles
- Decreased need for taking notes, everything is on the board can be saved for later replay and analysis, and can be printed
- Teachers adequate use of IWB encourages students to discuss and exchange views
- The result of the previous two points has increased the cooperation between students and active participation of students in the teaching

What IWB brings teachers?

- Integration of ICT in teaching process
- The ability to draw and write at a very different resources (including video, animation, photography, picture, software windows ...)
- The ability to save and print whatever is currently on the board
- The ability to share and re use materials (once prepared materials can be reused and once they make available to their colleagues become widely usable)
- Savings in time because teaching is much more efficient with the pre-prepared lecture material (for example math teacher can use picture of previously prepared coordinate system instead of drawing it).
- Savings in time leads to change the approach and pedagogical practice, there is more time for discussion, verification, analysis, teamwork, ...

Possible problems that may occur when using the interactive whiteboard are:

- Failure to exploit the possibilities of interactive table due to insufficient or incomplete training of teachers
- Partially hiding table by the lecturer or lecturer real shadow that can cover a large part of the visible surface of the projection surface (This problem is solved by adequate UST projectors)
- Several hours standing in front of the projector can be hard for users eyes (This problem is also solved by adequate UST projectors)
- Both students and teachers must have adequate knowledge and skills to effectively use the IWB

IV. CONCLUSION

Using the interactive whiteboard in teaching can significantly affect the educational process and to contribute to a better quality of teaching. The efficiency of the teaching resources largely depends on teachers who should find the best ways for use the great features IWB in their work so that students can be more active and better understand topics and therefore we will have more successful teaching. However, practice shows that teachers are just one side of the coin. Where problems may arise in our schools? In the first place because the

technology is often not available to teacher, and if it is available, it is often not properly positioned (set too high or too low, there are physical obstacles in the approach, inappropriately positioned the projector, a shadow on the projecting surface ...). At the other hand, for effective use of IWB technology it is necessary to spend some time for training and practice of teachers, approximately ten to fifteen hours of work, from the first meeting with the IWB technology. If teacher change IWB technology (school has purchased another model of IWB), he or she must spend up to five hours to master differences in functionality of different models and software. Furthermore, the teachers are often deprived of technical support. After purchasing IWB technology by schools, distributors carry only rudimentary training and do not provide any kind of further technical support. The next problem is the insufficient use of opportunities IWB technology which contributes to the insufficient exchange of materials prepared for use with IWB among teachers. All the reviews of this technology cannot be taken seriously without looking at the context of the educational process and without analyzing the way in which the teachers use the IWB. Efficiencies IWB technology varies from teacher to teacher. Thus, the only relevant way that the teachers will have a clear picture of this technology is to begin to use it and try to improve their practice and also increase the possibilities of using new technologies. The modern approach to teaching, as a condition of quality assurance, implies training of teachers. A teachers which are actively involved in the development of their scientific discipline and continuously improve their pedagogical skills, develop their technical and scientific competence, thus contributing to the quality of teaching.

By using appropriate media and instructional materials designed with respecting standards, raises the motivational aspect of the learning process. Time and future research of IWB technology will show if we overestimated or underestimated the possibilities and importance of IWB, and whether we are up to the task to use this technology properly, or how much we are willing to change our current pedagogical practices in direction of better utilization of opportunities IWB technology.

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APPLICATION EFFECTS OF INTERACTIVE WHITEBOARD IN TEACHING TECHNICAL AND IT EDUCATION

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Abstract - Teaching Technical and IT education is set with exceptionally high and complex goals. They cannot easily be reached by lagging in application of innovation teaching as by the teaching methods so by the contemporary teaching resources. This work is an attempt that the idea of active teaching is elaborated through application of interactive whiteboard and to show opportunities and effects of its application in teaching Technical and IT education.

I. INTRODUCTION

Development of technology and information society has set high standards for teaching Technical and IT education. Present teaching methods cannot answer to these challenges. Teaching practice confirms that changes are necessary, even obligatory, since everyone is aware of the fact that quality education depends on social progress, cultural development and technological progress.

The 21th century implies the knowledge of scientific basis and principles of contemporary technical resources, knowledge of material properties, rational and effective work organization and its strictly enforcement and use in everyday life. Every man, regardless of occupation, requires technical knowledge, knowledge of scientific basics of production, main production branches, on modern technology and organization production, basics economic knowledge etc. In the application of that knowledge, some skills and habits are formed (handling primary tools, mechanisms and machines, instruments and equipment, knowledge and skills of reading technical drawings and documentation). In this area, based on the knowledge, intellectual abilities are developing such as monitoring, technical thinking, and construction ability [1].

Experts warn that in today's school, teaching objectives that contribute to development of independence in learning and intellectual work of students are not reached and that this results with small practical value of knowledge, that is, its application in new situations.

It's undeniable is that teachers support creativity, innovation but in practice, they are unprepared to step out from traditional - verbose and formalistic teaching. On the other hand, the application of contemporary teaching resources increases the efficiency of learning and eliminates rigidity of traditional teaching methods. Teacher's role to these classes is discrete, but exceptionally important. He, like a director that has performed the main part of the work before lectures, quietly monitors students' work, controlling and directing their activities, serving them as counselor, a reminder and contributor in implementation of planned tasks [2].

II. INTERACTIVE LEARNING AND TEACHING

"Interactive learning is process that results in relatively permanent changes in thinking, emotions and behavior which arise from the experience, tradition and practice achieved in social interaction [5].(p. 24). However, interactive learning can be characterized and as introduction to information technology in teaching process whereby the instructional materials are presented to the students in quite a new way. These methods have the task of activity transfer from teachers to students.

Activity involves everything that students do in the teaching process (write, read, listen, solve tasks etc.) and it can be thinking or motored activity. Motored activities are visible from the outside, so the teacher can affect them. On the other hand, thinking activities of students are internal and not visible, but are exceptionally important.

Although the need of thoughtful engagement of students in teaching process is recent date problem, it was observed a long time ago and as such present in works of thinkers like Plato,

Quintilian, Montaigne, Comenius, Locke, Rousseau, Dewey and up to numerous movements in early to 20th century.

Findings of many empirical researches unambiguously agree on the benefits of activation of thinking and independent work of students in teaching process. The active learning process has better quality because student thinks on the material, trying to understand it better and link it with his previous knowledge. This way, the acquired knowledge has greater quality and can be used in different situations. Active learning involves personal student's effort and his increased engagement in learning process.

In the knowledge acquisition process, the most important elements are sensory perceptions, thinking (cognitive element), and practice (practical experiential element) and should be present in all stages of teaching process. It practically means that observation in teaching has more sense if some knowledge can be verified in practice. Therefore, students should be encouraged to ask questions, make conclusions, use different sources of knowledge and verify their knowledge through practical activities (experiments, practical work, independent research assignments, presentations and etc.).

Planning and implementation of these classes requires additional engagement of teachers for preparation.

III. INTERACTIVE WHITEBOARD

In recent years, we are witnessing attempts of modernizing teaching process, above all, by introduction of contemporary achievements in Information technology. Great number of schools are equipped with computer classrooms with working place for each student. In most schools, teachers are provided with computers and video projectors. However, engineering and technology have gone a step further and place a new challenge for teachers the interactive whiteboard. The first electronic interactive whiteboard were released for sale in 1991. But their expansion came a few years later. Until 2008, billion whiteboards had been sold. Nowadays, interactive whiteboard has become unavoidable teaching medium in schools throughout world being very popular in Canada, the United States and UK. In Serbia, the number of schools with interactive whiteboard is increasing, although that number is much lower than in developed countries and in neighboring countries.

Interactive whiteboard is modern teaching medium which modernize the teaching process and involve use of Information technology. Interactive board consists of computer, projector and projection screen – white-board, that is, at the same time, an input unit. The whiteboard can be written on with special pencils or, for some models, with pressure of finger. Operation of this system is aligned with convenient software that provides possibility to use white board to write, create, display and record presentations, video and audio, display and search Internet content and similar. There are two basic types of interactive whiteboards: fixed and portable interactive board. Most common brands are: Smart, Promethean, Mimio, Numonics, Polyvision, Hitachi and other. Approximate representation of some brands of interactive whiteboards in Serbia is as follows: Smart, Hitachi (more of 15 schools), interactive whiteboard Školarac, virtual marker, interactive whiteboard Mimio (more from 20 schools) [6].

In schools in Great Britain, as a remark for using interactive board, it is proposed to encourage direct teaching and interactive examination of whole class.

Some of the advantages of interactive white-board in teaching are:

- attracting and keeping the student’s attention;
- increasing students motivation and active participation in the learning process;
- interactivity and flexibility of teaching materials;
- ease use;
- multimedia views;
- drawing and writing on lesson materials during the class
- developing student’s skills to use information technology and so on.

Possible disadvantages of interactive whiteboard:

- High prices of quality interactive whiteboards
- Possibility of damaging
- They cannot be moved from classroom to classroom.
- Technical problems can occur during the teaching ;
- Additional training of teachers is required.

IV. INTERACTIVE WHITEBOARD IN TEACHING TECHNICAL AND IT EDUCATION

Teaching methods "means purposeful and systematically applied way for managing students work during the teaching process, which enables an acquisition of knowledge and skills so as it's application in practice, and also contributes to development of their cognitive ability and interests, forming views to world and preparation for life " [3], (p .33).

Technical and IT education is a school subject that implies introducing students with wider technical - technological territory. Curriculum subject areas included are scientific areas like mechanics, electrics, electronics, architecture and construction, transportation, graphic communication, IT and computer science, robotics, energy, materials and technology. All of these fields have its own specific conditions and a way for presentation of teaching materials to students. For example, the probability that students will remember the principle of melting furnace is higher if they can see the process on film or illustrations than only with verbal teacher's explanation. Moreover, very often, exercises and experiments are required for students to do, but school is not equipped for that, so everything remains to theory without practice. Since there are too many examples like this, multimedia is unavoidable teaching medium in teaching process. Multimedia interactive whiteboard is recent teaching medium that provides exceptionally large opportunities in modernization of teaching Technical and IT education. It allows the teacher to utilize teaching time maximally. The teacher's preparation of material is necessary and it can be Power Point presentation, Word document, JPEG, Flash, program or link to Internet content. This way students can have a closer look at different technological processes, they can exercise traffic regulations, technical drawings, collective production and comparison of sketches for construction modeling, presentation of students research work, online experiments and research, making tutorials, electronic textbooks that can be forwarded to students and similar. Moreover, using interactive whiteboard, they can learn and practice work in programs like - Google Sketchup, Virtual Lab, Envisioneer Express and other programs included in curriculum. The student's work with interactive whiteboard can be saved in corresponding folder so the teacher can make some sort of pedagogical documentation and follow the work and progress of each student. There are great opportunities for application of interactive whiteboard in training and reinforce of learning through practical examples, making Hot Potatoes exercises and quizzes, as and preparation of students for competition in Technical and IT education. Saved lessons can be uploaded and always available for students through Moodle system for learning.

V. INTERACTIVE SYSTEM "MIMIO"

Mimio is portable digital system that can be set to any white board. This set for Interactive whiteboard includes:

- Mimio base with link USB module,
- Wall mounts to device,
- USB cable,
- Multifunctional IR pen (mouse stylus),
- Mimio studio CD with Software.

To operate interactive whiteboard, a computer and a video projector are necessary equipment in classroom.

Base with the carrier's sets very simply to any white board and USB cable connects with PC to whom it is installed corresponding software. Upon setting and switching system, it is necessary to do the calibration according to instructions that appear on screen, to determine the working surface. Files can be recorded in format .ink to be available for use in other classes, or in format pdf, if they are required to be distributed to students.

There are three basic components to work in Mimio system: mimio Notebook, mimio gallery and mimio book score.

Mimio Notebook is software that enables interactive lecture and storage of materials in different formats (pdf, bmp, jpg, png, tiff, html) that the can be forwarded to students. Graphical surroundings of program are very similar to Power point, working with pages - slides and after opening the program, new page is automatically available for operation. Word documents, Power Point presentation and pdf files can be inserted into main presentation.

Mimio Tools appear as special panel. Tools can be used to develop materials as well as in the processing of learning material. There are many useful options: zoom, color markers, text writing, highlighting, coloring, inserting automatic shape, arrow, and eraser. Further options are available: Reveal – is used to reveal parts of screen that are

in shadow to hide answers below, Magnify – enlarges parts of presentation, Spotlight - to emphasize important parts on screen and this light can have different shapes and colors, Screen Clipping – capturing parts of the screen, Web searching option.

Mimio Gallery is divided into 4 categories:

- Pictures
- Patterns (templates),
- Multimedia - movies, animations, audio records,
- Existing lessons.

Opening the Gallery, folders with materials that are sorted by teaching items and concepts, and that the can insert in lessons, are available. Materials made by teacher himself can be added to Gallery.

Mimio Grade book is used to track students' progress by forming classes, entering the basic data on students and then regularly entering the points for their work and to reviews. Averages for the each class are automatically calculated, and can be printed out as a report with points and ratings for each student and average for whole class.

VI. CONCLUSION

In order to prepare young generations, or majority at least for challenges of contemporary age, educational institutions must hold pace with current engineering and technology and maximum exploit its potential in field of education. It includes, in addition to planned equipping of schools with contemporary teaching aids, and appropriate training of teachers. That way their didactic potential will be maximally exploited. Advantages of traditional teaching can be very successfully amended with possibilities of innovative teaching methods and tools. In this way the classes, which most students find boring and unnecessary obligation, will be approaching J. A. Comenius "learning through game".

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CLOUD COMPUTING IN FUNCTION OF CENTRALIZED LEARNING

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Abstract - Modern world is accustomed to high IT access and networking. Not only business is done highly over computers today – the Internet also allows intensive globalization of all aspects of contemporary life. One of them, being researched to a certain extent, is education - especially formal. Namely, even though there have been strives to implement e-learning and distance learning in various ways, little has been done to centralize this trend by using Cloud Computing and the advantages it offers. The purpose of this paper is to investigate the possibilities of centralizing the knowledge pool through Cloud Computing, present the effects and predict the future of this trend.

I. INTRODUCTION

Being one of the newest trends in the world of information technology, cloud computing makes great amounts of information available and helps better and faster response from the services offered to citizens. This comprises not only users' needs for information, but also for requests for formal documents, public data and such (also known as e-government), business connection, knowledge sharing, education and so on.

The keywords in cloud computing are: cheaper, faster and greener, so it is clear that this trend pinpoints strives present in almost every aspect of today's life. In order to be more competitive and therefore successful in any aspect of modern life, one needs to do things at a lower cost, greater speed compared to the others and with the least possible negative impact on the environment.

Speaking of education, one must say that certain movement towards implementing cloud computing is obvious, yet still to be explored and improved more thoroughly.

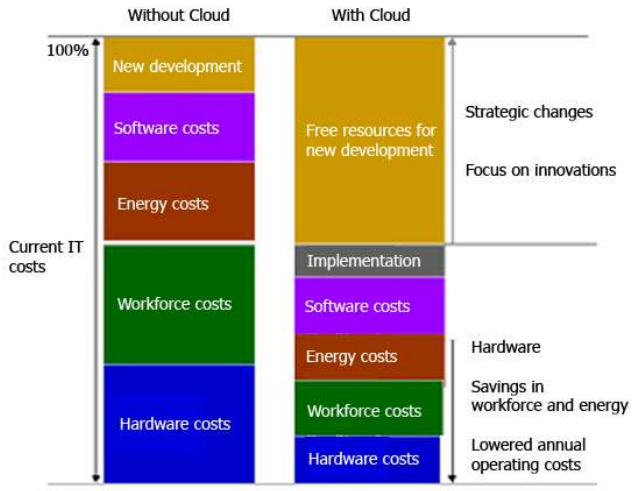
The basic idea behind cloud computing is that the data in use are not stored locally, i.e. on hard drive of individual user, but on a remotely located server owned by so-called cloud vendor. Actually, most Internet users nowadays already use cloud computing, being completely unaware of that fact (e.g. web-based e-mail). Transferred to the education field, the idea shall be that, at the basic level, the knowledge pool is based on an educational institution and accessed by its members to a certain extent of authorization. The main aim of this new strive in education is to make knowledge more accessible as a resource, easing the process of studying to the students and needless to say, cutting the costs of traditional distribution of knowledge dramatically, meanwhile paying close attention and accurately responding to every student's educational needs. Ultimately, through implementation of cloud in educational field, every individual professional development shall be able to track – making the process of finding right people for certain job positions easier to the employers.

II. CLOUD COMPUTING IN EDUCATION

A. Advantages

Apart from having slight requirements for the equipment (only basic peripherals and connection to the Internet are necessary), cloud computing enables access to various sources of data provided by the approved users. When speaking of this from the educational standpoint, it becomes clear that cloud computing opens a new chapter in knowledge transfer and sharing. Virtual classrooms, libraries, study assistants, pre-test and test facilities all become available thanks to this new trend in information technology. Another advantage here is the accessibility of data from anywhere in the world, which foster the current trend in economy, that professionals need to be mobile, seeing the globe as a single place.

Risk management, long-term planning, fast and more qualitative responding to clients' needs are all facilitated through cloud computing. Furthermore, cost reduction that occurs as the result of application of this trend is significant, as can be seen in Fig. 1.



a. Source: Breiter, G., Cloud Computing Architecture and Strategy

Figure 1. Cost reduction by innovative cloud

III. IMPLICATIONS OF CLOUD COMPUTING ON EDUCATION

A. *Limitation Circumventing*

As Walter Bailey [3] said, the entire educational system has a number of resource deficiencies: premises, staff, quality of programs offered and such. This is where cloud computing can help improve students' achievements, through improving accessibility to quality education, bypassing the previously mentioned problems.

One of the possibilities here is virtualization of the classroom environment. This means that the students will actually be able to log onto a space online and attend classes from their homes. The lecturers will find it easier to focus on creating quality content students will actually understand and use, instead of dealing with overcrowded classrooms with poor learning conditions. In this way, they will be able to actually help students comprehend their lectures and develop their skills, leading finally towards the successful passing the exams and retention of the knowledge in the future.

Given that most scientific areas nowadays rely on information technology and have their databases stored electronically, scientific research and development can be significantly improved by means of efficiency and data perusal through cloud computing implementation.

B. *School Administration*

Another significant schooling area where the efficiency is still utterly poor is the administration. Namely, developing countries like ours still pose the teaching staff a great deal of paperwork which needs to follow the actual classroom activities, and which is in the majority of cases larpurlartistic – curricula are written in preset booklets, scarcely checked by a higher authority and literally never used again. Thereby, the time consumed here is immense and the effects are almost none. With the cloud implemented, mandatory data written on a 'cloud' should be concise and made accessible (to a certain extent of authorization) to all the members of teaching staff in order to help them plan their lessons.

C. *Uniformed and Globalized Education Process*

Accessibility is one of the greatest benefits of cloud when applied to an educational setting [3]. Universal approach to students of all educational, cultural and financial backgrounds should result in improved quality of education, fostering the collaboration, enhancing team-building initiatives and improving group- and team-centered project success rates. Resources like rare textbooks or data from other countries regarding the same topic enable great deal of knowledge sharing. Between students, it is not limited just to ideas, but also education infrastructure and tools, which can boost their competence regardless of their origin, place of living, previous experiences and such. Everything they need is the computer, connection to the internet and willingness to collaborate in the learning process. Therefore, global collaboration starts early on – from the education.

Another advantage is the durability of the information. This means that the 'life' of the information on cloud is virtually eternal. As John Omwamba [4] notes, many schools have moved their libraries online. This has enabled students to access a really great number of publications (books, periodicals and such) at any time and from any place, enhancing the learning process with an extreme ease of access.

D. *Greater Similarity to Worklife*

As it can be seen, all contemporary trends found in business also apply to the education sector. Erasing temporal and special boundaries prepare students for mobility present on market nowadays. Therefore, these two aspects (schooling and business) converge, getting mutually closer than ever. At this point, the fact that the needs of educational institutions almost do not differ from enterprises, regarding marketing strategies, technology-focused operations and such should be

noted. Moreover, the future opportunities for success or failure of students could depend particularly on cloud. This is why schooling system should not neglect the fact that cloud computing is here and will stay present in future. What is more, educational institutions (especially the ones of higher education) recognize that adopting the latest technologies and solutions is essential to staying competitive and retaining students. Next to it, this trend in information technology helps reduce high expenditures on hardware, software and IT maintenance.

E. Tracking individual development

With individual profiles on educational clouds, each student will have certain history of research and other activities regarding their education, which should ease their individual profiling and help expressing their interests. In other words, the more research one does, the easier it becomes for the cloud to recognize their field of interests and serve the adequate data. Another advantage here could be used by companies who seek for professionals – having all the necessary information at disposal, they will be able to pick candidates they find the most suitable, cutting the time and costs of interviews, candidate testing and other conventional methods for choosing new workforce.

F. Security

One of the main concerns when saving personal data to a basically unknown pool of information is the concern about security. Whether it is the company or private students' data, certain level of trust is necessary.

Namely, most Internet users are completely unaware of the fact that many sophisticated tools are used today to collect the private information (including names, addresses, phone numbers, preferences and even current health condition, according to the data searched) from the sites they are currently visiting. This already shows how the personal information is compromised. In fact, as a research [6] concludes, one of today's fastest growing Internet jobs is exactly the information tracking – or, more precisely, the Internet user spying.

This issue gets even more serious when taking the whole thing to the level of cloud, where even the users' mere documents are dislocated to a remote server. Then it comes as no surprise why there is still a respectable amount of users who do not trust enough to leave their data anywhere else but on their own hard drives. In addition to this, a research conveyed at DEFCON 2010 Hacker conference [7] (where the participants were actually hackers) showed that a significant majority (stunning 96% of the respondents) think that cloud computing is a hacker 'Eden'. 89% of them said that cloud vendors still do not pay sufficient attention to data protection, and even 45% of them claimed to have discovered weak points on clouds and used them in a way.

Since this trend is still relatively new and not followed by adequate legislature on global level (since the cloud jobs themselves are done on global level), a great number of changes still need to occur in order for cloud users to completely trust when storing their data. When applied to the field of education, it is clear that, in the first instance, means of authors' rights protection still have to be developed. Next, there is the issue of students' personal notes, pre-exam preparation, exam sheets (which could be the most interesting to 'hack'), students' marks and curricular development and such. All these issues will have to be addressed in the most rigorous way in order to ensure safe use of cloud computing in education. One of the ways to do so is so-called clustering of clouds, with the different levels of security rigor.

IV. CLOUD COMPUTING ON EDUCATION – FUTURE TRENDS

Predicting trends in information technology is sometimes futile, but certain developments still can be forecast. As The New Media Consortium [2] believes, the following several years will see the emergence of the following:

- Flipped Classroom – instead in the classroom at fixed timetable, the materials are learnt on students' own time via video lectures, podcasts, e-books or online collaboration with classmates. However, this does not expel the real class time – this time is just used in a better way, being devoted to real-world applications and hands-on projects that help students gain a deeper understanding of the subject.
- Massive Open online Courses – web-based courses that provide personalized learning for students everywhere. One of the advantages is little or no cost per course.
- Mobile applications – enable students to learn from any place, at any time, often across multiple devices.

- Tablet computing – good and economic alternative to conventional books or computers, adaptable to almost any environment, which can be personalized to fit the needs of any student.
- Augmented reality – is laying of virtual information over 3D space, offering significant potential for learning. For example, technology development led to the state where people can hold their e-Pads up to dinosaur fossils, with the screens showing what the dinosaurs looked like in the flesh.
- Game-based learning – although still not accepted as a formal way of education, games and gaming mechanics have proven to be effective as learning tools. They can help with cognitive development, communication, collaboration, critical thinking and problem solving.
- The Internet of Things – by 'things', the authors think of network-aware smart objects, which can connect to the physical world, therefore enabling fast and quality learning and discovery of facts of user's interest.
- Learning Analytics – emerging practice that allows educators to gather data produced by and gathered on students. Practically, this means that their academic progress shall not be assessed in a conventional way but tracked over time. Moreover, in this way, learners' future performance will be possible to predict, as well as potential issues. On the other hand, benefits that colleges will get from this trend is improvement of services, increase in student grades and retention, and the ultimate goal will be to become able to tailor educational opportunities for each student.

V. CONCLUSION

As it could be seen, cloud computing is a trend to stay. Almost equal to public libraries (which provide equity to poorer parts of society, compared to the rich ones who often enjoy the access to various resources), cloud give the opportunity to anyone willing to prosper in their education and career.

Numerous opportunities offered by this contemporary game changer ease the access to information for the student, as well as the access to professional profiles for the employee-seeking companies. One of the greatest is global connecting of cloud users in collaborative manner, which paves the path towards successful career which fulfills all the requirements of contemporary business – mobility, interactivity, constant access to and use of fresh information and so on.

Therefore, it should come as no surprise if in the following few years, teachers begin their classes with the instruction for students to take their mobile devices and turn them *on*, because they will be using them. Knowledge transfer, storing and use will all be done over electronic media, as well as tracking the career path of each individual. This shall enable more efficient search for adequate people to come to certain positions. In this way, with lowered costs in means of time, energy and money spent, the main requirement of contemporary economy shall be met – to have the right person at the right place in the right time, equipped with the right knowledge and competence to do their job in the best possible way.

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ETHICAL AND TECHNICAL ISSUES IN NETWORK SECURITY LAB CREATION

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Abstract – This paper deals with the ethical and technical issues in network security lab creation. The importance of research in these fields emerges from the rapid growth and utilization of information and communication technologies in past few years. Since the utilization of computer networks grows, the importance of their security becomes more and more important. The larger number of systems connected to the public networks requires larger number of skilled professionals capable to deal with network security. The role of higher education institutions is not only to maintain the quality of educated security experts, but also in constant improvement of curricula and in building laboratory environments and related laboratory exercises efficient enough for preparing future security engineers for their tasks. In this paper are presented ethical and techical issues important for building efficient environments for teaching security experts within bachelor, master and doctoral courses.

I. INTRODUCTION

The rapid growth of utilization of information and communication technologies resulted with the increasing number of internetworked devices such as computers, mobile phones, PDAs and other equipment. The growing number of people is also required for the configuration, usage and maintenance of these systems. Unfortunately, the increase of technology utilization is followed with the appearance of new viruses, hacking tools and treads for system security. All this together resulted with the need for significant efforts to be pointed towards improvement of data and network security related courses at higher educational institutions. The improvements of data and network related courses highly depend on creation of efficient environments for the lab exercises. The efficiency of these environments is based not only on the technology and tools used for teaching, but also on carefully designed learning topics. All this important bases of efficient security curricula are heavily shaped with ethical issues needed to be considered very deep before making the decision how to design the course.

In this paper will be presented technical resources needed for creation of efficient lab exercises and efficient learning environments for teaching data and network security. Beside this, the ethical issues important for the design of these environments will be presented as well.

The starting point for this analysis is dilemma whether to design lab exercises for "classic" profile of students – the IT security engineers and system administrators or to design lab exercises for penetration testing.

The important terms relevant for this discussion are also described in this paper. At the end, final discussion and recommendation for the right approach in designing curricula are outlined as well.

II. THE TERMINOLOGY

In design of curricula and laboratory exercises the lecturer can approach in two directions. One direction is pointed towards system administrator and security engineer education. In this direction Data and Network security course is designed to teach future security experts in implementation of security mechanism and protocols in operating system and services such as firewall, SSH, SSL, IPSec implementation etc. All these exercises are design to the students how to protect the systems and how to monitor system security.

The other direction may be pointed towards education of future security experts to act as hackers. This approach is the main reason for the discussion about ethical aspects of teaching data and network security. Before the discussion about laboratory exercises design, the short discussion about related terminology is very important.

The main term here is hacker. A hacker is someone who seeks for and exploits weaknesses in a computer system or a computer network. This is the person who accesses a computer system or network without the authorization of the system's owner. The motivation of hacker may be different and it spans from profit and protest to the challenge (the old school hackers). The true meaning of the term hacker is also applicable to broader community of open-source programmers, so some authors because of precision use term cracker for

malicious hackers. Hacker can be also used as a joined term for computer criminals (called black hats) and computer security experts (called white hats). There are different opinions about usage of these terms, so someone thinks that white hat hackers should only be called hackers, and black hats should be called crackers. So, the crackers are the "bad guys", the persons who try to break into the system, and who try to steal or corrupt the data or the system. In many literature references there are no differences between hacker and cracker.

So, we are slowly coming to the terms such as penetration testing and ethical hacking. An ethical hacker is a person who performs most of the same activities a hacker does but with the owner or company's permission. In that way they are not commenting a crime, on the contrary they are doing security assessment and testing. Ethical hackers are usually contracted to perform penetration tests or security tests. Companies hier ethical hackers because they realize that intruders might attempt to access their network resources and they are willing to pay someone to discover these vulnerabilities first. The penetration testers are the white hat hackers.

According to the [1] this whole situation and relation between white hat and black hat hackers may be considered with Star Wars terminology "Star Wars universe where there are two sides of the 'force': Jedis and Siths. Both sides have access to an incredible power. One side uses its power to protect and serve, whereas the other side uses it for personal gain and exploitation. Learning to hack is much like learning to use the force (or so I imagine!). The more you learn, the more power you have."

So the terms "white hat" and "black hat" can be compared with Jedis and Siths. "White hat" can also be called "ethical hacker" or "penetration tester" while "black hats" can be called "crackers" or "malicious attackers."

It is important to note that ethical hackers complete many of the same activities with many of the same tools as malicious attackers.

The common activities of ethical hackers can be vulnerability assessment and penetration testing [2].

A. Vulnerability Assessment

A vulnerability assessment is usually carried out by a network scanner. Scanning software is used to probe the ports and services on a range of IP addresses. Most of software products can also test for the type of operating system and application software running and the versions, patch levels, user accounts, and services that are also running. The final result is a large pile of reports that provides a list of each system's vulnerabilities and corresponding countermeasures to mitigate the associated risks [2]. The system administrators can perfome the same task in order to find the vunderabilities in their own systems.

B. Penetration Testing

The more sophisticated activity of ethical hacker is a penetration testing. The penetration test is the process when ethical hackers can test many of the vulnerabilities identified during the vulnerability assessment to quantify the actual threat and risk posed by the vulnerability. When ethical hackers are carrying out a penetration test, their ultimate goal is usually to break into a system. Their goal is to gain administrator privileges on the attacked system and to gain control over all of the resources of the system and on the networks. They do this to show the customer (company) what an actual attacker can do under the circumstances [2].

It is important to finish with the difference between penetration testing and vulnerability assessment. A vulnerability assessment is the process of reviewing services and systems for potential security issues, whereas a penetration test actually performs exploitation and attacks to prove that a security issue exists.

III. ETHNICAL ISSUES

So, the key issue here is "is the ethical hacking approach ethical enough to be used in laboratory exercises?". This question is very hard to answer. In the process of teaching the students to be ethical hackers and penetration testers, lecturers take the full responsibilities because learned skills might be used in unwanted way. In other word, the lecturer may be responsible for training Siths. The usage of pen testing approach and its implementation in the curricula have to be followed by presenting the legal issues of computer crime. For example, the students have to be informed with legal consequences of the various cybercrimes.

For example, in Serbian Criminal Law [3], Chapter VII is dedicated to the cyber-criminal. There are classified crimes connected to unauthorized deletion, change and damage of data; computer sabotage; development and spreading of computer viruses; unauthorized access to computer, computer networks or electronic data processing system; obstruction of operation and access to the public network and unauthorized usage of computer or public network. The students have to be informed about possible criminal acts and its

consequences, to know exactly what can and what cannot be done.

The students also have to be informed about the most famous computer criminals, their crimes and sentences they had. All this makes the penetration testing too complicate for implementation in the curricula.

In the other approach, e.g. in the case when lacturer is designing laboratory exercises for IT security engineers and system administrators, whole this information for the student about criminal law and computer crimes can be avoided since the kind of "defensive" approach is chosen and students are trained to protect the system and not to break into one.

IV. TECHNICAL ISSUES

Like in previous chapters, the technical issues in creation of laboratory exercise for both approaches (penetration tester approach and system administrator approach) will be discussed here. For both approaches there are a large number of open-source software systems that can be implemented in the courses.

V. BUILDING A LAB FOR PENETRATION TESTING

In the first case, in the case of building lab exercises for penetration testing there are several toolkits developed for that purpose [4].

The best known toolkit is Kali Linux (successor of Backtrack Linux [5] – latest version 5 R3). Kali Linux may be used as Live CD or USB booting system. It dates from the beginning of 2013 and has a lot tools for penetration testing such as:

- Metasploit,
- Aircrack-ng,
- Kismet,
- Nmap,
- Wireshark (new version of Ethereal) and
- Hydra etc.

The Metasploit Project is a computer security project which provides information about security vulnerabilities and helps in penetration testing. The sub-project is the open-source Metasploit Framework [6], a tool for developing and executing exploit code against a remote target machine.

Aircrack-ng is wireless packet sniffer and wireless security cracking and analyzing tool for IEEE 802.11 WLANs.

Kismet is ward-riving [7] software for network detection, packet sniffing and intrusion detection system also for IEEE 802.11 networks.

Nmap is well known security scanning software [8] and Wireshark (formerly Etherreal) is open-source packet analyzer tool for network troubleshooting and analyzing software [9].

Hydra is network logon cracking software.

BackTrack has it tools in several categories such as: information gathering, vulnerability assessment, exploitation tools, IEEE 802.11, Bluetooth and RFID tools, stress testing, forensics, packet analyzers etc.

There are also other penetration testing toolkits such as: The Live Hacking CD (based on Ubuntu), Samurai Web Testing Framework, Organizational Systems Wireless Auditor Assistant, Network Secrity Toolkit (based on Fedora), and Arudius etc.

All these systems and toolkits can be use in lab exercise creation in data and network security curricula, but the Kali Linux have the greatest significance because of its wide usage and variety of tools for penetration testing.

VI. BUILDING LAB FOR SYSTEM ADMINISTRATORS

In the second case, when the laboratory is designed for system administrators and security engineers there are also several approaches. In this paper will be presented two approaches extensively used at Technical faculty "Mihajlo Pupin" Zrenjanin, these approaches are based on usage of virtualization technology with or without GNS3 graphical network simulation software.

One approach is described in [10] and it is based on VNLab environment the online and remotely accessible engineering education environment based on virtualization technology and developed and used for networking related courses at Technical Faculty "Mihajlo Pupin".

The second approach is based on desktop virtualization software Oracle VirtulaBox [11] used alone or in combination with GNS3 [12], graphical network simulation software. The laboratory exercises and the environment are described in more details in [13].

Generally, this environment has CentOS Linux installed as guest operating system on virtual machines. In this environment currently are supported lab exercises for:

- firewall systems in IPv4 environment with iptables and packet filtering, NAT and port forwarding,
- firewall systems in IPv6 environment with ip6tables and packet filtering,
- SSH protocol with private and public keys,
- FTP server security with SFTP, SSL and TLS protocols,
- Apache web server security with SSL and TLS protocols,

The enlisted scenarios can be expanded with IPSec VPN site-to-site exercises with *strongswan* packet installed; security assessment lab exercise with *nmap* software package; IDS (Intrusion Detection System) with open-source package *snort*.

VII. CONCLUSION

After this discussion and analyses of technical and ethical issues related to the data and network security lab exercises the conclusion is as follows:

- There is to uproaches in designing lab exercises in data security and network course. One approach is in educationg penetration testers and second one is in educating system administrators and IT security engineers.
- Both approaches have broad range of efficient open-source tools for utilization in those courses.
- In preparation of the lab exercises for penetration tester courses it is important to have in mind ethical and legal issues and for this time, it is not recommended to develop the courses in this direction for undergraduate and master students.
- The design of lab exercises is the better choise for the mentioned courses, but they cannot be limited only to the implemetation of security mehanism, but expanded with vunderability assesment exercises even if they are part of penetration tester skills.

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FIELD OF VISION AND BASKETBALL ACTION COVERAGE FROM A POINT OF A BASKETBALL REFEREE

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Abstract - Mapping the human visual field is a rather difficult task since every person is unique. Having in mind physical predispositions, especially person's height and depth and width of a vision field, it is usually represented as a semicircular cone, emphasizing the depth and width of a person's vision field.

The developed solution has been designed and developed with the aim to establish how successfully is a part of a basketball game observed by a referee and to establish whether his or her decision in a particular situation was valid or not.

I. INTRODUCTION

Solution we are about to propose can be used for advanced education of basketball referees and basketball coaches since it provides detailed insight on proper movement of basketball referees as well as on action coverage in all 6 quadrants of a basketball field.

Every basketball referee is to observe certain quadrants of a basketball court, following ball movements through assigned quadrants, regardless whether the ball is dribbled, passed or shot. Division of responsibilities over quadrants of a basketball court may be changed so that certain quadrants "belong" to two referees. [6] [3] In such circumstances, decision of the referee who has better view of the action is more valid. Current mapping of quadrants in a basketball court is shown in Figure 1. In this configuration, quadrants 6, 4 and 2 have the double jurisdiction.

Basketball referee has his own visual field that may be adjusted depending on his individual characteristics. Effective visual field of a basketball referee is shown as blue on Figures 2-4, being at the same plane as Vision Front Point (Focal Point), marked as a green circle, and usually it takes one third of a general visual field of the referee. Having in mind different court configurations and the need for personalization of a referee, depth and width of a visual field is adjustable. [5]

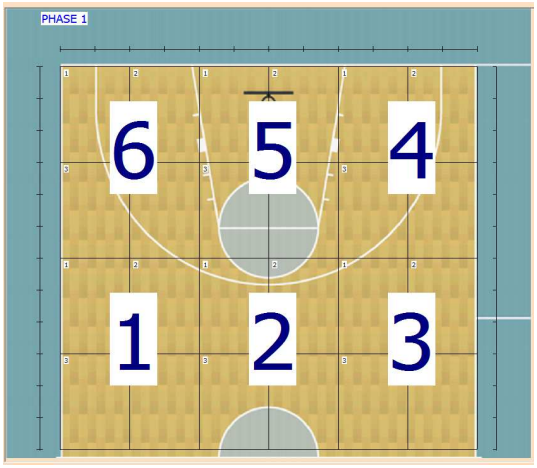

Figure 1. Implied allocation of quadrants and subquadrants

If an object is positioned directly between the referee and the player handling ball or the ball itself, internal memory of the Referee's Board : Client [1] with the solutions for such a case notes a visibility interruption in a certain period for a certain referee. Any such object is called the Interruption Object (Figure 3).

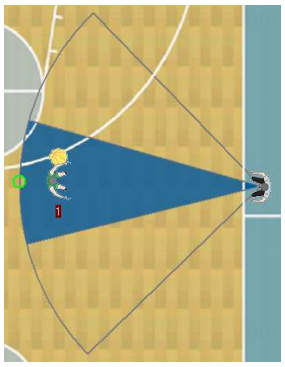

Figure 2. Referee's effective visual field

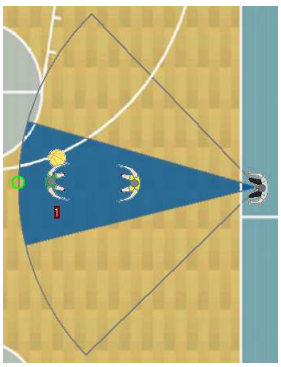

Figure 3. Interruption Object

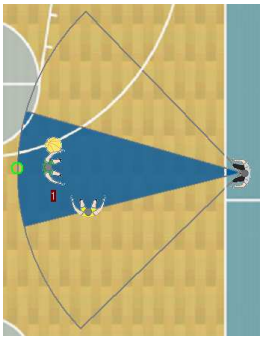

Figure 4. Noise

If an object enters the referee's visual field, it is called a Noise, or a Noise Object. A noise may be large or small, depending on how close it is to the object that is followed. Based on the percentage of coverage of the referee's effective visual field, the size of the object that is considered a noise and the distance between such object and the player with the ball, a metric is formed that lowers the percentage of court visibility by the referee. The noise may become the Interruption Object, if it enters the straight line between the referee and the player with the ball. If the Interruption Object is moving away from the said direct line, it becomes a noise (Figure 4).

II. PROPOSED SOLUTION

Calculation of court coverage is based on object collision, from the aspect of their area, between referee's visual field, the player and the ball, distances between them, and the time they spend during the collision and moving on the court. This method is widely known, since it is used in development of various 2D and 3D games and therefore it will not be explained here.

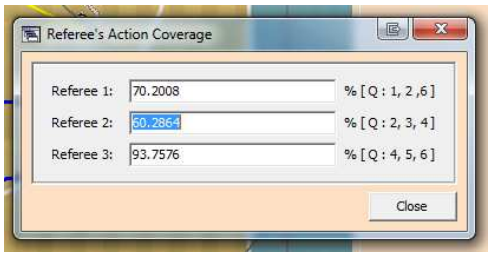

Figure 5. Percent of action coverage

After the end of the action simulation, a percent of court coverage is calculated for every referee, considering their jurisdiction for each quadrant (Figure 5).

Figure 5 shows a result of the procedure that had a flaw. Since a referee is given jurisdiction over certain quadrants of a basketball court, it is necessary to determine an observation percent for a part of action in every quadrant. Here is an example. Let us suppose that a jurisdiction over a certain quadrant is given to two referees. Percent observation of a part of basketball action is 62.77 for one referee and 85.33 for another. If there is any violation or dubious situation in that quadrant, the second referee's decision is more valid based on percentage difference. But there is a question: what if an observation percent of the second referee is a consequence of his high observation percent in other quadrants, while in this one the first referee has 91% and second one only 45%?

Therefore this procedure was replaced by a new one, more correct, fulfilling conditions stated in previous paragraph. In accordance with procedure modification, the format of report for observation of the game is also changed. New report is shown in Figure 6.

Report format has the following structure. Fields Referee 1, 2 and 3 contain labels for quadrant and the observation percent for actions within the quadrant in format [$quadrant_x$: $percent_x$]

... [$quadrant_x$: $percent_x$], where x is a label for quadrant given to a referee. In order to have more concise report, its graphic representation is introduced as a basketball court divided into quadrants.

Every quadrant contains following information:

- Quadrant Number – Number of quadrant for which the referee's observation percent is established.
- Referee (s) Assigned – Labels of referees having jurisdiction on this quadrant. For now referees are marked numerically, so that value of this parameter may be non-repetitive combination of numbers 1, 2, and 3, in format [r] [r] ... [r] where r is a number, or a label of a referee.
- Overruled Verdict – The purpose of this parameter is to emphasize whether, if more referees has jurisdiction in this quadrant, a verdict of one referee was overruled by other referee's verdict if he had higher observation percent for action for the quadrant.
- Referee Verdict – This parameter simply and directly tells which referee has higher observation percent of action in the quadrant and is most competent to judge all events in this quadrant. The Referee Verdict parameter has the following format: [r] R.A.C. proc, where [r] is a referee label, R.A.C. is acronym for Referee's Action Coverage, and proc marks observation percent for part of action for referee [r], in this quadrant.

Let us consider, for example, results of action from Figure 6. If we start reading results from visual result representation, we may conclude that jurisdiction in quadrant 6 belongs to referees 1 and 3, that there is a verdict overruled and that referee 1 has the higher observation percent for action in the quadrant, so therefore referee 1 should make any decisions regarding events in that quadrant. Quadrant 5 has no divided jurisdiction, and a right to decide regarding events inside the quadrant belongs to referee 3, with observation percent for action of 82.4192 %.

The developed tool will form the result based on those principles, establishing observation of action by referees for every quadrant. It is necessary to establish metrics which provides adequate observation for part of action by the referee to whom is the quadrant assigned. It is proposed that observation for action over 65% is unconditionally accepted, since observation of more than 90% will happen rarely if ever, due to a large number of objects that will act as interruption objects or the noise within the field of vision for a referee. The next stage in development will address this question.

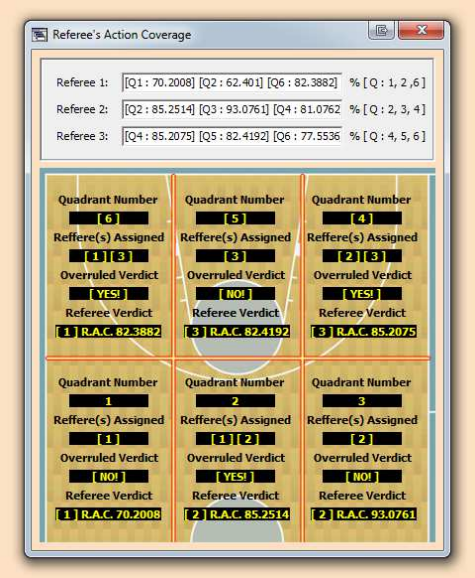

Figure 6. Result of observation action per quadrants

Another interesting aspect of assessing the ability to observe is a separation of vision field depth per zones, since it is evident that even people with good vision (20/20 by AOA) better see closer object than far away ones. This thesis will be studied in the next iteration of development of presented solution. [7]

The secondary aim is to correct the referee path, produced by a neural network [2][4], based on test referees with 20/20 vision. (20/20 vision is a standard adopted by the AOA - American Optometric Association). This is a generally accepted standard for good vision: it is usually described as a person who is able to see detail from 20 feet, or 6.1 m If a person has visual acuity 20/100, he is said to see detail from 20 feet (6.1 m) away the same as a person with normal eyesight would see it from 100 feet (31 m) away. [11][10]

III. BASKETBALL REFEREE PATH CORRECTION

Referee path correction is done in two stages. The first stage uses pure mathematics and observation of action when there are no additional actors to reduce observation percent for action by entering the effective visual field of a referee.

In this stage, it is important that all elements, besides the players dribbling, passing, shooting or receiving the ball, are removed from the court. After that a request is sent to the neural network to form ideal paths for referees. During automated computation whether the referee's path is valid or not, attention is being paid solely to the parameter pointing how well referee had observed action while the ball was in a quadrant. If the observation percent for any referee on relatively empty court is under 90%, Referee's Board : Client automatically notes such solution, with input and output vectors of neural network, as unacceptable solution.

The second stage of referee path correction is to use a human factor. Neural networks are trained with the aim to produce solutions identical or at least similar to our thinking and problem solving. If a coach or a referee is not satisfied by referee's path for particular action, even if an observation percent of action for all referees is above 90%, such action, with its input and output vectors, may be sent to correction – additional training of the neural network. [8][9]

IV. CONCLUSION

The developed solution shows acceptable results and is still in development stage. During further development, a migration is planned to an Open Source mobile platform, since the complete code of a client application is written in C++ programming language and it is easy to modify in order to be accepted by a C++ GNU/Linux compiler. In this way, client application would be tailored for one of Tablet/Pocket computers, so it would be in the true sense similar to digitalized clipboard for action planning and analyze.

During the relatively extensive test stage, conclusions were as following:

- Relying on official FIBA rules, expert know-how and mechanism for establishing visibility at Referee's Board : Client program, initial data set for neural network training has been corrected.
- It was established that it is better to re-train neural network by corrected data set, using Sequential repetition trainig method with progressive action development, than to additionally train existing neural network by corrected training data set.
- Variations were noted in evaluations of basketball actions that were longer than 12 key points, or stages. This may be caused by lack of appropriate action samples in training data set, individual randomized evaluation of basketball action simulations, or potential error in implementing the mechanism for moving elements on a court.

Plans for further development include:

- analysis and implementation of visual field separation by zones
- improvement of graphic interface and enhancing the automation level
- integration with the solution that will provide player and events detection in real time and from video, in order to automatically create diagrams for referee's pathfrom which the particular HawkEye application will be produced
- integration with the solution that will provide player and events detection in real time, so that referee's paths could be predicted and further converted to coordinates i.e. paths for camera-bearing mechanism for TV coverage, in order to obtain better view of a basketball court and more insight in all events at it.

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RESPONSIBILITIES AND POSSIBILITIES OF DISTANCE LEARNING IN CORPORATE SETTINGS

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Abstract - Distance teaching is spreading to almost all areas of education and training and has become a pervasive and growing phenomenon. Innovative uses of technologies create more effective techniques to distribute learning in non-traditional ways. Collaborative real-time multimedia technologies provide an effective and low cost opportunity to deliver corporate training activities. Educators are forming new institutions that deliver distance learning exclusively. Academic institutions and corporations are combining resources to bring distance learning to workplaces. Every organizational setting requires responsibilities with the management of distance learning. The aim of this paper is to indicate the possibilities of distance learning in corporate/ non-educational setting with the responsibilities associated with management and administration.

I. INTRODUCTION

Real-time multimedia technologies allow an effective and low cost opportunity to deliver corporate training activities that are required from technological environment. Competition and very fast changing business environments are powerful motivations for continuous learning process. Company employees need to stay up to date with current rapidly changing technological environment to be competitive. Skills must be replaced continuously because are becoming outdated much quicker. The deployment of Internet and intranet infrastructures within organizations provides a unique opportunity to enhance on-going training activities by incorporating multiple forms of media and real-time interactivity. Collaborative real-time corporate training offers a numerous advantages over traditional training:

- Dramatically reduces corporate travel related costs
- Delivers focused learning content
- Enhances interaction and reduces delay over traditional video based training
- Supports the use of multimedia
- Provides access to digital libraries of training materials and archived sessions

Collaborative software applications enable on-line chat, video, audio, whiteboard editing and voting [1]. An Enterprise company uses these tools to provide real-time training for its employee all over the world. Dedicated classrooms train multiple users at a time and this approach to training saves money compared to traditional training costs.

Collaborative real-time multimedia for corporate training is the result of recent technology advances. It enhances interactive distance-based learning by using various forms of media in real time. Table I and Table II describes four generations of distance learning. These generations range from traditional correspondence teaching, to multiple media delivery mechanisms, to fully interactive mechanisms of the latest [2]. First generation of correspondence course for corporate training relies on hardcopy text as the primary form of communication between the instructor and student. This form of training was asynchronous in nature, the flow of information takes place asymmetrically, and there was no peer-to-peer interaction. The second generation enhances the first using of multiple forms of media. For example, video, audio, TV, radio, and interactive CDs enhance text-only media are used in the second generation. Otherwise, the flow of information remains asynchronous. Third generation training uses collaborative multimedia technologies to enable communication and information sharing between instructor and students, and between student peers. Training sessions are synchronous, two-way communication is enabled between faculty and students, and

multiple forms of communication and media are used. The technologies of the fourth generations make possible the development of learning communities across time and distance. Especially valuable to distance education was the emergence of two-way videoconferencing classroom technologies. Videoconferencing has grown in sophistication such that classrooms can be used as remote sites to send or receive scheduled instruction. Videoconferencing technologies enable real two-way audio/video communication. These technologies are finally becoming more affordable and easier to operate. Virtual classrooms can be created that consist of one or many classrooms [3]. A virtual classroom might be composed of two classrooms many miles apart linked by point-to-point line or of many class- rooms linked by a video bridge and multiple lines. If the virtual classroom consists of only two classrooms, a videoconferencing class can be initiated by a simple call placed between the two classroom videoconferencing units. This technology requires video codecs (compression - decompression) units sold by companies such as Cisco, Polycom, Panasonic, Sony and others. Currently the costs for these codecs are significant. Low-end, small-room videoconferencing can be accomplished using relatively economical adapted classrooms for sending and receiving video [4]. A high-end, studio-quality classroom will also have professional cameras, operators, and monitors. New developments of videoconferencing software products are bringing videoconferencing to the desktop level. Thus, in designing distance education programs, three levels of videoconferencing can be considered: desktop videoconferencing for faculty-to-student and student-to-student discussion and collaboration; small conference rooms for instruction and collaboration between small groups; and large classroom studios for large group regular instruction.

The fifth generation of distance learning technologies is essentially a derivation of the fourth generation, which aims to maximize the current capabilities of the Internet and the Web [5].

TABLE I. GENERATIONS OF DISTANCE LEARNING TECHNOLOGIES*

	First Generation	Second Generation
Primary feature	Predominantly one technology	Multiple technologies without computers
Timeframe	1850 to 1960	1960 to 1985
Media	• Print (1890+) • Radio (1930s) • Television (1950s and 1960s)	• Audiocassettes • Television • Videocassettes • Fax • Print
Communication features	• Primarily one-way communication • Interaction between faculty and student by telephone and mail • Occasionally supplemented by on-site facilitators and student mentors	• Primarily one-way communication • Interaction between faculty and student by telephone, fax, and mail • Occasionally supplemented by face-to-face meetings
Student characteristics and goals	• Student generally isolated from faculty member and other students • Students must be mature, highly motivated, and disciplined • Students generally working on core educational requirements or lifelong enrichment • Occasionally used for large, isolated groups of students with site monitor or mentor	• Increased contact between faculty and students by telephone and occasional face-to-face meetings • Student generally still primarily isolated, studying in home, often at unusual times, by self • Student highly motivated and self-disciplined cont. generally working • Student on core educational requirements, advanced degrees, or lifelong enrichment • Occasionally used for large, isolated groups of students with site monitor or mentor
Educational philosophy and curriculum design	• Highly structured materials, such as programmed learning • Materials almost 100 percent prepackaged for stand-alone delivery, supplemented by tutor or mentor, a novice expert • View of student as empty vessel; primary goal is information dissemination	• Materials almost 100 percent prepackaged and structured for independent learning • Highly dependent on instructional systems design to compensate for lack of direct and immediate student-faculty interaction, spontaneity • View of student as empty vessel
Infrastructure components	• Postal Service for delivery of print materials • Radio technology in home • Radio and television broadcast stations and towers • Instructional program designers, developers, producers • Significant up-front investment • Faculty tutors or site facilitators, depending on model	• Widespread television in homes and schools (1960) • Widespread audio and videocassette technology (1980) • Instructional program designers, developers, producers • Significant up-front investment • Faculty tutors or site facilitators, depending on model

* Source:The concept of generations of distance learning was adapted from A. W. Bates*: Technology, Open Learning and Distance Education* (London and New York: Routledge Publishing)

TABLE II. GENERATIONS OF DISTANCE LEARNING TECHNOLOGIES (CONTINUED)

	Third Generation	Fourth Generation
Primary feature	Multiple technologies including computers and computer networking	Multiple technologies including the beginning of high-bandwidth computer technologies
Timeframe	1985 to 1995	1995 -
Media	• Electronic mail, chat sessions, and bulletin boards using computers and computer networks • Computer programs and resources packaged on disks, CDs, and the Internet • Audio conferencing • Seminar and large-room videoconferencing via terrestrial, satellite, cable, and phone technologies • Fax • Print	• Electronic mail, chat sessions, and bulletin boards using computers and computer networks plus high- bandwidth transmission for individualized, customized, and live video interactive learning experiences • Computer programs and resources, packaged on disks, CDs, Internet • Audio conferencing • Desktop videoconferencing via terrestrial, satellite, cable, and phone technologies • Fax • Print
Communication features	• Significant broadband communication from faculty to students via print, computer programs, and videoconferencing • Two-way interactive capabilities enabling asynchronous and synchronous communication between faculty and students and among students • Internet good for text, graphics, and video snippets	• Two-way interactive real-time capabilities of audio and video • Asynchronous and synchronous communication between faculty and students and among students • Full 30-frame-per-second digital video transmission with databases of content resources available via the Internet and World Wide Web • Lengthy digital video programming available on demand
Student characteristics and goals	• Increased contact between student and faculty via computer-mediated communication • Increased contact and collaboration between students in the same program • Technologies support the development of a learning community between the students and the faculty • Increased face-to-face meetings, often for longer periods, such as three to fourteen hours • May be working on core education requirements, advanced degrees, professional certification, or lifelong learning • More faculty direction and support is possible; less-disciplined learners can be supported • Goal to develop skills, knowledge, attitudes	• Increased contact between student and faculty via computer-mediated communication • Increased contact among other students in the same course or program • Technologies support the development of a learning community between the students and the faculty • Increased face-to-face meetings, often for longer periods, such as three to fourteen hours; also face- to-face contact through desktop videoconferencing • Student may be working on core education requirements, advanced degrees, professional certification • More faculty direction and support possible; less-disciplined learners can be supported • Goal is to develop skills, knowledge, attitudes
Educational philosophy and curriculum design	• Materials must still be highly structured and instructionally designed; interactive technologies can provide more ad hoc direction and support of learners • Materials may vary from 100 percent prepackaged to about 30 percent prepackaged, with more faculty or mentor direction and support • View of student as active learner, participant, and contributor	• Materials must still be highly structured and designed, but interactive technologies can provide more ad hoc support of learners • Materials may vary from 100 percent prepackaged to about 30 percent prepackaged, with more faculty or mentor direction and support • View of student as active learner, participant, and contributor
Infrastructure components	• Widespread use of computers and multimedia • Critical mass of ownership of computers with online services (in 1996, about 8 percent in U.S. could access World Wide Web) • User-friendly technologies are needed to ensure access • Instructional program designers, developers, producers • Significant up-front investment • Faculty tutors or site facilitators, depending on model	• Critical mass of ownership of computers with online services • User-friendly, affordable multimedia Internet technologies • User-friendly technologies needed to ensure access • Instructional program designers, developers, producers • Significant up-front investment • Faculty tutors or site facilitators, depending on model • Improved development tools for complex media design and development

II. POSSIBILITIES OF DISTANCE LEARNING IN CORPORATE SETTINGS

The basic principle to the adoption of collaborative multimedia training in corporate settings is economic. Large multi-national businesses save large amount of money in training related expenses. Collaborative training in corporate settings has proven to be cost effective, while also increasing knowledge retention. Even with smaller companies, corporate training is a profitable market [6]. The widespread use of information technologies within corporate settings is another cause to the deployment of collaborative real-time training. The adoption of open Internet standards and protocols, along with the deployment of intranets in corporate settings, has provided the necessary network infrastructure to support digital collaborative training activities [6]. Common standards and protocols have also led to a

reproduction of video training solutions. The development and adoption of the Internet has played a fundamental importance role in stimulating interactive distance learning. However, the Internet's success has led to increased traffic that threatens to undermine its usefulness in this important area. To overcome some of problems related to Internet congestion, firms are beginning to lease dedicated high-bandwidth networks as viable substitutes. There are numerous obstacles to success, mainly the availability of robust communication networks to support both synchronous and asynchronous communication. Current network infrastructure is one of the reasons to limitation of widespread use. Interface design for corporate training applications needs some refinement, e.g. efforts to coordinate signals and communication between learners and instructor; issues of gesture and peer to peer interaction need intuitive execution. The costs for the training labs are non-trivial. The transition to a collaborative training environment involves considerable investments in infrastructure, applications, instructional personnel, and learning content. These elements must also be integrated. As with other forms of distance learning, dedicated training facilities require careful planning in terms of infrastructure, hardware, software planning, and setup. The appropriate delivery of training material also needs to match the levels of interaction supported. Instructors must be informed with the technology and the learner interaction in collaborative settings. New instructional roles are needed to support telecommunications and manage digital connections between sites. If courses require on-line reference materials, these material need to be maintained. Finally, instructors and learners must understand and effectively navigate their new learning environments if they are to maximize their learning experience. Findings from on-going developments suggest that a focus must be placed on how technology is used, rather than what technology is used. Training goals and processes must determine which tools are adopted. The obstacles to the adoption of real-time collaborative multimedia technologies for corporate training can be overcome, e.g. network infrastructure limitations are being addressed using private and leased networks. Leased network lines provide a cost effective alternative to companies that need reliable connectivity, but cannot afford their own network. In addition, organizations are upgrading their LANs and WANs with more robust intranet and extranet architectures. These new architectures are not only cheaper than previous client-server solutions, but they are well suited to support high-bandwidth, high-speed corporate traffic such as two-way video and audio. While the technologies are not yet ubiquitous throughout society, they will soon become part of every corporate intranet.

III. BENEFITS OF DISTANCE LEARNING IN CORPORATE SETTINGS

Distance learning provides an alternative means of training/instruction to employees as well as apprentices. Academic institutions or corporate companies can use distance learning to upgrade their worker skills and keep them up to date on the rapidly changing technologies or simply to introduce new products. Workers benefits of corporate distance learning programs: [8]

- no travel time
- material can be viewed as often as they like
- flexibility
- the ability train off the clock
- no cost
- self-paced learning

Many organizations are finding positive returns on investment from distance learning. Distance learning provides the opportunity to study more subjects and reach out to programs that are not available in the immediate area. Learners may to work at their own pace in many circumstances. The requirements are not as strict and typically give a range of due dates when the work needs to be submitted. It seems as though distance learning has the potential for great cost savings, and some studies have shown encouraging results on the benefits side of the equation such as increased and timelier sales. Not all programs report positive results, though. Distance learning initiatives can be costly to design, and they certainly will not replace all the traditional methods of training [9]. Determining the proper place of distance learning within a program of employee training and development is necessary. Companies have noted the following benefits:

- Economic savings by converting traditional methods to distance learning
- Improved consistency and scalability with content
- Individualized learning
- Convenience and cost
- Recordkeeping and testing
- Customization and language

- Standardized delivery
- Self-paced learning
- Variety of available content

IV. RESPONSIBILITIES OF DISTANCE LEARNING IN CORPORATE SETTINGS

Every organizational setting requires responsibilities with the management of distance learning, including the corporate/non-educational setting. These responsibilities include:

- Ensuring equipment is up and running
- Providing support to learners and facilitators
- Upgrading equipment
- Receive copyright permission
- Ensuring content meets the needs of the learners

Distance learning may not be the ideal option for everyone, because requires self-motivation, does not give direct access to instructor, does not offer immediate feedback, does not give learners the opportunity to work on oral communication skills, may not be acknowledged by a specific employer, requires to have reliable access to technology and may have hidden costs. Distance learning is best suited for mature motivated learners who cannot afford the time to participate in a traditional classroom. Some learners have feared the loss of the personal touch with an instructor, such as asking questions after class, and the loss of human contact offered in a traditional classroom until learner commit himself to this mode of learning and communication. However, distance learning gives an opportunity to email instructor any time or chat online. The corporate/non-educational settings seem to face greater challenges when it comes to managing and administering the distance learning programs. These challenges include:

- Unqualified facilitators
- Content not geared toward various learners due to lack of time to evaluate learner needs
- Equipment cost
- Training and supporting facilitators may be rather difficult
- Inadequate support for learners due to small staff
- Copyright permissions

Learners need full access to the equipment necessary to carry out course requirements, e.g. online courses require a computer with Internet access. Technical requirement may be difficult to meet for some learners who may feel overloaded and challenged if they are not completely computer informed. Technical glitches and dealing with an unfamiliar learning environment can cause stress and frustration. Companies take a serious risk when pursue distance learning programs that are not accredited. Not all distance learning is legitimate - they may be issuing fraudulent, invalid degrees. This is probably the most important factor to check before companies enroll in a distance learning institution.

V. CONCLUSION

The future of corporate training using collaborative multimedia technologies is very capable. Numerous studies have found distance learning courses as effective as traditional classroom training. The economic reason and the technology have been demonstrated in numerous settings. Corporate distance learning activities have significantly reduced overall training costs, and enhancing learner retention rate. The capabilities of the distance learning increase, as the costs of infrastructure and tools decline. While there still remain some challenges to overcome, we expect corporate distance training through collaborative interactive multimedia to undergo widespread adoption in the next years.

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EFFECTIVENESS OF COMPUTER-ASSISTED INSTRUCTION IN TEACHING AND LEARNING GENETICS

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Abstract - This experimental study examined effectiveness of the computer-assisted instruction (CAI) on students' achievement in biology science as compared with the traditional method of instruction. This experimental study was conducted in a grammar school in Zrenjanin, Serbia. The sample for the study comprised 100 students 4th grade of grammar schools, which were randomly distributed into control and experimental groups. The experimental group was taught Genetic by CAI program (educational computer software "Genetics"), while the control group was taught the same content in the classroom by the teacher through textbook based lecture method. All students received one pre-test in order to estimate their prior knowledge, post-tests in order to assess knowledge and comprehension immediately after learning and retest again after 6 weeks. The independent two-sample *t*-test was applied for the evaluation of the results of the study and there was a significant difference favoring the experimental group. The experimental group performed better on both post-test and retest components of the achievement test as compared to the control group.

I. INTRODUCTION

Modernization of teaching and learning in modern age implies enhancement of work in education based on fitting into the framework of technological surroundings of IT society. The more and more increasing role and significance of information and communication technologies (ICT) in human society is one of the most important characteristics of today's world. These new technologies are an integral part of many human activities and have implications both in pedagogy and education from pre-school to institutions of higher education. We can assume that ICT increases student motivation, what can be seen in many arguments for why ICT should be used in schools. There are many assumptions that students are interested in using ICT; they found it more pleasant, more appealing, and more motivating to study with computers than with traditional means. Teaching and learning of biology could be made more interesting if the lesson presentation using Power Point or multimedia education software to motivate students to learning and to make more interesting, to attract more students. Software can be provided to the students to allow them to engross the biology as subject, thus making learning more meaningful. The use of educational computer software will bring new, exciting, actual and rewarding educational experiences for both students and teachers [6].

In the field of education, computer has been used in a variety of ways instructional process that consist of computer assisted instruction (CAI) and computer management instruction (CMI), and in administration. In the instructional process, Computer Assisted Instruction (CAI) is used to instruct students in various subjects. Information and messages are presented to the learner using the computer, through interactive process involving drill, practice, tutorial and dialogue. The CAI ensures that students are presented materials or problems situations, guiding students' thinking, responding to students' questions, assessing students' performances and managing students' path through a course [2].

A. Computer-Assisted Instruction (CAI)

Computer-assisted instruction is the process by which written and visual information are presented in a logical sequence to a learner through a computer. CAI can be characterized as interactive and individualized learning. The students learn by using software with the text material, graphic information displayed audio-visual presentation or simulation.

Computer Assisted Instruction (CAI) is a program of instructional material presented by means of a computer or computer systems in which teacher use computers at different times and spaces according to the characteristics of the subject matter. CAI can be used for tutorials (drill and practice), problem solving, simulation exercises, enrichment programs, remedial learning,

applications (of problems or concepts) and testing [11].

A computer enables repeated trials of experiments with considerable ease in a limited time, provides immediate feedback, allow stimulus, observation of graphical representation and offers a flexible environment that enable students to proceed with their own plans [3] [11] [15].

Costa et al (2008) [4] worked on A Quick Guide for Computer-Assisted Instruction in Computational Biology and Bioinformatics and gave following Guidelines:

- Ensure that CAI Activities are integrated into curriculum.
- Do not overuse CAI
- Plan for use of CAI well adjusted to Infrastructure and Resources available
- Maximize Interactivity
- Allow Different rates of Progression in Class, but ensure that all students reach the Objectives
- Ensure students understand the scope and objectives of Assignments
- Be sure students understand the models presented on the screen
- Assess and Evaluate student Performance while using CAI

B. Effectiveness of CAI

Chapman and Ferguson (1993) [9] investigated the performance of students using skills using Computer assisted genetics instructor which was evaluated in an introductory genetics course. Students utilizing CAGI scored an average of between 6 and 10 points higher on hour exams than students in the same class who did not use CAGI. Authors found that CAGI helps students focus on the key aspects of biological processes, diagnose misconceptions, and provides drill accompanied by immediate feedback.

Mahmood and Mirza (2012) [5] investigated effectiveness of the computer assisted instruction (CAI) on students' achievement in general science as compared with the traditional method of instruction (TMI). The experimental group performed better on all the three components of the achievement test as compared to the control group. The CAI group also scored higher than the TMI group in various content areas of general science.

Yusuf and Afolabi (2010) [8] investigated the effects of computer assisted instruction (CAI) on secondary school students' performance in biology. The influence of gender on the performance of students exposed to CAI in individualized or cooperative learning settings package was also examined. The findings of the study showed that the performance of students exposed to CAI either individually or cooperatively were better than their counterparts exposed to the conventional classroom instruction.

Cepni, Tas and Kose (2006) [13] investigated the effects of a Computer-assisted Instruction Material (CAIM) related to ''photosynthesis'' topic on student cognitive development, misconceptions and attitudes. An experimental research design including the photosynthesis achievement test (PAT), the photosynthesis concept test (PCT) and science attitude scale (SAS) was applied at the beginning and at the end of the research as pre-test and post-test. After the treatment, general achievement in PAT increased by 10% in favor of experiment group (EG) at ($p < 0.05$) significant level. Although the increase in cognitive development at knowledge level was 14.8% in the EG and 18.2% in the control group (CG), the development at comprehension and application levels were 19.8–18.5 in the EG and 1.75–0.86 in the CG, respectively. This result showed that using CAIM in teaching photosynthesis topic was very effectiv for students to reach comprehension and application levels of cognitive domain. However, CAIM did not change major misconceptions related to photosynthesis topic in EG as expected.

The effects of tutorial and edutainment software programs related to genetics concept on student achievements, misconception and attitudes investigated Kara and Yesilyurt (2007) [15]. The results showed that only tutorial design software program had the positive effect to the awareness of student's understandings to the genetics concepts.

Yildirim, Özden and Aksu (2001) [16] compared the traditional and hypermedia learning environments on the chosen subjects in a control-treatment group and pre- and posttest design in their study on acquiring and retaining knowledge. Nine grade biology students were distributed into subject (hypermedia learning environment) and control (traditional) groups. Pre-tests, post-tests and retention tests were administered to both

groups. The results of the post-test did not display a significant difference between the control and experimental groups about acquiring knowledge. However, the retention tests showed that the experimental group retained knowledge better than the control group.

The content of Biology lectures is practically predisposed for CAI. The largest part of theme units and lesson items from Biology curriculum at all levels of education can be presented with pictures, texts, adequate video sequences and simulation applications. For certain fields this is the way to achieve maximum effects. However, little is known about the use of computer assisted instructional package in the Serbia education system particularly in grammar schools. Thus, much remain to be empirically studied on the effect of CAI in biology education, in Serbia.

II. PURPOSE OF THE STUDY

The study investigated the effect of computer-assisted instruction on the performance of secondary school students in Genetic (Biology). Specifically, the study examined the effectiveness of the CAI on student's learning Genetic as compare to traditional method of instructions.

A. Material and Method

A.1 Educational software

The software "Genetics" is made in Adobe Captivate 5.5 programm. Teaching software "Genetics" is compiled for 4th grade students of grammar schools as a substitution for the book during the elaboration of Biology materials. The software contains 15 tutorials, exercises, animations as well as the final test from Genetics. After each lecturing unit (tutorial) the test follows.

The test contains various types of questions and problem tasks: multiple choices questions, fill in the blanks, matching.

A.2 Sample

The sample for the study comprised 100 students 4th grade of grammar schools in Zrenjanin, which were randomly assigned into experimental (n=50) and control (n=50) groups. While the experiment, experimental group was taught with CAI, the other, control group continued their instructions with the regular teaching method.

A.3 Instruments

Instruments used in the research were as follow: pre - test, post - test and retest. The maximal scores on any test were 100.

A.3 Data analysis

In order to compare the deference's between control and experiment groups on the pre-test, post-test and retest results the independent t-test was applied. Statistical processing of data obtained from the tests was done by using SPSS 19.0 software package.

III. RESULTS

Both experimental and control student groups were balanced at the beginning of research according to the results of the pre-test. As seen in Table 1, at the beginning the pre-test means of experimental group (EG) and control group (CG) was 80.240 and 81.040, respectively. These results showed that the sample's present knowledge levels were very close to each other and a significant difference does not exist between the pre-test scores of the computer assisted and traditional educational groups. ($t = 0.506$, $p > 0.05$). For this reason, it can be stated that students do not differ in knowledge levels), in other words, the groups are equal.

TABLE I. DIFFERENCE BETWEEN THE SCORES OF EXPERIMENTAL AND THE CONTROL GROUPS ON PRE-TEST

Group	N	Mean	Std. Deviation	t test	Sig. (2-tailed)
EG	50	80.240	7.836	0.506	0.614
CG	50	81.040	7.974		

After the treatment the post test scores for EG and CG were 91.680 and 80.100, respectively. (Table 2.). These results showed that the sample's post - test knowledge levels were different, EG had significantly higher than the mean score for CG. A statistical significant difference was found between the groups ($t = 8.317$, $p < 0.05$). This means that CAI was more effectiv at Genetics teaching in EG than traditional method in CG.

TABLE II. DIFFERENCE BETWEEN THE SCORES OF EXPERIMENTAL AND THE CONTROL GROUPS ON POST-TEST

Group	N	Mean	Std. Deviation	t test	Sig. (2-tailed)
EG	50	91.680	5.339	8.317	0.000
CG	50	80.100	8.272		

The average score in the students' retention test, who received computer assisted instruction, was 90.820 and the average retention test score of the students who received traditional education is 78.900.

TABLE III. DIFFERENCE BETWEEN THE SCORES OF EXPERIMENTAL AND THE CONTROL GROUPS ON RETENTION TEST

Group	N	Mean	Std. Deviation	t test	Sig. (2-tailed)
EG	50	90.820	5.454	8.679	0.000
CG	50	78.900	8.036		

The difference of 11.92 between the scores in the retention test is found was significant. A statistical significant difference was found between the groups ($t = 8.679$, $p < 0.05$).

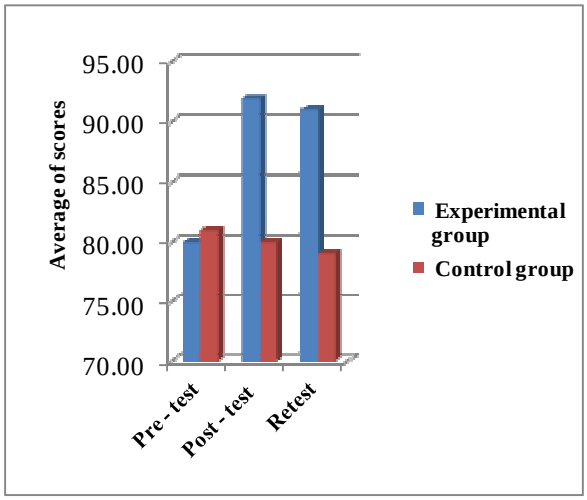

Figure 1. The average score of experimental and control group on the pre-test, post test and retest

According this result, it can be stated that students receiving computer assisted instruction in teaching Genetics shows differences in terms of remembering what they have learnt and enables retention in learning when compared to traditional education, in other words it can be stated that CAI is more effective than traditional education.

To support education activities with visual and audio equipment provides enrichment based on the technological developments or availability of technology. As seen on Fig. 1. computer assisted instruction is a better method of instruction for secondary level Genetics science as compared to the traditional method of instruction.

IV. DISCUSSION

Results of the study demonstrated that computer assisted instruction was an effective mode for learning in Genetic lectures. The results of the present study are in consonance with the results of many of the experimental studies demonstrating effectiveness of CAI for better student achievement in biology [1], [5], [7], [8], [9], [15], [16]. All listed authors emphasize the advantage of the use of computers in relation to application of other forms and methods of work in Biology lectures.

The efficiency of these kinds of lectures and enhanced motivation of students is especially emphasized. The effectiveness of computer-assisted instruction for improved student learning as demonstrated by the present study may be attributed to the software used in the experiment and the way it was used. Educational software can be used to explain the concepts and processes in such a manner that is not possible through traditional practices. Achieved results show students' interest for these types of lectures and learning, and output results show that the students' average grades are higher in comparison to traditional approach of learning with lecturing topic "Genetics".

V. CONCLUSION

The pedagogical research was conducted with parallel groups (an experimental one and a control one) during which the efficiency of applying computer assisted instruction (CAI) in biology classes was analyzed in relation to the traditional classes. The experiment was realized on the sample of 100 students (of which 50 were in the experimental group and 50 in the control group). With the students from the experimental group, 15 lessons of *Genetics* teaching unit, was done by using CAU, while the students form the control group covered the same content in a traditional way. The average score of students from the experimental group on the pre-test was 80,24 points, while the average score of students from control group was 81,04 points. The difference in results from the pre-test for the two groups is not statistically significant. After realization of the Genetics teaching unit, by applying different teaching methods in experimental and control groups, the students from both groups were tested in the post test. The average score of students from the experimental group on the final test was 91,68 points, while the average score of students from control group was 80,10 points. After 6 weeks, the students of both groups were tested with the same test (retest). The average score of students from the experimental group on the retest was 90,82

points, while the average score of students from control group was 78,90 points. The analysis of the results from the post-test and retest has shown that the students from the experimental group achieved higher quality and quantity of knowledge in relation to the students from the control group. The differences in achievement of the students from experimental and control groups on post-test and retest are statistically significant in favor of the experimental group.

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BY SIMULATING TO THE SOLAR FUTURE

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Abstract - The new, digitally educated generation, requires individualized teaching process, as well as increasing interactivity, during the adoption of the new curriculum. With the development of information technology, the ability to adapt teaching material needs of students is increasing. Today, it is possible to present every physical phenomenon, in an easy and understandable way to students. An important role in teaching technical and IT education subjects are simulations, as they offer the possibility of certain processes manipulation. Simulation in the teaching process allows two-way communication, changing the input and output of the model.

I. INTRODUCTION

Simulation is the imitation of some real thing, state of affairs, or process. The act of simulating something generally entails representing certain key characteristics or behaviours of a selected physical or abstract system. Simulation is used to resolve problems with events whose occurrence is stochastic. It represents an approach to solving operational problems, in which the parameters of the actual problem situations a system entries in a mathematical model. The mathematical model, based on the value to determine possible states that the system can take. The simulation does not provide a concrete solution, but the information supporting the decision.

The simulation process is a structure to solve real-world problems using simulation modeling. It can be displayed as a series of steps that describe the different stages solving problems with this method (life cycle simulation). The structure of the simulation process is not strictly sequential, but it is possible and returns to the previous steps of the process, depending on the results obtained in different stages of the process. Number of phases and sequence their performance depends on each specific situation, but it is still possible to specify a general, an ordered set of procedures.

Simulation is also used when the real system cannot be engaged, because it may not be accessible, or it may be dangerous or unacceptable to engage, or it is being designed but not yet built, or it may simply not exist.

II. SIMULATION IN EDUCATION

The modern age expects a different approach to educational - pedagogical process. Huge attention is given to the individualization of teaching, that is adapting methods and forms of pedagogical-educational activities to individual students' characteristics.Thanks to new technologies, students can follow syllabus at their own pace and according to their ability, which contribute to better activities of students, encouraging independence and creativity [3].

From the beginning, man has weighed to communicate and interact with its surroundings. Over time, the forms of interaction are becoming more complex and progressive. Of course, all this is being simplified by appearance and use of computer. Today's technology expands the capabilities of man, allows him to engage in solving highly complex and demanding problems. The development of computers has created conditions for the design and implementation of simulation. Today simulation is widely used in many fields, such as business systems, engineering, medicine, IT, biology, schools, etc..

As mentioned above, simulations have found their place in the field of teaching. Sometimes for the realization of the experiments, it was necessary to find a lot of time and money. Today, simulations enable you all of this much more successful, with no major investment. The use of simulation and animation in teaching TEO, in many ways makes work easier and evoke interest with students. It is necessary to modernize and adapt teaching to new generations, high quality, modern and productive teaching technical and IT education in our education system, is something we should strive for.

Simulation models allow the study of phenomena in reality, they are used to show only the essential characteristics of a real phenomenon, essentially modeling is the emulation of certain processes, systems, phenomena and accept their behavior in real life. Models can be the forerunner of a real system or to be realized subsequently on the basis of the existing system. The models witch

are designed on the basis of existing real systems are very useful in the learning process, especially models that allow the functioning of a system, process or machine to be presented to students.

The advantages of using simulations are*:*

- The model can be reused for the analysis of the suggested plans;
- Simulation methods can be used to assist in the analysis, in the case where the input data is in some way incomplete;
- Data are often much cheaper from similar data obtained from real system;
- The generated data can be used to assess any measurable characteristics;
- Simulation is the only tool for solving particular problems, if there is a danger to students (electronics exercises)ili su promene brze tako da ih oko nemože registrovati (rad motora SUS, rad elektromotora ili generatora);
- It is possible to describe and solve complex dynamic problems with random variable;
- Facilitates the adoption of a curriculum, helps students to understand individual processes and phenomena [4].
- Disadvantages of using simulations are:
- Simulation models can be costly and require significant time for the development and validation;
- Due to the statistical nature of simulation it is necessary to perform a number of experiments in order to obtain an appropriate sample of simulation results;
- you don't get dependence of output variables of the models' input variables;
- It does not get the optimal solution;

Model validation is complex and involves additional experiments [1].

Today it is possible to find many ready-made applications that simulate certain processes which makes teachers work easier and more interesting to students. It is possible to simulate the circuit, without fear that the children might happen discomfort, it is possible to make a solution, make a molecule to study the effect of the electromagnetic field, explain the principle of inclined plane, etc. Applying some of the simulations in teaching TEO, I notice a huge interest in students and their desire to be more icluded in this form of material presentation. It is evident that the chalk and blackboard, slowly replacing the computer and interactive whiteboard, namely because what all that new technologies have to offer.

If we genuinely decide for self-development model, you need to stick to some rules. Practical modeling is done through the following phases:

A) The choice of content - a preliminary phase

B) Define the objective of the class or learning objective:

- The design phase
- implementation phase
- Phase of testing, verification and validation
- Preparation of user documentation, which should contain the following elements:
- Model name,
- The type of model,
- School subject, educational topics, field,
- which is intended age,
- Didactic and technical Instructions [5].
- Evaluation phase

Solar energy is energy from sun, which we see in the form of light and heat. The sun is the biggest source of energy on the Earth. Photosynthesis is solar energy converted to plant mass, which thus becomes transformed into energy in the form of cellulose or other carbohydrates. The energy generated from solar radiation is called a renewable energy source, because its use does not disturb the balance of nature. All conventional, fossil, fuels are also a form of solar radiation. Solar energy can be used in different ways, it is possible to transform it in the thermal, electrical, chemical or mechanical energy.

Unbelievable but true is that, at the time of the ancient Greeks, writer Xenophon described how withclever construction we can use solar energy for heating homes at winter. Today, solar energy is used primarily to generate electricity or produce heat.

Solar systems based on the use of photovoltaic cells are used to convert solar energy into electricity and thereby ensure power supply . The basic and major part of the system is the solar panel that produces energy using Sun's energy.

Solar collectors convert solar energy into heat, which is used to heat water, but it may be used for additional heating or as auxiliary heating.

Solar energy has achieved enormous popularity as a renewable energy source, which does not generate pollution and contributes to the conservation of nature [2].

IV. SIMULATION MODEL

The simulation model, with which we want to approach with syllabus from renewable energy sources, includes action of replacement elements of Sun and clouds. With such actions, the student insight into the contribution of solar energy in the development of hot water, and what are the outcomes of bad weather. In the following part of the paper are presented the simulation [5].

V. CONCLUSION

In modern society and in modern education people are constantly trying to progress. In addition to the material that is taught in schools teaching effectiveness depends on the method of teaching. Simulation proved to be extremely effective method of learning, and interesting method that students willingly accept and use to easily acquire knowledge. As far as our model, we wanted a practical example to show how solar

Figure 2. Appearance of the pages

Figure 3. Appearance of the pages

energy can easily and efficiently be used in everyday life, and thereby to familiarize students with the concept, purpose and benefits of simulation as a teaching method. As shown in this study simulation is therefore an ideal way to show that a model has to work in a real environment, and then on the basis that it can be modified and improved, or even determine whether it pays to implement the project. Therefore simulations are increasingly being used in education.

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M-LEARNING AS A TREND TOWARDS MODERN LEARNING

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Abstract - Mobile learning is an e-learning approach in which the learning materials available using PDAs (Personal Digital Assistant, PDA) and smart mobile communicator. Typically, e-learning is described as learning "anytime" and "anywhere" (anytime, anywhere), but with access to a computer and connection to the Internet. All student needs, it is a device PDA or smart mobile phone and wireless network of any type.

I. INTRODUCTION

The use of mobile devices to support learning and teaching is not an unknown conception in educational circles. Three decades ago the use of graphic and scientific calculators in the classroom made a significant contribution to learning.The use of PDAs for years is present in the classroom and in the work place, for example, the fields of medicine, transportation, business organizations, the media and so on. These are the beginnings of mobile learning. Today the laptops in higher educational institutions of the developed world, desktop PCs, and Pocket PCs (Pocket PC) and handheld computers (palmtop, handheld computers) have the rank of the most important hardware to mobile. Manufacturers today combine PDAs with cell phones (smartphones), MP3 player and digital camera.

The evolution of education and training at a distance can be characterized as a transfer from d-learning (distance learning) to e-learning (electronic learning) to M-learning (mobile learning). With the successful development of Bluetooth, WAP (Wireless Application Protocol), GPRS (General Packet Radio System) and UMTS (Universal Mobile Telecommunications System), the technological structure for wireless telephony and wireless computing technology is now firmly established. M-learning or mobile learning, involves the delivery of digitized content on any wireless phone connected to a laptop or personal digital assistant (PDA).

Wireless technologies and the mobile revolution contributed to the spread of wireless communication devices. The idea behind the m-learning is that it allows on-line connectivity anywhere at any time with the center base of the learning achievement of Socrates thinks he should be everywhere and anywhere learning.

M-learning can include any of the business supplies to take the course from a personal digital assistant PDA to the net-based one, while instructor training is facilitated through a laptop. Mobile technology allows schools to extend learning beyond the classroom walls. Higher educational institutions have already started experimenting with this technology to develop new ways to improve the educational experience of their students.

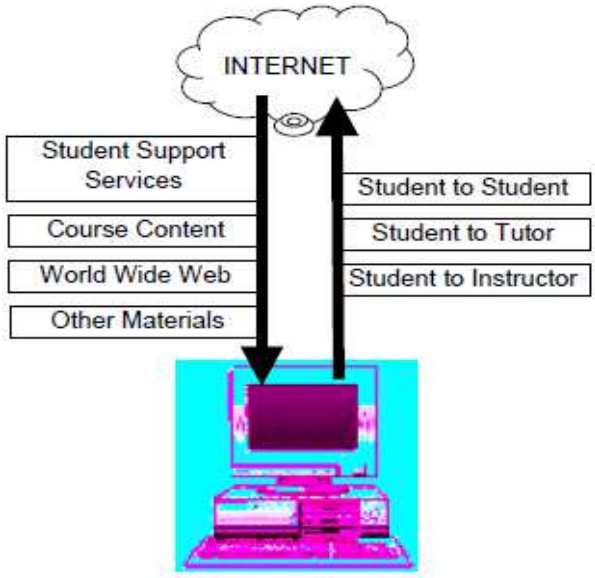

Figure 1. E-learing

This technology allows students and teachers the opportunity to interact with the contents of the course. The intersection of mobile computing and e-learning demands any time, anywhere resources powerful search capabilities, rich interaction, powerfull support for effective learning and performance orientation. There are two known directions in the development of mobile learning. The first line indicates that the development will

be the dominant way to access the Internet and it will soon be based on wireless devices. E-learning simply becomes m-learning with no special changes in content. It also highlights the new direction of development that m-learning is a characteristic of certain types of target knowledge, knowledge that the location depends on the situation. The transformation of e-learning to m-learning is presented in Figures 1 and 2.

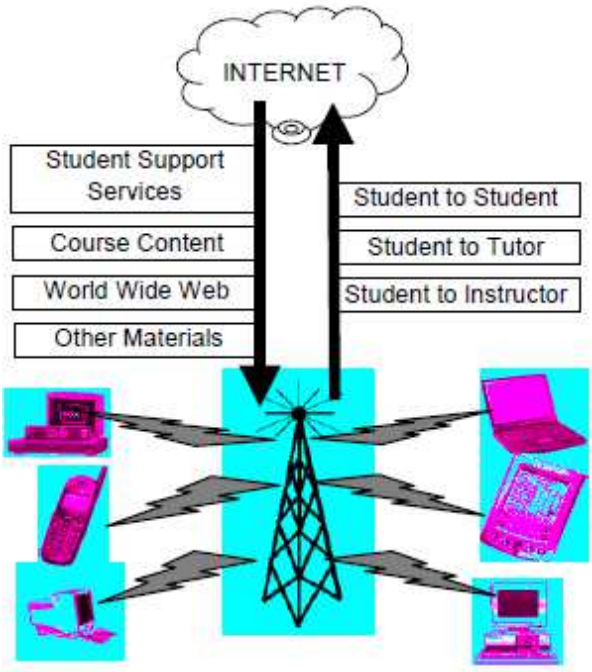

Figure 2. M-learing

Until the beginning of 2005 in the world of mobile learning there was little reason to seek knowledge from the pocket and hand held devices. However, the expansion of the third-generation networks and integrated communication devices that combine telephony, instant messaging, and multimedia computing, has led to a paradigm shift in learning. Many users have found that their need for a computer with broadband connection can satisfy a small device, that is mobile smartphone (Figure 3) [4]

Figure 3. M-learing

Increased interest in mobile devices and using them for learning and research can be attributed to a number of factors: the constant expansion of wireless broadband networks, the explosion of power and capacity of the next generation mobile, and the fact that the mobile has established itself as devices for communication, deeply embedded in everyday life as part of our social practices. "Whether we like it or not, we are ready for it or not-mobile learning is the next step in a long tradition of learning based on the technology-says David Metcalf in the view of mobile learningen titled "Stolen moments for learning. "It will have a new strategy, practices, tools, and application of resources to realize the promise of personal, pervasive learning at anyplace and at anyt ime. It corresponds to the interests of "learning on demand" connected citizens in the information society [3

Figure 4. M-learing

Mobile connects formal learning practices with the informal practice of situational learning-receiving support tasks in the workplace, or using what David Metcalf calls "stolen moments of learning"-while riding the train or sitting at the

airport while waiting for the airplane flight (Figure 5).

Od E-learinga do M-learinga kao trend

	Classroom	E-Learning	M-Learning
Access	Limited	24/7	24/7
Quality	Varied	Consistent	Consistent, Progressive
Metrics	Difficult	Difficult	Formal and Informal, Automatic, Anytime
Retention	Varied	Varied	High Retention, Personalized Learning.
Relative Cost	High	High	Currently Mid-Range, Decreasing.

Figure 5. E-learning - M-learing

In the early days of implementing e-learning lessons are some of the lessons that need to be taken into account in the mobile learning initiatives. Learning is a deeply personal act that makes the situation when learning relevant, reliable and engaging. Different types of learning require appropriate strategies, tools and resources. Technology alone cannot guarantee better learning. Programs effective mobile learning will require new skills, digital communications, new pedagogies, and new practices. The Nordic countries and South Korea[6] are the leading countries in mobile learning today.

II. WAP AND MOBILE PHONE-DIALER

What has accelerated the trend of e-learning to M-learning is the emergence of WAP protocols and devices that can directly communicate with the server wireless applications (WTA – Wireless Telephony Application) [5].

As the wireless technology in developing standards and proposals are quickly changing. What used to be a mobile phone is now becoming a communication terminal that executes the application, browse, schedule meetings, serves as a reminder, a terminal for remote reading and learning knowledge base and, of course a phone. This takes a standard upgrade. There is a WAP forum industry group for med to develop a wireless standard that digital mobile phones and other small terminal devices, for example, a PDA (Personal Digital Assistant) has provided services to more than a standard service of voice or telephone service [12].

See the website at http://www.wapforum.org or WAP Forum has become the Open Mobile Alliance (OMA)http://www.openmobilealliance.org/tech/affiliates/wap/wapindex.html where you can find the latest specs (Figure 6).

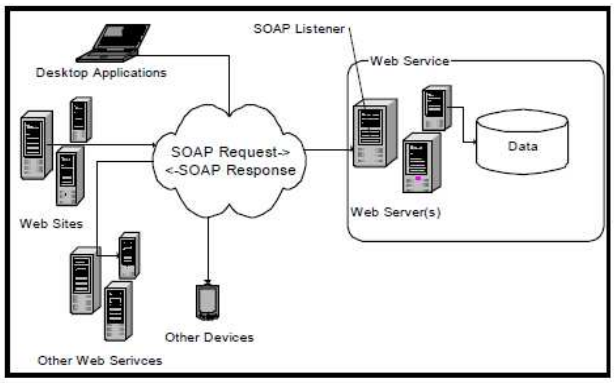

Figure 6. Architecture Web service in E-learning

III. IMPLEMENTATION OF ON-LINE LEARNING IN SERBIA

In Serbia, as well as its environment, the traditional form of education used by some of the media (speech, printed text, graphic materials...) and technologies (print). The most common is teaching in the classroom, what are the media used mainly talk and text (Figure 7). In recent years the used video beams and presentations made in PowerPoint, which significantly increases the visualization, interactivity and accuracy of the material in[11].

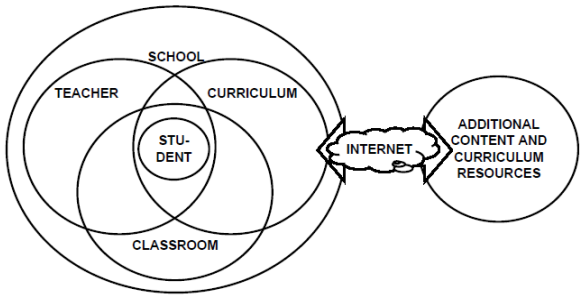

Figure 7. The traditional approach to learning

The use of ICT in teaching, mostly boiled down to each individual and independent projects. This situation has changed in recent years, primarily because educational institutions are increasingly equipped for the use of ICT, and the conditions for the functioning of the Internet in Serbia are getting better. However, the introduction of e-learning is a complex process and is not enough money to invest and equip and expect it to be anything else but "just happen by itself."

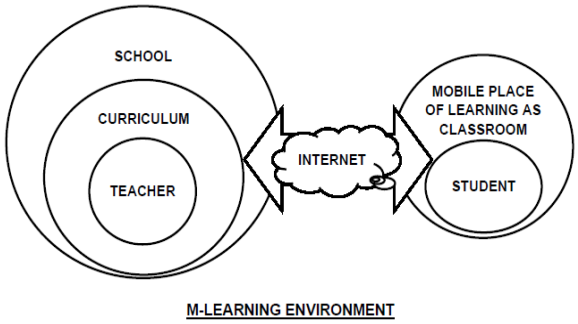

Figure 8. M-learning environment

Serious projects of e-learning and the lack of strong institutional support in the administration and organizational and financial terms. A lack of systematic knowledge on the possibilities of improving the use of technology can make the process of teaching and learning. It is necessary to provide conditions for the systematic use of information technology in the organization of the teaching and learning process (Figure 8).

It should be expected that in the near future the conditions mentioned in the preceding section may provide an education in Serbia gained "momentum of the system" and moved to higher stages of individual projects require a higher level of organization [8].

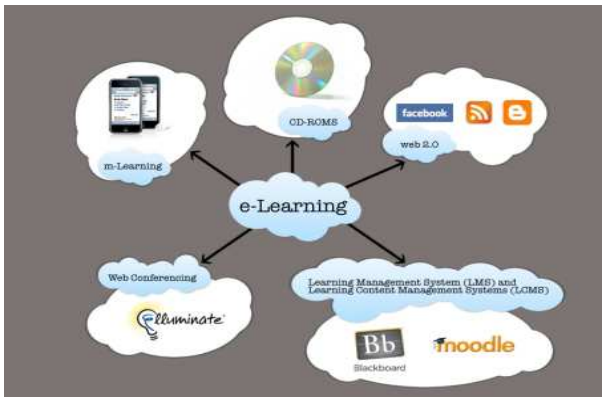

Figure 9. E-learning in the organization of teaching.

The introduction of e-learning, and more and m-learning involves achieving some basic assumptions: the organization of support systems, training staff, teaching staff, support staff (technical support) and strategic commitment to the institution, the introduction of information technology in the work of the institution, including the strategic plan for the introduction of technology into teaching [7]. The number of institutions considering implementation of distance learning has been increasing. There are those who have at least once tried with such projects (Figure 9) [9]. Courseware tools are conceived and designed to assist achieving this goal (Figure 10). This would facilitate and improve the process of education and teachers and students as well. In order to enable and facilitate the use of certain technologies, institutions must provide various forms of support to the students: online application and registration for remote participants, technical support, consulting assistance in program selection, assistance in mastering the content, help with the organization of learning, access to literature and other forms of support.

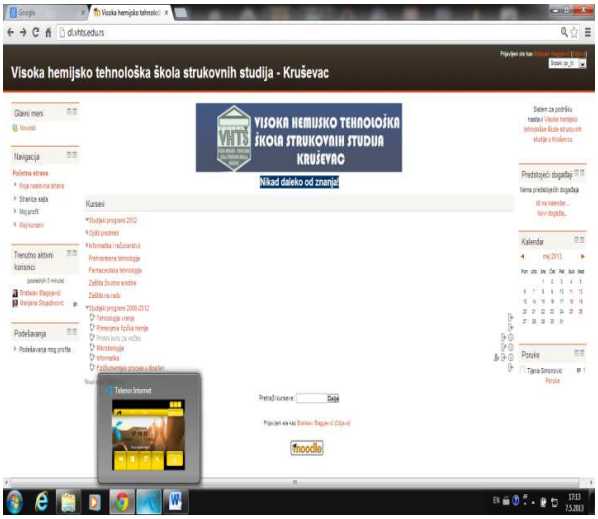

Figure 10. DLSVHTŠin Krusevac

IV. CONCRETE IMPLEMENTATION OF M-LEARNING

iTunes U app enables fingertip access to entire courses from the world's most prestigious universities. Provides knowledge to all who are interested in the subject area although at this point not in the classroom. In addition to reading books, viewing presentations, lectures and assignments, students will be notified in order at all times have the latest information on the subject. Teachers can quickly and easily create, manage, and share courses, tests and additional material by means of the tools on the Internet and use content and links from the iTunes U apps, the Internet, iBookstore application or App Store as part of the curriculum.

All three apps, iBooks, iBooks Author and iTunes U, free of charge. The App Store can find a lot of educational applications, intented to children, pupils, students and all who are thirsty for knowledge. Current state of the market in favor of Apple that is closest to the reorganization of education and increasing the availability of teaching materials. On the other hand, we have devices that support the Android operating system,

and because of lower prices, better quality and all new, even more powerful model pretending to take a leading position in the sale of the tablet.

According to the Intrnational Data Corporation (IDC), the market share of the iPad tablet in the last three months of 2011-and was reduced from 61.5 to 54.7 percent. The result of this distribution will lead to a gradual increase in dominance devices with the Android operating system, which is projected to 2015th culminate assume the leadership position in the tablet sector. Although there is no self-contained story as Apple, open technology to develop applications from Android and create more than a serious competitor to iOS, as generally and in the field of education. Play free Google Books app provides access to your favorite books in electronic form, and many educational applications enable children overcoming creative math, letters, foreign languages, etc.. TEDx application is based on the TED (Technology, Entertainment and Design) - a global organization that brings together the conference in order to spread "ideas worth spreading" and images of successful people from various sciences that in 18 minutes holding his inspirational speeches. TEDx offers individuals or groups a chance to organize independent conferences like TED and TEDx around the world makes it easier to find these conferences to all.

The transition to full use of heavy electronic books is still difficult. However, attendance via live streaming as a common part of education is closer than you think. Virtual attendance has moved classrooms to address myriad worldwide. This model of learning that makes a lot of training to employees and students who are not always able to attend classes, and is employed by us. An example is ITAcademy and Bussines Academy where students can watch free seminars, and regular classes, live on their computer, tablet or mobile device.

V. CONCLUSION

Today's era of globalization and modern technology make rapid changes in all aspects of life. The new development requires new skills and new forms of education-timely, complete, faster, more efficient, more accessibleand cheaper.

Computer technology enables interactive training and distance education via the communication channel that distance learning is realized on the basis of specially designed software (courseware). The use of modern information and communication technologies for distance learning for fast, functional and stable access to learning materials, multimedia presentations and other educational resources on the Internet, with continuous testing, testing of knowledge at all levels, electronic communication with teachers and other students of the course.

Distance learning can be adapted to Global strategy for the knowledge economy, because it intensively increases the return on investment in knowledge, global connectivity and interaction and learning in the entire service period. It is an efficient interactive tool for increasing educational opportunities without increasing the financial allocation to conditions of rapid technological change. Distance learning and especially learning with modern smart mobile communicator is a challenge means of improving and enhancing the educational processes, as well as one of the foundations for a new and better ways of knowledge management. intensive introduction information technology in education become a priority of modern higher education institutions around the world.

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A NEW NETWORKING FEATURE IN COMPUTER CLASSROOMS: HOMEGROUP AND HOMEGROUP PROTOCOL

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Abstract - HomeGroup provides methods for easy sharing files and printers in a classroom network without knowledge about computer networks or additional investment in IT equipment. HomeGroup creation, discovery and joining, as well as file and printer sharing, are done with no ambiguous options through simple user interface and Windows Explorer. System services are self-configuring and hidden from the end users. HomeGroup protocol creates a trust relationship between IPv6 configured hosts via peer-to-peer networking with the use of DPWS and Peer-to-Peer Grouping Security Protocol.

I. INTRODUCTION

The average school in primary and secondary educational system in Serbia usually has several computer classrooms. In each one, there are ten to twenty computers networked in a LAN (Local Area Network), sharing one Internet connection. The best scenario for maximum utilization of those available resources would be to deploy a school domain network, which would be maintained by a school network administrator. The reality is that primary and secondary schools do not have a network administrator. They also do not have adequate networking equipment and servers for the implementation of a school domain network.

Teachers fend for themselves as best as they can, trying to make better use of what they have. The most common solution for networking and sharing resources is a Windows workgroup, and even that solution requires specific knowledge and skills about computer networks and operating systems. One shared Internet connection and a workgroup in a computer classroom could be acceptable solution for networking, but a poor one for sharing resources. In Windows XP there was a limit of ten inbound connections that one host could handle. That disappeared with Windows Vista, but still, the increased amount of network traffic created issues with host visibility in a workgroup. Mentioned problems in combination with low-cost SOHO (Small Office Home Office) switches and routers meant problems in a classroom during the class. It was not common that the teacher had to solve those problems to be able to continue with the class.

The idea to make network feature focused on small networks came in 2002 during the Longhorn development, and it was called Castles. Few years ago, starting with Windows 7, Microsoft officially introduced the end result, a new networking technology called HomeGroup [1]. HomeGroup provides methods for sharing files and printers in a local subnet working with other networking technologies that are already in use. Compared to those technologies, a domain network or a workgroup, HomeGroup is optional. Windows host must either belong to a workgroup or to a domain, but it is not required to use the HomeGroup feature. HomeGroup requires from each host who is initially joining, to provide a matching shared password, while workgroups do not. Unlike workgroup, HomeGroup does not require students to have accounts on other hosts. Instead, HomeGroup utilize a common system account so that all students can connect to any host in the group transparently, as with domains. HomeGroup hosts communicate via P2P (peer-to-peer) networking, similar to workgroups, but using different network protocols. Each host in a HomeGroup is equal, there are no computers configured as network servers. Windows 7 Starter, Windows 7 Home Basic, and Windows RT can join the HomeGroup, but cannot create one.

II. USING HOMEGROUP

If the teacher decides to use a HomeGroup in a classroom, he must take notice about network identification, HomeGroup creation, discovery and joining and about proper use of the HomeGroup potentials.

When a host successfully connects to a classroom network, several characteristics are examined to determine if it is a known network location. If the network is previously unknown and not identified as a domain-authenticated network,

the teacher will be prompted to select a profile for that network location. The selections are as follows: Home, Work, or Public. If the teacher sets a Home network profile for the location, proper ports are opened in the firewall and the network undergoes examination for an existing HomeGroup.

If HomeGroup is not detected during the out-of-box experience, one may be auto-created by that host. No content will be shared with the newly created HomeGroup except the Public folders and attached printers. If HomeGroup is not detected when joining a new Home network, the teacher will be prompted to create one. The defaults will be pre-selected on what to share: Pictures, Music, and Videos Libraries and Printers, and those choices can be modified. At that point, teacher has the ability to cancel HomeGroup creation. However, if the he chooses to create the HomeGroup, the HomeGroup password will be shown, so he can add other hosts later.

Once the teacher has decided to create a HomeGroup and determined what to share with the others, the HomeGroup services perform several tasks on his behalf. HomeGroup is created on the host and secured with a strong auto-generated password, which is provided to the teacher. Firewall ports required by the HomeGroup to function properly are opened. HomeGroup is then advertised on the classroom network to allow other hosts to discover and join it. HomeGroup account is created on the host to be used by all members for authentication to access shared resources. Local security group is created on the host and all local users except Guest are added in it. Libraries and printers, as selected by the teacher, will be shared appropriately with other HomeGroup members. Those shared libraries and printers on the host are then advertised on the classroom network to make them discoverable by the future members. The two core services that work to configure a Windows host are: HomeGroup Listener Service that performs local changes and HomeGroup Provider Service that performs networking tasks.

Whenever a new host is connected to a classroom network, the host will automatically try to discover an existing HomeGroup on that network. If the classroom network already has a HomeGroup present, the teacher may join that existing HomeGroup. But, before the teacher is asked to join an existing HomeGroup on the classroom network, HomeGroup services perform some key checks to determine if it is valid to ask the teacher to join that group. So when a host joins the new classroom network and discovers the existing HomeGroup invitation on that network, the HomeGroup Provider Service examines the invitation for the name of the HomeGroup creator, the number of hosts that belong to the HomeGroup, a PeerGroup Invitation for the HomeGroup, and the time the HomeGroup was created. Using that, the HomeGroup service then determines whether or not to show the join experience to the user. If the host is not a member of any HomeGroup, it will prompt the user to join the discovered HomeGroup. If the host is already a member of another HomeGroup, and is the only member of that HomeGroup, it will then further examine the date the newly discovered HomeGroup on the network was created to determine which one is newer. If it is determined that the discovered HomeGroup was created more recently than the one on that host, it will ask the user to join that newly discovered HomeGroup. If the host is already a member of another HomeGroup with more than one member, it will ignore the newly discovered HomeGroup on the network since it is already a member of a fully functioning HomeGroup, and the user won't be prompted to join.

Once the correct password is supplied by the teacher and authentication is successful to join the discovered HomeGroup, the HomeGroup Provider Service joins the host to the shared PeerGroup as specified in the HomeGroup invitation and retrieves information from it. The HomeGroup Provider and Listener Services use the information from the PeerGroup, with user sharing preferences supplied during the join user experience, and complete necessary tasks. First task is to open firewall ports [2] for Peer to Peer Grouping, Peer Name Resolution Name Protocol, Media Streaming, SMB (Server Message Block Protocol) etc. Then the HomeGroup is re-advertised to all hosts to facilitate future joining with an updated HomeGroup invitation – the number of hosts is incremented and reflected in the new invitation. A HomeGroup account HomeGroupUser$ is created on the host to be used by all members for authentication to access shared resources across the classroom. A local security group HomeUsers is created. All local users except Guest are added to the HomeUsers Security Group. Libraries and printers, as selected by the teacher, are shared appropriately to the HomeUsers group. Both the shared libraries and printers on the local host are

then advertised on the network to make them discoverable by future members. Public folders are shared with the HomeGroup to allow for a default network save location on every host. Windows Media Streaming Services are enabled to allow streaming of the users media to future members in Windows Media Player or to other authorized DLNA (Digital Living Network Alliance) compliant media receivers. New entries are added to the user credential store on the current host to allow seamless authentication for shared resources on other members using the HomeGroupUser$ account.

The common ways to share resources are: electing to share libraries or printers when creating or joining a HomeGroup, via the sharing choices available in HomeGroup in Control Panel, via the Share With menu in Windows Explorer or via the context menu that can be invoked by right-clicking any appropriate resource in Windows Explorer and clicking the Share With menu. When someone shares content in the HomeGroup, the HomeGroup shares the selected resources with other members by sharing the resource with the HomeGroup Users security group. This is achieved by applying the respective ACL (Access Control Lists) for the HomeGroup Users security group to the resource in the local file system. Then HomeGroup creates a UNC (Universal Naming Convention) share, if one does not exist, to expose the resource so that it can be accessed on the classroom network. Finally, HomeGroup advertises the shared resource on the network to other members using Function Discovery – the same way as advertises itself.

When another host receives and parses the share resource message, the next step is to render the shared resource within Windows Explorer to provide users with easy discovery and access to that shared resource. Shared libraries and folders appear under a user's name. When the user initiates a request to access a shared resource from the HomeGroup folder, the connection request is handled by Windows Explorer, which hands off the connection request to SMB to complete the request. Based on user preference, SMB will attempt to connect to the remote host using HomeGroup Credentials or user specified Credentials, which are configurable under HomeGroup Connections in the Control Panel under Advanced Sharing Settings.

On a HomeGroup password change, the HomeGroup Provider and HomeGroup Listener services must first stop HomeGroup members from accessing shared content until they can provide the new password. That is achieved by disconnecting any currently active network connections, de-authorizing all hosts for media streaming access, departing the old PeerGroup, changing the password for the HomeGroupUser$ account and removing all credentials from the credential manager. Then HomeGroup Provider and HomeGroup Listener services re-configure the HomeGroup for members to join with the new password by creating a new PeerGroup and updating the HomeGroup invitation with new information. Existing members will parse the new HomeGroup invitation and inform the users that the password has changed.

A user can leave the HomeGroup at any time. When a HomeGroup is departed, the HomeGroup Provider and Listener services close all firewall ports used by the HomeGroup, stop publishing all HomeGroup messages on the classroom network, delete the HomeGroupUser$ account, delete the HomeUsers local security group, de-authorize MAC addresses of previous members from accessing streamed media content, remove all entries from the credential manager and disconnect all HomeGroup SMB connections.

III. HOMEGROUP PROTOCOL

A. Protocol Overview

MS-HGRP (Microsoft HomeGroup Protocol) [3] is used to create a trust relationship that facilitates the advertising and publishing of content between hosts via a peer-to-peer (P2P) infrastructure. This relationship is achieved with the use of WSD (Web Services on Devices) and a PeerGroup infrastructure. There is no client-server relationship in this protocol. In order to participate in a HomeGroup, all hosts implement the protocol in the same manner. WSD is used to publish messages that are discoverable to all hosts on the subnet. These messages include the HomeGroup Invitation and Shared Printer messages. The PeerGroup is used as a secure line of communication between HomeGroup members.

A host that attempts to create a HomeGroup accomplishes this by creating a PeerGroup first, which is the secure P2P connection through which the HomeGroup is synchronized. This HomeGroup host sets the HomeGroup password, which is used to secure the HomeGroup. Once the PeerGroup has been created, this first host publishes an invitation to the HomeGroup via WSD, which allows new hosts on the subnet to discover the HomeGroup. A host detects that there

is a HomeGroup on the subnet by receiving a HomeGroup Invitation message over WSD. With the invitation and the correct HomeGroup password, the host is able to join the PeerGroup, and by extension, the HomeGroup.

This protocol depends on DPWS (Devices Profile for Web Services) to enable the discovery of a HomeGroup on the subnet, and MS-PPSEC (Microsoft Peer-to-Peer Grouping Security Protocol) to create a PeerGroup for communication between members of the HomeGroup. The underlying PeerGroup is restricted to hosts on the same subnet. DPWS and MS-PPSEC are used independently of each other, which means that neither protocol sits above the other in the relationship hierarchy. MS-HGRP also requires that all hosts implement the IPv6 (Internet Protocol version 6) protocol and have a valid IPv6 addresses.

B. Protocol Messages

Transport for this protocol is achieved through two channels: the PeerGroup and WSD, both of which are independent of the other. WSD is used to publish messages that are available to all hosts on the subnet. The PeerGroup is used for sending secure communication between members of the HomeGroup. All messages are generated in XML format.

WSD Messages are transported using WSD and published to the local subnet. The HomeGroup Protocol uses WSD messages to advertise the presence of a HomeGroup, as well as shared resources on the home network. The HomeGroup Invitation message is used to advertise the presence of the HomeGroup to other machines on the home network and to provide the required details to allow them to join that HomeGroup. The HomeGroup invitation includes the PeerGroup invitation (which is required to join the PeerGroup) and other relevant information about the HomeGroup. The invitation is serialized into an XML string and then published on the local subnet using WSD. The Shared Printer message is used to advertise printers that are installed on the advertising machine. It is serialized into an XML string and then published on the local subnet using WSD.

PeerGroup Messages are transported using PeerGroup. They are used for secure communication between members of the HomeGroup. All messages sent via the PeerGroup are converted to binary before being sent. HomeGroup Member Info messages are used to broadcast a HomeGroup member's host name and Peer ID. The HomeGroup Record format is the base data structure that is used by the following PeerGroup messages:

- HomeGroup Credentials messages – used to synchronize HomeGroup credentials that are common to all HomeGroup members. This message contains the common credential name, its password, and its creation time.
- HomeGroup User Info Record messages – used to broadcast information about each user on the host to other hosts in the HomeGroup. Each user account on each HomeGroup host has a separate, corresponding HomeGroup User Info record in the PeerGroup.
- HomeGroup MAC Address messages – used to broadcast the MAC addresses of all network adapters present in a HomeGroup member host to all other members of the HomeGroup.
- Messages containing information about the UNC (Universal Naming Convention) shares in the HomeGroup – created with Data Protection Listener which enables a user to back up their data to a different device from the device where it is currently located. One of the objectives of data protection is to enable multiple users in a HomeGroup to share the same external device.
- HomeGroup Signing Key messages – used to distribute signing keys to the HomeGroup. The signing keys are used to verify the integrity of signed WSD messages that are sent by HomeGroup members over WSD.

C. Protocol Details

To implement the HomeGroup Protocol, an individual HomeGroup member stores and updates the data about itself and other members of the HomeGroup. That is necessary for sending the proper messages. When ever the data maintained by the host changes, the appropriate messages are re-sent. Resending the messages ensures that new information is propagated to all members of the HomeGroup.

HomeGroup protocol is initialized when a host creates or joins a HomeGroup. Upon first initialization, the host should check for the HomeGroup Invitation WSD message. If a HomeGroup Invitation is detected, then the host

may join the HomeGroup. If no invitation is detected, then the host may create a HomeGroup.

To participate in a HomeGroup, a host must create the HomeGroup when a HomeGroup Invitation message does not exist. This requires a HomeGroup password. All other hosts will then be able to join the HomeGroup when the first host's HomeGroup Invitation is detected. A new HomeGroup is created by creating a new PeerGroup with a secure Peer ID. The Peer ID is a unique identifier that other members in the PeerGroup can use to identify a particular member. The host then generates the signing keys. The host then sends a HomeGroup Signing Key message, a HomeGroup Member Info message, a HomeGroup User Info record for each user on the host, a HomeGroup Credentials message and a HomeGroup MAC Address message to the PeerGroup. If the data contained in a message changes, the host must create new messages and send them to the PeerGroup. After that, host must publish a HomeGroup Invitation WSD message. If the data contained in the HomeGroup Invitation WSD message changes, the host must create a new HomeGroup Invitation WSD message and publish it on the WSD channel. When a printer is attached to the host that is to be shared, the host should also publish a HomeGroup Printer WSD message on the WSD channel. If the printer is unshared, the host should remove the printer from the HomeGroup Printer WSD message. If a new user is created on the host, a HomeGroup User Info record must be sent to the PeerGroup for that user account. If a user is deleted from the host, the HomeGroup User Info record corresponding to that user account must be removed from the PeerGroup.

Joining an existing HomeGroup requires the presence of a HomeGroup Invitation message. Multiple HomeGroup Invitation messages can be present on the network. When a HomeGroup Invitation message has been detected, the host must use the PeerGroup invitation and a proper HomeGroup password. Then the host can join the PeerGroup. Once the host has joined the PeerGroup, it is considered a member of the HomeGroup. After joining the PeerGroup, the host must then take the actions as described in a previous paragraph.

To depart from the HomeGroup, the host must remove all messages that it sent to the PeerGroup from the group, except those that are flagged to persist after the host's departure. The host must stop publishing the HomeGroup Invitation WSD message and, if applicable, the HomeGroup Printer WSD message. The host may then close and delete the PeerGroup.

Changing the HomeGroup password is accomplished by departing the HomeGroup and creating a new HomeGroup with the new password. To change the HomeGroup password, the host departs the HomeGroup and creates a new HomeGroup. When doing so, both the name and the signing keys must be reused from the departed HomeGroup. When the new HomeGroup broadcasts its invitation, it will contain the old HomeGroup name and the digital signature will be signed with the signing keys of the previous HomeGroup. The other members then detect the new HomeGroup Invitation WSD message and can join the HomeGroup by supplying the new password.

D. Protocol security

An encryption key is generated when a HomeGroup is created. A 256-bit AES (Advanced Encryption Standard) key is formed by taking the SHA-256 (256 bit Secure Hash Algorithm) hash of the PeerGroup name and the HomeGroup password as the salt. This encryption key is used to encrypt the HomeGroup Credentials message account credentials, as well as the public and private signing keys, before sending over the network.

The HomeGroup creator generates a 2048-bit RSA key pair (Rivest, Shamir and Adleman algorithm for public-key cryptography). These keys are encrypted and sent to the other members of the HomeGroup over the PeerGroup channel via a HomeGroup Signing Key message. The keys are used to sign or verify the integrity of signed WSD messages sent over the HomeGroup.

HomeGroup Invitation messages are SHA-256 hashed. This hash is signed with the HomeGroup signing key and the signed version is included in the message. The hash is then signed with the public signing key using the RSASSA-PKCS1-v1_5 (RSA Cryptography, Public-Key Cryptography Standards) signature algorithm. HomeGroup Printer messages are also signed with the public signing key using the RSASSA-PKCS1-v1_5 signature algorithm.

The password element in the HomeGroup Credentials message and the signing keys element in the HomeGroup Signing Key message are encrypted using the Encryption Key with the AES-

256 algorithm in Cipher Block Chaining mode with a zero Initialization Vector (IV). Detailed HomeGroup protocol analysis is possible with Microsoft Network Monitor and Network Monitor Open Source Parsers available on CodePlex website. Network Monitor Open Source Parsers are parsers for open standard protocols described in the MSDN Open Specifications. HomeGroup protocol parser is implemented in hgrp.npl.

IV. CONCLUSION

HomeGroup helps make sharing files and printers in a classroom network easy for everyone. With or without knowledge and skills about computer networks and operating systems, teachers and students can better use IT equipment they already have. HomeGroup creation, discovery, joining and other procedures are simple and system processes underneath are automatic and hidden from the end user. HomeGroup protocol is well designed, safe and adequate for a classroom network use.

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SIMULATION OF USING SOLAR ENERGY FOR ELEMENTARY SCHOOL STUDENTS

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Abstract - One of the basic principles of modern teaching principle is obvious. Since it is often impossible, something that requires a certain educational unit, display in reality, there is a need for models and computer simulations. The rapid development and decline of computer prices have influenced virtually everyone to use a variety of models and simulations. Although it is known in the literature that it continues to renewable energy is often termed as alternative energy sources, the fact is that the use of these resources can no longer be called alternative. The reason for this is slowly but surely wasting the world's supply of non-renewable energy sources, and the use of renewable becoming increasingly inevitable. Of course, as an additional reason for avoiding the use of non-renewable energy sources, which consists mainly of fossil fuels, we should not forget their bad effects on the environment of man. In line with this trend, it is the students, at a younger age, to be familiar with these sources. Therefore, the curriculum for technical and IT education includes processing unit on renewable energy sources and their use.

I. INTRODUCTION

Modern pedagogy tells us that the traditional approach to teaching, where the teacher is a reviewer and presenter of dry material, while using almost exclusively the method of monologue, no longer gives good results. Modern pedagogy advised that a wider application of various teaching materials using active teaching methods for better motivation of students to learn, as well as for fostering the obvious issue of what teaching processes. Unfortunately, the financial situation in Serbia is such that the provision of teaching aids, laboratory practice and workshop in particular, the prices of the same, often is an insoluble problem for the school. The solution to this problem is the implementation of various models and computer simulations.

In the case of technical IT education a need for teaching tools is pointed out (hand and power tools, machine, electric storage devices, electrical material, etc.). They are expensive and often dangerous to students or it is impossible to set the dimensions in the classroom.

For example:

- *Price as a problem:*

In teaching subject such as machines and mechanisms within the curriculum for the seventh grade, it is expensive for any school in Serbia to process trailer work and various parts.

- *Risk as a problem:*

In teaching the topics such as electric technical materials and installations within the curriculum for the eighth grade, among other things, constructing and testing circuits of home installations can be dangerous to students or can cause minor or major electric shocks.

- Dimensions as a problem:

In teaching the topics: among other things, electrical machines and devices are in the curriculum of the eighth grade. Students should learn to handle the production, transmission and transformation of electricity. Of course, it is impossible for the office of technical and IT training to set up a power plant, transmission line or, substation because of their size (the dimensions are not the problem, the price would be). As a solution, there is a tour of a power plant or substation. However, again because of the price and fit in the calendar of the school, touring is very difficult and often impossible to implement.

As previously stated, similar to teaching topics and units which use a variety of models and simulations, the logical solution for the implementation of these quality manner and the material needs.

Of course, the most accessible way to create models and simulations is the use of computers. Realistic physical model beside the production costs, takes up space in the classroom. There is also a repair problem, if it is necessary.

This is not the case when it comes to the computer model, which is flexible in every way.

The use of a computer and computer simulations that the teaching brings as a number of advantages such as:

- individualization of matter that is addressed, and the pace of work in accordance with the needs of individual students,

- learning through constant feedback which is a major motivating factor for students,
- efficient emission, transmission and absorption of knowledge, etc.

II. MODELS AND SIMULATIONS

A. Models

A model presents a simplified and idealized picture of the original, and the result of the modeling process. In developing the model, it is necessary to retain only those features of the originals that are essential for the study of.

Models can be classified in several ways:

1 way:

The mental (cognitive) models have been constructed by the human mind.

Verbal models colloquialism mental models, usually expressed in writing.

Physical models are scale models of the real system and act as their originals.

Mathematical models are those in which the relationship between the original and the model described by mathematical equations.

Conceptual (structural) models are constructed and based on the logic of the system.

Computer (simulation) models are conceptual models presented in the form of a computer program.

2 way:

Material models

Symbolic models (mathematical, conceptual, computer, simulation)

3 way:

An Informal model provides only basic information about the original one and it is not complete and accurate.

A formal model is more complete and accurate than the informal model [3].

B. Simulations

Most often, the model can present static state of the system, and we present a simulation system changes per unit time.

At the present, we can simulate the behavior of the system, mainly using computer simulation that we can make with or without the use of simulation languages.

Simulation models can be classified into:

- Deterministic models listed as predictable,
- Stochastic models whose behavior cannot be predicted in advance,
- Discrete models whose state changes are not continuous but occur only in certain points in time,
- Continuous models whose state changes continuously in time,
- Continuous - discrete models that contain continuous and discrete variables.

III. RENEWABLE RESOURCE

A renewable resource is a natural resource that can replenish with the passage of time, either by biological reproduction or other naturally recurring processes. Renewable resources are a part of Earth's natural environment and the largest components of its ecosphere.

A positive life cycle assessment is a key indicator of a resource's sustainability. In 1962, Paul Alfred Weiss defined Renewable Resources as "The total range of living organisms providing man with food, fibers, drugs, etc..."

Renewable resources may be the source of power for renewable energy. However, if the rate at which the renewable resource is consumed exceeds its renewal rate, renewal and sustainability will not be ensured.

The term renewable resource also describes systems like sustainable agriculture and water resources. Sustainable harvesting of renewable resources (i.e., maintaining a positive renewal rate) can reduce air pollution, soil contamination, habitat destruction and land degradation.

Gasoline, coal, natural gas, diesel and other commodities derived from fossil fuels, as well as minerals (like copper and others), are non-renewable resources without a sustainable yield[5].

IV. TYPES OF RENEWABLE ENERGY

Most countries currently rely heavily on coal, oil, and natural gas for its energy. Fossil fuels are non-renewable, that is, they draw on finite resources that will eventually dwindle, becoming too expensive or too environmentally damaging to retrieve. In contrast, the many types of renewable energy resources such as wind and solar energy are constantly replenished and will never run out.

Most renewable energy comes either directly or indirectly from the sun. Sunlight, or solar energy, can be used directly for heating and lighting homes and other buildings, for generating

electricity, and for hot water heating, and a variety of commercial and industrial uses.

The sun's heat also drives the winds, whose energy is captured with wind turbines. Then, the winds and the sun's heat cause water to evaporate. When this water vapor turns into rain or snow and flows downhill into rivers or streams, its energy can be captured using hydroelectric power.

Along with the rain and snow, the sunlight causes plants to grow. The organic matter that makes up those plants is known as biomass. Biomass can be used to produce electricity, transportation fuels, or chemicals. The use of biomass for any of these purposes is called bioenergy.

Hydrogen also can be found in many organic compounds, as well as water. It is the most abundant element on the Earth. It does not occur naturally as a gas. It is always combined with other elements, such as with oxygen to make water. Once separated from another element, hydrogen can be burned as fuel or it can be converted into electricity.

Not all renewable energy resources come from the sun. Geothermal energy taps the Earth's internal heat for a variety of uses, including electric power production, and the heating and cooling of buildings. The energy of the ocean's tides come from the gravitational pull of the moon and the sun upon the Earth.

In fact, ocean energy comes from a number of sources. In addition to tidal energy, there is the energy of the ocean's waves, which are driven by both the tides and the winds. The sun also warms the surface of the ocean more than the ocean depths, creating a temperature difference that can be used as an energy source. All these forms of ocean energy can be used to produce electricity. [6]

V. SIMULATION OF USING SOLAR ENERGY

According to the curriculum of the Ministry of Education of the Republic of Serbia in the subject of technical and IT education the topic "Sources of Energy" is taught four classes in the fifth grade and two classes in the eighth grade. To close the operation of this complex system the most practical way is to make simulation of the system. In this way, students easily recognize and understand the way of converting solar energy into electricity or heat.

The sun's energy can be captured to generate electricity or heat through a system of panels or mirrors.

- Solar, or photovoltaic, cells convert sunlight directly into electricity. Most photovoltaic cells are made primarily of silicon, the material used in computer semiconductor chips, and arranged on rectangular panels. When sunlight hits a cell, the energy knocks electrons free of their atoms, allowing them to flow through the material. The resulting DC (direct current) electricity is then sent to a power inverter for conversion to AC (alternating current), which is the form in which electric power is delivered to homes and businesses.
- Solar thermal collectors use heat-absorbing panels and a series of attached circulation tubes to heat water or buildings.

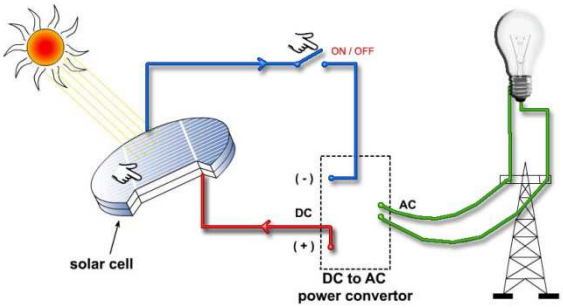

Figure 1. Simulation of the production of electricity using photovoltaic solar cells (open circuit)

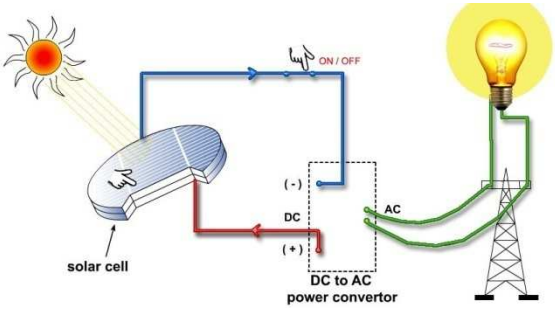

Figure 2. Simulation of the production of electricity using photovoltaic solar cells (close circuit)

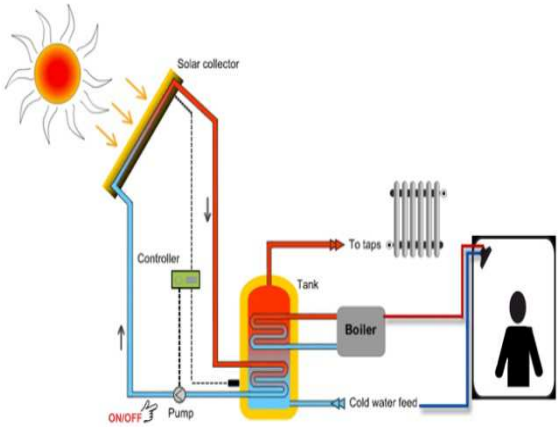

Figure 3. Simulation of the production of hot water using solar collectors (pump off)

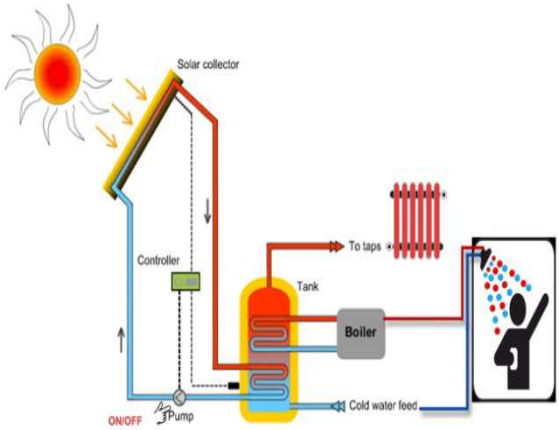

Figure 4. Simulation of the production of hot water using solar collectors (pump on)

- Solar concentration systems use mirrors - usually arranged in a series of long, parabolic troughs, a large round dish, or a circle surrounding a "power tower" - to focus the sun's reflected rays on a heat-collecting element. The concentrated sunlight heats water or a heat-transferring fluid such as molten salt to generate steam, which is then used conventionally to spin turbines and generate electricity.

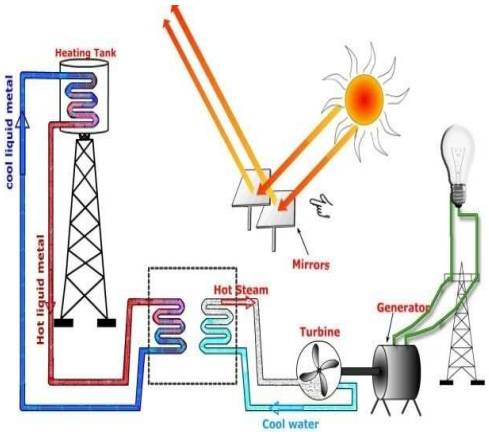

Figure 5. Simulation of the production of electricity using solar collectors (when the mirror is out of focus)

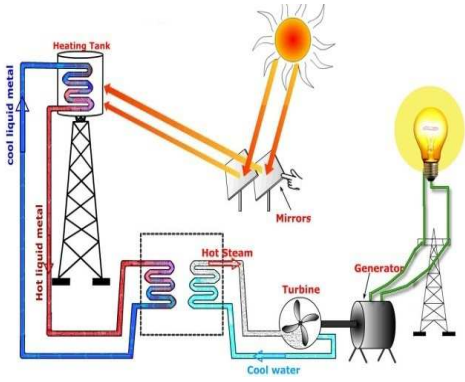

Figure 6. Simulation of the production of electricity using solar collectors (when the mirror is in focus)

- Passive solar design is the creative use of windows, skylights and sunrooms, building site and orientation, and thermal construction materials to heat and light buildings, or to heat water, the natural way [7].

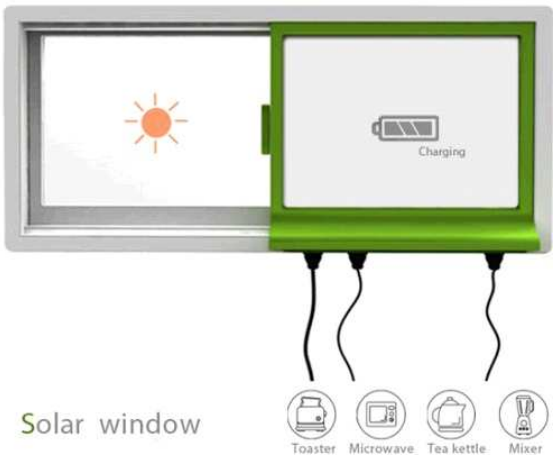

Figure 7. Electricity production using solar windows

VI. RENEWABLE ENERGY COSTS

Power from renewable energy sources is getting cheaper every year, according to a released study, challenging long-standing myths that clean energy technology is too expensive to adopt. According to the study by the International Renewable Energy Agency (IRENA), the costs associated with extracting power from solar panels have fallen as much as 60 percent in just the past few years.

The price of generating power from other renewable, including wind, hydro-power, concentrating solar power and biomass, was also falling. The numbers tell that costs are falling exponentially and will continue in the future.

According to IRENA's innovation and technology centre, investment in renewable is no longer a niche but rather represents the "bulk of investments in global power generation," accounting for half of the total annual capacity additions worldwide.

"The markets are growing very fast and further cost reductions are very likely," he said adding that in 2011, investments in the supply side of renewable energy sources reached about $260 billion.

A second IRENA study released estimates renewable will create a minimum of four million jobs just in the electricity sector in rural areas of the developing world.

Today, there are five million jobs world wide in the renewable energy sector and more than 1.3 billion people, mainly in Africa and Asia, who do not have access to electricity, according to IRENA.

IRENA is an intergovernmental organization established to promote the widespread use of renewable energy sources. It has more than 155 member states and its headquarters is in Abu Dhabi [8].

The World's energy demand is constantly growing, especially in developing countries, and even despite moves by countries to improve energy efficiency and create saving. While renewable have an important role to play in meeting this demand, proper policy and regulation planning are key to investment in renewable energy. The lecture explored a diversity of policy mechanisms and highlighted the importance of having a stable and predictable regulatory framework to attract investors.

The use of renewable energy technologies, particularly solar PV technologies, enjoyed a tremendous growth in the past decade.

Improving the ability to better forecast e.g. the production of solar technologies minutes or hours ahead is thought to be critical.

Most strong countries guarantee payment for solar energy produced by projects for twenty and ten years, respectively [9].

In line with the tendency of the growing use of renewable energy are set binding targets under the Directive 2009/28/EC of the European Parliament and of the Council of 23.4.2009. On the promotion of energy from renewable sources in the EU Member States, to ensure renewable energy sources, in the 2020th year accounted for 20% of gross final energy consumption in the European Union level.

This obligation is still in the original version. The Republic of Serbia has taken over the 2006th "Law on the Ratification of the Treaty establishing the Energy Community between the European Community and the Republic of Albania, Bulgaria, Bosnia and Herzegovina, Croatia, Former Yugoslav Republic of Macedonia, Montenegro, Romania, Serbia and the United Nations Interim Administration Mission in Kosovo in accordance with the security Council Resolution 1244 of the United Nations (Official Gazette of RS, no. No. 62/2006) "[11].

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A MODEL FOR OPTIMIZATION OF HIGHER EDUCATION PROCESS WITH DATA ENVELOPMENT ANALYSIS

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Abstract - In this paper we present an approach for modeling production units (DMUs) in Higher Education, as a preparation for applying Data Envelopment Analysis (DEA) to measure their efficiency. As a tool for analyzing efficiency of production units, DEA is especially applicable in cases where exact relationship between inputs and outputs is neither available nor necessary for efficiency rating among DMUs. In order to apply DEA, inputs and outputs for each DMU must be clearly defined. The courses were recognized as production units; staff costs, equipment costs and teaching hours as inputs, and contribution of courses to students' competencies as a measure for output. Applying DEA to measure efficiency among selected set of courses could help managers in Higher Education to explore weak points in knowledge delivery process.

I. INTRODUCTION

The main goal of Higher Education (HE) is to prepare students for the labor market according to the requirements of specific jobs and assignments. These requirements are formally defined as engineer competencies which students achieve through the learning process [1]. The number of competences, their titles, and the connection to learning outcomes are defined by higher education institution, according to their capacity and needs of industry representatives.

To develop competences, various inputs need to be used through the knowledge delivery process defined by curricula. Human and material inputs are being used to develop engineers' competences as outputs. This paper presents an approach of building a mathematical model for measuring courses' relative efficiency according to resources used and competencies developed on first study cycle on Faculty of Information Technologies in Mostar (FIT). The model treats courses as production units that transform inputs to outputs. Using Data Envelopment Analysis, the model allows managers to optimize competences' development by discovering possibilities of achieving the same results with as less inputs as possible.

II. METHODS

The research presented in this paper combines exact and empirical methods [2]. The main exact method is Data Envelopment Analysis (DEA). DEA is commonly used [3] to evaluate, and compare [4] the efficiency of a number of production units comparing each producer with only the "best" one using the extreme point method. The procedure of finding the best virtual producer can be formulated as a linear program. Analyzing the efficiency of *n* producers is then a set of *n* linear programming problems [5].

As DEA was deployed for modeling efficiency of teaching process, which is not its primary application, there was the need of preparatory modeling and analysis [6]. After the thorough analysis, the CCR [7] model was chosen for it turned out to be the best suited for the problem.

In order to develop a DEA model for a HE institution, we first defined decision making units, as well as their inputs and outputs [8].

A decision making unit in this model is a course, for it can be expressed as conversion of resources (inputs) to competences' development (outputs).

Inputs, expressed as resources, were listed as human and material resources.

Outputs were contributions to competences, and their quantification was a bit more demanding. The authors had do conduct a survey in order to determine contribution of courses to a sample set of competences.

The target population for the survey was divided into two sub-populations: teachers at FIT, and FIT alumni. The first were important as

education providers, and the later as education users, whose engineering competences were developed at FIT. Therefore, the entire population was relevant to estimate contribution of each sample course to all of the sample competences. Contribution was expressed in percentages, the results were averaged (for the reason of being quite homogenous), and transformed into two output variables, index of specific, and index of general competences.

III. MODEL

The focus in model development was on the process of knowledge delivery [9]. Accordingly, model inputs were chosen to assure adequate quality of teaching process [10]. They are:

- Total number of teaching hours, calculated as

$$H_i = h_{Pi}G_{Pi} + h_{Vi}G_{Vi} + h_{Wi}G_{Wi},$$

where H_i stands for total number of hours per course i, $h_{Pi} / h_{Vi} / h_{Wi}$ are hours for lectures/exercises/workshops, respectively, and $G_{Pi} / G_{Vi} / G_{Wi}$ is a number of groups per lecturers.

- Teaching staff costs, calculated as

$$T_i = \sum_{i=1}^{m} \frac{P_{Ci}}{n_{P_{Ci}}},$$

where T_i stands for total staff costs per course i, P_{Ci} for brut salary of staff member C_i, $n_{P_{Ci}}$ for number of courses per lecturer and m number of lecturers per course.

- Teaching equipment costs, calculated as

$$R_i = 0.15\sum_{i=1}^{l} \frac{V_i}{n_P},$$

where 0.15 stands for semester depreciation rate, R_i for total equipment costs per course i, V_i for purchase price of equipment in classroom i, n_P for number of courses per classroom and l number of classrooms per course.

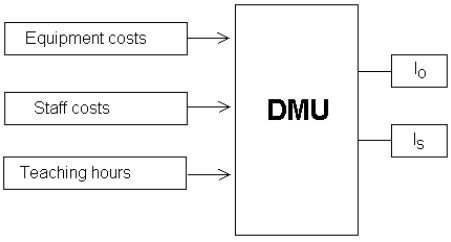

Figure 1. Model inputs and outputs

The inputs and outputs of the model are presented in Fig 1.

Model outputs are expressed through competences. As it is common in HE, competences can be classified as either general or specific. In this research, a sample was drown with three specific and two general competences, after consultations with labor market representatives. Contribution of course to a competence should be nonnegative, and, as a rule, is defined as [11]:

- after consultations with all relevant stakeholders, define a set of content based competences,
- create a courses-competences matrix,
- adjust syllabuses according the matrix.

In the research the existing courses-competences matrix for first-cycle curriculum at FIT was used to choose courses for the selected competences.

The contribution of each course to certain competence is classified as:

- 1-5: existing but insignificant,
- 6-19: poorly visible,
- 20-49: moderate,
- 50-79: significant,
- 80-100: infallible.

After defining the contributions, we derived two synthetic indicators that express significance of a course in the development of the competence. As there were two groups of competences, the indicators were named as indices of general and specific competences, I_O and I_S respectively.

Such defined model is [12]:

- Linear,
- Static,
- Non-integer,
- Input-oriented,
- Prescriptive.

After the model was defined, and all preparatory analysis performed, we applied DEA using DEA Online Solver [13] [14].

IV. RESULTS AND DISCUSSION

The set of production units (courses) is divided into two subsets – relatively efficient and relatively inefficient. It turned out that 9 of 28

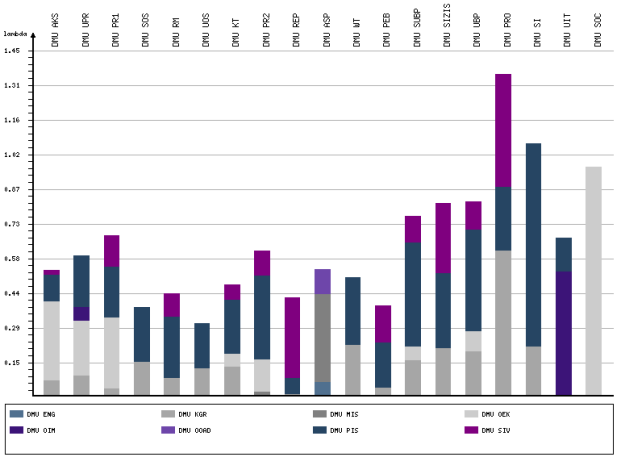

Figure 2. Combination diagram for inefficient courses

sample courses were classified as efficient, while the rest were relatively inefficient.

Nevertheless, the advantage of DEA is the possibility to indicate both inputs and outputs to be changed in order to improve courses' performance. In Fig 2 it is indicated which composite units good practice should serve as a model for inefficient courses. For example, virtual unit for the fourth course from the left (coded SOS) should be a combination of good practices of courses coded as

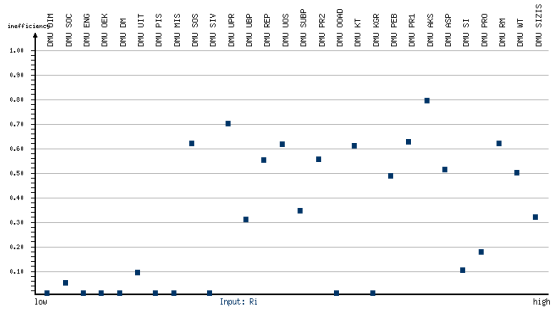

Figure 3. Course inefficiency with regard to equipment costs

KGR and ENG, as shown in Fig 2. The measure of the good practice is DEA defined coefficient λ, used for multiplication of referent units' inputs in order to create an optimal virtual unit [15].

Furthermore, DEA offers possibility to explore partial inefficiency, with regard to separate inputs

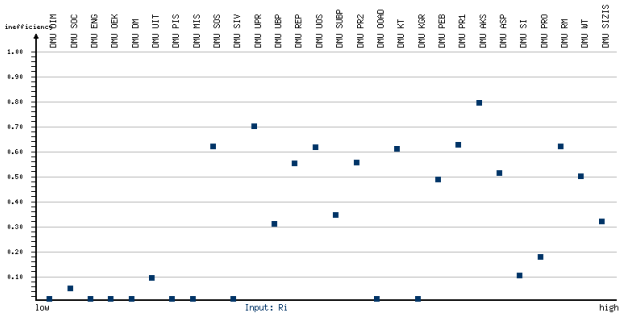

Figure 4. Course inefficiency with regard to specific competences

and outputs.

For example, the inefficient courses with respect to the equipment costs have cost increase in the range from 4.3% to 2573%, as shown in Fig 3. The courses represented with dots in the upper right corner are most inefficient and most costly with regard to equipment, while courses in lower left corner are most efficient and least costly.

As an example for the partial efficiency with regard to outputs, we present courses' efficiency with regard to specific competences. In Fig 4 nine efficient (model) courses are presented at horizontal axis, while their contribution varies from very low to very high. It is also visible that majority of courses (16/12) has significant contribution to specific competences.

Apart from these summary results, DEA Online Solver provides for each inefficient unit detailed numerical results, as well as a model for building an optimal virtual unit. For example, the analysis for course coded SOS is presented in Fig 5. The model is suggesting coefficient λ for each input and output for each referent unit.

Input/Output	Composite		DMU_{KGR}		DMU_{PIS}
Ri	199.730		577.000		529.000
Ti	2,553.287		5,400.000		7,950.000
Hi	54.769	= 0.13705	150.000	+ 0.22808	150.000
Io	8.695		32.715		18.465
Is	14.973		7.716		61.012

Figure 5. Composite unit for course coded SOS

Deviation from the composite (built from the referent units) for SOS is presented in Fig 6.

V. CONCLUSIONS

This paper presents a research where DEA was deployed as a mechanism to determine relative efficiency of courses with respect to the set of

Input/Output	DMU_{SOS} (original values / deviation from Composite)	
Ri	577.000	+188.9%
Ti	6,660.000	+160.8%
Hi	150.000	+173.9%
Io	8.695	-0.0%
Is	14.973	-0.0%

Figure 4. Deviation of original input values from the composite for course coded SOS

analyzed competences. Model inputs are expenses related with teaching process, such as equipment and staff costs and spent time, and outputs are contributions of courses to two groups of engineering competences, general and specific. The results should help management of HE institution in planning and optimization of the teaching process.

Since the sets of inputs and outputs were not complete with regard to Study program Curriculum, the model results should be carefully interpreted. Nevertheless, the model shown both the possibility of applying DEA in HE management in such a way and the usefulness of such application. Once full model is developed, it can serve as another feedback of the study program Curriculum quality with respect to engineering competences the study program is aiming to develop.

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POSSIBLE APPROACH FOR WEB BASED EMPLOYEE TRAINING IN GOVERNMENT SECTOR

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Abstract - Constant employee education is one of the main characteristics of modern age and industry. Improvement of employee's work skills and ability is no longer present only in private sector, in companies struggling to find their place in the market, but also in the public government sector and administration. Considering that the Serbian legislation is changing in order to meet regulations of the European Union, work and administration procedures are constantly evolving. Therefore, employees must continuously learn and develop their skills, and web based training emerged as one of the most efficient methods of education.

I. INTRODUCTION

The Internet made distance learning evolving, and growth of e-learning is directly related to development of information and communication technologies. Web based training uses these technologies to facilitate learning.

Web-Based training (WBT) is the integration of instructional practices and Internet capabilities to direct a learner toward a specified level of proficiency in a specified competency [1]. We can say that this way of employee training is any method or process that enables them to create, deliver, and track training using an online system. Departments can set up their training, launch courses, and then, for the most important part, let the training software system to take over and manage their e-learning program.

According to this definition, effective WBT should provide:

- Customized content for the needs of a targeted audience,
- Outcome-based learning objectives,
- Logically sequenced material to reinforce those objectives,
- Creating navigational options based on existing and desired skill and knowledge of learners,
- Objective-based, interactive learning activities for students to complete in order to receive some form of evaluation.

The final WBT product can contain only static graphics and text or highly interactive presentations and audiovisual simulations. Web training can be delivered asynchronously, in which any required communication occurs independently at self-defined intervals (for example by email), or synchronously, with communication occurring at the same time for all participants. Non-facilitated training is self-paced, and does not require interaction with instructor. On the other hand, facilitated training can be either asynchronous or synchronous human interaction.

Experience has shown that WBT is often equivalent to expressions e-learning, online learning, virtual learning; all of these refer to student being physically away from the teacher and using some form of technology to facilitate learning and communicate with instructors as well as other students [2].

II. CONTINUOUS EMPLOYEE TRAINING IN PUBLIC GOVERNMENT SECTOR IN SERBIA

In 2005 The Serbian Government formed The Human Resource Management Service (HRMS) in order to improve career development and employee education in the public government sector. The role of this service is to provide continuous support to the reform of public administration in accordance with the principles of professionalism, depolitization, rationalization, and modernization set out by the Public Administration Reform

Strategy; to ensure the implementation and further development of established standards and procedures in processes that make up Human Potential Management in public administration [5].

One of the roles of this Service is also to provide advanced training of needed skills for public employees. The program of advanced training determines thematic areas that will be part of training. At the moment, there are 17 areas such as:

- Public policies,
- Civil service system,
- European integration,
- Public finance,
- Information and communication technologies, and others.

Based on these areas, courses are organized where employees from the whole country can get practical knowledge and apply it in their work. Employees from the government sector who have fulfilled the needed criteria perform courses. If there are no candidates, outside associates are hired.

There are several major shortages of this kind of training:

- The greatest barrier is that all courses are organized in Belgrade, in headquarters of Human Resource Management Service, which means that all employees who live and work in other cities have to spend valuable time on transportation and training itself, where it is also clear they cannot perform their duties at work either.
- Considering that courses can last for several days, costs of transportation and lodging can be a limiting factor.
- The number of people that can attend a course at the same time is also limited, usually from 20 to 50 people depending on classroom size, number of computers and other factors.

III. ONE APPROACH FOR WEB BASED EMPLOYEE TRAINING

One of the ways to overcome these problems can be implementation of system for Web based training of employees. It could include all the courses provided by HRMS, where employees can log on, choose a course they need and attend it in most suitable time (in their free time or even during work hours). The fact that it is web-based would not limit them in terms of computer platform, operating systems, or web browsers.

Employees can have available teaching materials in audio and video format, as animation, chart, or text. One of the significant benefits is possibility of progress tracking and control of theme areas, where each candidate can take as much time as needed for learning, independent to other course participants [3].

One course can track practically unlimited number of participants (depending on infrastructure).

Governmental agency asks data for logging their employees to the system from HRMS and after registration they can join the portal and choose any course. After finishing it and taking the final exam, they obtain a certificate for successful completion of a thematic area. During the whole course, managers and HR can track the progress of their employees.

There are numerous models of Web based training, which can depend on purpose, infrastructure and number of participants. In this model, relevant sides of web based training process are employees, HRMS and technical staff (vendors of the system and support staff). Communication between participants can be one- or two-way.

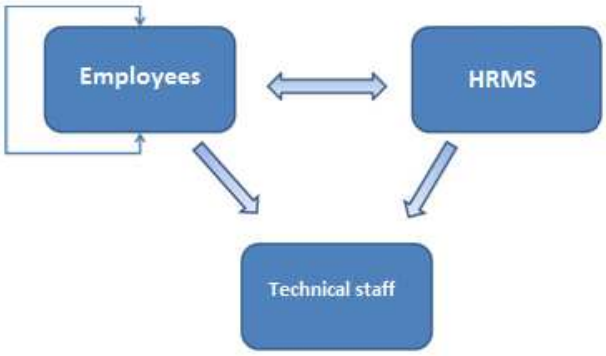

Figure 1. Communication between training process participants

Two-way communication is established between employees and HRMS, as well as other employees, and technical staff usually communicates when other participants initiate it (as shown on Fig. 1). The employee-employee communication is similar to group learning in classroom where students exchange ideas; in online environment they use forums, e-mail, discussion groups (asynchronous communication), or instant messaging, chat, video conferencing (synchronous communication). Employee-HRMS communication is not limited by time or place that can stimulate employees to ask questions and get help if needed, usually through forums or e-mail.

Interaction between employees and technical staff is usually one-way and happens when system users have problems with logging, downloading files or any other technical issues; it is most often established through e-mail. HRMS-technical staff interaction is happening when there are infrastructural problems or software issues [4].

IV. CHOOSING AND IMPLEMENTING SOFTWARE PLATFORM

Open-source software is often the first choice when considering web based system implementation. The solution that is at the top, in academic or business environment is Moodle (Modular Object-Oriented Dynamic Learning Environment) – a free platform for e-learning. Moodle is diverse huge system for course and learning management supporting flexibility, personalization, and product longevity.

Moodle is created according to pedagogical principles with the aim to enable teachers simple creation of online courses and efficient community of users for e-learning, as well as simple, time and place independent access for students. The most important thing when implementing Moodle in organization is understanding that it is a product which, like any other, demands planning, certain budget, time needed for learning how to use the system and clearly defined needs of users. As such, it should be treated as a product with all implementation phases that include creation of business plan, definition of concept, design and testing phase, and then maintenance.

The most important first question for managers in governmental institutions is to decide if their IT department is going to run the installation and configuration of the system, or they will go to experts, so-called Moodle partners, and installation service providers. Although the first option may seem tempting and with smaller costs, it does not always give desired results.

Installation and configuration of the platform is only beginning of IT department's involvement where requests for constant maintenance may become gruesome customer support, often with IT staff not well trained or limited budget. Maybe even bigger concern is further development and adjustments, of sometimes even the simplest features of the system, because lack of programmers or experts can lead to big costs. The key to success is accepting the system from end user's viewpoint, so the platform needs to be well structured, appealing, and tailored to their needs and demands.

On the other hand, trusting project to Moodle partner can provide: (1) Technology expertise, and ability to manage a good team of programmers, clear understanding of costs, as well as customer support; (2) Consultations about strategic development of the product, where Moodle partners can give guidelines for further development and integration of the system with other business solutions used across departments; (3) The most efficient design of interface which is extremely important for employee motivation and active involvement in learning process.

V. USE OF MOODLE PLATFORM IN GOVERNMENTAL ENVIRONMENT

Moodle, already widely adopted in academic environments, also found its place in big business organizations and governmental departments that wanted to implement specialized courses for their employees. Some research show that use of this platform is still somewhat limited in governmental agencies, and that it is usually used as a low cost platform for launching e-learning project, or for clearly determined and limited purposes and employees.

Reason for this is that Moodle is still lacking some functionality needed in this specific environment, but every day specialized modules are developed to meet different organizational demands. Still, for now it can mean additional investment and rise of initial costs if the IT department is not skilled enough to make system adjustments.

Naturally, every governmental agency needs to establish priorities and demands, and the agency also considers the benefits that Moodle can bring:

- Speed of implementation and flexibility,
- Significant reduction of manual administration of users,
- Low cost initial investment,
- System based on the Internet,
- Customizable and personalized system,
- Possibility if reporting and progress tracking,
- Support for collaborative and combined learning,
- Easy content and learning paths management,
- Well developed customer support.

VI. BENEFITS AND BARRIERS OF WEB BASED TRAINING

The benefits from using web based training are many, but we shall mention these ones:

a) Web based training software is usually cheap or inexpensive when we compare it with traditional forms of training programs. Organizations purchase the capacity they need and mostly they have no set up fees, maintain contracts or they upgrade fees.

b) Departments can always count on web based training software, because it is always on; only thing they have to do is to log in and take their training. This part is very significant for employees, because they can take training on their own time and organization do not have to pay for it.

c) This software is consistent and always updated. Over the past years, employees did not get the updated version of the training on the CD so often. Therefore, this kind of training is easy to maintain and update.

d) Web based training software reflects the interactivity meaning that employee can use video clips, forums and discussion boards during the training and e-learning. Thanks to Web based resources, training is enhanced and leads to better knowledge retention.

e) The most important fact for every user is security and this kind of system ensures it; it can provide more secure usage than some financial institutions have.

This kind of training system can have its setbacks. One of the biggest educational problems can be lack of face to face communication between student and instructor. During time, this can affect employee's motivation and completion of course. Also, special attention must be given to authentification of test results at the end of the course.

Although nowadays it is understandable that everyone are familiar with using computers and its basic tools, experience showed that often it is not the case. Many employees use only certain applications needed for specific tasks so often there is need to organize additional preliminary training before proceeding to one that is web based. This demands 'face to face' training that raises costs and additional time for the whole process [3].

VII. CONCLUSION

For the right audience, training goals, and content, a web delivery system can provide instruction that is highly cost-effective and that can significantly raise learning outcomes by providing training in an often learner-directed, Just-In-Time format. Web based systems not only take advantage of the existing infrastructure, but can also help with workforce planning, performance reviews and documentation for legal purposes.

Reasons for web based training usage are numerous and, despite few barriers, allow governmental departments to provide continuous education and skills improvement for their employees. In this way, employees are getting more competent and efficient, influencing global administrative improvement, with minimum costs.

There is evidence that Moodle can provide tactical platform to launch e-learning, and it is getting more and more interesting for wider users every day. Still, at the moment, Moodle does not have all needed functionalities for managing overall tasks that big agencies can demand. Conclusion would be that, if a department needs a system to manage simple courses without additional functions like employee performances, Moodle can be the best choice.

ACKNOWLEDGMENT

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MODELING AND SIMULATION OF INTERNAL COMBUSTION ENGINES

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Abstract - It is almost unthinkable to hold any kind of engineering job today without the help of computers. Computers, however, are not all-powerful device that can easily replace a man, but because of a multiple speed up the design of complex actions. The paper presents modeling and simulation of the internal combustion engine so called Combustion engine.

I. INTRODUCTION

According to Shannon (Shannon, 1975) simulation is "the process of designing a model of the real system and conducting experiments with this model for understanding the behavior of the system or of evaluating various strategies (within the limits set criteria or set of criteria)" [1]. Model should be sufficiently realistic and reflects the reality, to describe the system or phenomenon and respond to the tasks set before the simulation [2]. Features of the model are the degree of abstraction and validity. Validity is a measure of the success of the model in the plays showing the original parts which we want to analyze, and the level of abstraction of the model is the degree of simplification of the model with its parts in ratio to the original.

II. THE CONCEPT OF THE MODEL, MODELING AND SIMULATION

The informal description of the basic concepts of the model, the main features of informal models is that they are quick and easy form, and is often ambiguous (there are an unknown sequence of actions), incompetent (does not describe all situations) and inconsistent (there are several rules that can be applied in the same situation). This model introduces objects (building blocks model), descriptive variables (describing the condition of the structure and characteristics) and the rules of interaction objects (description of the mutual influence of objects) [3]. The formal description is using the modeling methodology; it relies on the conventions and rules. The formal model provides greater accuracy and completeness of the description of the model. It uses abstraction; it focuses attention on the essential characteristics of the model [2]. Process modeling is the process of developing the model and the process of imitation of real phenomena, processes, objects and systems, and contains two clearly separated stages:

- Phase observation and perception of the essential characteristics and
- Phase practical model representation.

The first phase begins with the thought processes that meet the essential qualities that we want to look at some real system or phenomenon. Proper selections of important features that will be a subject of observation directly influence the success of the model in representing the real system, phenomena or objects. The second phase is a concrete model, that is, the phase of its development. Modeling as a creative activity should satisfy three principles:

- Universality object modeling
- Variety of models and
- Principle of prototypes and exemplary [3].

The goal of modeling is to use the model instead of the real system to certain knowledge, avoiding the danger of the experiment on the real system. The analysis of the results should provide a more efficient management of the real system and not to reproduce reality, but to fully express that, videlicet-formal description of the structure and behavior of the real system. Simulation is the process of establishing a connection between the model and the computer Figure 1. [4].

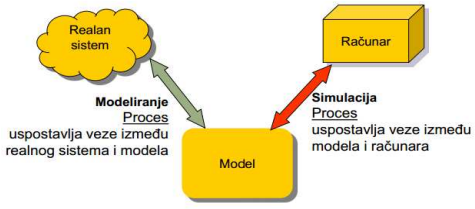

Figure 1. Modeling and simulation taken from

Simulation is monitoring events and changing in a module at a time. The special significance of simulation is that it allows double application. Simulation to watch some parts of the system are important for research on an existing model, also, it is possible to study the simulation of a hypothetical system and based on the results of the real realization also access the system.

III. ADVANTAGES AND LIMITATIONS OF THE USE OF COMPUTER ANIMATION IN SIMULATION MODELS

Development of models and simulations that are intended for use in the classroom must satisfy specific criteria. In addition to the general characteristics that are common to all models in model validation must take into account the end-users of the model - students. It is important that simulation has shown an educational function. Education means that students will model the model so that it will provide a thorough understanding of the observed process, object or phenomenon. Descriptive models based on linguistic basis of explaining the process of teaching tend to be unclear, and this causes a faster process of forgetting. On the other hand, the visual experience of a system which we observe allows us storing its design and easy to remember even more complex systems by invoking the "seen" images in memory. By using computer animation it complements the visual effect as the visualization adds a time factor, it allows the observation of a system in function of a time. This feature is very important in complex systems that are studied in the classroom (clocks in internal combustion engine). Apart from the possibility that the observed system "run", computer animation meets the requirements prolonged observation of individual moments in the system or phenomenon (second valve in the compressor). With the development of computer technology have been developed and three-dimensional models (3D models). These models enable the student to rotate the model, to observe it from several directions and views, which stimulate cognitive needs of students.

Limitations in the application of computer animation in the development of simulation models in the classroom can be divided into technical, that is, constraints that require a certain level of quality techniques that we use in the preparation and presentation of the model and constraints related to the level of knowledge must have one who makes a model. Material, realistic simulation model and a target of attention of students while computer animation visually explains the way the apparent motion of the parts of the system considered the input or output of the system [3].

"The Institute of Industrial Engineers (IIE) was in 1998. year made a list of the advantages and disadvantages of the use of modeling and simulation.

- The ability to make the correct choice by testing every aspect of the proposed changes without having to commit additional resources.
- Compression and expansion of time to allow users to speed up or slow behavior or phenomenon in order to facilitate research that is more detailed.
- Understand the process of constructing scenarios and test scenarios through close control of the system.
- Exploring opportunities in the context of business policies, operational procedures and methods without disturbing the actual or real system.
- Diagnosis of the problem by understanding the interactions among the variables that makes up a complex system.
- Identify constraints by observing delays in the process, information, materials to determine whether the restrictions causes or consequences.
- Develop understanding of how the system works through observation rather than assumptions about how the system will work or how it should work plan using visualization and animation work observing how the system actually works, or organization.
- building consensus for an objective opinion because M & S can help in avoiding confusion, misunderstandings and different interpretations of preparing for change in response to the question "what if" in the design or modification of the system.
- Wise investment because the simulated study costs much less than the actual cost of replacing or modifying the system.
- Better training can be done cheaper and with less disruption than training on the job or location.

- specification of the requirements for system design that can be modified to achieve the desired goal" [1]

IV. MODELING AND SIMULATION OF COMBUSTION ENGINES

Modeling and simulation of combustion engine was made in Director 8.5. Figure 2. show the number of parts of combustion engines.

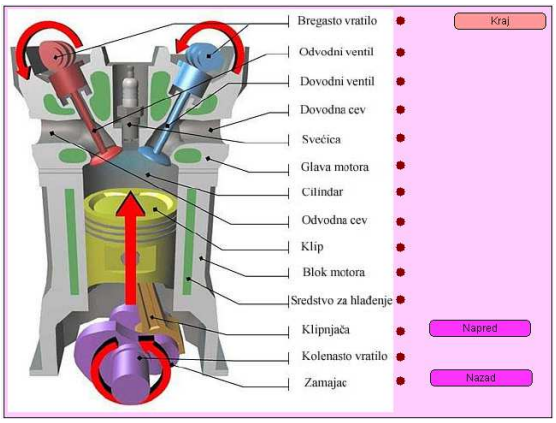

Figure 2. Parts of internal combustion engines

When the user clicks on the red button next to the part of the engine, a new window opens the explanation of that part of the engine. An example is given in Figure 3.

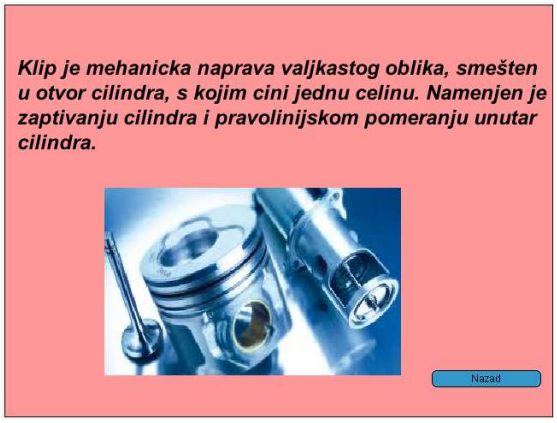

Figure 3. Explanation clip

Clicking the Back button to open the screen with parts of internal combustion engines. Then, click on the Forward button a new window opens with the first note simulation engine.

The working principle of combustion engine consists of four basic processes such as extraction, compression, combustion and expansion, and exhaust. The differences between the types of internal combustion engines are in place, time and manner of these processes.

When the user presses the "START" to start the simulation of internal combustion engines can be seeing in Figures 2-5th.

Figure 4 shows the first bar (suction) mixture of air and fuel is drawn into the engine (spark ignition engine with a carburetor) or just sucking air and fuel is injected under pressure (ignition engine with direct injection). For diesel engines, the fuel is injected into the compression process. Priming task is to provide a motor fuel mix or pure air for later burning. Engine piston moves down, the blue arrow indicates the intake valve is open, allowing the entry of the mixture.

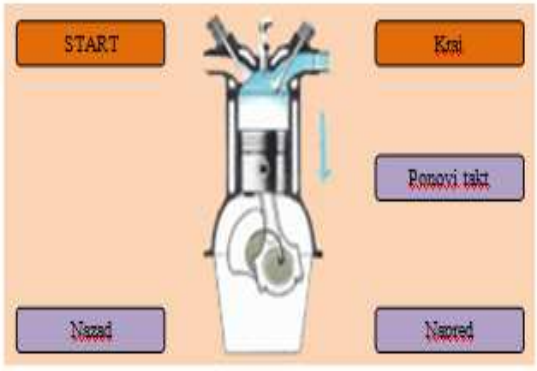

Figure 4. Suction

Figure 5 shows a simulation of another stroke or compression. The piston upward compression provides sucked air mixture or a mixture thereby increasing the pressure and temperature. Higher pressure provides faster and more explosive combustion. Both valves are closed.

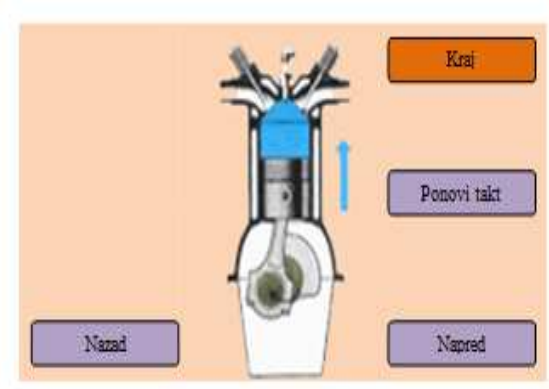

Figure 5. Compression

Combustion and expansion stroke is the third in which the compressed fuel-air mixture burns releasing a large amount of energy. The piston up to the compression of the mixture that eventually burns rapidly and piston moves down, with both valves are also closed. The expansion gives the

engine power to perform mechanical work and all other processes exist to create the conditions for this process (Figure 6.).

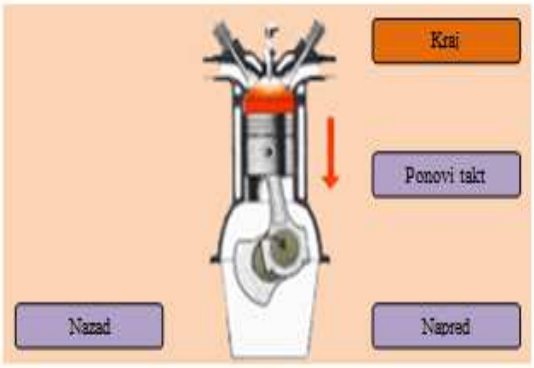

Figure 6. Expansion

When you burn gas potential energy converted into mechanical work, they become useless. The task of this process (vacuum) is useless gases released into the atmosphere can be seen in Figure 7. Simulation shows the movement of piston upward, while the exhaust valve is open, and burned gases are released into the atmosphere.

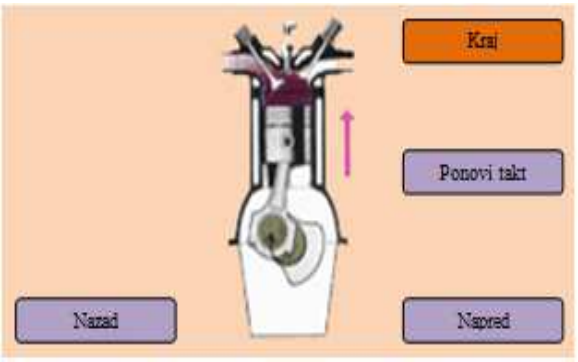

Figure 7. Air outlet

V. RESEARCH

The study was conducted in primary school "Zarko Zrenjanin", Kikinda in a sample of 30 seventh grade students. The aim of the research is to determine if it is easier to learn through simulation or traditional mode. Asked whether daily computer use 90% of the students said yes while 10% said they do not use the computer.

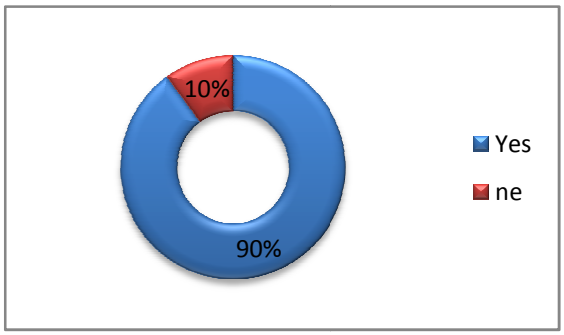

Figure 8. Do you use a computer daily?

TABLE I. HAVE YOU ENCOUNTERED IN TEACHING SIMULATION?

Have you encountered in teaching simulation?	I am	I am not
	30%	70%

Students are often faced with simulations in the classroom, which can be inferred from their responses, only 30% of teachers at least once used the simulation in the classroom and they are declared a way of like, as shown in the following Figure 9.

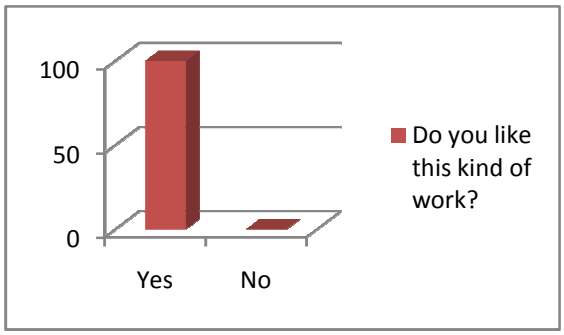

Figure 9. Do you like this kind of work?

Asked whether easily mastered the material when working through simulation majority of students responded positively.

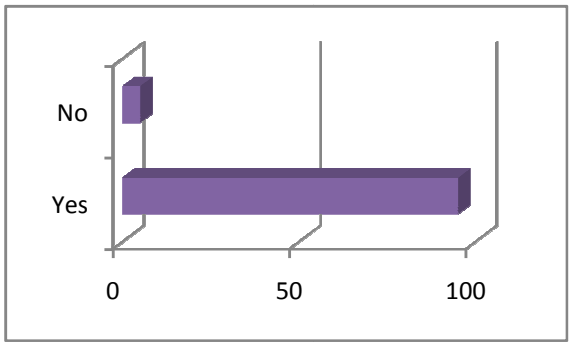

Figure 10. Would you like to easily mastered material when you do through simulation?

On the last question, in which case you would most like to use the simulation, most of them answered technical and IT education.

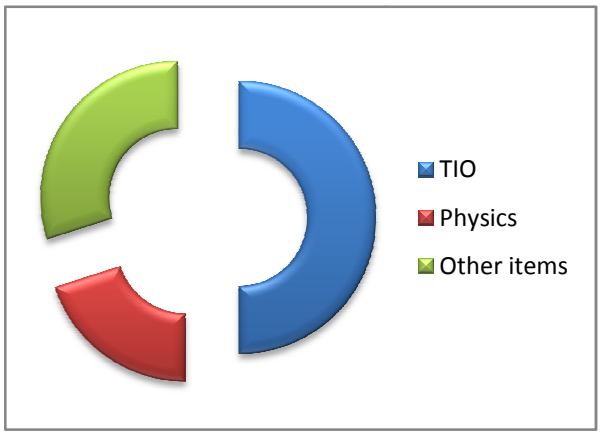

FIGURE 11 IN WHICH CASE YOU WOULD MOST LIKE TO USE THE SIMULATION?

VI. CONCLUSION

The use of models and simulations in teaching is of great importance. For these students that is the safe and accessible way to learn about the phenomena, processes and behavior of a system. In this way, they are approaching real systems.

Based on the study conducted it can be concluded that the students liked working with the simulation program. They also believe that in this way can more easily learn the subject matter, which will have the effect of motivation of students already in place, as well as better results.

On the other hand, due to the high degree of environmental degradation and the overall statistics we can expect that in the near future to improve internal combustion engines.

For its launch, they will use some of the alternative fuel or a further expansion and application of significant external combustion engine, as well as the development of hybrid vehicles.

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HYBRID CAR WITH INTERFACE

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Abstract - In technical education, modeling helps students to obtain the practical part of teaching as well. With models, we can show everyday issues, which, otherwise we would not be able to present. This project was done with the help of microcontroller and solar collector. With the microcontroller, we can solve complicated tasks in an easy mode. It is used in hobby electronics and in the industry. With the help of programs, microcontroller turns on and off the LEDs by the task regulations (knight rider). Solar collectors "collect" the solar energy. They are connected to an accumulator. This accumulator provides voltage for the electromotor of the car. In this case, the petrol engine is substituted with electromotor.

I. INTRODUCTION

"Modeling and simulation are important factors of efficacy in the education and learning, especially in the technical education. Taking into consideration the minimal number of classes for the curriculum elaboration, the main part should consist of practical work and exercises. They should be combined with teaching of special theoretical knowledge and giving information about materials, tools, and steps of adaption for appropriate class, as well as student's adoption of the curriculum. We can conclude that the application of the model and simulation in the teaching and the process of learning are very important, practically inevitable."[8]

With the help of the microcontroller, we can solve complicated tasks in an easy mode. It is used in hobby electronics and in the industry.

In this work, we will present an easy mode of the use of microcontroller.

For a start, it was necessary to make a detailed and exact plan and to provide the parts for the model.

After the interface had been made-a part for the car, I started with the embedding of solar cells. I learned from films and newspapers how dangerous the fuel is. It has a bad effect on the nature, so I made an ecological voltage for the engine. The solution is in the solar cell. Solar cell, therefore, makes the solar energy into electric. It starts the engine and protects the environment from emissions.

I hope that my work will draw attention to the importance of ecology, that is, protection of the environment.

II. THE APPLIANCE OF MODELING IN TECHNICAL AND IT EDUCATION

Modeling in technical education helps students to obtain the practical part of education, as well. With models, we can show everyday issues, which, otherwise we would not be able to present (e.g. a bridge, big motorcycle, etc.)

III. THEORETICAL PRESENTATION

A. PIC microcontroller

The roots of PIC microcontroller go all the way to the University of Harvard. They were made within the range of the Ministry of Defense.

The Harvard architecture was first used in Signetics 8x300. After this, General Instruments was adopted and used by conjoining of the periphery of the command (peripheral interface control, c.f. in PIC) [6,7]

The production started later, in 1985, in Microchip Technology in Arizona, where PIC became their leading product. The spectrum of PIC microcontrollers is very broad nowadays: PIC 10x, PIC 12x, PIC 14x, PIC 16x, PIC 18x, PIC 24x. [6,7]

In these series, we can find a microcontroller, which serves almost all purposes. The 12 series is a simple microcontroller, 6I/0, 25 – 128 register and an embedded numerated module of 8 bits, a timer and a numerical periphery, A/D converter, ordinal synchronous of comparison (asynchronous, addressed port, SP and 12c bus, PWM module with reading option) contains an analog comparator, etc. Microchip has provided the users with quality books, and the instruction manuals (in English). Innovations are done according to the user's opinion. Based on this, the PIC of new generation is constructed. Price of these microcontrollers is very available and

affordable even to the students. The microchip is provided to the users free by the MPLAB innovative program. [6,7]

IV. THE USE OF THE SOLAR COLLECTOR

The main aim of the use of the solar collector is the save of energy and money. Nowadays, the big issue makes the heating of some buildings, car gear, etc. The solution to these problems is the solar collector. Solar collector gets the energy from sun. Therefore, there is no need to use the regular resources of energy (e.g. natural gas, crude oil, coal, petrol). For this reason, the consummation of the solar collector is cheaper then heating by the usual resources. Solar collectors are also used on the areas where the mentioned resources are absent, or there is no constant supply of them and the number of sunny hours is high. Solar collectors are ecological, less harmful than renewed energy sources, because they do not support global warming, neither the production of toxic gases. The continuous work for its maintenance is unnecessary (while the material for the coal and natural gas heating systems should be produced, transported, etc.) From the fore mentioned, we can see that the use of solar energy is certainly the best solution. We get pure energy and the only investment is the building up of the system. Of the other "necessities", the nature takes care by its own.

V. THE APPLIANCE OF MODELS IN TECHNICAL AND IT EDUCATION

B. Power

The device gets power from a 6V battery. On the front is embedded a diode (1N4148) in order to protect from the opposite polarity. 78L05 gives a stable voltage on the controller, which has a 5V stable voltage (Figure 1.). I embedded this, because the controllers are very sensitive on a high power (4,5 – 5,5 V). A condenser (C1, C2, C3, C4) serves for filtering the power.

C. Microcontroller

We can easily solve complicated problems by microcontroller. It is used in hobby electronics and in the industry.

In this task, we will present an easy mode of the use of microcontroller (Figure 2.). The device turns the LEDs on and off by the given program. Microcontroller (PIC16F84A) consists of: a flash memory for a program, arithmetical unit (ALU), working memory, oscillator, output and input ports.

Oscillator will be a 4 MHz crystal and ceramic condenser (C6, C7) for their filtering. Microcontroller can directly control the LEDs by the resistors (R3 – R10) by which we limit the electricity of the LEDs.

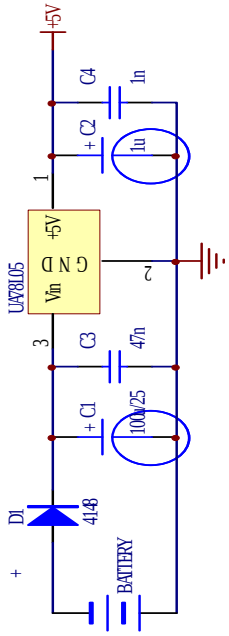

Figure 1. Power

Microcontroller with a program turns the LEDs L1-L8 on and off by the regulations of the given task. The LEDs are red.

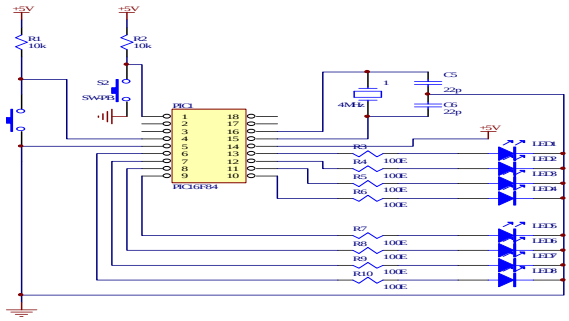

Figure 2. Microcontroller

The power of the LED diode depends on the color, approximately 1,7-2,3 V. In order to make the calculations simpler, we can use 2V. The light power depends on the electricity power, which goes through it. The higher the intensity is the stronger is the light. The light is visible at about 10mA. At 30mA, the value is the highest. It can be maintained for a long time, without any damage.

The resistor limits the electricity of the LED. The Ohm's law can calculate its value:

$R = U/I$

Were R represents the resistor; U is the power on the resistor in V, I is the electricity in A. In this

case, the LEDs use 20mAs and 5V of voltage. 5V of power should be on the resistor. If we put both of the value in the formula, then we get:

$$R = \frac{(5-2)V}{20mA} = \frac{3V}{0,02A} = 150\ E$$

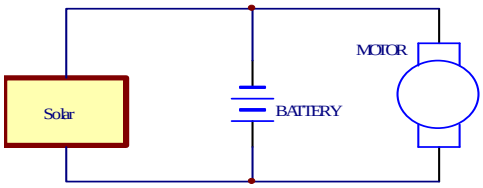

Figure 3. solar and motor

The value of the resistor is 150E. The effect of the resistor is not critical. Even the smallest one fits.

D. Solar and engine

Solar collectors connected to an accumulator "collect" solar energy. This accumulator, serving as power, enables power for the car's electromotor. In this case, the petrol engine is substituted with electromotor.

The installation of the solar collector is a hundred percent safe investment. Besides, it is pure end ecological "fuel" (Figure 3.).

E. Programing

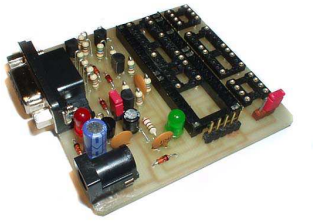

Figure 4. programator [11.]

The program's writing is done in picbasic by the program of Microcode studio, by which we turn the assembler and HEXA code. The code given was inscribed into microcontroller by the ICPROG program.

F. The device making

- Printing panel projecting by the program Protel 99SE [4.]
- Printing panel making by photo procedure and abrasion in the mixture of hydrochloric acid (HCl) and hydrogen peroxide (H_2O_2)
- Printing panel drill
- Printing panel element embedding (soldering)
- Car models making
- Electronics installation into the model
- Testing

VI. COMPONENTS

PIC: 16F84 + holder
Crystal: 4MHz
Elko: 100u/25V
10u/25V
1u/25V
Kerko: 1n
100n
22p 2 pcs
Resistor: 10k 2 pcs
100E 8 pcs
Diode: 1N4148
LED 8 pcs
Stabilizer: 78L05
Switch
Solar

VII. CONCLUSION

With the computer development, modeling and simulation are getting more and more present as a way of solving even the most complex problems. Education and teaching, process of thinking and process of learning are not researched enough in the area of modeling and simulation theory.

The development of digital technology and the new computer possibility made the development of the new scientific discipline- computer modeling and simulation. Modeling and simulation are having a huge use in business systems, medicine, economics, technique, industry and in scientific research.

In technical education, modeling helps students to obtain the practical part of teaching. By models, we can show everyday things, which, otherwise we would not be able to present (e.g. a bridge, big motorcycle, etc.)

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POSITIVE AND NEGATIVE ASPECTS OF THE PLATFORM FOR DISTANCE LEARNING - MOODLE AND WEBCT

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Abstract - The aim of e-learning is to transfer knowledge through certain computer programs to improve the educational material. E-learning allows you to reach teaching materials easily. The rapid development of distance learning method facilitates the students attending and the choice of whether to choose to attend classes in a traditional manner or through online.

I. INTRODUCTION

At the end of the twentieth century, the development of information technology has caused rapid development of distance learning. Distance learning has recently entered the wider application. However, the beginning of distance learning can be found in the record for more than 100 years in America. Penn State University and two other universities have developed a system for the delivery of learning materials as a way to access a wider range of students who could not go to university. Means of transport are delivered learning materials, students who lived far away from educational institutions.

Multimedia contents have very great importance when it comes to this type of learning – the distance learning. Development of technology for learning distance learning offers significant advantages in contrast to traditional schooling. Teacher and student are not physically present in the same place but the communication between them is a very important element. For achieving this kind of communication, need to be a messaging interaction as the sender and recipient.

II. THE DEVELOPMENT OF E-LEARNING

E-learning involves learning techniques with the help of the Internet and computers. It was initially used as a means of sharing information, and text messages, but over time, it has become the fastest and most powerful tool for communication. There are courses for online learning that can be found on the websites of educational institutions. Educational institutions should provide a system for e-learning, which should contain a computer with various services in order to perform a successful communication. E-mail is the most famous service has reached a very broad application.

In many countries, the e-learning has been already formed. The United States has the most developed concept of e-learning. Canada, Australia, and America in this field have the advantage since the 80s of the twentieth century.

Many educational institutions today apply distance learning, which is quite normal at Harvard and Stanford universities. At these universities are virtual classrooms that offer a great selection of courses that are accredited. Teachers in a virtual classroom have a different role to play, taking advantage of their time in a useful way to detail. Virtual classrooms do not replace teachers. Virtual Classroom is software that connects other software and allows students efficiently acquire knowledge.

Each country develops a form of electronic distance learning to their demands and population. Many types of educational institutions, whether public or private, have taken the initiative to implement virtual classrooms. They offer a variety of courses to students who are motivated by applications of electronic learning. Students work with their own material, which is available through the website of the university or work with the literature they received an e-mail or post. Students often communicate with their mentors in the forums. E-mail and receive text messages and educational materials.

III. ADVANTAGES AND DISADVANTAGES OF DISTANCE LEARNING

A. Advantages of Distance Learning

Distance learning allows students to reduce travel costs, rent, and other charges. It allows to choose the curriculum and to study without a change of residence. Student who study at a

distance learning easier, have more time to devote to other activities, and employment. Unlike traditional learning, distance learning allows students to learn independently and at a place and time that suits them.

B. Disadvantages of distance learning

Students, who attend distance learning, are considered to be one of the largest and most disadvantages the non-attendance of personal contact among the participants. Contact between student and teacher is not physically present and that can be a huge problem, especially for those students who are not accustomed to this way of learning. Therefore, there is a great lack of interest and withdrawal from the course, how to avoid it is necessary to encourage students and professors increased activity and the introduction of a tutor or mentor.

IV. MOODLE

Moodle is a free platform for teaching that distance learning. It is design for creating web sites and courses and courses on the Internet. Localized and localized for 73 languages in over 150 countries. An anonymous surveys and discussions with the students and the results were some positive and negative aspects of the platform Moodle and WebCT. Moodle is copyright, its users cannot copy, use and modify if they agree to certain terms and conditions. Conditions that are required include the provision of programs to other users who want to use the platform, the original license and copyrights may not be copy or change, the same license can be observed on other projects stemming from the "Moodle".

Figure 1 Home of the official Moodle site

C. The positive side of working with Moodle

- Students are given the opportunity to try out a completely different way of teaching and learning foreign languages;
- They were given the opportunity to communicate and collaborate with their colleagues from foreign countries;
- They soon learned to work in Moodle, it took only one of the possibilities the platform for 30 minutes and students were already able to use them as creators of their own courses;
- In Moodle can include various kinds of tasks from other applications;
- Moodle is free, and is available to the wide range of users
- There is no limited number of users

D. The negative side of working with Moodle

- Obscurity (too many different icons "block" the screen is hampered rapid orientation);
- The tasks listed above, as well as the display mode (one below the other, with a number of different icon) was not easy to follow;
- Too many changes in the work area (weblogs, Word, PDF files, wiki, chat ...) problem with login;
- Insurmountable limit to the possibilities chat (every time the chat involving more than 10 people, he would slow down to uselessness, that is why it was necessary for students to "meet" in a chat room in Moodle outside);
- It is not possible to import all kinds of content in Moodle (e.g. no types of tasks from WebCT were able to switch to Moodle).

V. WEBCT

WebCT is educational software that includes a set of media, illustration, e-books, software. It is used for teaching at a distance. Provides users with the ability to form discussion groups to exchange emails, chat including, to upload drawings and various messages to whiteboard-in.

Figure 2. Home of the official WebCT

E. The positive side of working with WebCT

- On-line assessment of students, with the help of on-line assignments and tests
- Enables communication between teachers and students through chat and forum
- Improvement of distance learning through multimedia elements
- Contains a glossary of terms that are contained in the lessons and create an index
- Professor can change classes at any time, and changes may not be immediately available and visible to students
- Each user of the program must have its own password, and the name thus stored data from misuse
- Contains a number of features and easy user distance learning
- Can add audio and video content on the page with the materials, possibility of working in groups
- Includes a short course in the use of the program

F. The negative side of working with WebCT

- Price of the license depends on the website in a certain situation, i.e. of the current infrastructure, usage and future goals of each user of the program
- The program works only on UNIX operating systems
- To a large extent depends on the RAM, it can be cumbersome to navigate websites
- Require more memory for a web site without frames

VI. RESEARCH

Students from the Technical School, "Mileva Maric" Titel and students from the Economic and Technical School "Dositej Obradovic" from Alibunar, contributed to the improvement of their responses to a short survey has been performed successfully.

Figure 1. Answer on the first question

Students who have heard of the platform helped the further implementation of the survey.

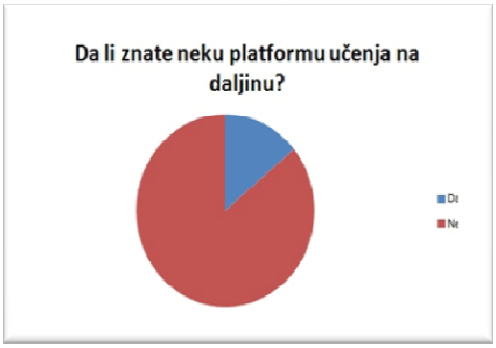

Figure 2. Answer on the second question

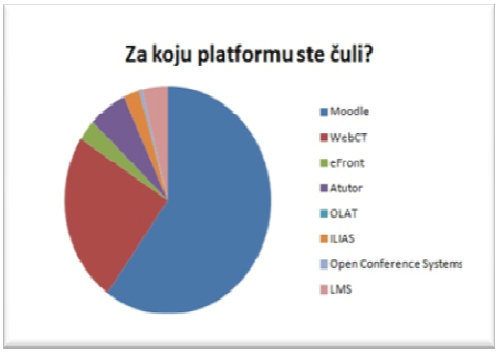

Figure 3. Answer on the third question

The students listen to a presentation on Moodle and WebCT platforms and answer the following questions:

Figure 4. Answer on the fourth question

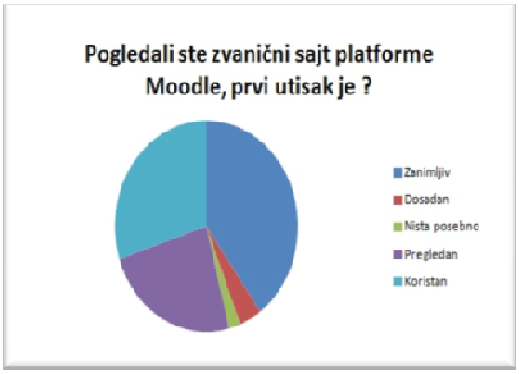

Figure 5. Answer on the fifth question

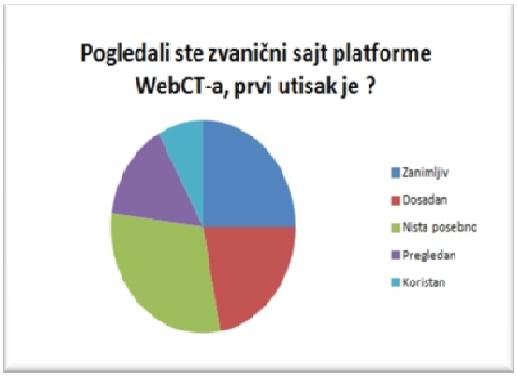

Figure 6. Answer on the sixht question

VII. CONCLUSION

Through the program of distance learning can be seen all the negative and positive aspects of these platforms and see many advantages as well as disadvantages. WebCT platform is unlike Moodle simpler and better, easier to follow tasks but unfortunately not free like the other platforms, i.e. Moodle is already licensed. WebCT is visually more organized; no problems with the login-machine that cannot say the same for Moodle. Making WebCT platform is quite complex and does not allow for improvisation. The official website of WebCT can be found a short tutorial for using the platform. Both platforms are available for a wide range of users as well as in many countries. The only difference is that Moodle has more customers and localized for multiple languages in well over 150 countries, which is available for use, whereas WebCT contains a much smaller number of users and is available in 80 countries.

For the Moodle platform requires an active instance of PHP-enabled features such as image processing that supports JPEG and PGN format, support for the session as well as support for upload files and active SQL server. Although WebCT emerged as the first platform for distance learning, Moodle is gain much more popularity and is much more widely used. Both platforms are use in colleges and recently in the elementary schools that have this type of learning. Moodle and WebCT have three important parts: a space for professors, room for students, administrators, and space for an author.

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MODELLING AND SIMULATION IN ENERGY IN TECHICAL AND IT EDUCATION

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Abstract - Scientific and technological progress is characterized by automation, computerization and cybernetics, a huge increase in the quantum of knowledge (now it takes less than three years to double it) and all shorter time than its invention to practical application. In the field of science, it leads to differentiation, specialization and integration, and the birth of new disciplines (interdisciplinary science).

The third technological revolution did not bypass education, even though education is currently one of the inert social systems on the changes. Education will have to react quickly to changes in the sphere of science and technology; otherwise, it will gradually weaken social function, which it is intended.

Changes and developments in science and technology affect the education system, but there is also the influence of the other direction. Application of knowledge is the most important element in close causal connection with the previous two.

The aforementioned effects of education largely reflect the natural sciences and the most on technical education as a subject. Artificial distinction between scientific disciplines has become a limiting factor for the rapid application of science in engineering and technology.

I INTRODUCTION

The objectives of the technical and technological education of society reflect the interest of the scientific and technical literacy for socio - economic development, to prepare people for the wide application of scientific achievements and to train those who will these achievements further developed and improve.

Independent work by students with the help of teachers is one of the main goals of modern teaching. Students should gradually lead to self-employment, systematically and continuously trained. Independent work can be defined as an organized student employment under controlled conditions to solve the tasks.

Individual teaching is the best solution for teaching. Selection of tasks (content) most appropriate for a particular student is necessary. Individualized instruction is to orient the students to the real types, consider the differences between them, align them, and change the methods and procedures of the pedagogical activity to these differences, allow students to progress at its pace and opportunities.

The software used in the field of education in the means of learning is called educational computer software. It includes programming languages and tools, given the organization of teaching and learning, which is based on logic and pedagogy. When we talk about educational computer software, we think at computer programs that can be used in teaching to help and guide the individual phases of instruction.

Modeling and simulation are important factors of successful teaching and learning, particularly in the teaching of technical education. Taking into account that the number of hours of learning provides a minimum that should dominate practical work and exercises. Combining them with giving the necessary theoretical knowledge and information about the materials, tools and processing procedures specified for a given class, and students to adopt teaching material, it can be concluded that the use of models and simulations in teaching and learning is very important, almost essential.

With the development of digital technologies and new capabilities of computers, the development of computer modeling and simulation has been enabled. Applying software model of teaching is aim, not only to create the technical literacy of students, but also to contact with computer technologies and their applicability.

II BASIC CONCEPTS

Model *(lat. modulus-action)* display of the essential characteristics of an object, appearance or system that has been built or will be build; form, with the original analogy, natural or artificial

objects, phenomenon or system whose trial would be impossible to conduct with other expensive methods.

Teaching model - a set of features that characterize certain manner of teaching´s realization.

Modeling process - imitating phenomena of objects, processes and systems. By modeling, only the essential features of the original, which are relevant for the study, are abstracted. Model therefore contains only the essential features of the original or real system yet to be built.

Simulation - examination of the model (functional simulation model) varying the input values randomly generated and monitoring so that the output should move in defined distances.

The validity of the model - level of success in model´s representation of the essential characteristics of the real systems, phenomena, processes or objects (Original).

Teaching - an organized form of learning in the educational systems and institutions.

III ENERGY IN TECHNICAL AND IT EDUCATION

The term energy efficiency means the efficient use of energy in all energy sectors: households, industry, transport, agriculture and service industries. Under the energy - efficient device is the one that has a high degree of efficiency, i.e. small losses in transforming one form of energy into another.

According to the curriculum subjects Technical and Information Education (V, VII, VII and VIII grade) list of the contents of subjects in the field of energy and energy efficiency activities which is expected to be done with the students is:

Fifth grade, VI topic Energy (4 hours from 72 hours per year) - Renew the teaching content of nature and society and nature relating to heat (sun light source and heat), water (water distribution), air (air movement - winds), the growth and resistance to movement of the body. Then familiarize students with more specific concept, types and importance of energy for humankind. Indicate the primary energy sources without going into details.

Familiarize students with the use and conversion into a useful form of energy the sun, water and wind as they already known sources.

Sixth grade, subject V Energy (4 hours from 72 hours per year)-To show the importance of the species chosen material for the construction of buildings, at the option of saving energy and the use of non-conventional sources of energy, both in the design of new facilities and the possibility of upgrading the thermal - insulation in existing buildings.

Seventh grade, IX topics Energy (6 hours from 72 hours per year) - students need to know principles of energy, resources, utilization and transformation of energy.

To acquaint students with the development of propulsion machinery - engines and types: hydraulic, air, heat (cylinders, turbines, steam engines and turbines, four-stroke gasoline engine, diesel engine and other engines). Detailed way of work and principles of internal combustion engines and parts.

In realizing preferably used engine parts, models and audiovisual media, and multimedia.

Eight grade, II topics Energy (6 hours of 72) - part of the learning content is introduction to electrical engineering, and it is necessary to realize it is highly correlated to teaching physics.

Students in physics class acquire the basic concepts of electric current, while in the classroom technical education provides application aspect. The focus is on the production, transformation and power transmission. The content given to alternative sources of electricity energy.

Eight grade, VI theme Electrical machinery and equipment (8 hours of 72) - This area is carried out in close correlation with the syllabus of physics; particularly in terms of electrics, which are based on different devices or electro thermal electromagnetic effects of electric current. Introducing electro, thermal appliances and household appliances start from the simplest, such as iron, heaters, and introduce more complex such as stove, furnace, and water heater. Introducing construction relays on use an electromagnet to meet in other devices that operate on the same principle as an electric bell, Crane and others. Introduction to Electrical Machinery (generator, electric motor) and their use in cars and household appliances requires appropriate technical requirements for implementation.

Analyzing these facilities, it is clear that it is possible (with the help of a computer) to create a large number of models and simulate the processes that occur to students as closely as possible the

material presented. In addition, the widespread issue of energy allows the contents can be presented from the fifth to the seventh grade.

IV RENEWABLE ENERGY SOURCES

Most countries relies heavily on coal, oil and natural gas for energy. Fossil fuels are nonrenewable, that is they rely on the limited resources that will eventually become too expensive or environmentally harmful to use. In contrast, many types of energy sources such as wind and solar energy are constantly renewed. Most renewable energy comes directly or indirectly from the sun so we can talk about solar energy. The sun's heat also produces winds, indirectly, whose energy using wind turbines. The winds and the sun's warmth cause evaporation of water. When water evaporation turns into rain or snow and flowed downhill into rivers or streams, its energy is used in power plants.

Organic matter consisting of plants is known as biomass. Biomass can be used to produce electricity, transportation fuels or chemicals. The use of biomass for any of these reasons is called bioenergy. Renewable energy is not only from the Sun. Geothermal energy draws heat inside the Earth for various purposes, including the production of electricity and for heating and cooling buildings. In addition, the energy of ocean tides comes from the gravitational field of the Moon and the Sun on the Earth.

All these forms of energy can be used to produce electricity. Renewed and will never be exhausted. [8]

V HYDROENERGY

Hydropower is energy that comes from the power of water (*hydro*), hence its name. Represents conventional renewable energy source, which, for centuries, was used to obtain mechanical energy and electricity.

After the discovery of the electric generator in 19th century, they began to build growing hydroelectric power plants, where the mechanical energy of water converted into electricity in the generator. One of the first to produce AC power, with the participation of Nikola Tesla, was built at Niagara Falls. The advantage of this is that the energy can be transmitted through wires over long distances. Earlier factories often had to be on the banks of the river to take advantage of direct hydropower, especially before the invention of the steam engine. Steam engines, however, were not suitable for small consumers, and only the appearance of cheap electricity from hydropower address the problem.

In order to study hydropower is necessary to know several features of this potential.

- **The theoretical hydropower potential** is theoretically possible power that can make water flow regardless of the technical feasibility and economics of the plant. To account for this indicator is necessary to know the altitude of the given unit distance, i.e. longitudinal profile of rivers and streams, the duration and frequency of power, distribution of power along the flow, the distribution of power over time, average and maximum flow rates.
- **Technical usable water potential** is determined by the development of a technical solution when it is determined realistically achievable potential annual energy production.
- **Economic usable water resources** are one of the technically feasible potential whose exploitation is economically worthwhile.

Today, the world uses 18% technically feasible, or 28% of the economically exploitable potential. Most of the untapped reserves are located in developing countries.

Hydropower provides great opportunities for further development. Although the major rivers are generally used, small rivers and streams provide opportunities for further construction, especially hydro flow type or small dams.

When it comes to **hydropower,** it implies **energy streams (i.e. energy of river**). **Energy of glaciers** and **energy of sea currents** are currently uneconomic and technically demanding to use, and is not used or their use is experimental (energy currents). **Tidal** owes its existence to the gravitational effect of the moon. **Wave energy** is derived from wind power, and sometimes states away from hydropower. Wave energy, tidal energy and ocean currents are generally classified into Energy Sea. [10]

VI SIMULATION EXAMPLES FROM THE FIELD OF HYDROPOWER

Displayed animation explains what the water cycle is, what is the energy of water, the principle of hydroelectric power plant as well as the

principles of operation of the power plant and the waves that operate using the tides.

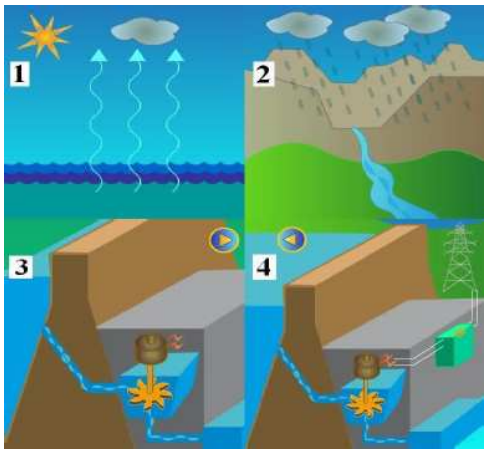

Figure 1. Animation - Hydropower

The first sequence shows the start of the water cycle, the second shows how the moisture that has evaporated as rain returns and influences the energy of the water flow. The third shows how the energy of the water first in motor and then into electricity using generator. Energy obtained is transformed by the transformer and transmits power lines.

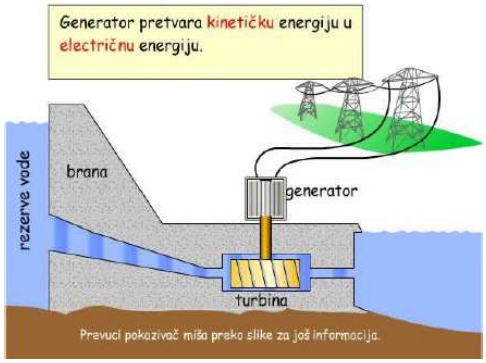

Figure 2. Animation - Hydropower plant

This animation shows how the energy of the water causes the turbine and then to be converted into mechanical and then electrical energy.

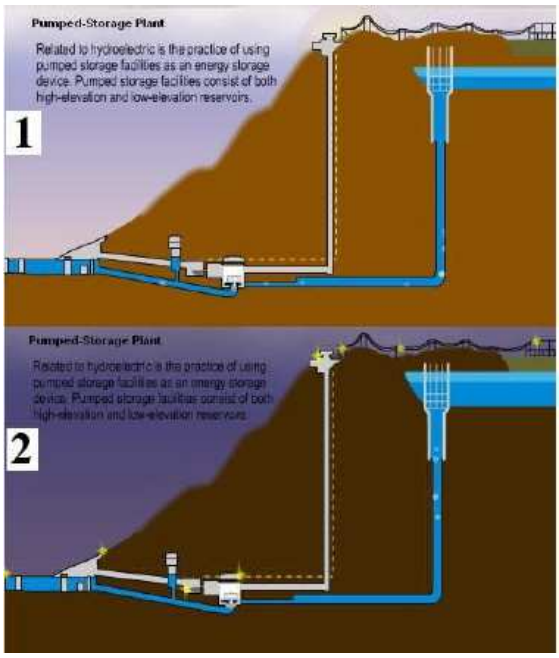

Figure 3. Animation - Pumped storage hydropower

Pumped hydro has upper and lower reservoir and pump turbine plant. In the first animation sequence shows how the water from the upper lakes through the turbine fails to produce electricity, while in the second sequence shows what happens in periods of low loads, i.e. how to pump water from the lower to the upper reservoir.

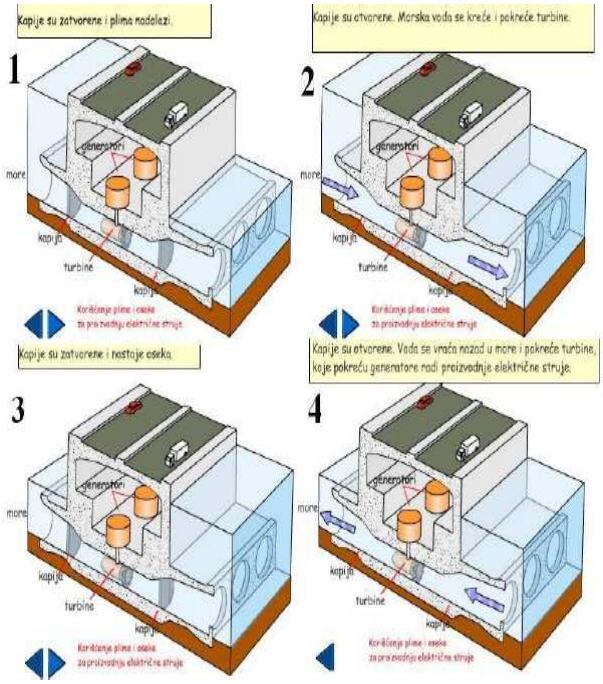

Figure 4. Animation - Tides

The first segment shows how the gates are closed, the tide's coming, then the gates opened, and seawater moves a turbine. After that, the gates are closed and the tide begins. When re-opening,

the seawater is returned to the sea and then turns a turbine that drives a generator.

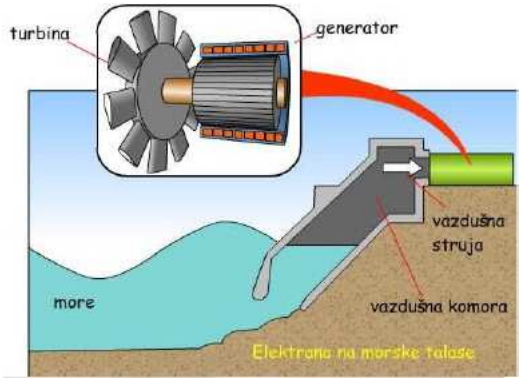

Figure 5. Animation - The plant on the waves

The animation shows how the energy waves used for directing the airflow into the air chamber from which the airflow directed towards the turbine blades which in turn drives a generator, which is induced by the electric current.

VII CONCLUSION

Simulations in teaching can be considered as a special type called cognitive tools, and they provide opportunities for students to check various assumptions by changing the conditions of certain systems (e.g., physical, chemical or biological) providing a deeper insight into a particular problem.

The status of the simulation is to provide the possibility of changing the input and output of the model, which leads to a deeper understanding and assumptions or models that can be viewed as a kind of cognitive gets understanding how a system really works.

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TEACHING SUPPORT VECTOR MACHINES IN ARTIFICIAL INTELLIGENCE CLASSROOM

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Abstract - There is a growing need for solving nondeterministic problems. This need has influenced research in the field of artificial intelligence. Seeing that most of the aforementioned problems can be presented as classification problems, this paper will focus on methods for solving them. Support vector machines, nonlinear Kernel methods in particular, have been proved to be the most accurate methods currently available for classification. Students must be familiarized with these methods in order for them to be competitive in the current market.

This paper will present Support Vector Machines and some of their learning methods, analyze their performance in comparison with more popular Neural Networks, hopefully add some insight into teaching them to students, and answer the question of whether there is a place for them in Artificial Intelligence classroom.

I. INTRODUCTION

Currently introductory courses in Systems of Artificial Intelligence across most of the colleges are teaching several similar topics.

After the introductory class, that takes one week, the main part of the curriculum starts with Heuristic search algorithms, which is a solid starting topic for introduction into artificial intelligence. This segment currently lasts four weeks.

Curriculum continues with teaching formalization of reasoning and automated proving of theorems with resolution methods and refutation procedures. The main part of the course lasts for eight weeks.

Third, final part in the practical part of the curriculum, is working with logical programming language Prolog. Formalization and Prolog are considered the main theme of the course and are currently taught for eight weeks.

Systems of Artificial Intelligence curriculum concludes the semester with introduction into machine learning. This introduction takes three weeks covering themes such as Decision Trees, Naive Bayes and Perceptrons.

In the following text we will introduce Support Vector Machines and see how and where they can find their place in this course.

II. SUPPORT VECTOR MACHINES

Support Vector Machine (SVM) is a family of machine learning algorithms. They belong in a supervised learning category of algorithms.

This means that it expects to be given a set of training samples, where each is marked as belonging to a specific category. Support Vector Machine training algorithm uses those samples to build a model that is used then to categorize newly inputted data.

Simple, linear hyper-plane Support Vector Machine is composed of a set of support vectors z and set of weights w. The computation for the output with n support vectors z_1, z_2, z_3, ..., z_n and weights w_1, w_2, w_3, ... , w_n is given by 2.1.

$$F(x) = \sum_{i=1}^{n} w_i (z_i, x) + b \qquad (2.1)$$

III. KERNEL BASED SUPPORT VECTOR MACHINES

Kernel based algorithms were invented in 1992 by Boser, B., Guyon, I., and Vapnik, V. as an improvement on Vapnik's linear SVM algorithm, from 1963, by applying kernel trick.

This algorithm replaces inner products of support vectors with a nonlinear kernel function (3.1). This function still encompasses the old one (2.1) by simply making $k(z, x) = \langle z, x \rangle = z^T x$. [1]

$$F(x) = \sum_{i=1}^{n} w_i\, k(z_i, x) + b \qquad (3.1)$$

Kernel trick is a powerful tool that provides a bridge between linearity and nonlinearity for every algorithm that depends on the inner product of two vectors.

Problem with linear classifiers was that if we map the input into higher dimension space, our algorithm would not behave linearly in the input space.

Kernel trick never computes the mapping. It replaces the inner product of our vectors with inner product of another, more suitable space (3.2). [1]

$$k(z,x) = \langle \varphi(z), \varphi(x) \rangle \qquad (3.2)$$

For any consistently labeled data set there exists a kernel function that maps the data to a linearly separable set as shown in figure 1. Kernel function can carry algorithm into a higher dimension space without explicitly mapping the input into this space. This is desirable because feature space can be infinite, and thus not computable.

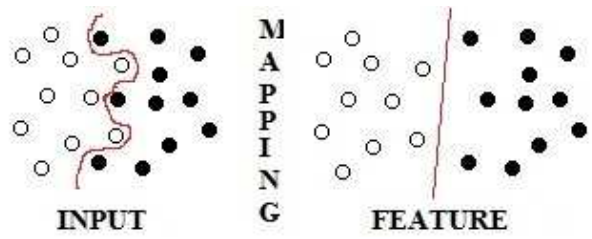

Figure 1. Mapping in Kernel Space

IV. COMMON KERNEL FUNCTIONS

Most common Kernel functions include linear, polynomial and Gaussian kernel. [1, 5]

A. *Linear Kernel*

Linear Kernel function is the simplest one. The function is composed of the inner product <*z*, *x*> added with a constant *c* (4.1).

$$k(z,x) = z^T x + c \qquad (4.1)$$

These are often the equivalent of its linear counterpart.

B. *Polynomial Kernel*

This Kernel is a non-stationary kernel (4.2) it is suited for working with normalized data.

$$k(z,x) = (\alpha z^T x + c)^d \qquad (4.2)$$

Slope is represented by α and *d* represents the degree.

C. *Gaussian Kernel*

Gaussian Kernel is one of the most versatile kernels. It is radial basis function kernel (4.3) and is preferred when you are working without a lot of knowledge about the input data.

$$k(z,x) = exp\left(-\frac{\|z-x\|^2}{2\sigma^2}\right) \qquad (4.3)$$

Major role in the performance plays parameter σ and should be carefully tuned for each problem. Overestimation would make algorithm behave almost linearly and the higher dimensional projection will start to lose its non-linear power. Underestimation would cause the lack of regulation and the algorithm will become sensitive to noise in training data.

Exponential Kernel is similar to Gaussian. It only leaves out the squaring of norm. Laplacian Kernel is another variation. It leaves out multiplication and squaring of sigma parameter. That makes it less sensitive to changes to sigma parameter.

There are many others, including Sigmoid Kernel, Rational Quadratic Kernel, Circular Kernel, Spherical Kernel, Power Kernel, Log Kernel, Spline Kernel, Bayesian Kernel, etc.

V. LEARNING ALGORITHMS

There are many uses for Support Vector Machines, and even more learning algorithms made for teaching them in the most optimal fashion for the given problem.

Early learning algorithms used quadratic programming solvers. Later were developed systems that used chunking to split problems into smaller parts that were solved then in a more efficient fashion.

Here we will present two of the most commonly used general purpose learning algorithms.

For the resulting point to be used in creating a new Support Vector Machine, it has to fulfill Mercer's condition (5.1).

$$\iint K(x,y)g(x)g(y)dxdy \geq 0 \qquad (5.1)$$

A. *Sequential Minimal Optimization*

Sequential Minimal Optimization algorithm was invented by Platt, J.

This algorithm breaks the problem into two dimensional sub problems that are then solvable using analytical methods. This method removes the need for numerical optimization algorithms that were used previously.

This algorithm iterates over all the points until convergence to a tolerance threshold. It examines all examples, finding two points to be optimized jointly. Two points are jointly optimized then using analytical method.

When the algorithm finishes its job, a new Support Vector Machine is created using only those points whose Lagrange multipliers are higher than zero. Expected outputs y_i will be then individually multiplied by their corresponding Lagrange multiplier a_i to form a single weight vector w (5.2). [2, 3]

$$F(x) = \sum_{i=1}^{n} a_i y_i k(z_i, x) + b = \sum_{i=1}^{n} w_i k(z_i, x) + b \qquad (5.2)$$

B. *Sequential Minimal Optimization for Regression*

Platt's Sequential Minimal Optimization algorithm was modified for solving regression problems. Retaining most of its original structure, it uses two Lagrange multipliers $\hat{a}_i$ and a_i for each input.

On completion of the algorithm, new Support Vector Machine is formed by using only points whose Lagrange multipliers are higher than zero. Multipliers are then subtracted to form a single weight vector w (5.3). [4]

$$F(x) = \sum_{i=1}^{n} (\hat{a}_i - a_i) k(z_i, x) + b = \sum_{i=1}^{n} w_i k(z_i, x) + b \qquad (5.3)$$

VI. APPLICATIONS OF SUPPORT VECTOR MACHINES

Support Vector Machines are in wide usage in the industry. Most common examples are for text categorization, image recognition, hand-written digit recognition, but they are used also in fields such as bioinformatics.

A. *Text Categorization*

Classification of natural text or hypertext documents into a fixed number of predefined categories based on their content has many different applications such as email filtering, web searching, office automation, sorting documents by topic, etc.

Common technique for finding text documents is vector space model, known as bag of words representation. In that method the document x is represented by a vector $\phi(x)$ indexed by a pre-fixed set of dictionary terms. Value of an entry can be Boolean indicating the presence of the corresponding term. The distance between the documents is calculated by calculating the inner product between the corresponding vectors. [1]

Best results are given when word stems are used (for 'computer', 'computation' and 'computing' a stem would be 'comput'), and uninformative words ('and', 'or', etc.) are removed.

For weighting stems we need a number of occurrences tf_i, ratio between the total number of documents and the number of documents containing the term idf_i, and normalization constant k that ensures the $\|\phi\|_2=1$ (6.1). [6, 7]

$$\phi_i(x) = \left(\frac{tf_i \log(idf_i)}{k}\right) \qquad (6.1)$$

B. *Image Recognition*

Automatic categorization of images is crucial in many areas such as information retrieval, filtering internet data, medical applications, object detection, etc.

Most research in image recognition concentrates on extracting high-level data for edge detection, shape description in order to capture relevant attributes, but quick information retrieval methods were also developed.

To avoid high level data most often used attributes are histograms of the luminosity or color levels. Distance between histograms is estimated with x^2. [8]

In aspect independent recognition of images we represent an image by transforming bitmaps into vectors of 3**h***w*, or just *h***w* for grayscale images, where *h* stands for height and *w* for width of the bitmap.

Color based classification uses color data and/or luminescence. This classification takes the distance between the histograms as a measure. Here we use color regions as feature space, which allows comparing of images of different sizes. For comparing HSV (Hue Saturation Value) is more plausible than RGB (Red Green Blue) because it separates color components from luminance. [1]

$$d_p(x,y) = \left(\sum_{i=1}^{n} |x_i - z_i|^p\right)^{1/p} \quad (6.2)$$

If we take that *d* is the measure of similarity - kernel that satisfies the Mercer's condition uses d_p (6.2) but general choice is usually written as *d*. (6.3).

$$k(x,y) = exp\left(-\frac{d(x,z)}{\sigma^2}\right)$$
$$d(x,z) = \sum_{i=1}^{n} \frac{(x_i - z_i)^2}{x_i + z_i} \quad (6.3)$$

C. Hand-written Digit Recognition

Hand written digit recognition was a first real task on which Support Vector Machines were tested and it is still used as a benchmark for classifiers. Original task was for classifying hand written zip codes in postal services.

Both soft and hard margins were tested, mainly with polynomial and Gaussian kernels. Performance was comparable.

$$k(x,y) = \left(\frac{(x,y)}{256}\right)^d \quad (6.4)$$

For USPS (United States Postal Service) data they used 256 dimensional input space, with polynomial (6.4) and Gaussian (6.5) kernels for different values of *d* and σ. [1]

$$k(x,y) = exp\left(-\frac{\|x-y\|^2}{256\sigma}\right) \quad (6.5)$$

D. Bioinformatics

Protein Homology Detection is one of the central problems in bioinformatics. Proteins are formed from a sequence of amino-acids from a set of twenty. Support Vector Machines are used to predict structural and functional features based on amino-acidic sequence.

Amongst many techniques for detecting homologies, most common one involves constructing generative model of protein family based on positive examples, and uses degree of similarity with existing family.

We can mark a given sequence with x, which makes a HMM (Hidden Markov Model) *H(θ)* have a probability *P(x| H(θ))*. Kernel function should specify a similarity score between a pair of sequences, whereas the likelihood of HMM score is a measure of closeness to the model itself.

For calculating, HMM uses some intermediate representation of sequences U_x. One of the quantities in this representation is the Fisher score (6.6) that is the gradient of logarithmic likelihood of the sequence *x* with the respect to the parameters of the model *H(θ)*. [1]

$$U_x = \frac{\partial log P(x|H(\theta))}{\partial \theta} \quad (6.6)$$

Best kernel for the job here is Gaussian based on the 2-norm (6.7), which makes it a Mercer kernel.

$$k(x,y) = exp\left(-\frac{\|U_x - U_y\|_2^2}{2\sigma^2}\right) \quad (6.7)$$

Gene Expression is another application of Support Vector Machines in bioinformatics. This application does the data mining by automatically categorizing gene expression data from DNA microarrays. [9]

Example of use would be detecting whether a new gene encodes a protein of a certain class, recognizing a new member of a class amongst genes of unknown function. [1]

VII. SUGGESTIONS FOR INCORPORATION INTO CURRICULUM

Systems of Artificial Intelligence class tries to teach quite a broad subject matter. It is taught in only one semester, two forty-five minute classes a week. It would be a stretch to expect to go into depth of every subject it touches in that time span. At the best it can be seen as introductory course for latter classes, and that is indeed its main purpose.

Current curriculum of Systems of Artificial Intelligence could incorporate Support Vector Machines into its Machine Learning segment.

It is unadvisable to cut either Decision Trees or Perceptrons from the curriculum. They are fundamental for understanding Machine Learning, and arguably more important than Support Vector Machines. Taking that into account, current timetable of the course would have to be changed to incorporate the new subject.

Results that are currently available show that students are learning heuristic search with relative ease. This allows for shortening the length of this segment down to three weeks, at least for a trial period. The same results are showing that cutting of the Formalization classes is not advisable.

That still leaves one more week for Machine Learning to be extended into. New Machine Learning segment would start with teaching Naive Bayes for the first week. Second week would be given to teaching Decision Trees, followed with third week and Perceptrons. Final week could be reserved for introduction into Support Vector Machines.

Ninety minute is not nearly enough time to present all of the matter described earlier in this paper, so the time should be rationed properly.

It is our suggestion that the optimal approach is to introduce linear Support Vector Machines, followed by presenting important terms such as Kernel and Learning Algorithms, without going into depth.

Optional work can be distributed for broadening students' knowledge about Support Vector Machines. Homework and seminars are ideal to incentivize students with their self-study. Themes for seminars could include various specific learning algorithms, kernels and research into practical, real-world uses of Support Vector Machines.

VIII. CONCLUSION

Students taking this class have an opportunity to broaden their knowledge in later courses that concentrate on particular subjects, such as Soft Computing and Neural Networks.

Support Vector Machines could be viably incorporated into the current Systems of Artificial Intelligence course. For the results to be visible it is necessary to deal additional, extracurricular work to students.

All changes should be tracked and results documented for further research.

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SESSION 2
CONTEMPORARY TEACHING CURRICULUM

Today in professional literature, there are many attributes that define more precisely Curriculum such as national curriculum, national frame curriculum, educational curriculum, creative curriculum, open curriculum, close curriculum, mixed curriculum, hidden curriculum, etc.

Under the term curriculum, different international and domestic theoreticians very often comprehend not only teaching plans and syllabus but also didactics, teaching methodology, school pedagogy, and sociology. Thus, under curriculum in modern sense beside teaching plan and syllabus, aims and results of learning and teaching are understood, but also teaching and learning contents and procedures, as well as standards of knowledge and teaching styles, too.

Creating a curriculum encompasses detail planning, establishing and controlling work process, and acting due to appropriate detailed goals, content elements, establishing and controlling success according to globally set aims and assumptions for realization of teaching process.

Concept of contemporary teaching curriculum comprehends all processes and activities directed to accomplish the educational goals and tasks in order to promote students' intellectual, personal, social, and physical development. Beside official teaching syllabi, it includes informal syllabi, school image characteristics such as quality concerns, concern about opposites-equality, evaluation of examples setting criteria of educational institutions and ways that the institution is organized and conducted. Educational and learning styles strongly influence the curriculum, and in practice cannot be separate from it.

Review of papers and their contributions:

1. **HARMONIZING THE COMPETENCY PROFILE OF THE TEACHER IN TECHNOLOGY TRAINING WITH THE EUROPEAN QUALIFICATIONS FRAMEWORK**
   The article expresses the author's understanding on the establishment of an objective competency profile of the teacher in Technology training, justified by references to its conformity to the European Qualifications Framework for lifelong learning.
2. **TEACHER COMPETENCE FOR 21st CENTURY**
   Competence is a combination of knowledge, skills, attitudes and values of teachers. Teachers play a major role in the improvement of education, because they directly affect the development and learning of students.
3. **COMPETENCE OF DIRECTORS FOR SUCCESSFUL SCHOOL LEADERSHIP**
   School management is a set of interrelated activities focused on the strategy and tactics of management teachers, education and training of students and gaining work experience and professional teachers. Managing principle role is a continuous process of all kinds of knowledge in order to meet current and future needs identified, used and developed knowledge.
4. **MOTIVATIONAL FUNCTION OF SCHOOL PRINCIPLES IN RELATION TO EMPLOYEES**
   In working with people, a successful principle is of the belief that people do not do only what they have to, but what they want to do. The way a principle performs his work, may be conducive to employees and their own work, but also can discourage employees to work, which is a big responsibility of principles, which in this context must act and always have to be on mind that in some way he is a role model for their colleagues.

5. **MATERIAL AND TECHNICAL RESOURCES AS A CASE OF EVALUATION**
   The introduction of school evaluation as a continuous and systematic process that is consistent with the educational standards would contribute to ensuring the quality of teaching, achievement of educational outcomes and improvement of the conditions in which it takes the educational process.
6. **INFORMATION TECHNOLOGY AS A FUNCTION OF MANAGEMENT EDUCATION**
   In this paper, focus is on educational technology - the electronic education and electronic diary (computer and multi-media teaching technology). Their use in the educational process aims to facilitate effective teaching and acceptance of knowledge and easier access to information about the student, such as grades, as well as additional features.
7. **ACTION AGAINST CHILD PORNOGRAPHY OVER THE INTERNET**
   In this paper actions against child pornography over the internet is presented. Teachers and parents must be aware of all the treats and pitfalls that children may fall into when using Internet.
8. **MULTIMEDIA PRINCIPLE IN ELEMENTARY CHEMICAL EDUCATION**
   The research in this paper was conducted with an aim to establish whether PowerPoint presentation has significant influence on quality of chemistry knowledge.
9. **ADAPTED INTEGRATED CURRICULUM (AIC) IN PRESCHOOL EDUCATION**
   Adapted Integrated Curriculum (AIC) includes three components that are an integral part of the case study: contextual and dynamic assessment of children's ability, knowledge and needs, development of individualized education plan (IEP) for each above-average and below-average child and the application of individual and individualized approach to work-based Montessori methodology.
10. **INTRODUCING AGILE METHODS INTO "TECHNOLOGIES OF SOFTWARE PROJECTS" CURRICULUM**
    In this paper, we present the learning and exercising processes introduced with emphasis on student project assessment.
11. **THE SOCIOLOGICAL THEMES IN FRENCH AS A FOREIGN LANGUAGE CLASS**
    This research study consists of two parts: in the first part of the study, it was focus on analyzing sociological themes in French language textbooks. In the second part of the study, it was focus on examining students attitudes and preferences towards sociological themes in general, with a special emphasis on themes which, according to our textbook content analysis.
12. **COMPARATIVE ANALYSIS OF THE SCHOOL PROGRAM (AND CURRICULUM) TEACHING SOCIOLOGY IN CROATIAN AND FRENCH SECONDARY SCHOOLS**
    The analysis of curriculum and objectives of the curriculum compares the basic starting point of teaching sociology in French and Croatian general education system and emphasize that sociology, as a scientific discipline, has a completely different status.
13. **THE IMPORTANCE OF INTELLECTUAL EDUCATION CONCEPT BY JOHANN HEINRICH PESTALOZZI**
    This paper is about the theory of Johann Pestalozzi's intellectual program, which greatly influenced the development of modern pedagogical thought.
14. **MOTIVATION DYNAMICS IN THE CONDITIONS OF MIXED (ELECTRONIC AND TRADITIONAL) FOREIGN LANGUAGE EDUCATION**
    The paper discusses an attempt to direct, maintain and regulate the individual motivation for learning in the conditions of mixed foreign language education with students majoring in Education Science. The results presented are related to the motivation dynamics of students in this context.
15. **ADJUSTMENT OF TEACHING OF MATHEMATICS TO VOCATIONAL SUBJECTS IN SECONDARY ELECTROTECHNICAL SCHOOL**
    This paper presents observations on the lack of knowledge of mathematics required to implement the plan and achieving the expected outcomes of the subject Fundamentals of Electrical Engineering in the second year of secondary electrotechnical school.

16. **APPLICATION OF GEOGEBRA IN TEACHING OF MATHEMATICS IN PRIMARY SCHOOLS**
    In this paper, GeoGebra will be present as an interesting software tool, appropriate for young students of higher grades in primary school. Characteristics of GeoGebra, its importance and usage examples will be consider.
17. **FUNCTIONS OF PRINCIPLES AS HEADMAN AND PEDAGOGICAL MANAGER**
    Changes in education are caused by technological developments and achievements of educational technology, as well as forms and resources in school. With changes in education, changes the position and function of the principal.
18. **KEY ISSUES IN COOPERATION BETWEEN PARENTS AND SCHOOL MANAGEMENT**
    It is necessary for parents to realize that only by successful communication with school and taking part in school life, they can increase the chances of their children to be successful not only in school but also in later life.
19. **ARCHIVES - SOURCE OF KNOWLEDGE ON CULTURAL HERITAGE**
    The authors discuss the role of archives and archival materials in informing students of the cultural heritage. They look at contemporary changes in the use of archival documents, the relationship between archives and educational institutions, cooperation, archivists, and educators together to create the most reliable way to archive repositories. The most important part is to develop cooperation in the field of education after the opening of the showroom in the Historical Archives of Zrenjanin.

HARMONIZING THE COMPETENCY PROFILE OF THE TEACHER IN TECHNOLOGY TRAINING WITH THE EUROPEAN QUALIFICATIONS FRAMEWORK

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Abstract - The article expresses the author's understanding on the establishment of an objective competency profile of the teacher in Technology training, justified by references to its conformity to the European Qualifications Framework for lifelong learning. The author defines the necessity of developing the competency profiles and methods to achieve the professional and job identification of teachers in Technology training at the level of Bachelor degree according to the European Qualifications Framework. His statements are based on analysis of the higher education in Pedagogy as well as theory summarization and monitoring in practice. The aim is to reduce the gaps and overcome the contradiction between education and the labor market by supporting the processes of validation and recognition of the professional qualifications of teachers in Technology training.

I. INTRODUCTION

With the advent and development of the Bologna Process [1] and subsequent European directives of Lisbon [9], Berlin [4] and Bergen [3] were activated a number of processes of change, both in the higher education system of the member states of the EU and the overall philosophy of European education in the context of globalization and the ambition of the EU to make Europe a "competitive area of knowledge." The first steps began with the so-called "harmonization" which basically means using universal mechanisms to facilitate the recognition of the periods of study with the educational degrees and professional qualifications granted to enable successful realization on the European labor market. The main instruments to achieve "harmonization" were issued by the European Commission- The European system for the recognition of credits ECTS (European Credit Transfer System), which had its harmonized analogue in Bulgaria named as the System of accumulation and transfer of credits approved by the Ministry of Education and Science in 2004; the European Reference Framework on Key Competences for Lifelong Learning, adopted with a Recommendation of the European Parliament and the Council from 18 December 2006; the European Qualifications Framework for Lifelong learning, which came into force in 2008. Nowadays, the process of harmonization still continues to be based on key criteria set by the European Commission such as relevance, transparency, comparability, reliability and portability, which are particularly important for the recognition of qualifications between countries, systems and institutions in the European Community. Having a background with variety of educational and qualification systems in the European area, reasonably comes into question how to harmonize the educational qualifications. In particular, we consider the competency profile of the teacher in technology training whose comparability in the first place is a very difficult task, primarily due to the lack of references for the harmonization of the educational cycle related to the identification of the technology teaching in the different stages and levels of the general secondary education. Second, there are certain difficulties to be overcome in determining the competency profile of teachers in Techniques and Technology (this is the professional qualification legally adopted in Bulgaria) and these are associated with the operationalization of the content parameters set out in the European Qualifications Framework [8]. This competency profile of the teacher is directly related to and dependent on the outcomes from the learning process such as knowledge, skills and competencies. Furthermore, the complexity of the

problemattic situation is determined by the adoption of the National Classification of Jobs and Occupations in Bulgaria in 2012, which refers to the establishment of complex relationships and dependencies between the competency profile, competency model, position and job description.

II. QUALIFICATION COMPATIBILITY AND INTERACTION

The philosophy of European integration in education implies at first place the use of reliable approaches and tools for achieving qualification compatibility, allowing recognition of periods of study and certificates attesting the degree and the professional qualification received. Secondly, but not less important, is the synergy between the institutions involved in this process- universities, ministry of education, social ministry, professional organizations, employers. As a result of such interaction the National Qualifications Framework of Bulgaria is in line with the European Qualifications Framework, which led to compatibility of qualification levels and educational descriptors for all levels of secondary and higher education. There is an understanding of the knowledge, skills and competencies required for certification at any level of competence. A structural reform was conducted in the system of higher education and it includes three educational cycles now: the first cycle corresponds to the learning outcomes for level 6 of EQF (educational and qualifications degree 'Bachelor'), the second cycle corresponds to the learning outcomes for level 7 EQF (educational and qualifications degree 'Master'), the third cycle corresponds to the learning outcomes for level 8 of EQF (educational and scientific degree "doctor"). The preparation of the teacher in Techniques and Technology is situated in the first cycle which corresponds to the outcomes of training level 6; subsection 6B- Bachelor of the National Qualifications Framework. The professional qualification is called 'teacher in techniques and technology' and is valid for primary and secondary school. So speaking, everything is all right as compatibility and transparency have been achieved, because as all other graduates, this specialist is allowed to receive his diploma and European Diploma Supplement in English, making it legitimate for the European labour market. Of course, this is a necessary but not sufficient condition as the connoisseurs of this matter are well aware that the curriculum and qualification characteristics form a competency profile which is too conservative because it does not comply with one of the main participants in the labour market- the employers. The business management in all areas is much more flexible, comprehensive and analytical in their approach to the recruitment of the necessary personnel. Peculiar instruments in this field are competency models whose structural components appear competency profiles. In this way, for example, is already underway a process of designing the so called 'sectored competency models' and 'competency profiles' for assessing the competence of the workforce in the Bulgarian industry (Bulgarian Industrial Association - Union of the Bulgarian Business, 2011) [2].The competency profile is used for identification and customization of the activities in a professional environment, taking into account the educational potential that is needed and other specific requirements of the position to a given profession. In that sense, it is a competency profile position to a profession, which includes the necessary skills for the position, while the description of the specific type of work and the related to its performance features, requirements and responsibilities are contained in the job description, which is the official document for each employer. In this way is achieved completion of the competency model, and we can assume that there is harmonization with EU directives. However, the design of sectored competency models in education is still far from the labour market reality as a whole, for the job 'Teacher' and of the competency profile of the teacher in techniques and technology in particular. In another publication related to this matter is reasonably emphasized that "the enumeration and the order of competencies is not sufficient enough to refer to the competence profiles, including the specialties for Bachelor degree preparing specialists with professional qualification 'teacher in Techniques and Technology ", the main user of which are secondary schools" [7].

There are reasons to state that the harmonization of the competence profile of the teacher in Techniques and technology is possible if both qualification and job compatibility are achieved. The actual educational practice is too dynamic and determined by educational innovations, provocations, needs and conflicts which necessarily involve standardizing the position of 'teacher'. The standardization will allow the job 'Teacher in Techniques and Technology' to be situated competently and functionally among the variety of 195 roles and

functions of the teacher brought out by the big Serbian educator Mirceta Danilovic. Given the complexity of the preparation of such 'multifunctional teachers', the author states that '... the question remains, who will teach them all this, and who will teach them what they need to learn in what departments and what content [6].

Based on the current 'frozen' state of interaction between educational policy and educational practice we endeavor to achieve compatibility between the qualification characteristics, related to the competence of future teachers in techniques and technology with Bachelor degree and the National Qualifications Framework in the context of European Qualifications Framework. One of the possible steps in the harmonization process is the secondary schools to facilitate this process by using the seven-point system of Roger described by M. Armstrong [5].

These seven points are:

- Appearance, health, physics, exterior, speech;
- Education- qualifications, experience;
- Skills- manual and machine;
- Interests- intellectual, practical and social;
- Positions- impacting others, dependency from others;
- Mental agility- intelligence and manifestation of the intelligence;
- Social roles;

For understandable reasons, this type of feature cannot be operational in the qualification of teachers, as another standard is missing, the educational environment one.

III. MODEL FOR QUALIFICATION CHARACTERISITC OF BACHELOR DEGREE FOR GRADUATES IN TECHNIQUES, TECHNOLOGY AND ENTERPERNOURSHIP

A. Purpose

The educational qualification "Bachelor" and professional qualifications of graduates in majoring Techniques, technology and entrepreneurship corresponds to level 6 on the European Qualifications Framework, subsection 6 B of the National Qualifications Framework and the National Classification of Jobs and Occupations in Bulgaria.

The Graduates in majoring Techniques, technology and entrepreneurship are prepared to carry out teaching and didactics, research, methodological, organizational and managerial activities related to training in techniques, technology and entrepreneurship in the school education system. They are competent to organize and manage activities in the support centers for personal development of interests, skills and expertise in the field of science and technology, and the development and expression of initiative and enterprise of students.

The graduates in techniquess, technology and entrepreneurship can occupy management positions in various institutions requiring pedagogical background. They have the necessary skills to fill vacancies in specialized service units in the school education system and can perform research and information, organizational and methodological support, organizing training activities and training for pedagogical professionals in technology and entrepreneurship. They are also competent to carry out activities in the organization, preparation and conduct of internal and external evaluation and for participation in international research related to the training in technologyy and entrepreneurship.

The graduates in Techniques, technology and entrepreneurship are competent to manage international programs for the realization of educational policies related to technological and entrepreneurial training in formal and informal learning environments.

Graduates in Techniques, technology and entrepreneurship have advanced and in-depth theoretical and factual knowledge on:

- **critical** perception and analysis of the theories, strategies, principles and practices in the field of general pedagogy, general, age, pedagogical and occupational psychology, pedagogy of general and technological training, didactics of technological training, didactic forecasting and modeling; methodology of technological training in primary and secondary education, methodology of formation of economic culture in technological training, methodology of entrepreneurial training, career guidance and school counseling, organization and management of the institutions in the system of school education;

- **self-interpretation** of scientific principles, facts, laws and regularities in mathematics, mechanics, materials science, machine science, electrical and electronics, information technology, engineering and computer graphics, biology and applied ecology, at the level required to compile and solve cognitive and practical tasks corresponding to the National educational standards for training in Technology and entrepreneurship;
- **connection** of facts, understanding and expression of theories and principles of art, technology, economics, and scientific schools in the field of entrepreneurship;

The graduates in techniquess, technology and entrepreneurship are able to:

- **communicate** and **work** in teams;
- **plan, organize and carry out** teaching and educational activities in technology and entrepreneurship in the state, municipal and private schools, in the centers of support for personal development and specialized service units;
- **lead** technological activities and entrepreneurial initiatives at school, extracurricular and production environment by conducting educational and production instructions;
- **assess and ensure** the safety of the process in the educational environment;
- **apply** modern information and communication technologies in the teaching in technology and entrepreneurship;
- **identify, select and use** appropriate materials, components and products, tools, machines, devices and equipment for the student technology activity;
- **solve** problems related to the equipment of offices, laboratories, training workshops and educational testing grounds for the realization of educational and working process, and student entrepreneurial initiatives, marketing and advertizing of student output.

Personal and professional competencies of graduates in techniquess, technology and entrepreneurship:

A) Independence and responsibility;

- **apply** knowledge of mathematics, science, technology, economics and entrepreneurship for developing and solving of cognitive and practical tasks corresponding to the curriculum of Technology and Entrepreneurship;
- **implement** pedagogical interaction in interactive learning environments;
- **use** contemporary scientific methods and tools for research and diagnostics of results from the training on Techniques and entrepreneurship.
- **plan, organize and conduct** different forms of technological activities, entrepreneurs initiatives and educational projects in the school education system and informal education by building partnership between the participants in the educational process, institutions, parents, municipalities and other interested parties.

B) Competency of learning

- **assess** the level of their own qualification, provide arguments and plan the expansion and actualization of the professional qualification;
- **choose** appropriate forms and programs for continuous education in professional fields of techniques, technology and entrepreneurship, education of adults, professional orientation and career development corresponding to the National Qualifications frame and the European Qualifications Framework.

C) Communicative and social competencies

- **provide up** to date information for the profession and career of teachers, pupils and parents;
- **communicate** effectively in English using the correct terminology in the field of techniques, technology, economics and entrepreneurship;
- **differentiate** and select electronic resources for training, evaluation and effective communication with the participants in the educational process;

D) Professional Competencies

- **model** technical objects, develop and use documentation for school technology activity and entrepreneurs initiatives;

- **know and apply** the basic economical definitions and categories related to the forming of entrepreneurial culture in the students;
- **form** entrepreneurial attitude and initiative in the students;
- **explore** and **evaluate** the development of curricula, teaching methods and practices applied in the teaching of techniques, technology and entrepreneurship;

IV. CONCLUSION

The kind of conservative status quo outlined in the statement still persists as the main employer for the teachers are the school institutions in general secondary education system. At this stage they are not in functional interaction with the universities preparing teachers and there is no established practice of joint development of competency profiles, which naturally deprives them of the opportunity to act as a demanding factor on the educational labour market. It is mandatory to achieve meaningful and functional compatibility between qualification characteristics of the teacher, including the teacher in techniques and technology, and his job description.

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TEACHER COMPETENCE FOR 21ST CENTURY

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Abstract - Competence is a combination of knowledge, skills, attitudes and values of teachers. Teachers play a major role in the improvement of education, because they directly affect the development and learning of students. Today, teachers are required to actively take care of their personal and professional development, and, first of all, to be an agent of change in the educational process. Traditional school and traditional teacher as the only source of knowledge will remain characteristic of one last time. A new century and a new millennium are seeking for "a new teacher.

I. INTRODUCTION

In recent years a tendency of changes in the educational system in Serbia can be observed. At all levels, from preschool to university, there are structural changes in the learning process, organization of school work, standards for the acquisition of applicable knowledge are developed, competencies and skills are introduced as well as instruments for the objective evaluation of the overall quality of education. The teachers have lost lot of their traditional roles, adapting to new circumstances, receiving and accepting a new role. Consequently, the focus of activities of the modern teacher explicitly directs the learning, the use of new information and communication technologies in the educational process, promoting cooperation and teamwork, and self-study. During the operationalization and concretization of teacher's role and the definition of his professional profile the concept of competence is introduced.

II. TEACHING COMPETENCE

In defining the concept of competence, it is usually based on the assumption that it is set, or a set of knowledge, skills and values necessary for every individual to be able to act as a successful member of the community. The term is of French origin and was used primarily in the area of vocational education in the context of the ability to perform a particular job or task. Lately usage of the term is extended to the field of general education, which means the ability to use certain skills. As far as possible taxonomy of teacher competence in addition to regular competencies related to teaching, learning, and working with students, differentiated the five areas, as well as new competencies: integration of children with special needs

- working in groups with different children (multicultural environment),
- the management of the school,
- conflict Resolution,
- teaching with the use of modern information technologies [1].

"Occupation or call of the teachers by their nature is in fact very complex, but always based on optimism, strong belief in the value and appropriateness of developmental and educational activities" [2]. Competence can still be defined as a combination of knowledge, skills, attitudes, values and practices that enable the individual to actively and effectively act in a certain (specific) situation or profession. European principles of teaching competence is based on the fact that learning should not be the ultimate goal, "the sum of knowledge," but should be reflected in a better understanding of himself and others in everyday life. Students should know what to teach and what to teach teachers to classes taken on interpersonal characteristics, rather than the accumulation of facts and generalizations without the possibility of developing life skills [3].

The last decades of the 20th century, most countries in transition began (and ended) reform their school systems. Reforms of the education system in our country and in other countries in transition are based on the universal thesis expressed by the phrase "Towards a Europe of Knowledge". This indicates an altered context of education in our country. This new context of education is bordered on one side of the view that education is seen as a major lever for ensuring the cultural, technological and overall social development, and on the other side of the general

stagnation in social development and its key elements and institutions.

The aim of education should be the realization of the full potential of every child in the school, whose climate is characterized by understanding and appreciating diversity. Modern, and above all, practical education, directed to the full development of each individual, must exceed the level of finished transferring knowledge and focuses on acquiring skills "how to learn" and develop the capacity to create new knowledge [4].

In the framework of the Lisbon strategy the EU, one of the nine expert groups proposed a list of teacher competencies as they could, in an appropriate way respond to the demands of "knowledge society". The starting point for a list of competencies to new social relations (at the global, national, local) puts teachers in a new situation, a different position, require new roles and tasks, but they also require different skills. These competencies are categorized into five groups:

- training for new ways of working in the classroom;
- training for new tasks outside the classroom in the school and the social partners,
- capacity to develop new competencies and new knowledge of students;
- developing their own professionalism;
- the use of information and communication technologies [1].

III. TEACHER COMPETENCE - DIVISION

The three dimensions of teacher competencies: professional, pedagogical - didactic -methodical, working professional competence

- level of general knowledge
- planning ability
- ability to perform tasks
- participation in projects
- self-assessment and evaluation
- professional development of pedagogical - didactic - methodological training
- knowledge and application of educational theory and practice
- getting around the area
- ability to teach and monitor
- adoption of school procedures
- creating educational content
- identifying and addressing educational issues
- develop classroom management skills
- finding answers to problems in the discipline
- teaching in the school's limited capabilities
- students' motivation and involvement in classroom activities
- skill evaluation / assessment
- understand the social and other circumstances that may affect the student's behavior
- learning to communicate with parents and parent involvement
- connecting theory and teaching methods acquired education in teaching practice
- orientation in international affairs

Working competencies - practical knowledge skills are:

- dedication
- teamwork
- a sense of responsibility
- quality work
- conscientiousness - taking responsibility
- the persistence of goals regardless of the results
- initiative
- optimism - intrinsic motivation and willingness to work
- building and maintaining proper oral and written expression
- General Communication language and literacy
- knowledge of English and other foreign language
- skill non-violent communication and conflict resolution - the teacher is a mediator in social relationships [5].

According to another classification, teaching competence can be divided into:

- Part competence - knowledge of a specific area
- pedagogical and methodological competence - includes knowledge and mediation skills of scientific knowledge in teaching certain subjects
- psychological competence - personality traits of teachers / teachers [6].

IV. COMPETENCE FOR XXI CENTURY

We cannot go into the future to turn back and look at the past. We must ask ourselves what our schoolchildren should be provided to enable them to live freely in a time in which they live and the knowledge to use. At the end of the twentieth century, it was clear that these were new competences on a wide range of skills that are very different from those that were necessary for life in the last century. We extracted twenty-eight competencies for the XXI century:

Cognitive competencies:

1. Selection of important and unimportant, skill selection information;
2. Asking questions about the material as well as individual cognition;
3. Understanding of matter and problems;
4. Memory, select the information that is necessary to remember;
5. Information handling, management and information management - quickly find, use and storage of information
6. Convergent and divergent production, fabrication of new ideas, solutions and products;
7. Evaluation, evaluation of the effectiveness of learning and work, as well as the benefits.

Emotional competence:

8. Emotional awareness, recognizing each other's emotions;
9. Self-confidence, a clear sense of their own power and limits;
10. Self-control, control of disturbing emotions and impulses;
11. Empathy and altruism;
12. Truthfulness, construction standards of honor and integrity
13. Adaptability, flexibility in accepting change;
14. Innovation, openness to new ideas, approaches and information.

Social competence:

15. Understanding of other individuals and groups, the interpretation of group emotional currents and power relationships;
16. Consent, compliance with the objectives of the group or organization, collaboration;
17. Group management: to be a leader and to be guided, making connections, the capacity assurance, organizational skills, team skills, division of labor;
18. Communication: listening openly and sending convincing messages, communication "face to face" nonviolent communication;
19. Support others and servile navigation, sensitive to the developmental needs of others and supporting their capacity;
20. Respect for diversity, tolerance, democracy,
21. Positive feeling of belonging to the nation and civilization.

Office-action competence:

22. Knowledge of the profession or professional;
23. General information and communication literacy, English or foreign languages;
24. Conscientiousness, responsibility for personal achievement;
25. Persistence, persistence in goals despite obstacles and setbacks;
26. Achievement motivation, desire for improvement and achievement of the highest quality;
27. The initiative, a willingness to take advantage of the provided opportunities;
28. Optimism, internal motivation, willingness to work.

Model "Twenty-eight competencies for the 21st Century" shows how our present school behind what today should be and what they will need in the future for a man to live freely in a civilization in which he lives.

V. TECHNOLOGICAL COMPETENCE AS A SEGMENT OF MODERN TEACHER'S PROFILE

Today, in the second half of the first decade of the twenty-first century, knowledge based society is far more futuristic vision, but a lasting inspiration to many people, the actual idea and the goal of the current, socio-economic, scientific-technological and educational reforms in most countries of the modern world. It is believed that even in some highly developed countries, particularly those in the European Union, the knowledge society has become a living reality. Instead of still missing, quite clear and unambiguous definition of the knowledge society, are usually separated and specifies certain parameters and general development trends of that society:

- Continued evolution of the Information Society, particularly in the direction of general networking computer systems;
- Acceptance of innovation as a source of competitiveness and as an instrument of efficiency and effectiveness of public organizations of all types and levels:
- The rapid development of the service sector is becoming increasingly important in the delivery of different "products" specific "clients" (computerization and human interaction)
- Affirmation of social learning as a concept that includes sustainable, optimal investment in
- Improving the quality of education and selection of desirable skills and knowledge necessary from the standpoint of their socio-economic importance;
- The various challenges associated with the process of globalization that encourages all aforementioned trends, and vice versa.

It is clear that the face of such challenges, in modern general-social context, is extremely complex and burdened with many contradictions, a special importance and significance of getting the teaching profession and teacher as a professional and as a man. The environment in which it is operating today's teacher is constantly complicated, not only under the influence of the aforementioned, a new, general social context, but also as a result of the effects of other specific factors, including:

- he increasing heterogeneity of the school population ("Education in diversity and diversity");
- Explosion quantity of information and its impact on curriculum content;
- The competition between alternative sources of information, especially the mass media with conflicting values and impacts;
- Introduction of innovative teaching paradigms especially those based on the use of new information and communication technologies
- Opening schools to the environment and the different expectations of the community in relation to teachers and their work.

VI. CONCLUSION

The modern teacher, besides his deep, general and specific knowledge and skills on how to plan and implement lessons, should master a range of special abilities and develop appropriate personal attributes, skills and competencies. Teachers are primarily looking for the ability to diagnose students' needs and sensitivity to their social and emotional problems. The teacher has to be a mature and stable person who has high organizational skills, adept at a variety of techniques to establish contact and interaction with students, colleagues and the students' parents. Also, the teacher should have a good understanding of group dynamics and leadership, should know how to analyze and solve conflicts, has a strong sense of democratic values and a balanced attitude towards personal independence, and highly developed social skills, and government communications, technology and intercultural competence. Finally, it is necessary that the teacher has practice in formal and informal discussions with students and colleagues about the different life experiences, general and individual problems, relevant pedagogical issues and academic issues.

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COMPETENCE OF DIRECTORS FOR SUCCESSFUL SCHOOL LEADERSHIP

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Abstract - School management is a set of interrelated activities focused on the strategy and tactics of management teachers, education and training of students and gaining work experience and professional teachers. Managing principle role is a continuous process of all kinds of knowledge in order to meet current and future needs identified, used and developed knowledge. The school principal was partly control and other, mainly the head. It is the principal cares about the compatibility of all the factors of the educational process. Toward, it is undoubtedly important his role because very much depend on the atmosphere in a group, the level of organization and unity of the implementation of the tasks.

I. INTRODUCTION

The reform process that involves the democratization and decentralization of the education system presupposes a number of structural, systematic and functional changes that are reflected in the school management and the role of the principal. The principle maintains constant direction of school transformation to the better quality. There growing visionary and missionary role of principle. This role involves the need for training and management training for school change processes, which requires a new way of managing reflected in mastering school management and teamwork. The director shall investigate, plan and program, implement, monitor and evaluate, that detects and reacts. In such circumstances, the principle must constantly change and develop the necessary competencies to be successful. From school it is expected to provide many answers and offer solutions to many dilemmas that accompany the education system in a time of rapid technological and social transitional turmoil. The school principal has become one of the most important factors for successful reform, innovation, improving the education system. A good education requires good participants in the educational process, ready to own transformation and the necessity of planned, systematic, and continuous development of professional skills in order to achieve successfully the objectives of educational concepts.

II. PRINCIPAL AS A EXECUTIVE ORGAN

The principle is responsible to assist the progress of teachers and other employees, and to provide working conditions that are conducive to quality work. The principle shall ensure that workers have clear terms and conditions of service and all agreements and regulations on wages, lessons and working conditions are followed. You need to have an open door where the teachers and other employees or their representatives of labor unions, have complaints, and should try to correct them informally before it was necessary to resort to the appeal. The management of teachers and other staff, the principle will lead by example and be a role model for others. Principle participates in the appointment of teachers and other staff at their school, and provides them with the introduction of the work, training and support they need to fully contribute to raising educational standards at the school. He is responsible for coordinating the work of teachers, ensuring that the work is meaningful and meets the goals and objectives of this school.

Due to the nature and specific objectives that the school provides, the director plays a dominant role in the management of schools. On its activity influences the position of the school authorities, and the establishment of functional connections between these bodies.

The principle is the most important experts of the school and the daily charge, but in order to achieve school success, it needs to work as director of the game. Depending on the laws and decisions of the ministry, municipality or school board, the principal role of principles consists of the following:

- keep school and gives her an idea;
- promotes quality education, constantly striving to improve standards;
- encourage and supervise the provision of equal opportunities for all, including girls belonging to minority communities and students with special educational needs;

- the school creates a positive spirit that encourages mutual respect, hard work and a sense of responsibility among students;
- to act as a champion of the community school, and
- effectively and efficiently collects financial and other resources for the school to attain its educational goals[1].

When we talk about the factors that determine the success of a leader in education, we can divide them into three categories:

- Circumstances - Among these factors are: the tradition, the social environment, legislation, quality of communication with the school's senior management instances, opportunities for professional development, human resources and technological state school, etc.;
- Personal competence - as personal competencies can be considered: the expertise, intelligence, social intelligence, initiative, dominance, extraversion, responsibility, adaptability, and others;
- Motivating people to work and loyalty to the organization - a successful manager is based on the belief that people do not only what you have, but also what they want and what they want to do [2]

III. COMPETENCE OF SCHOOL DIRECTORS

Management is a complex function composed of a large number of different activity. One systematization of the factors influencing the successful management features highlights of principles, school staff characteristics, management style of the principles shall, and situation in the school and its immediate surroundings. In the broadest sense, the principal determined [3]:

- the role (function),
- the work area,
- competence.

Under the competencies we mean knowledge, qualities, skills, qualities, characteristics, behavior - that the principle must have to be successfully completed specific tasks that brings him his role manager of school. Despite differences in systematization ideal profile principle, research has shown that there is one, one might say, a standard set of competencies without which no principle can achieve optimal results. These are the following competencies [3]:

- Professional - pedagogical competence - knowledge of the educational process (knowledge of the nature of pedagogical-psychological processes in school, planning and programming of educational work, teaching the basics of teaching, internal professional development schools, innovation, application of information technology, knowledge development and progression students, evaluation of educational activities, parent-school).
- Competence in the field of human relations - working with people to achieve school goals (knowledge of leadership styles, communication skills, networking goals and objectives of the school's teachers, motivation to work, stimulating work environment, respecting the specificity and affinity, conflict resolution, the skill set of tasks, the establishment of working teams, effectively working meetings).
- Organizational and development competencies-knowledge of the functioning of the educational system (education system, education system management, development and monitoring of the educational policy, the school as an educational institution, linking the school and its environment , coordinating the work of the school and of the community in which the school operates).
- Administrative and administrative competence - knowledge of business school (business schools as institutions, administrative and administrative functions of educational services and school bodies, labor and educational legislation, finance schools, administrative procedures at school, work relations, technical standards in educational institutions).
- Office-executive competence - behavior in practice (have a vision and determination to achieve it, an optimistic attitude towards the attainment of the objectives, diligence in work, trust in their partners and their capabilities, honesty in attitudes and behavior, efficiency in operational work, properly judgment and decision making to achieve the school's reputation in the social environment, distinctive work and general culture).

Principles use analytical and conceptual skills for long-term planning in the school, because they allow them to look ahead [4].

Expertise in management is reflected in the fact that all of these competencies applications in various areas of management [5]:

- strategic direction and development of the school;
- teaching and learning;
- leading and managing employees ;
- effective professional development;
- responsibility.

IV. PROFESSIONAL DEVELOPMENT OF PRINCIPLES

Increase knowledge to be acquired, complexity of environmental circumstances in which the activity occurs principle (new roles of parents and teachers, reform at the state level, new values and demands that occur in the transition process, the introduction of new quality systems) placed before the principles of the application for continuing professional development. The quality of all employees in education as well as the quality of schools are brought into direct connection with vocational training and professional development. Set is axiomatic that without the continuous professional development of employees in the school there is no quality of the school.

Among the "new roles" principles emphasized the willingness and openness to change, abandonment of some traditional roles (e.g. that it is almost the only source of information), adapting new circumstances (the role of mentor, facilitator, organizer of situations in which working and learning, intensive involvement of students, parents, surrounding the life and work of the school), acceptance of the "new role" (e.g. the integration of new technologies in education, cooperation, teamwork). It is pointed out that the director needs to be primarily an agent of change in the school environment also pointing out the following roles: principle as someone who inspires learning, a principle who takes care of their personal and professional development, a principle who is part of the organization that develops and learns [5].

The vision of life-long learning and professional development continue request of the principle who will be able to think critically, someone who is capable of reflection and evaluation. It means to seek or provide conditions for the development of each student, someone who encourages and supports associates in the growth, encourages teamwork with colleagues, co-workers, parents, partners from other organizations and institutions the school works with. In fact, the principle is expected that through continuous professional development and responsible participation in all aspects of school really contributes to the quality work of the school, and their own growth and development, while at the same time is not only an expert in the area of professional activity, but primarily "teacher "[5].

Professional development of principles, as a process based on the active participation of principles, its foundation is the key assumptions - the knowledge, skills, competencies, necessary for the realization of high-quality educational school work, developed through participation, interaction and mutual action principles, teachers, parents, other colleagues and associates at the school [5].

Professional development of principles as well as the process of learning, taking place in a specific socio-cultural and chronological context. Due to the aforementioned factors differ significantly from school to school, the principles are demands for various engagements in the process of finding the "truth". Hence the need arises for an individual approach to the professional development of principals. Such an approach would contribute to the school to respond to the demands of a particular socio-cultural and temporal context in which students, teachers, parents live and work, and their personal needs and expectations, as some authors point out that the reality is "the result of social processes that are accepted as normal in the particular context. "[5].

Professionalization of principles is usually achieved at several levels and in several phases [6]:

- Before naming the managerial function in an educational institution: in most countries, candidates for the position of principle of an educational institution, should complete the appropriate training program i.e. verified programs at a higher education institution.
- Elected principles who began work in schools, they should like in any other business, and the role for some time for introduction. They need less time to get to know the circumstances and procedures, gaining experience and independence in decision making. It is a sensitive period, quite stressful and involves professional and administrative support staff supervisors.
- After the phase of introduction followed by training it is necessary because the changes happen all the time, as the system and its

organization, and in the pedagogical process, programs, science and others. Training cannot be reduced to a notification of updates and upcoming changes (in legislation, funding, innovation, etc.). It is occasionally possible to gain skill skills in specific areas of the principle.

- Finally, professionalization of directors includes ongoing monitoring forms:
- ongoing support;
- continuous monitoring of the quality of the director;
- evaluating their work and contribution to the development of the school.

V. CONCLUSION

The goals of education reform concerning the above mentioned facts is to improve the quality and efficiency of educational process. In order to achieve these objectives, it is necessary to pay special attention to the management of schools and principle of school. Increasingly we talk about successful school management developed not only management, but also leading features and high social skills are a key competence. The most significant change in school management is to move from the level of expectation management and control by motivating and encouraging staff and their professional development and commitment to achieving the expected standards.

In its basic educational principles do not acquire sufficient knowledge of the organization, management and administration, nor acquire the basic skills and competencies. Until now most principles individually have had training schemes, depending on their understanding and personal responsibility. However, based on the results of research in the field of psychology, and psychology of interpersonal relations and professional experiences of school principals, it is clear that the issue of competence development must be approached in a different way.

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MOTIVATIONAL FUNCTION OF SCHOOL PRINCIPLES IN RELATION TO EMPLOYEES

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Abstract – In working with people, a successful principle is of the belief that people do not do only what they have to, but what they want to do. The principles of the teaching staff expect expertise, success in work and the evident results, but the employees of its managers expect knowledge, responsibility, communication skills, punctuality, determination, objectivity, and most importantly, social intelligence, and ability to cooperate. The way a principle performs his work, may be conducive to employees and their own work, but also can discourage employees to work, which is a big responsibility of principles, which in this context must act and always have to be on mind that in some way he is a role model for their colleagues. With their performance, commitment to work, principles of institutions other than the authority, which was acquired on the job position, must deserve respect and appreciation by employees.

I. INTRODUCTION

By the Education reform there was a decentralization of the education system, which is reflected in the school management, and the role of the principal. With this change, principles gain greater autonomy in planning and programming. It is necessary for them to motivate and encourage the manager associates, to support teamwork, to communicate with the environment, to act entrepreneurial, to be a leader and manager leader, to have a good communication, which is the first condition for successful management, to ensure the quality of the educational process, administrative and technical operations, to monitor and evaluate employees. Therefore, the principle shall promote human and material resources and to contribute to the development of school identity. The issue of motivation is one of the issues related to the management of the business in recent years and is increasingly gaining in importance.

II. PRINCIPAL DUTIES AND TASKS

The principle manages the institution. The principal may be a person who has higher education, licensed to teachers, educators and psychologists, passed the head of the institution, and at least five years of experience in the field of education.

A successful school principal in his work manifests the following skills and abilities:

- creates a vision, communicates and shares it with employees
- communicates effectively with all parties interested in the school
- makes at school everyone feels safe,
- promotes a positive school culture,
- understands the needs of children, parents, teachers, and their own,
- leads school with dedication and love.

How much is a principle successful in certain segments of business and how is it linked with the motivation of employees may be apparent when joint decisions are made and where all or most take part on the way of solving the problem and the climate in the collective. Principles require and expect success in working in a group, however, they have to motivate co-workers and need to "listen", understand and recognize their needs and opinions.

Principal tasks are:

- identification and implementation of goals,
- planning
- organization of people and resources needed,
- personnel selection and care of their development,
- guidance and support
- creation of a positive climate

- objective measurement of achievements of individuals and organizations as a whole.

All the functions of the principle shall be executed in a way that will be supportive of the collective work that is motivating.

III. FUNCTION OF LEADERSHIP

In our country, holders of managerial positions in educational institutions are called principles. Their role as the head of an educational institution is generally required by a system laws and regulations in the field of education [1].

In our theory and practice in the last decade under the influence of Western European and American literature there are new approaches and views that are especially characteristic in management and leadership education. These new views are the result of the democratization of school management and organization in general. In addition to the traditional term in Serbian language, such as handling performance, leadership, management, leadership, but also new terms appeared such as management, school management, team management, leadership, manager, leader, and in the last few years the terms in Serbian : leadership, management and leadership.

In all sectors including education, management includes five characteristic features:

- Planning and programming,
- Organization;
- Caring for people;
- Managing and
- Evaluation.

Regardless of the activity the basic functions of management prior each other and close a second cycle in which management is achieved. Within self-evaluation and evaluation of school among others also performed self-evaluation, there is also the evaluation of the field called leadership. The results are obtained by analyzing data from questionnaires completed by employees. These questionnaires are relevant indicators of the motivation of the respondents, as hay on the results it can be concluded that the statements with the highest grades in the areas where the respondents are most satisfied, most successful and motivated, while the statements with the lowest index of the areas that they feel need to be improved. Questionnaires were excellent data source i.e. Feedback on the basis of which the principle can correct and improve their work, which directly affects the satisfaction and motivation of employees.

IV. MANAGEMENT AS A FUNCTION OF LEADERSHIP

Phase of leadership, which is responsible for the implementation of activities and is largely focused on the management of human resources - guiding and motivating employees to work in the best interest of the organization. For phase of leadership, it is crucial to establish an effective system of communication. The basis of communication is the transfer of information, knowledge, thoughts, and perceptions, and attitudes and emotions and conformation of them to achieve a common meaning.

Leadership is a process whereby an individual influences a group of individuals to achieve a common goal. Defining leadership as a process emphasizes that it is not a trait of a leader but a process that takes place between the leader and the group of individuals. Process means that the leader of a group of individuals mutually influence each other. It is not linear, one-way process, but an interactive process [2].

Term management is closely associated with the style of management. Specifically, it involves managing people, planning, organization and evaluation of results, and can be defined as a specific mode of behavior of leaders in the work process that affects the results of the school [3].

In a situation of creating a good working atmosphere, the principle of which is oriented towards people is essential to have good relationships, while for principles facing the tasks is essential to have a good performance. For principles facing the people, guiding the people means helping them, while principles facing the tasks of the employees give a clear orientation to work, but they will not help. Conflicts in interpersonal relationships also addressed differently. Principle faces the people will try to alleviate them, and the principle faces the task will threaten the participants in the conflict, because conflict resolution tasks interfere. These two types of principles differ in the criteria for the evaluation of employees. Principles oriented people will be willing to hear the opinions of employees, while for principles facing tasks, criteria will be assessing the performance of employees.

V. MOTIVATION AND MOTIVATORS

The issue of motivation is one of the issues related to the business management in recent years and is increasingly gaining in importance. Existing concept of motivational systems, motivational techniques and strategies become insufficiently flexible, so it is necessary to develop and introduce new ones that will with its versatility lead to high motivation and employee satisfaction, and thus at the same time achieve business success. To achieve a successful business, every company has to find the optimal combination of material and non-material incentives for their employees that will depend on many factors: the sector in which it operates, competition in the labor market, the nature of work, the employment structure. To ensure proper quality of employees in the company, it is necessary to provide the appropriate level of earnings, but it is only a necessary condition - is not sufficient. The concept of motivation embodies the concept of a motivator [5].

Motivators are things that encourage individual action, and they influence the behavior of individuals. They make a difference in what a person will do. Motivators are certain rewards or incentives that enhance the desire to satisfy desires. Stimulants are the wages, hours, working conditions, participation in decision-making, communication processes and so on. Awards are factors that are introduced into the work situation to employees stated that they behave in certain desirable ways for the company, and thereby satisfy their wishes. With their potential (knowledge, skills and behavior) people contribute to the achievement of the objectives of company. For return, it needs to enable employees the realization of their personal and professional goals.

There is a strong correlation between motivation and organizational climate. Positive organizational climate contributes to motivation, while negative climate affects negatively the motivation. The complexity of motivation requires situational approach that takes into account the environment, including organizational climate [6].

VI. EMPLOYEE MOTIVATION FACTORS

Motivation factors can be divided into internal and external factors of motivation. External factors of motivation are:

- salary
- job security,
- working conditions,
- communication
- competent supervision
- organizational climate.

Internal factors of motivation are:

- satisfaction over the successful completion of the task,
- responsibility for their work and the work of others
- acquisition of new knowledge and experience
- airmanship,
- progression.

Factors affecting the process operation and its sources of internal and external motivations are varied and they can be classified into four groups:

- complex personality
- status of education in the society
- stimulation of the school
- attitudes and activities of students' families in relation to the need for cooperation with the school.

VII. EMPLOYEE MOTIVATION TECHNIQUES

There are different techniques of motivation; however, the director should use those techniques that are available to him; first and best suited to the nature of work performed by its employees. In this sense, for the motivation of employees in schools, most appropriate motivational techniques are enrichment work and the ability to communicate; communication skills.

Enriching business allows it to work more challenging and accountable, and allows the employee to achieve recognition for their work and effort. Work might include:

- introducing innovations in educational activities,
- constant monitoring of new developments in the profession,
- acquire new pedagogical, didactic and psychological knowledge
- giving the employee a sense of personal responsibility for the execution of the task,
- feedback on the achievement of workers

- greater freedom in deciding the methods and the order and rate the performance of activities,
- encouraging participation (participation) and the interaction (cooperation) among employees
- including workers and allowing its active participation in the analysis and change, the working environment and working conditions,
- organizing social events for employees and students: celebrations, trips, anniversaries, sporting events , anything that brings people and staff and students provides a positive image regardless of the kinds of social barriers.

VIII. CONCLUSION

All major changes require great leadership. Satisfaction and motivation of employees are becoming key issues of contemporary organizations. The common goal of the system model and measurements of satisfaction and motivation is a tendency to develop in each individual a feeling that employees share a common destiny - an attempt to tangible and intangible incentives release the creative potential of employees. The way principle performs his work employees may be conducive to their own work, but also can discourage employees to work, which is a big responsibility of principles, which in this context must act and always have in mind that in some way he is a role model for colleagues. By performance and commitment to the work of principles of institutions other than the authority, which is got by a position at work, they must deserve honor and respect by staff. Motivational functions of the principal influences on employees. In order to be successful his influence, manager must know the factors and techniques that help motivate employees.

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MATERIAL AND TECHNICAL RESOURCES AS A CASE OF EVALUATION

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Abstract - The introduction of school evaluation as a continuous and systematic process that is consistent with the educational standards would contribute to ensuring the quality of teaching, achievement of educational outcomes and improvement of the conditions in which it takes the educational process. The obtained data would provide to all stakeholders in the education system and stakeholders promptly valid and relevant information on the effectiveness and impact of education. One of the areas of evaluation and analysis are material and technical resources in schools.

I. INTRODUCTION

In this paper, the focus will be directed to the area of resources. When evaluating the quality of resources, it is determined by whether:

- Human resources are in a function of the quality of the school.
- If there exist material-technical resources (facilities, equipment and materials)?
- If the material - technical resources used functionally? [1]

By testing material and technical resources, it is determined whether the school meets those criteria:

- The school is physically safe place. School premises meet health and hygienic conditions.
- The school has space to work in accordance with the regulations.
- The schoolroom is equipped in accordance with the regulations.
- School is equipped with necessary teaching resources for implementing quality teaching.

II. QUALITY STANDARDS OF EDUCATIONAL INSTITUTIONS

Standards of quality performance are:

- part of the quality assurance system of education,
- a mechanism to better agreements in key target groups in education, adopted by consensus
- instrument for evaluating the quality of institutions,
- clear, detailed and comprehensive picture of school quality or the conditions in which such quality can be achieved.

Development of quality standards of institutions:

- the obligation arising from the Law on Primary Education (2009).
- the competencies to prepare - Institute for Quality Education
- result-year project IEQE, Ministry of Education and the Inspectorate of Education of the Netherlands, with the support of experts from the Inspectorate of Education of England, Scotland and Germany
- pilot-testing in real school setting
- harmonization and improvement of the public debate
- National Council of Education adopted the standards of quality performance.

The characteristics of quality performance standards:

- areas include all the key aspects of the school standards are presented in the complex evidence of quality practices and conditions in which it can be achieved
- indicators include some New aspects of the quality of schools (eg, educational standards, vulnerable groups, safety, inclusion, IOP, exam results and tests, etc.).
- indicators to identify requirements that are in the "zone of proximal development" school (leadership role Directors, the use of research results in the development of

schools, using databases for development, developed procedures, etc.)[3].

Key areas of quality performance are: school program and the annual work plan

- teaching and learning
- educational achievements of pupils
- support
- ethos
- resources
- the organization of the school and management [1].

III. EVALUATION OF QUALITY OF SCHOOLS

The main task of the educational systems in the world is to determine, establish and ensure the quality of educational institutions.

This includes:

- the responsibility of all stakeholders in the education system
- generally accepted and agreed standards of quality of schools
- Standard implementation
- Mutual trust
- school autonomy [1].

At the level of the education system and the schools there are four basic domains of evaluation:

- self-evaluation
- supervision service
- external exams;
- evaluation research [2].

A. Self – evaluation

One of the most effective mechanisms to ensure the quality is the self-evaluation which is implemented by professional bodies, parent council, student parliaments, director and governing body of the institution. Self-evaluation organizes and coordinates the team for self-evaluation, whose members are appointed by the director of the facility for a period of one year. The self-evaluation team has at least five members, namely: representatives of professional bodies, parent councils, student councils and governing bodies of the institution. Members of the team elect team Leader from their ranks. Director participates in the team for self-evaluation.

Self-evaluation is based on analysis of:

- records and documentation of pedagogical institutions, programs of education, annual work plan and the development plan of the institution;
- databases within a single information system of education and other sources
- monitoring of activities;
- data collected from research conducted at the institution;
- the impact of the project activities;
- interviews, expert discussions, meetings, poll results and other ways data collection [3].

Team for self-evaluation collects and process information related to the subject of self-evaluation and analyzes the quality of cases of self-evaluation based on the processed data.

School self-evaluation, as well as any system for monitoring and evaluating the quality of education should be based on the following principles:

- Relevance - the subject evaluation should be the most important areas and aspects of the school;
- Transparency - the educational standards and criteria for monitoring and evaluation, assessment and evaluation of the consequences should be known and clear to the evaluator, and evaluant as well and all other stakeholders in the educational process;
- Professionalism - organizational, methodological and technical aspects of the evaluation must be at the level of contemporary professional standards
- Participation - when the evaluator and the person who is being evaluated are not the same person, it is necessary that both parties participate in decisions about evaluation;
- Ethics - respect for the personal integrity of each actor whose work is subject to evaluation, correct relationships between the participants in the evaluation, confidentiality, protection of human rights and children's rights;
- Autonomy - teachers / e, students / e, directors / professional / staff e / ei all other actors evaluation should without

external pressure, make decisions relevant to the planning, implementation process and the use of evaluation results [3].

B. External evaluation

External evaluation of is done by ministry, through educational advisors and the Office via employees who have completed the training program for external evaluation. External evaluation is done as a team. Ministry appoints a team of external evaluation and determines a team leader. Annual Plan provides a number of facilities that are used for external evaluation at the level of the school administration, the duration of the external evaluation of the number of team members for external evaluation. External evaluation is primarily aimed at improving the quality of schools and at collecting comparative data that can help schools to review their functioning compared with others. It provides feedback to schools on their strengths, weaknesses and opportunities, directing them to the necessary actions, offering support and additional resources that lead to desirable goals [4].

External evaluation of schools is based on:

- analysis of records and educational records of the school, the school's self-evaluation report, the curriculum, the annual work plan, the development plan of the school and educational consultant reports;
- direct monitoring of teaching and other forms of educational and pedagogical work;
- interview with the director, associate, teachers, educators, students, parents, and others significant to the life and work of the school or otherwise;
- Other actions who are deemed to be necessary [3].

Based on the report of the external evaluation, the institution prepares plan to improve the quality of the institution in the areas defined by standards of quality of institutions on the basis of which they can change development objectives defined by development plan facilities, and by school administration [1].

IV. TECHNICAL RESOURCES AS AREA OF EVALUATION

The school can independently make different instruments and complement the existing ones. School judges the quality of their work according to the given framework of evaluation (key areas, areas of evaluation, indicators and descriptions of achievement levels 4 and 2). School determines the level of achievement of specific indicators within specific areas of evaluation by identifying strengths and weaknesses. To the assessment of the level of achievement of indicators leads to the analysis of the data collected. The assessment must be based on valid and reliable evidence. Within 6.area of evaluation, following resources are evaluated: human, material, technical, and financial resources of the local community.

In the area of financial and technical resources, we are looking at the following indicators:

1. School space and equipment - a necessary condition for achieving the goals, objectives and content of education, is directly connected with the provision of the necessary resources, contemporary designed furniture and school space. Work efficiency and favorable working environment contributes to functional furniture in specialized classrooms: for students, by age and position of the subject, for the needs of teachers and teaching materials for housing.

2. Teaching resources - teaching resources are diverse technical and other resources that are tailored to the needs of teaching. They serve to provide, transmit and receive information, and this is also called teaching techniques. Teaching resources are a source of knowledge and understanding, and contribute to a proper representation of objects and phenomena of the real world around us. It should be noted that some of the tools we use is used exclusively teaching (texts, film), and many are used for other purposes (battery, projection apparatus, electrical measuring instruments). Appropriate use of teaching aids increases the concentration of students to the essential elements of learning material. Activating all the senses in the learning process, the student creates a clear picture of the objects and phenomena. This increases the durability of knowledge and greatly reduces forgetting. Learning tools that we call "learning resources" must meet a number of specific requirements. When deciding about teaching tool, we should take into account these requirements in order to achieve maximum pedagogical usefulness of applying. Teaching aids should be placed so as to be within arms reach of students and teachers and no special difficulties facilitate communicative working environment for frontal, group and

individual work - the modern mobile classroom furniture [5].

3. Use of available technical resources - depending on the organization of the school, teaching aids may be appropriate cabinets or cabinet specially designed for didactic instructional resources. Regardless of which system is the organization of the school, teachers and students have a role in the preparation and maintenance of teaching aids. The value of the implementation of teaching materials is enormous. To ensure the implementation of didactic value of teaching materials, it is essential that they are used: measured, timely, complete, cost-effective, and skillfully combined.

It is determined whether the spatial conditions (classrooms, offices, library, utility rooms, yard, gym), equipment and furniture are to the standard, and if they are adequately maintained. You can determine whether a school has room for the use of modern information technology.

By evaluating whether the buildings and equipment contribute to creating a safe, pleasant and stimulating environment within the field of evaluation of teaching, it is checked weather the school has the necessary and modern teaching aids (books, working papers, audio-visual materials, computers, photocopier machines ...), which are preserved in the function of a variety of methods and forms of work with. Many teaching materials are made by teachers and students.

Assessment of the available material and technical resources arises the question of whether they are available to teachers and students and if are in a function of educational and extracurricular activities. It is determined whether they are effectively used by students and teachers, and there should be a record. Here are just some of the issues raised during the evaluation process in the field of technical resources:

- Does the school environment provide adequate opportunities for the implementation of educational and extracurricular activities?
- Are all the rooms in the school adequately maintained?
- Are all the rooms in the school well lit?
- Do teachers have been involved in editing the school premises?
- Are students involved in editing the school premises?
- Is there the functional furniture in school?
- Are the teaching resources in place?
- Are there classrooms equipped with appropriate teaching aids?
- Are the classes implemented in classrooms?
- Do teachers have and use the facilities for the preparation of teaching?
- Are there rooms for gathering and socializing students?
- Are there rooms for the parents?
- Does the school library has literature and sufficient fund books for students and teachers?
- Does the school library regularly update and modernize the new releases?
- Does the school have a well-equipped media center?
- Do teachers have the ability to use school mediate?
- Do the teachers access to the Internet?
- Is the material for teaching purposes provided sufficiently?
- Does the school have a gym?
- Does the gym fit norms?
- Have good sports facilities regulated?
- Have students and teachers the opportunity to use the sports facilities and after school? [3]

Well-designed criteria and indicators enable you to control various stages in the process of self-evaluation, providing quality information and make it possible to obtain reliable, relevant and clear information that can be used for the improvement of school practice. Successfully implemented self-evaluation process and quality data are obtained for improvement work in one area and can help us, using the knowledge and experience gained in the process, devise and implement a self-evaluation in other areas of the school. In this way, we can obtain a wealth of data with which we will be able to more comprehensive approach to change and improvement of the school [1].

V. CONCLUSION

The basic questions for whose answers teachers and methodologists of different subjects are

looking for, is how to enable students to achieve the learning objectives related to the specific content in the shortest possible time and to allow continuous acquisition of knowledge, applicable in different situations. The goals can be achieved by different methods of teaching and learning, but it is very important to choose the most efficient method with appropriate teaching aids.

In order to affect the students, the basic conditions in school cannot be worse than those students have at home (especially when it comes to basic infrastructure), and the equipment would have to be such that the school can monitor newspapers and innovations used in working with children. Still, especially in rural areas, there are some improper working conditions.

The quality of primary education affects working conditions in schools, the physical (buildings, facilities, infrastructure) and equipment (office equipment, library, teaching aids, instructional materials). Periodic evaluation should be conducted for obtaining review of the current status in all key areas of the life and work of the school. This overview provides immediate feedback on the particular strengths as well as areas that need improvement.

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INFORMATION TECHNOLOGY AS A FUNCTION OF MANAGEMENT EDUCATION

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Abstract - Nowadays, society is a becoming information society. This technology is getting great importance and it is a tool for obtaining information, knowledge, money, and power. Information Technology indicates the general and broader term than technology that is widely used, both in everyday life and in the function of business, the execution of various tasks and achieving higher goals. One of the activities in which you recently applied information technology, is education. In this paper, we focus on educational technology - the electronic education and electronic diary (computer and multi-media teaching technology). Their use in the educational process aims to facilitate effective teaching and acceptance of knowledge and easier access to information about the student, such as grades, as well as additional features.

I. INTRODUCTION

Jim Domsik from Michigan first used the term information technology in November in 1981. Until then, "data processing" was used. [1] Information and communication technologies have a great impact on our lives and the functioning of the whole. Bill Gates said about them: "Information and communication technologies for many people, regardless of where they live open incredible opportunities to become part of the global economy. Soon educated young people in China, India or any other developing countries must have a better outlook for the future but uneducated young people in Europe or the United States." [2]

Now when we use modern technology, modern media for expressing and information transfer, we can say that this is the most dynamic technological advances in the history of civilization. On the World Wide Web, there are more or less unrelated information from the users of electronic resources required to construct new views, theories and ideas. [3]

A. *Educational technology*

The term educational technology encompasses the organization, teaching methods and procedures and the implementation of teaching materials including the most modern teaching aids. [4]

The most attractive and most effective educational technology used today is the computer and multi-media teaching technology.

Mila Nadrljanski highlights the benefits of learning with the help of a computer, its multimedia feature, and interactivity: "Education through modern interactive media is much better compared to traditional methods of education. Digitized information can be easily mounted aided by images, animations and sound, act simultaneously to multiple senses giving full the information. "(Nadrljanski, 2007).

This is supported by data on the relationship between perception and the effects of any action students:

- Auditory perception (hear) 20%
- Visual perception (see) 30-50%
- Audio-visual perception (see and hear) 50-70%
- Audio-visual-motor perception (hear, see and do) 90%

In the last five years, with the massive use of multimedia and the Internet, the innovation of educational technology in terms of a more flexible and effective presentation of information has been increased.

II. MANAGING INNOVATION IN EDUCATION USING INFORMATION TECHNOLOGY

Traditional teaching is verbalized, formalized and non-obvious to the extent that is sufficient to increase the durability of knowledge and link theory to life. The estimated function is lecturing teachers, so there is no mutual interaction and students do not have time for independent activities. Students do not know how successfully mastered the material, and even the teachers are not aware of the knowledge of their students. [5]

There have been made significant steps towards equipping schools with modern teaching aids all around the world, but the school is expected to adequately implement and innovate methods and techniques with students. [6] Science and technology is developing rapidly, and they allow the use of new, modern and efficient appliances to continue. Most are in the application of computers and special technical devices for teaching, introducing multimedia systems, distance learning, and virtual schools.

B. Educational software in the classroom

Software in education involves programming languages and tools, organization of teaching and learning, which is based on logic and pedagogy. The term educational computer software refers to ready computer programs that can be used in the classroom, but also programs that help students and guide them in independent study. [7]

Software for interactive learning allows students to communicate, monitor exposure, ask questions, answer questions. The display shows conferee, the cameras can be placed in all classrooms, so that communication can be performed in real time. Software used in schools and colleges. This technology is suitable for similar colleges because in them the students can share information, and teachers work as a team in the planning and realization of teaching.Voice recognition software and manuscripts - the use of the software keyboard will become a secondary device, and electronic device and primary microphone. Educational software support teachers in teaching mathematics, technical education, geography, and in order to better accept of students' knowledge. There are also educational software used in preschool education. [8]

When we consider that the current price accessible computers and software that can be prepared and teacher innovation in education seem as easy to achieve. However, teachers do not have the experience of working with a computer, or willingness to train.

C. Organization of teaching using electronic interactive whiteboard

ICT in education allows the use of new teaching methods and new teaching organization which would shortcoming of traditional education can be reduced to tolerance. Conventional classrooms and forms of work, a new technology that combines the positive elements of traditional technologies.

Using multimedia software can be developed and implemented lessons according to individual abilities and prior knowledge of students. Multimedia presentation contributes to easy maintenance of discipline in the classroom and create an atmosphere where students' thinking activity increased and contributed to their responsibility for the success of teaching and learning. [9]

Better monitoring students in courses with multimedia presentations and their active participation in the learning process can be achieved. Students make a greater contribution to their development as they are engaged in learning research, discovery, and troubleshooting. [9]

The application of electronic interactive whiteboard, known by the name of electronic whiteboards, interactive whiteboard or multimedia board, turned the traditional-teaching of reproductive classes into interactive classes corresponding to modern educational needs of students and leads to the achievement of the desired learning outcomes, which are consistent with the requirements of modern society.

Instead of recording, students focus their attention to the rich content of teaching, they are active, and thus develop their functional skills. Because different content and methods are more motivated to learn, easier to understand the complicated tasks, thanks to clearer and more dynamic and effective presentations. For the organization of teaching in this manner the followings are needed:

- Computer,
- Projector, and
- The surface design to take charge of presenting, writing, drawing, etc.

Using the interactive whiteboard in creating teaching materials will enable teachers to use documents from different applications on the desktop, highlighting, text magnification. Highlighting function "spotlight" and other features, which are used to put the focus of major themes, and allows it to store all the changes that have occurred during lectures or presentations to retain its original form to the next lecture teaching process going the other way, according to the student’s needs.

On the interactive whiteboard teachers can, with the help of so-called pen or a finger, draw circles, write or draw different shapes that can be

easily recognized as a regular geometric shapes as needed, and simple movements can be performed and the deployment of elements in the given area, i.e. panel, which is particularly useful in schematic.

Figure 1. Appearance of active electronic interactive whiteboard

During presentation, it also allows during opportunity to connect with other parties on the desktop, connect with other documents and programs on your computer, and connect to the Internet Web sites. This option provides the necessary dynamics in the learning process and makes easy the inclusion of many examples in the process of explaining the material, which is of great importance for the development of practical knowledge and skills of students. (College of Professional Studies in Information Technology, Information Technology School-ITS, powered by Trade Com-experience since the introduction of interactive whiteboard in the classroom) [10]

Margaret Israel, an English teacher and coordinator of the school professional learning in Australia, says that the teachers and students who used the interactive whiteboard in less than one year have shown excellent results.

Not everything is so easy, since we had first to secure finance. It all paid off very quickly, because the very ability to make all the notes you made in class, just now enthusiastically presented and abroad. The words of my students was a "cool" because they are now able to seamlessly talk with some ease on the email, and more and more emphasis on teaching. Some interactive boards are used to study and analyze some parts of the lecture with a brief moves, some of their materials can play a DVD, because the screens are very good that broadcast projectors. Everything is still there on the creativity of the teacher and each lecture is significantly different from previous one, she added.

D. Electronic diary

Electronic report not only provides parents with insight into the assessment of the child, but also the ability to check the number of absences and behavior of students, as well as information about parenting meetings, and even contact with teachers, depending on the module used. The main and most important function of electronic diary is certainly an insight into assessment and students' absences.

There are two ways to access the parent information of the kind student, including:

- By mobile phone sending an SMS to a specific number - sms request (get information on grades or absences and behavior of the students)

In fact, this is implemented by typing certain words, depending on whether you want to access grades or absences and performance, and unique PIN code that parents receive from the school, then send the sms to the four-digit number. We get the required feedback.

- On the Internet

Accessed by going to the IP address or by filling in the following way: enter the user name that parent receives from the school, and then SMS password (obtained by sending text messages that contain certain words and student's PIN code). Sent SMS, automatically receive a code that types in the password text field. By clicking the button-Verify-, we get a detailed report on the success of the students and work.

The benefit of this is that the information is more comprehensive and clearer than the mobile phone. [12]

This access to information is completely protected because it excludes the possibility that other people have access to examination grades, behavior and absences. Therefore, parents can monitor their child's work just getting the user names, and passwords in PIN code. This is only one possible solution for the introduction of

electronic diaries into the educational process, although not essential. No necessary modifications in the methodology and approach of the current electronic journals should be done. The only changes may relate for example on user interface that varies from manufacturer to manufacturer, and the site administrator.

- Media Net Company from Novi Sad has developed the project "Electronic Diary" which is compatible with the software package EIS (Education Information system of the Republic of Serbia). In addition to the above functions insights parent ratings of the child over the Internet and sending text messages, the project provides the following:
- Teachers can instead of the traditional diary electronically enter grades of their students, and without the mouse and keyboard, only by touching the screen.

Figure 2. Appearance of the so-called "touch screen" display

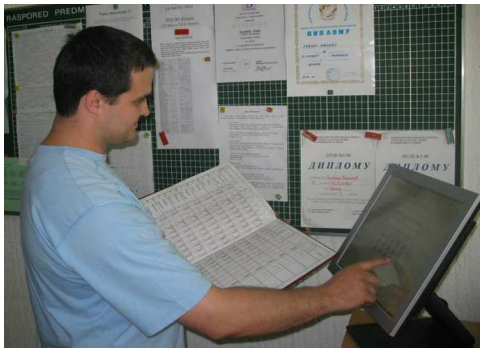

Figure 3. Input method from the electronic diary

- Archiving score (transfer to CD and keeping);
- Statistics from the control tasks, by subject, by department;
- Easy view from parents who were coming to the school and the ability to print from a central computer;
- Production of patterned statistics for the Teachers Council.

It is useful to note that the schools do not need your own website, or a permanent Internet connection. The software is easy, professional and reliable. It can be installed at every school. This is an excellent preventive measure in case of poor grades and absences. [11]

III. CONCLUSION

Thanks to the application of ICT and education in the formal educational system, it will soon look completely different. In addition to the application of information technology in the field of education today, the formal system, there are many opportunities for informal learning opportunities that are accessible to all Internet users and the most important economic - for free so that we can come to the conclusion that new technology can greatly assist in the learning process and perfect both . Every day there are new solutions that can facilitate teaching and thus help both students, and teachers, however, Serbia e-learning, or electronic boards and logs are still not present to such an extent that we talked about electronic educational process, but there desires of the students and teachers to education to a higher level. The reason that this implementation is not a practice of teaching is mainly lack of funds and the conditions for such work in educational institutions, as well as the fear of introducing innovations.

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ACTION AGAINST CHILD PORNOGRAPHY OVER THE INTERNET

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Abstract - Internet has made a grand entrance into our lives. It is representing a big aspect of modernization and globalization nowadays. It is not frequent that children are more IT educated than their parents. However, Internet may also be a great danger for pupils and students. Therefore, teachers and parents must be aware of all the treats and pitfalls that children may fall into when using Internet.

I. INTRODUCTION

Lately, the question that gained in importance is whether parents know for what purpose their children use Internet, which website they visit, with who they chat, etc.

We usually warn our children not to talk to strangers and to be wide awake when they get in touch with unknown persons and situations. But the question is how to teach our children to be equally careful when it comes to Internet? From the moment your child stepped into the virtual world, as a parent you must know how to protect it, so your child does not get abused on social networks. Children and juveniles must be protected from the violent and pornography contents, inappropriate posts and messages from the persons that may abuse and take advantage of children, pressure them to reveal private data, exchange photos and even to go to a date with them, their virtual 'friend.' Children must be taught how to safely use social networks.

II. CHILDREN AND SOCIAL NETWORKS

Nowadays, there is over a billion Internet users all over the world and that fact made Internet the most popular mass communication system. It brings a range of benefits. We can use all kind of useful information and we can communicate with people from any part of the world. However, the other side of the coin is the danger of the identity personation, hacking profiles on social networks, misuse of private data, etc. Therefore, the constant education on these bad points of the global network is necessary, so children become more prepared to recognize danger and protect themselves.

Creating a Facebook account is in most cases the first thing that a young person would do when joining a global network, because 'everybody is on Facebook.' Truly, according to statistics, most Internet users in Serbia joined hundreds of millions Facebook users all over the world.

However, the nature of Internet communication contains no protective system when it comes to personation and this greatly facilitates the development of child pornography on social networks.

III. PEDOPHILIA ON THE INTERNET

As a medical diagnosis, 'pedophilia or pedophilia is a psychiatric disorder in persons sixteen years of age or older typically characterized by a primary or exclusive sexual interest toward prepubescent children.'

Most pedophiles use the Internet as a medium because they can anonymously get child pornography, but also the real contact with children. The exchange of child pornography is a key component of the network of pedophiles. This network allow them to rationalize and justify their behavior by understanding that they are not alone, that there are more people who have the same instincts as they have.

Pedophile groups create website that store information for children, where they are attempting to convince them that the relationship between a child and an adult is natural and normal. Disturbing finding is that pedophiles demanding for themselves freedom of sexual expression and at the same time using the Internet to publish their views. Harm caused to youth who came into contact such content is high and poses a serious threat to their safety.

IV. CHILD PORNOGRAPHY

Child pornography is material that shows a child or person who look like a child involved in sexual acts or realistic scenes in which one has the

impression that the child was involved in the operation.

Child pornography includes the following acts:

- production of child pornography,
- distribution of child pornography,
- offering or making available child pornography,
- purchase and possession of child pornography.

There are many images of child pornography on the Internet, which enables reproduction of these images without any control an easy transfer.

V. PREVENTIVE ACTIONS TO COMBAT CHILD PORNOGRAPHY IN SERBIA

In Serbia exists a certain number of organizations interested in the protection of children on the Internet. To spread awareness about the importance of safe Internet use, they organized educating children about the kind of unpleasant situation they may experience using the Internet. It is also important that children know how to recognize such situation and report them to parents or guardians.

One such action was supported by the mobile operator Telenor. Telenor, in cooperation with the Ministry of interior signed on an agreement on the application of filters that will block access to websites with child sexual abuse. Telenor received lists of websites that Interpol and the Ministry of interior have determined that has illegal activities. If the user tries to access such website, it will automatically show the 'stop' page with the message that he is trying to access a restricted website. In this way, authorities may stop or at least make it harder to pedophiles. The Ministry of interior seek to enter into such an agreement with other mobile operators.

The project 'click safe' has been started by the Ministry of telecommunications in 2009. This project, through the organization of forums and lectures explain to children how to safely use the Internet, how to protect themselves and how to recognize if someone bothers them on the Internet. Since 2010th had began educating parents and teachers in elementary schools, because it is very important that people who are in contact with children to recognize the problem.

VI. ACTION "ARMAGEDDON"

In 2010th in Serbia began to conduct police action "Armageddon". This action is designed to stop child pornography over the Internet and has an international character. Serbian police in this action worked with several states, with the United Kingdom and the United States. During the 2010th ten men were arrested and their number in the next year increased significantly, indicating the importance of this issue. In this action, which is still ongoing, Serbia has achieved very good results. Department for the fight against cyber crime in 2011th was presented appreciation for the achievements of the "Armageddon".

VII. ACTIONS AROUN THE WORLD

In 2012th in Italy police arrested dozens of pedophiles around the country. Disturbing fact is that some of them were abused even babies. It was discovered the chain of child pornography where was discovered digital archive with more than five million of explicit photos and videos. According to the Italian police, some of the photos show torture, abuse and sexual violence against babies. Police fear that some of the babies who were abused died. In 2012th in Moscow police arrested a thirty-year-old man. Parents of thirteen-year-old girl found in her e-mail erotic photos of arrested man, which they reported to the police. The police decided to trap him by posing as a girl and they arranged a meeting. They wrote him that girl's parents won't be home and set up cameras in the apartment. When he arrived at the apartment and tried to kiss the girl, the police came out of hiding and arrested him.

In 2011th in Poland in a massive crackdown, were arrested thirty-one people for spreading child pornography on the Internet. Polish police collaborated with colleagues from Germany and as they checking the website, they found the exchange of shots with child pornography and so they arrested those people. The arrested people were of different ages, education and profession and among them were arrested and women.

VIII. HOW TOY HELPED IN EXPOSING THE NETWORK OF CHILD PORNOGRAPHY

In the last two years have been arrested forty-three men who were part of the extensive network of child pornography. The first molester from Amsterdam police found across picture of half-naked boy of eighteen months who kept a toy rabbit.

In further investigation, the arrested men were accused for child sexual abuse and for sharing photos with scenes of abuse. Police found the conversation on social network in which the

accused men talk about wanting to kidnap children, even to bake and eat them.

Authorities have so far identified more than one hundred and forty minor victims and say that they doesn't see the end because there are hundreds of thousands of child pornography photos that were found on the computers of suspect.

The investigation, which is still expanding, was called "Holitna" by the river in Alaska with many tributaries.

The case began when Robert Diduca, manager of the Sheraton Hotel in Framingham and father of three, sent the photo of a boy with a toy rabbit to secret agent from Boston, thinking it was sent to another man-pedophile. The agent forwarded the photo to Interpol, the international police organization an even in some other countries. Netherland police inspector realized that the toy is actually Majfi, the famous hero from many children's book in Netherland. Also, it was found that the boy's orange sweater purchased at a small store in Amsterdam, which is sold only twenty sweaters like that. Photo was broadcast on national television program and friends and relatives immediately called the boy's mother.

Robert Mickelson, who each day guard boy, was arrested. On his computer police found thousands of images of children who were abused and raped, including a boy with a toy rabbit.

Photos and conversations found on Diduca's and Mickelson's computers took up more than thirty suspects in seven countries, among which were Canada, Britain, Germany, Sweden and Mexico. The oldest victim in the Netherland had four and the youngest only nineteen days.

It was also arrested Michael Arnett, in which computer was found long and detailed conversation over the Internet, in which he described his desire to kidnap, kill and eat children.

Police also arrested a man who had a conversation with him.

IX. CONCLUSION

Given all massive globalization and connection of all parts of the world, it is necessary to develop specific mechanisms to counteract the negative effects of the new globalized situation.

Without denying yhe enormous importance of the Internet in today's world, we must be aware of his disadvantages. One of the biggest dangers that the Internet brought with it, is the development of a network of child pornography. This is one of the worst form of breach human rights of children in modern world.

There is no simple solution. It is necessary to seek a solution in prevention, modification of social networks and the strict forms of control and punishment. Prevention includes raising awareness of young people, especially children about the dangers on the Internet. It is also needed to adapt educational systems in terms of time where we live.

One of the first from of prevention is through education that the children through experiences of victims met with situations they may fall.

Also, to reduce child pornography to the lowest possible level, it is necessary to increase control of Internet content and develop effective international mechanisms to control and punish.

Fortunately, there are many international organizations dealing with the protection of children's rights and at the top of their lists of priorities is the protection of children's rights on the Internet.

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MULTIMEDIA PRINCIPLE IN ELEMENTARY CHEMICAL EDUCATION

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Abstract - Meaningful learning requires that the learner engages in substantial cognitive processing during learning, but the learner's capacity for cognitive processing is severely limited. Instructional designers have come to recognition the need for multimedia instruction that is sensitive to information load. In designing a PowerPoint presentation teachers should apply principles for information off-loading, such as multimedia principle. So far, few studies were conducted with an aim to establish the influence of multimedia principle in teaching chemistry to elementary students. In this paper the results of the research are presented. The research was conducted with an aim to establish whether PowerPoint presentation has significant influence on quality of chemistry knowledge. The research was organized as a pedagogical experiment with parallel groups of elementary students of 7th grade. Chemistry lectures in two groups were delivered for a month to the same extent and contained exactly the same facts and terms. However, the control group was taught using traditional PowerPoint presentations, which contained many multimedia elements, including longer texts, on each slide. The experimental group was taught using presentations designed according to multimedia principle. Students were tested during each class with subtests, and final testing was conducted a month later. The results indicate that the experimental group had significantly better achievement than the control group, and emphasize the impact of presentation design on learning results.

I. INTRODUCTION

Even though the research on learning with pictures has been conducted from different theoretical perspectives [1, 2], recent cognitive theories like Mayer's ''Cognitive Theory of Multimedia Learning'' [3, 4] or Schnotz's ''Integrative Model of Text and Picture Comprehension'' [5] can be used to describe and explain the results of a large number of studies. Mayer's theory, for example, regards the learner as a constructor of his or her own knowledge, actively selecting, organizing, and integrating relevant visual and verbal information. It is based on three basic assumptions:

1. Active processing: According to Wittrock's generative theory of meaningful learning [6, 7], learning occurs when learners actively process information through the following series of activities: select - organize - integrate).
2. Dual channel processing and dual coding: From Paivio's dual coding theory [8] and Baddeley's working-memory model [9], the notion of two different cognitive systems for information processing is taken: a verbal system transmitting and processing sequential information like written or spoken text and a visual system responsible for spatial information and images.
3. Limited capacity: The overall information processing capacity is very strictly constrained by the limitations of short-term memory load within each system [9, 10].
4. There is strong empirical evidence that learning outcomes are improved by presenting the learner with verbal and pictorial information in a coordinated way (the so-called ''multimedia principle'' [3, 4].

Using PowerPoint and slide shows to teach offers benefits to both students and teachers. Technology surrounds students. To reach them, teachers must use the language they understand: technology. Using PowerPoint and slide shows, you can integrate multiple sources in your classroom presentations. PowerPoint and slide presentations hold students' attention throughout the use of video, graphics and music. Because students today are so technologically advanced, tools that involve technology such as slide shows increase students' involvement and interaction.

Most users of PowerPoint appear to conceive their goals as educators to involve merely a one-way transmission of knowledge, rather than to promote the construction of knowledge and the analysis and synthesis of knowledge [11].

Given the widespread adoption of PowerPoint, the small number of studies of its effectiveness is surprising [12, 13]. Journal articles indicate that students like to be taught using PowerPoint and think that PowerPoint presentations are entertaining, that they enhance clarity, and aid recall of subject matter [14, 15, 16, 17]. Several studies point to the idea that graphics improve student recall [13, 18, 19, 20]. There is little consistent evidence, however, to show that teaching with PowerPoint leads to significantly better learning and significantly better grades than using more conventional methods. A majority of studies shows that use of PowerPoint is not associated with a significant improvement in student grades [13, 16, 17, 21]. In fact, one study demonstrated a decrease in student performance when the instructor switched from transparencies to PowerPoint [22].

PPT have a great potential to help teachers in delivering educational content; however, if used inappropriately, they present a barrier between teachers and students. Many times, students leave lectures taking only a small percentage of information that teachers have presented in a class. This is because some presentations contain too much information presented in a short time – too many pictures, large blocks of text, multicoloured backgrounds, animation effects... In fact, many characteristics of PPT presentations are in collision with the way the human brain works. Design of a PowerPoint presentation should be harmonized with the learning habits of human brain.

In design of a PowerPoint presentation it is necessary to take into account the limited capacity of a brain's working memory, thus minimizing the possibility of overload of a cognitive system [23].

Cognitive theory offers theory-based assumptions about how people learn from words and pictures. *Dual channels* is the concept that the human cognitive system consists of two distinct channels for representing and manipulating knowledge: a visual-pictorial channel and an auditory-verbal channel. The visual channel handles information presented to the eyes (such as illustrations, animation, video, or on-screen text). The verbal channel handles information presented to the ears (such as narration or nonverbal sounds).

Typically, you choose to use PowerPoint in your presentation for several reasons:

1. Help your audience to **understand**.
2. Help your audience to **learn**.
3. Help you to get your **message** across.

But, have you ever thought about what happens when you build too much information into your slides? When members of your audience become confused they switch off. Their working memories have become overloaded and they have become frustrated. As a presenter you have not wished such a reaction.

A growing body of research explains the science behind PowerPoint overload, and lays out recommendations to reduce the load. In the light of science, it is up to us to make a fundamental shift in our thinking. We have to change our PowerPoint habits to align with the way people learn.

In designing a PowerPoint presentation, one should have in mind the following rules:

1. PPT slide shows should contain both visual and verbal forms of presentation,
2. too many objects on a slide cause the overload of a human cognitive system,
3. presentation should be made in a such way to provide students with an opportunity to select, organize and integrate the presented information.

Mayer et al [24] have been conducting dozens of research studies on multimedia learning – the potential of using words and pictures together to promote human understanding. The studies have resulted in a substantial body of research with clear recommendations for multimedia design principles.

Five specific PowerPoint techniques lay out a pathway for reducing PowerPoint overload, each of which applies a research-based principle [24]:

1. The Signaling Principle,
2. The Segmenting Principle,
3. The Modality Principle,
4. The Multimedia Principle,
5. The Coherence Principle.

The signaling principle

The usual way of creating a PPT slide is to start with a title in the upper part of a slide. However, the title itself does not explain the main idea of a slide. Instead of writing a title, a *headline* should be written that explains the main idea of every slide.

The segmenting principle

The "Normal" view of the PPT slide is the place where individual slides are designed. But when you focus on a single slide, it's easy to pile on the information which only serves to shut down understanding. Information should be broken through the presentation.

The modality principle

Visual overload can be removed by moving text off-screen, and shifting the processing to the auditory channel by narrating the content instead. Mayer et al. have established that listening only to words and simultaneously watching the graphics on slides leads to 28% higher retention of information than reading the text along with watching graphic.

The multimedia principle

People learn better from words and pictures than from words alone [25]. In a presentation, it is common to see a series of PowerPoint slides filled with bullet points and no visuals besides a logo and a colored background. There are a number of reasons we put bullets alone on a slide: they are easier to produce than graphics and they remind us of what we want to say when we speak. But for whatever reasons we use bullets, text alone on a screen is simply not effective [24]. Instead of text, use graphics, which have a far larger capacity of describing phenomena than bulleted text.

The coherence principle

When we put everything we know on a topic to a slide in a PPT presentation with an aim to impress our listeners, we are actually doing the opposite. Too much redundant information stops their cognitive ability to process information. One of the hardest things to do is to keep things simple. When making a slide, cut out everything that does not support your main idea – text that you will narrate, logos, fancy animations and complex, multicolored backgrounds that have no connection with the slide context.

Nowadays, PowerPoint presentations (which should enrich the educational message) are becoming THE message, resulting in reduction of an audience's attention applied to a teacher's discussion of relevant content. Audience has a problem when it tries to assimilate the same information from two different sources at the same time. Thus, minimizing of information overload in a PowerPoint presentation should be a central consideration in the design of multimedia instruction.

II. METHODOLOGY

A. Research problem

The Programme for International Student Assessment (PISA) is currently the largest research programme in the area of education, organized by the Organisation for Economic Cooperation and Development (OECD), with an aim to improve education policies and outcomes in participating countries. Serbia has participated four times so far (in 2003, 2006, 2009 and 2012), with rather poor results. The main conclusion that can be drawn from our students' achievement is that serious changes are necessary in Serbian educational system. Important component in modernization of education is introduction of contemporary education technology. However, many educators are not trained enough for application of information-communication technology in teaching. Mistakes they make can prevent students from acquiring knowledge adequately.

B. Aim of Research

The aim of this research was to establish if the style of PowerPoint presentation design can have significant influence on students' achievement in chemistry in elementary school.

The stages of the research included:

- Analysis of educational programe of chemistry in the 7th grade of elementary schools in Serbia,
- Design and building of two types of PowerPoint presentations for educational theme CHEMICAL REACTIONS (*Types of chemical reactions, Mass conservation law, Law of constant mass ratio, Mole, Molar mass*). The first presentation was created in traditional way, containing both textual and visual data, usually combined on each slide. This presentation was created for application in the control group. The presentation used in the experimental group was created obeying modality principle and multimedia principle.
- Formation of groups (control and experimental).
- Carrying out pedagogical experiment.
- Design of instruments for evaluation of students achievements.

- Analysis of test results.

C. Research Hypothesis

Ground research hypothesis is formulated as follows: *The design of PowerPoint presentation has no effect on the students' achievement (quantity and quality of chemical knowledge).*

D. Research sample

Research sample comprised the total of 103 students of the 7th grade from the Elementary School "Dositej Obradovic" from Plandiste, Serbia. Students were divided into two groups. Control group was thought chemistry using traditionally designed PowerPoint presentations that contained integrated visual and textual information. The experimental group was thought using alternative presentations, created according to five principles for reducing information load (signaling, segmenting modality, multimedia and coherence principle). Control and experimental groups were equalized according to the average grade in chemistry (table 1). There are no significant difference in average grades between control and experimental groups.

TABLE I. AVERAGE GRADE IN CHEMISTRY IN CONTROL AND EXPERIMENTAL GROUP (P=0,77)

Group	Average grade in chemistry
Control	4.13 ± 0.70
Experimental	4.19 ± 0.80

E. Research instrument

Instruments used in this research were:

- subtests for assessing acquiring new data by students, used in each class,
- final test, comprising information from the whole educational theme.

Subtests each contained five questions related to new information given during the lecture. The questions were of multiple choice type, short answer type, alternative type and essay type. The maximal score for each test was 8 points.

Final test comprised 12 questions, which were of all types, and the maximal score was 14. Final testing was organized a month after completion of the educational theme.

F. Research methods

The following methods were applied:

- pedagogical experiment method,
- descriptive analysis,
- testing (subtests and final test),
- statistical data processing method.

III. RESULTS AND DISCUSSION

A. Achievements of students in subtests

General statistical parameters of results of four subtests in control and experimental groups of students are given in Tables 2-5.

TABLE II. ACHIEVEMENTS OF CONTROL AND EXPERIMENTAL GROUPS IN THE FIRST TOPIC (*TYPES OF CHEMICAL REACTIONS*)

Parameter	Control group	Experimental group
number of participants (N)	50	53
maximal possible score	8	8
maximal achieved score	6,5	8
minimal achieved score	0	1,5
arithmetic mean	3.14	4.53
standard deviation (SD)	1.70	1.90

There is a statistically significant difference between achievements of control and experimental group (p=0.069). The results of experimental group was better: 57% of the possible maximal score, compared to 39% achieved by the students in the control group.

TABLE III. ACHIEVEMENTS OF CONTROL AND EXPERIMENTAL GROUPS IN THE SECOND TOPIC (*MASS CONSERVATION LAW*)

Parameter	Control group	Experimental group
number of participants (N)	50	53
maximal possible score	8	8
maximal achieved score	6	8
minimal achieved score	0	2,5
arithmetic mean	2.48	5.30
standard deviation (SD)	1.53	1.76

As previously, the difference between achievements of control and experimental group is extremely statistically significant (p<0,0001). Experimental group achieved 66.25% of the maximal score, while students in control group achieved 31%.

TABLE IV. ACHIEVEMENTS OF CONTROL AND EXPERIMENTAL GROUPS IN THE THIRD TOPIC (*LAW OF CONSTANT MASS RATIO*)

Parameter	Control group	Experimental group
number of participants (N)	50	53
maximal possible score	8	8
maximal achieved score	6	8
minimal achieved score	1	0
arithmetic mean	5.28	5.78
standard deviation (SD)	1.74	1.87

In the topic *Law of constant mass ratio* there is no statistically significant difference between acvhievements of experimental and control group (p=0,324). Still, experimental group achieved

better score (72%), compared to control group with 66% of the maximal score.

TABLE V. ACHIEVEMENTS OF CONTROL AND EXPERIMENTAL GROUPS IN THE FOURTH TOPIC (*MOLE AND MOLAR MASS*)

Parameter	Control group	Experimental group
number of participants (N)	50	53
maximal possible score	8	8
maximal achieved score	8	8
minimal achieved score	1	0
arithmetic mean	3.60	5.07
standard deviation (SD)	1.71	2.20

Again the difference between achievements of control and experimental group is extremely statistically significant (p<0,0001). Experimental group achieved 63% of the maximal score, while students in control group achieved 45%.

Comparative results of all subtests for control and experimental are shown in Figure 1.

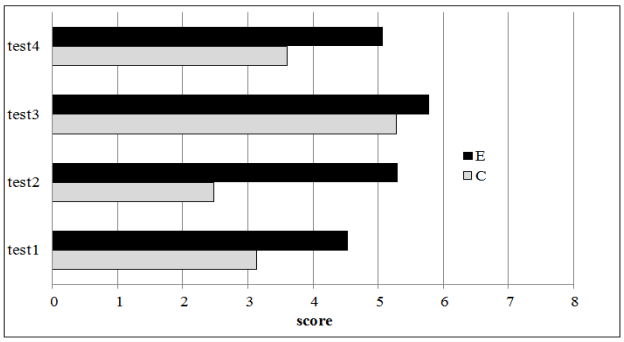

Figure 1. Achieved scores of control (C) and experimental (E) group in four subtests

B. Achievements of students in final test

Final testing was performed a month after realization of the pedagogical experiment. Some of the questions in the test were idential to those in subtests. The maximal score was 14, and it was possible to grade answers partially. The achievements of students in the conrol and experimental group are presented in Table 6.

TABLE VI. ACHIEVEMENTS OF CONTROL AND EXPERIMENTAL GROUPS IN THE SECOND TOPIC (*MASS CONSERVATION LAW*)

Parameter	Control group	Experimental group
number of participants (N)	50	53
maximal achieved score	13	14
minimal achieved score	2	3
arithmetic mean	8.56	10.5
standard deviation (SD)	2.92	2.59

Similar to the results achieved in subtests, experimental group again scored significantly better than the control group.

IV. CONCLUSION

Obtained results indicate the efficiency of multimedia principle and modality principle in learning chemistry in elementary school. Students of the experimental group, who attended classes in which PowerPoint presentations were designed in such way to avoid information overload, showed significantly better understanding of new data, better immediate remembering of new facts, as well as better retention of knowledge. This points out that the initial research hypothesis () is incorrect. The way in which a PowerPoint presentation is designed, in relation to the quality and quantity of information comprised on a slide and the content of redundant facts and data, has a significant impact on students' learning characteristics. If multimedia is chosen and implemented into an educational process in the optimal way, it has a large capacity to enrich learning experience. The teacher has to know and apply didactical principles, but also the principles of ICT design and application in order to use properly all possibilities which multimedia provides, and to avoid making mistakes.

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ADAPTED INTEGRATED CURRICULUM (AIC) IN PRESCHOOL EDUCATION

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Abstract - Non-implementation of systematic observation and adjustment difficulties of children before going to school often result in school failure and behavioural problems. To avoid most of the problems that occur later in a child's development, diagnostics and adequate application of specific programmatic interventions must begin already at an early stage. The subject of this research is focused on this domain. A new model called "Adapted integrated curriculum" that is based on the needs, interests and capabilities of the child so that it reaches the full potential of its development even before it starts school. Applying the adapted integrated curriculum the standards of the program would be determined and would prescribe what children can learn before they start school, and not what they need to learn before they start school. Such an approach would create a minimum and maximum level of knowledge and skill that every child adopts in the limits of its optimal development. Adapted Integrated Curriculum (AIC) includes three components that are an integral part of the case study: contextual and dynamic assessment of children's ability, knowledge and needs, development of individualized education plan (IEP) for each above-average and below-average child and the application of individual and individualized approach to work-based Montessori methodology.

I. INTRODUCTION

Bases of a healthy physical, intellectual, emotional and volitional development are formed at an early age. This period is very important in the early findings of moral development and acquisition of work habits that will later in life of individuals be a key factor in shaping their social behaviour. Preschool is a formative process that seeks to actualize physical and mental potential of children and direct positive trends to meeting their needs as a permanent source of development opportunities. In addition, education creates conditions for a better and more successful expression and the use of these options. Using children's potential aims to reach higher levels of children skills, expand and refine experiences, build character and attitudes. All of the above affect the behaviour of the child, which is formed and develops positive aspects of his personality. Pre-school education lays the foundation of the entire future of his personality and from its quality the success of further development and learning largely depend on. A holistic approach to the level of pre-school education is an integral part of liberal theory and is based on the understanding that the body in the physiological and psychological sense can only work as a whole. In order to achieve a holistic development of the child within the educational work it is important to:

- Individualize the learning process;
- Enable constructivist approach;
- Develop developmentally appropriate curriculum through differentiation and adaptation;
- Provide conditions for progressive education.

Individualization of the learning process starts from the assumption that there are no two children who are included in the same way in the learning process. Individualized approach will enable gifted children and children with special needs to develop in accordance with their capabilities, capacities and interests. The constructive approach is based on the fact that the child seeks to design the world around him, bringing in the process of their prior knowledge and experience. Developmentally appropriate curriculum means that each child is a unique creature that requires a developmentally appropriate approach to work with him. It can be carried out only when good knowledge of the characteristics of each individual child is comprehended, and based on these findings, games and activities that are appropriate to the child's abilities, knowledge are planned. Progressive education is based on developmental and constructivist - interaction principles. In this process, adults play an important role (parents and professionals in the institutional education), as well as other adults and children from the environment. Understanding the importance of family involvement in the overall development of children, as well as the significance in relation to the dissemination of positive influences, we

advocate for the inclusion of the family in all aspects of life and work in preschool.

II. RESEARCH

A. Starting regulation of curriculum

A word curriculum is of Latin origin and means competition, life. In pedagogy literature the word curriculum marks planned interaction of pupils with the teacher's content and resource, and teacher's process for accomplishing educational goals. In some states an expression "curriculum" is identified with the idea "program" so in our dictionaries that notion is translated as teaching program or teaching plan. The past of curriculum offers good archive opuses of this material in certain phases of past. Frequent reform and suggestions for changing curriculum, show that its modification is created by different changes in society. Each future conception of transforming and revolutionary pedagogy didactics change traditional curriculum, had bigger results if it was based on searching for possibility to find out and separate tasks and contents for each pupil what is in conformity with his individuality. Keeping in mind all these facts suggestions for reform curriculum come from holder of teaching process, teaching association, creators of educational system, associations of parents, public media opinion… When range is in question there are four reforms of curriculum:

- Aditive reforms: additional recourses are included and do not affect on organization's nature of school.
- External reform: focused on teachers who are members of school system and pupils who leave it.
- Regulate reform: reforms who gravitate to change the school, but mainly do not seize their basic element.
- Structured reforms: That demand changes in organization and work of school. They examine instantaneous school structure. (Marsh,C. 1994)

One of key dispute transformation of curriculum is directed to defining relation-obliged scope and performed program for appointed teaching subject or class. There is actually word about question of obligatory scope program that can be understood as completely obligated or as scope for ensuring of appointed pedagogy standard of some school. State pedagogy institution organizes searching projects because of evaluation that are made in change of program. In our school practice it is usual that under expression of educational pedagogical program we mean a document in which there are marked educational pedagogical tasks, then certain number of micro units, reference about realization, and conditions that should be ensured for relaziation. Change of curriculum at operalization of tasks are realized through:

- Goal of learning that should be gravitated to
- Contents subjects that are important for acomplishing learning goals
- Methods, means and ways for accomplishing learning goal
- Situations - grouping of content and method
- Strategy – planning of situation
- Evaluation – diagnosis of condition expression, measuring of learning success and teaching of objective actions.

Transformation of curriculum starts from notion definition of goal with of social and individual aspect. M.W. Apple (1988.) considers that reforms of curriculum should be concentrated between schooling and broader society on basis of inequality in society. The goals are primary basic of foundation to furthest goal that more concrete states ways precisely to objectively important values. They offer information about steps of this way. The goals are pedagogical aims that we have in mind and that we can attain after fixed time of schooling, after allowing inspection in educational contents, contents of one group of subjects, fixed range of knowledge or complete inspection in contents of a teaching subject (Schiro, M. 1978) considers that there are four essentially different approaches to this problem:

- Representatives of science-academic orientation as goal of every program see introducing children into some academic discipline. Everything worthy of including to world of knowledge is in some academic discipline.
- Other access is orientation on social efficiency. The society is one that determines purpose of education and upbringing. The creator of the program is the authorized society that reveals and defines those needs.

- The third access of determination is orientation on studying of child that depends on interest and needs of child oriented to urging natural growth and development.
- The fourth access is orientation to change in society as well as in personality of individual.

Social and individual aspects of upbringing aim and task are in function of affirmation of determined system of values and standards that are in harmony of needs of society. Curriculum-Teaching programs, stick to rule strive to consider needs, expectations of society and cognition of science. It makes sure further development of cultural and civilization accomplishments and in the same time insures satisfaction of cognition, experienced and psychomotor interest of individual. Transformed, adapted or in anyway modified curricula are less or more close to one of the following types [4]:

- "Subject-centered curriculum" – curriculum is oriented on subjects and consists of traditional teaching subjects.
- "Discipline centered curriculum" – curriculum is oriented on science discipline, its organization derives from structure and content of science disciplines.
- "Core curriculum" – "core curriculum" represents practice when a profession, for example mother language or science of society takes as a central core that other professions grouped about.
- "Child – centered curriculum", curriculum is oriented on child. It put child's needs at first place.
- "Community – centered curriculum" – curriculum that starts from unique needs and characteristic of place in which the child lives.
- "Social functions curriculum" marks curriculum that is oriented on society and social structures. It put their functions in the middle.
- "Problem centered curriculum" – Problem oriented program, where a focus of studying is a problem that demands contributions from more teaching subjects.

The most usual transformation of curriculum of some school does not rely only on one of the previous criteria but more of them crossed in it.

B. Criteria and directives for change of content in curriculum

Basic directions for selection, change or modification of content for some program are certainly goals of education and upbringing. The goal and task of education and upbringing are achieved by suitable contents and activities. The contents are more related on accomplishing social tasks and activities on individual aspect of upbringing goals. So we can talk about change of content from existential, socially moral, science, art, technology and humanistic aspect. Schulc in Hamburg's model contents divides into three groups. It depends which element preponderances in them. Those contents are:

- Contents in which experience about subjects are predominant
- Contents in which prevail emotional experience
- Contents in which prevail social experience.

According to him there is not "clean" content "filled" with only one element then all three intertwine and one of them prevails. The contents that are planned in curriculum should:

- Reflect specificity of school for it is determined;
- Give educational basis for further schooling;
- Be adopted to age level;
- That systematic knowledge from certain science are adopted through subject teaching.

Concerning that curriculum as concrete plan can be developed from completely overall didactic starting point, Marsh, 1994. contents in curriculum identifies with educational good so he classifies it as:

- Educational welfare classified after science that it comes from the pupil's own experience after activity. Needs and interesting determine preparations of educational welfare.
- According to essence or heart of matter of educational goods – problem determination of welfare
- According to correlation – connection with other educational goods.

- Situation of educational welfare inside broader scope – interdisciplinary.
- According to forms of life and aspects of problems.
- The criteria of educational welfare mentioned above in curriculum, C. Marsh cites as usable for easier choice of valid goals, while Bruner emphasizes that educational welfare in curriculum should:
- Be scientifically structured because through structure mental capabilities of pupils are developed.
- Be scientifically directed because in such way it faster understands basic notion and more complete perceives contents that are easy remembered and later more successful learned.
- Work out with contents goals, methods and teaching means.

C. Aimed directed curriculum

Christine Moller in her Curriculum's theory, the goals of teaching in curriculum put in the middle of didactic theory. Through aimed directed access, proposed model gives instructions for planning, leading and analysis of curriculum. In scheme drawn below Miller shows that planning of curriculum contents statements about goals of learning, organization and control of learning, that go well in three mutual depended processes.

Model "Aim of directed access". Moller was urged by behavior's oriented work [1] and especially programmed education that is based on foundation of behavior's theory. Key demands in programmed education are worked out and concretized programs with clearly set up aims. Miller places process of setting up aims in producing of curriculum as one of important tasks. Programmed education as scientific theory basement of Skinner's operative learning is urged by Miller to create the above presented scheme. It is especially expressed in the third step in which control actions are composed that have an aim to check accomplished aims. Very similar to that in programmed learning, where criteria are built on the basis of those the pupil can pass a resolution how much it has progressed. Miller valorizes accomplished aims through checking control actions of previously set up aims.

D. Planning and programming

Planning and programming of curriculum are integral part of entire long-term planning of every state and plans of development are mainly concentrated on satisfaction of educational conditions for everything. Application of modern educational technology and upbringing of free and responsible person will help him successfully to integrate into society. In respect of suggested regulation reform that includes inclusive education in our state, on the basis of frame program every school should work out performed program of work. That program should be concretization of frame program, considering material and personnel needs of school, specific environment in which school works. Performed program of work should be sum of the next programs:

- Obliged programs, selected programs, optional courses, program of different interest groups (research, sport, music, production)
- Every educational subject will be obtained performed program for a school year, and sum of whole subject's program for a class.

With this aspect of operative program subjects will be determined and will be obligatory for children that are integrated inyo regular school. As well as in regular GPP, this program will plan certain number of subjects and hours in week and year schedule.

E. Individual programming

If obligatory programs are created, on the basis of them it will be approached to individual and adapted programs for determined pupils. Those programs for appointed pupils a team of experts will work out starting from specific development of every pupil.
It will take into consideration noticed specifics in development of pupil (talents, some difficulties, psycho-physical condition, quantity and quality of adopted material, process of adoption, grade of socialization). The parents are necessary here. They consult themselves and program changes during the work dependently to noticed changes in the development of pupil.

During the individually planned curriculum the work of the teacher is very important. In the process of school teaching the most important role belongs to his meditation between educational contest and the pupils. Scope contest of education subjects, and obligation placed in realization of goal and task of educational program; bring the teacher into the situation that in front of pupils he puts demands that they should accomplish.

F. Dynamic assessment in the development of the "Adapted integrated curriculum"

Dynamic assessment in constructing an "Adapted integrated curriculum" is not a single activity or a procedure but a complex model of implementation procedures based on the following:

- that every child, regardless of individual characteristics, is capable of some kind of learning;
- that teaching with parallel evaluation and adjustment creates favorable conditions for quality education for children with special needs in regular environment;
- estimator actively intervenes during the evaluation process with an aim to deliberately or planned alter the current level of the child's functioning (learning, knowledge acquisition, execution of activities);
- assessment focuses on the child's problem-solving process through meaningful and real life situations trying to contribute to successful progress,
- the most important information for this type of evaluation is how the child responds to intervention (to contents and support presented in the individual educational program);
- assessment provides information on what types of activities or interventions produce the best results in the process of support to a child;
- this type of assessments reveals possible shortcomings in the planned support represented in the individual educational program, and the same will further be elaborated, changed or adapted to the personal characteristics of a child

G. Methodology of making the "Adapted integrated curriculum"

"Adapted integrated curriculum" aims to in accordance with the capabilities and the general characteristics of the individual child, assess appropriate steps that will help to develop and enhance the knowledge and skills, and acquire quality education in an inclusive environment. Planning and programming of all activities that imply the realization of educational goals are a complex and challenging educators' obligation. If in the educational group there are gifted children and children with disabilities all become more complex and more sensitive. The basic question is how to adopt the program for children who vary in ability, experience, motivation, emotional and social maturity, and other relevant characteristics (quality of attention, perseverance in work, self-control). Adapted development curriculum is based on an individualized program that includes the following assumptions:

- knowledge of the real level of the child's knowledge and his ability;
- knowledge of the child's personality, which could affect the faster or slower progression (sensitivity, indifference, irritability, a tendency to unpredictable reactions);
- knowledge of child's desires, what is he good at;
- defining the objectives of the educational process in accordance with the characteristics of the educational groups and individual needs of the child;
- Setting short targets, order of priority (socialization, very simple contexts, a sense of security and then increase of requirements);
- prediction as how much a child is participating in the implementation of obligations under the basic program, and where a special approach is required;
- determination criteria, methods of evaluation and the final outcome.

H. Methodology based on developing individualized curriculum

In this sence the educational content is taught along with all children. Monitoring is carried out to determine the acquisition of knowledge of children with disabilities. Changes in approach and operation of the teaching content are made in the way it suits the individual/ simplify. It is necessary to find interesting content that will be interesting for children and correlative approach for the teaching subject, for example, to explain through music, interactive game, drawing. The thematic area is viewed from several angles to get closer to each child in the group so that practically all children regardless of their capabilities will be found in the same situation. When it comes to communication, regardless of whether it is between educator-child or child-child it is always good to establish rules and monitoring. A child

with special needs should not be set aside in any way when it comes to communication. It is able to interact with peers who are already accustomed to its specific needs.

There is a possibility for dissent within the group and in principle these children find themselves a model "avoidance" that rarely disturbs other interrelationships. If there is a more complex problem then, there is a need for a support team intervention, educators and parents of children whose interests do not coincide. Practice has shown that children alone build relationships that suit them, and that the group always "finds" a child who approaches a child who has special modifications. In order to check indivial work we can adapt program through assessment and observation by monitoring the child and achieved results.

III. CONCLUSION

Modern pedagogy in preschool education respects individual differences of children and their potential for comprehensive and healthy development of personality. Creating an “Adapted integrated curriculum” is an integral part of the program plan and program, without which we would not be able to follow the progress and development of every child who enrols into the educational process. Unlike traditional programs that are made in advance, adapted development curriculum is never planned in advance, without knowing all the relevant assumptions. It also is not a model that in all segments fits children of the same age in the same kindergarten, and in different groups. Checking, changing and improving the work can only be made through educational practice. Adapted program must reflect the nature of the child and their specific needs. Program, in terms of integration, is advisable to steer towards the following objectives: to meet the specific needs and the resources to meet those needs. It is important to learn what is important and crucial to the advancement and training of children for later life and concentrate the program content around that. Assessment of the level of children's knowledge of the content, and closest opportunities for learning and development should be based on continuous monitoring of the child's achievements and interests in respective areas. Based on what the child already knows it is needed to make a realistic assessment of what might acquire in the future, indicating that assessment should not go further than the next few areas, or even take one at a time. Practice has shown that when doing the assessment the rule is that the child be your guide, that the educator follows the child's interests and expands these interests through guided activities. In order to achieve this, it is necessary to make a dynamic, contextual and individual assessment of needs of children's interests and capabilities.

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INTRODUCING AGILE METHODS INTO "TECHNOLOGIES OF SOFTWARE PROJECTS" CURRICULUM

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Abstract - Nowadays, fast delivery of software is even more important than several years ago, and agile methods are the modern standard to fulfill this demand. As reaction to the industry needs, we introduce agile methods into our curriculum of the 'Technologies of Software Projects' subject. In this paper, we present the learning and exercising processes introduced with emphasis on student project assessment.

I. MOTIVATION

The subject 'Technologies of Software Projects' was originally founded as result of industrial cooperation, but this cooperation ended and the topics of the subject became old – i.e. the aim to keep the learning content synchronized with the needs of the industrial partner and up-to-date failed due to the closing of the cooperation.

A new chapter needed to be introduced in the life of the subject. Because of the variety of software engineering techniques, technologies and methods, and because of the in general low hire rates of new employees in software companies due to the economical crisis, the opportunity to construct a new agreement of similar kind disappeared. No company will promise to hire 30-40 new employees every year for a longer duration. On the other hand-side, to provide only theoretical knowledge to the students would prepare them insufficiently. There is no need of employees who are only theoretically founded; the practical knowledge is the important one.

Many companies focus on fast incremental software delivery, and agile methods are the new standard way to fulfill the increasing demand on incremental functional extension of software products [1]. Therefore, our aim is to present these methods in our curricula too.

We already used LMS (Learning Management System) Moodle in the course, but mainly for lecture/presentation sharing and testing student knowledge [2]. The new version of the 'Technologies of Software Projects' course aims to use this LMS for tracking and evaluating student activity too.

The organization of the paper is as follows. In Section II, we present the new structure of the course. Next, we show our assessment method for student activity evaluation in Section III. Finally, we present our results in Section IV, and conclude and show future directions in Section V.

II. THE NEW COURSE STRUCTURE

A. Learning Content

The lectures focus on selected topics in software life cycle:

- Requirements engineering [3], because understanding user needs and requests is the most important key to project success,
- Design of (distributed) systems [4], because the majority of modern systems has a more complex and often a distributed architecture,
- Critical system development [5], because this area of software development requires much more knowledge, which could be presented by academicians and experts from the industry,
- System security and safety, because of the age we are living in, where the misusage of information is a rapidly growing discipline.

B. Exercise Content

The lessons aim to provide practical technological knowledge to the students, which knowledge is then tested in different activities and homework:

- Essays about selected related software engineering topics such as agile methods and/or techniques.

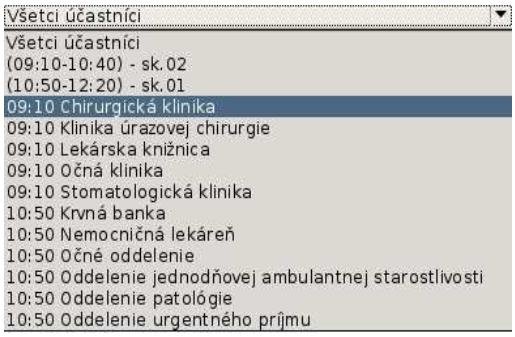

Figure 1. Moodle groups created for each team task to allow task-based assessment.

- Individual work on requirement acquisition tasks, e.g. writing user stories known from several agile methods. Task description is shown in Fig. 3.
- Team work on semester task, where the task consists of requirement analysis and processing, software development and documentation.
- Semester tasks are oriented on clinical information systems, which represent the category of least safety critical medical systems, see Fig. 1.

C. *Exercise Process*

1. The teacher assigns essay topics to students. It is not allowed to change topics between students. The reason of this decision is the fact that the students need to learn something new and not to repeat their older essays in the new subject again. The essays are then presented to other students from the same class according to a timetable at the lessons, and selected essays are also presented as lectures for all students of the subject. The aim of this double presentation is to increase student knowledge about how to present their work.
2. Student teams also get the semester task defined the first week. The topic applies for the individual task too, where the goal is to write several user stories based on the example provided on the lesson.
3. The team task is divided into seven steps (see Fig. 2). For each step, there is a smaller task defined. The small tasks represent the incremental process of requirement processing (and also understanding) and the incremental process of design and implementation. The last step of the task is the software product presentation. To achieve all goals, the team must operate fast. The best method for success is agile.

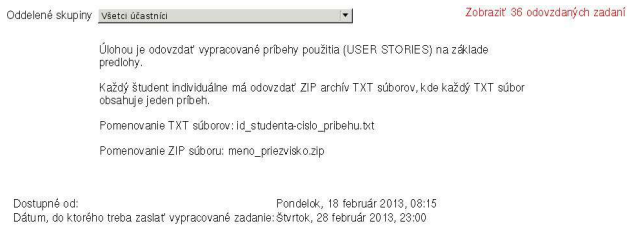

Figure 3. Example individual task in LMS Moodle. The one to write user stories.

At the beginning, students create their user

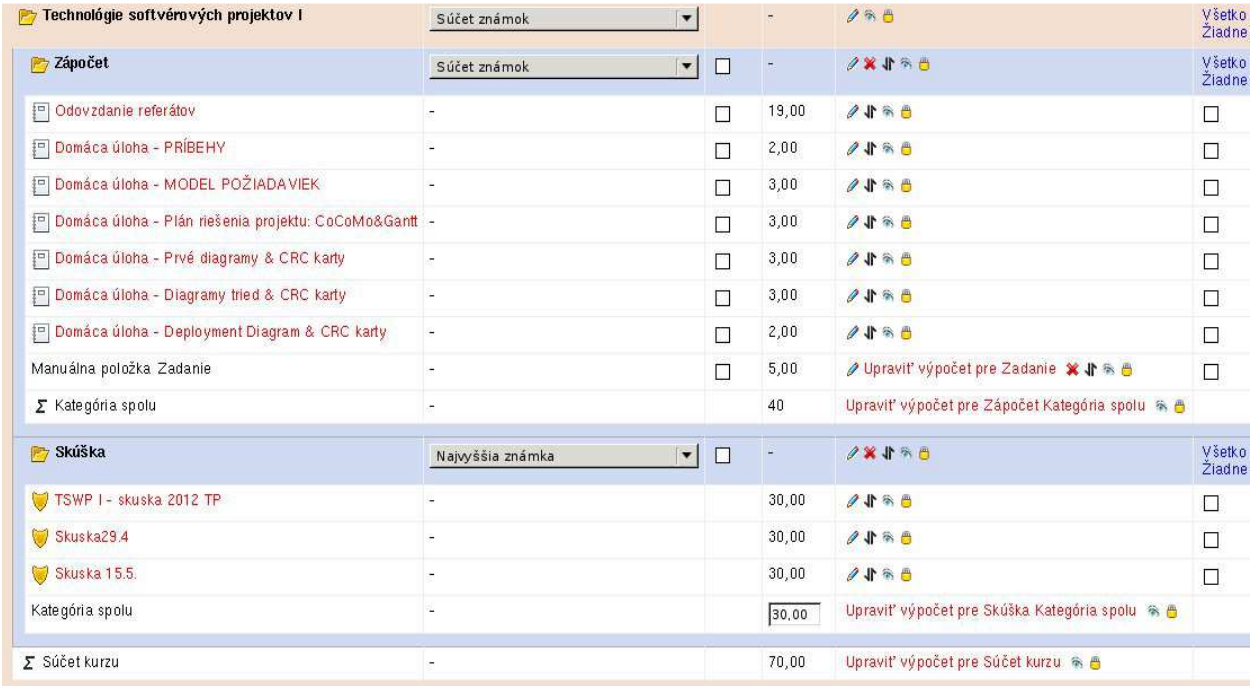

Figure 2. Grades table in LMS Moodle.

stories. Then, these are being analyzed in a team. To create the required requirements model (RQM), planning poker is used to determine requirement properties based on the user stories.

D. Process Documentation

A parallel task is also assigned to the team members: they have to report their activities using a predefined form. This documentation is included in the result set of each team task report and is the part of the final project documentation too.

III. ASSESSMENT METHOD

Student work in the semester is evaluated based on the grading structure presented on Fig. 2, maximum is 40, and minimum to pass the course lessons are 21 points. The 40 points could be collected as follows:

1. Maximum score for the essay is 19 points. Score is given by quality of the content of the essay and its presentation.
2. Six weekly controlled activities (small tasks) offer 16 points together. Every control affects the direct result and the activity report of each team member.
3. Presentation of the resulting system is worth up to 5 points.

The individual task is very important, because its results are used as base data for the other tasks.

To avoid possible problems caused by failing in one single task, students are allowed to upload their solutions after the deadline one time. Teamwork results need to be handed in only once, i.e. it is enough when one of the team members uploads the team result into LMS Moodle. The solution using separate groups for each team task allows easy assessment of these tasks.

IV. RESULTS

The presented course structure has been applied in the actual semester. We had 40 students in the course:

1. 36 active,
2. 1 with a shortened semester,
3. 1 with individual study plan,
4. 2 on Erasmus exchange.

Only the active students produced complete results, the aim to involve the students with different semester organization partially failed. The students abroad could not be involved too.

Student feedback to the course organization was various, some students welcomed the strong limits, and others could not organize their team as required. The stressing situation was a simulation of real industrial circumstances.

Tab. 1 concludes the student assessment results from the semester. Average values indicate, that

Téma	Meno	Typ zadania	Dátum, do ktorého treba zaslať vypracované zadanie	Zadanie bolo odovzdané
	Odovzdanie referátov	Preniesť jeden súbor	-	Zobraziť 36 odovzdaných zadaní
2	Domáca úloha - PRÍBEHY	Preniesť jeden súbor	Štvrtok, 28 február 2013, 23:00	Zobraziť 36 odovzdaných zadaní
3	Domáca úloha - MODEL POŽIADAVIEK	Preniesť jeden súbor	Pondelok, 4 marec 2013, 00:00	Zobraziť 10 odovzdaných zadaní
4	Domáca úloha - Plán riešenia projektu: CoCoMo& Gantt	Preniesť jeden súbor	Pondelok, 11 marec 2013, 00:00	Zobraziť 9 odovzdaných zadaní
5	Domáca úloha - Prvé diagramy & CRC karty	Preniesť jeden súbor	Pondelok, 18 marec 2013, 00:00	Zobraziť 9 odovzdaných zadaní
6	Domáca úloha - Diagramy tried & CRC karty	Preniesť jeden súbor	Pondelok, 25 marec 2013, 00:00	Zobraziť 9 odovzdaných zadaní
7	Domáca úloha - Deployment Diagram & CRC karty	Preniesť jeden súbor	Pondelok, 8 apríl 2013, 00:00	Zobraziť 9 odovzdaných zadaní

Figure 4. Task list in LMS Moodle with deadlines and results.

TABLE I. STUDENT SCORES IN THE COURSE

	Maximum	Group 1 average	Group 2 average	Course average
Essay	19	17,8	16,79	17,295
User Stories	2	1,85	1,58	1,715
RQM	3	2,85	2,38	2,615
Project plan, CoCoMo & Gantt Diagram	3	2,3	2	2,15
Sequence Diagram & Activity Diagram & CRC Card	3	2,45	2,16	2,305
Class Diagram & CRC Card	3	2,5	2,58	2,54
Deployment Diagram & CRC Card	2	2	1,79	1,895
Implementation	5	5	4,47	4,735
Project totals	40	36,75	33,79	35,27

the course content is relatively easy to complete to average students.

V. CONCLUSION

We presented the renewed structure and content of our "Technologies of Software Projects" course. Our experiences with the new course are based on work with two student groups. Students were not skilled in agile method application, but several of them are already employed in software companies.

As missing property, we can select the lack of integrated systems in LMS Moodle. To present student results, they needed to use several different editors and tools, which number could be reduced by integrating selected parts into the LMS. Usage of a special system is not a good idea, because that would lead to the situation that students would be familiar with only that one specific system.

ACKNOWLEDGMENT

This work was supported by the Cultural and Educational Grant Agency of the Slovak Republic under project No. 050TUKE-4/2013 (20%): "Integration of Software Quality Processes in Software Engineering Curricula for Informatics Master Study Programme at Technical Universities – Proposal of the Structure and Realization of Selected Software Engineering Courses."

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THE SOCIOLOGICAL THEMES IN FRENCH AS A FOREIGN LANGUAGE CLASS

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Abstract - This research study consists of two parts. Initially, we were focused on analyzing sociological themes in French language textbooks. Results showed that there is a basis for introducing sociological themes in French language classes. Namely, all the defined themes already appear in textbooks. The theme „Culture“ appears much more than any other theme. The theme „Religion“ appears the least. In the second part of the study, we were focused on examining students attitudes and preferences towards sociological themes in general, with a special emphasis on themes which, according to our texbook content analysis. It was shown that students mostly hold positive attitudes towards French language classes and sociology. Furthermore, it was mainly not difficult for them to understand and acquire sociology class content and there is no sociological theme they distinctly did not like. Of all the themes they could explore in French language classes, students would most like to explore the theme „Culture“ and they would least like to explore the theme „Politics“. These data are precious beacuse they give us objective information about students interests. This information can be useful to single out further goal of encouraging interdisciplinarity and a holistic approach to teaching and tuition.

I. INTRODUCTION

In the narrowest context, this paper aims to focus on the following topics: analyze and record the sociological themes in the books of French as a foreign language, and to examine the attitudes and preferences of students toward sociological themes in general, with special emphasis on sociological topics that appear in the books of French language. Introducing sociological topics in teaching the French language can help foster intrinsic motivation students (Vizek Vidovic et al., 2003), and when we talk about teaching French, she becomes more interesting to students introducing a sociological issue, gives students a richer vocabulary, goes solely linguistic content and be given the opportunity to students to demonstrate the right to the "I" in the class of languages that are so rarely show (Vrhovac, 2001). Similarly, if we talk about sociological topics in language teaching, until now, there was not conducted a study on students' interests in relation to them. Thus, the analysis aims to examine the current state of occurrence of these themes in the books of the French language, or condition that is objectively true for all students of French language. Specifically, the textbooks are the only means of teaching prescribed and equal for all students, as exclusive features and operation of the teacher and any additional documents and materials not covered by textbooks, but can be used in teaching French as a foreign language. We also want to examine the attitudes and interests of students. In this way we will get an insight into the topics that students want to cultivate during language classes, with the broader aim of determining their interests. The ultimate goal of this research is to create a foundation and guidelines for the enrichment of language teaching French language by tailoring interdisciplinary topics, taking into account the interests of students and their preferences for certain sociological topics. As far as educational policy in Croatia, the concept of cross-curricular topics in the National Curriculum Framework (2010) is plausible and is considered to be the goal for which to strive. Of the six interdisciplinary themes in the NCC, the introduction of sociological themes in teaching French as a foreign language could meet two: personal and social development and civic education.

II. THEORETICAL CONCEPTS, HYPOTHESES AND METHODOLOGY ANALYSIS CONTENT

For the purposes of this study, we took a sociological topic for the unit content analysis. How to define a sociological theme in this case? Sociological theme in this sense is understood as a backdrop or framework within which are designed activitys, tasks, etc. that allow ultimately adopting linguistic phenomena. In this sense, social issues in language textbooks are not direct or highly visible, because the adoption of the sociological phenomenon was not an objective of teaching a foreign language. Although the use of thematic units has serious drawbacks because categorization

is not unambiguous as it is based on the separation of phrases such as words or sentences (Milas, 2005), for the purposes of this study it was not possible to take "physical or syntactic unit of analysis" (Milas , 2005: 508), because only the appearance of a word in the textbook from a foreign language does not necessarily mean that it is treating the specific topics.

In determining the sociological themes in terms of content we used primarily the sociology textbook for high schools called Sociology (Fanuko, 2009) and a textbook in sociology called Sociology (Giddens, 2007). Emphasis is on topics that are largely covered teaching sociology in secondary schools. Thus, for purposes of this analysis ten sociological themes are provided. Socialization and identity, Gender, Family, marriage and kinship, Culture, Religion, Education, Employment and economic life, Mass media and technology, Politics, Social change. It is clear from the description of categories that they may overlap among subjects. It is therefore likely that the analysis of content we will experience lessons that contain more sociological themes at once. For the purposes of this content analysis, it will be taken into account everything a lesson in a foreign language can contain.

The main hypothesis of this study is: Of the ten defined sociological topics, sociological topics Culture appears in most lessons in the analyzed textbooks from French as a foreign language.

Samples of the content analysis are the textbooks from the French as a foreign language that are commonly used by the first to 4 grades in high schools in Zagreb. It's eleven books with which students encountered in the course students practice teaching of French in the Department of Romance Languages at the University of Zagreb: Le nouveau taxi 1 and 2, Alter Ego 1, Alter ego1, 2:03, Café crème 1, 2 and 3 and Forum 1, 2 and 3. For the purposes of this analysis, the most appropriate "way of quantifying the content is transformed into a binary variable, where the unit joins the content in which categories emerged, and one in which zero is absent (Milas, 2005). Listed and defined sociological themes are not mutually exclusive. It may happen that one lesson includes more sociological themes. The most appropriate statistical analysis of data and display the results of this content analysis is to display the percentage of sociological themes in the documents and textbooks.

III. RESULTS AND DISCUSSION CONTENT ANALYSIS

Summing all the lessons of all 11 books lead us to the number of 536. Sociological themes occur in 85.26% lessons. As seen in Table 5 and Figure 2, the total number of lessons, theme Culture occurs most frequently, or 56.34% of the lessons. Followed by themes: Work and economic life, Politics, Mass media and technology, Social change, Socialization and identity, Gender, Family, marriage and kinship, and at least appears theme Religion.

TABLE 1. PERCENTAGE OCCURRENCE OF SOCIOLOGICAL TOPICS IN TEXTBOOKS FROM THE FRENCH AS A FOREIGN LANGUAGE FROM A GROUP OF TEXTBOOKS LE NOUVEAU TAXI, ALTER EGO, CAFÉ CRÈME AND FORUM*

	Sociological themes	%
1.	**Socialization and Identity**	6.9
2.	**Gender**	6.16
3.	**Family,marriage and kinship**	5.41
4.	**Culture**	56.34
5.	**Religion**	3.73
6.	**Education**	5.97
7.	**Work and economic life**	17.54
8.	**Mass media and technology**	14.55
9.	**Politics**	16.42
10.	**Social changes**	11.19

*Percentages are calculated from the total number of lesson book Le nouveau taxi 1 and 2, Alter Ego 1,2 and 3, Café crème 1,2 and 3 and Forum 1, 2 and 3, which amounts to a total of 536

The content analysis showed that in the books of French as a foreign language appearing all defined sociological themes: Socialization and Identity, Gender, Family, marriage and kinship, Culture, Religion, Education, Employment and economic life, Mass Media and Technology, Politics and Social changes. While all these sociological themes are presented in textbooks, they do not appear in the same frequency. In this sense, the content analysis confirmed the original hypothesis: of the ten defined sociological topics, sociological topic Culture appears in most lessons in the analyzed textbooks from French as a foreign language. It appears in 56.34% of the total number of lessons all analyzed textbooks. Language teaching in general, including the French, implies the involvement of different topics from social life, keeping in mind all the communicative situation in which one can find a student, a user and a speaker of French. Results of this study are useful for sociology, because it shows that objectively there is already a lot of sociological themes in the books of French as a foreign language, and that there is a good foundation for the planned introduction of sociological topics in teaching the French language.

IV. THEORETICAL CONCEPTS, HYPOTHESES AND METHODOLOGY SURVEY

This research is to examine students' attitudes about school subjects sociology and French as a foreign language, to examine which topics they like or do not like in the teaching of sociology, what topics were difficult to understand and adopt, what social issues and antisocial themes students want to process in teaching French, and finally, what sociological topics they are interested in general.

The instrument we used is conveniently questionnaire that was designed for this research and is titled Questionnaire on attitudes of students on topics in the teaching of sociology and French languages, and their general interest in the same and is located in the Appendices.

We chose eight thematic sections of the textbook (Fanuko, 2009), and we add themes Gender and Mass Media and Technology. We have designed and thirty indicators in ten sociological themes. All these indicators are taken either from the textbook Fanuko (2009), any textbook Giddens (2007). Although previous research has shown that of all sociological topics most commonly is theme Culture in textbooks, for survey, we assume that the interests of students will not coincide with this result. Specifically, we believe that third grade high school students are not interested in so many cultural issues, such as issues of media, technology and social change. Given today's lifestyle and the use of technology in everyday life, it is expected that young people, high school students, will be more interested in this topic. Thus, our first hypothesis is: Of all these social issues, students in teaching French language most want to cultivate topic Mass media and technology and their impact on society. As for the second hypothesis, we assume that: Students are generally most interested in the topic of mass media and technology. Our third hypothesis is: Of all these social issues, students in teaching French at least want to edit the theme Policy.

For the method of this study, we chose a survey. Non-probabilistic method we came to a convenient sample that includes students third grade four Zagreb gymnasium: IX., Classic, V and XVIII., who taught French at school. We can not claim that the sample is unbiased and that is representative of the population it represents.

V. RESULTS AND DISCUSSION SURVEY

Indicators are grouped into ten broad themes and we get, as we can see in Figure 1, the average general interests of students in relation to the same. We see that all threads are between grade 3 and 4, and that no single issue, on average, is very interesting to students. We can tell that, so to speak, in the broadest sense, that they are the most interested in the subject Culture, and at least Policy.

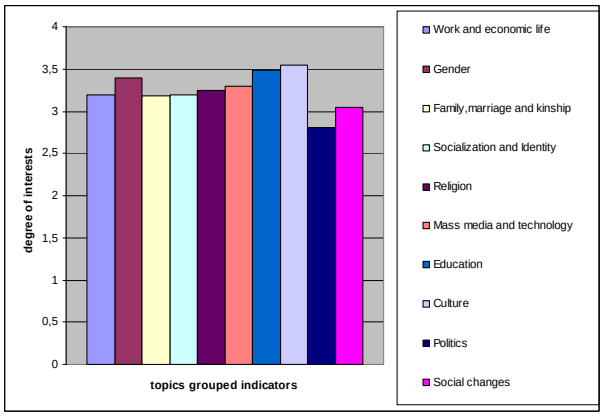

Figure 1. General interest of students to sociological topics grouped into ten broad themes

In Figure 2, we see the displayed results concerning the consistency of students' answers on the topics they want to cultivate in teaching French language and the topics that interest them generally. In most cases there are more topics they are interested in, more than they would like them to be processed in teaching French.

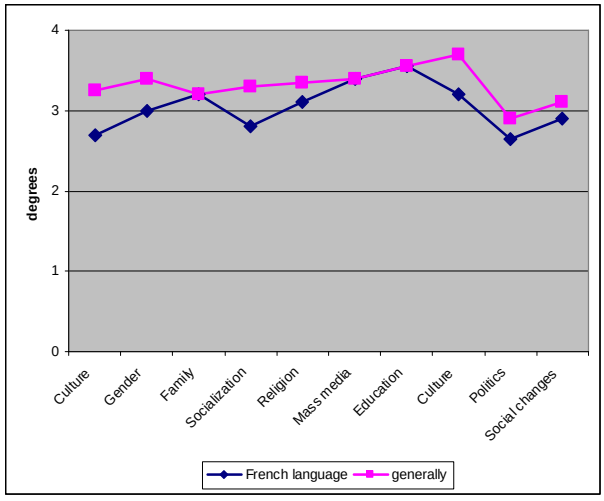

Figure 2. Consistency of students' attitudes about sociological topics they would like to edit the hour French language and their general interest in the same

Our first hypothesis (of all these social issues, students in teaching French language most want to cultivate topic Mass media and technology and their impact on society) has not been confirmed. In

fact, most students want to edit the theme Culture (Figure 2). Another hypothesis (Students are generally most interested in the topic of mass media and technology) was also not confirmed. The results showed that students and generally most interested in topics Culture (Figure 1). The third hypothesis was: Of all these social issues, students in teaching French at least want to edit the theme Politics, and it is confirmed (Figure 2). Also, it showed that students are generally the least interested in topics Politics (Figure 1). Finally, a major drawback of the study is sample. None of these findings can not be generalized.

VI. CONCLUSION

Further research on this subject should go in the direction of increasing the sample which is in our case simply too small to be somewhat generalized. With a larger sample it might be better to see the differences between the genders and between schools. We could also add more indicators to get more minutely insight into students' interests.

Finally, these data are very valuable because they give us a fair view of the interests of students. They can serve future and current teachers, textbook writers and everybody involved in teaching languages as a basis for the design and creation of models of teaching such content in teaching French language, in order to further encourage interdisciplinary and holistic approach to teaching and learning.

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COMPARATIVE ANALYSIS OF THE SCHOOL PROGRAM (AND CURRICULUM) TEACHING SOCIOLOGY IN CROATIAN AND FRENCH SECONDARY SCHOOLS

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Abstract - The analysis of curriculum and objectives of the curriculum compares the basic starting point of teaching sociology in French and Croatian general education system and emphasize that sociology, as a scientific discipline, has a completely different status. In Croatian gymnasium sociology is taught within the school subject "Sociology", which is a separate subject, while in the French lycée it is taught as a multidisciplinary subject called „Scienceséconomiques et sociales". While the main goal in Croatia is acquisition of basic theoretical approaches, concepts and research methods of sociology, in France, the emphasis is on the student's insight into the complexity of the social world and the ability to study and clarify the same from different perspectives. It follows that, in France, the objectives of the teaching process are defined as outcomes, while the Croatian curriculum focuses on the content of the teaching process. The difference is also in the scope as opposed to "Sociology", which is just one of the subjects that are taught for one school year, subject "Scienceséconomiques et sociales" is the main school subject of students who have chosen the economic and social direction in the Lyceum. The conclusion is that the general objectives are still largely similar because both systems seek to educate citizens of modern democratic society. The work elaborates that the Croatian curriculum, in many aspects, compared to the French is simply outdated.

I. INTRODUCTION

In the last few years many Croatian and European documents have been focusing on question of quality in education as a very important element of overall social development (Curić, 2007). But, there is still deficiency with comparative analysis of European and international educational systems that could contribute to better understanding of roles but also to define goals and purposes of different elements in educational structure (Antić, 1993). There is also just a few documents regarding role of special school subjects and their specific roles in education, especialy regarding teaching sociology in highschools. Among Croatian science publications regarding methodology of sociology there is not so many analysis, documents or other publications that clearly defines purposes of teaching sociology in Croatian educational system. Because of that we decided to investigate and analyze the way that sociology, as a scientific discipline, is taught in French general education, regarding secondary education.

The goal is to compare and to display the basic outcomes of teaching sociology in French and Croatian general educational system so we could have better understanding of the role that sociology has in French and Croatian society.

II. TEACHING SOCIOLOGY IN FRENCH AND CROATIAN GENERAL EDUCATION SECONDARY SCHOOL SYSTEM

Sociology, as a subject in secondary schools, in most European countries, appears around the 1960s. in the 20th century. However, in most European secondary system sociology, as a separate school subject, does not exist. Greece, Malta, Slovenia and Croatia are the only European country in which the "Sociology"[1] exist as a separate subject at the secondary level (Kougioumoutzaki, 2008)[2]. Most often it is integrated into the school subject called Social sciences, etc. (Kougioumoutzaki, 2008) and which serves to promote citizenship and democracy. Such a status of sociology at the level of secondary education leads us to the conclusion that the scientific discipline of sociology can not offer students anything specific and inevitably in the secondary general education. Some methodologists sociology believe that this can only mean one thing – sociology, as a scientific discipline, is not important enough to be made a separate subject in the school curriculum (Kougioumoutzaki, 2008). Unquestionably, sociology, as a scientific discipline, has its own

specific tools, scientific methods and topics that distinguishes it from other sciences, and that, due to their specific method, is irreplaceable in high school (especially general education) education.

The Croatian and French secondary school system of sociology as a scientific discipline occupies a very different place. The Croatian grammar sociology began to teach in secondary education in sixties of the 20th century on the initiative of Rudi Supek, Croatian philosopher, sociologist and psychologist, who is considered to be the founder of Croatian sociology. Today sociology, in Croatian grammar[3], is taught within the subject "Sociology" in the third grade of high school, for one school year. "Sociology" exists as a separate subject, and one of the main objectives of this subject is the adoption of basic theoretical approaches, concepts and research methods of sociology applied to examples of contemporary Croatian society (Fuchs, 2011). Students listen to two class hours of teaching per week, a total of 70 hours per year. On the other hand the French Lyceum is focused on a particular group of subjects, with a greater emphasis on subjects related to the selected direction. One of the possible directions that can be selected in the second year of secondary general education is the economic and social direction (Fr. économique et sociale)[4] in which students gain insight and learn the concepts, theories and conceptual and analytical instruments of economics, sociology and political science. "Sciences économiques et sociales" (en. "Economic and social sciences") is primarily a multidisciplinary subject whose main goal is the student's insight into the complexity of the social world and the ability to study and clarify the same from different angles. Teaching sociology, economics, and political science content is divided in the way, so that it is clear where the boundaries of each discipline are (Programme d'enseignement Specifique de sciences économiques et sociales en classe de première de la série économique et sociale, 2010). Underlying hourly rate and degree of the obligatory character of the subject "Sciences économiques et sociales" varies each school year, following the structure and organization of the Lyceum.

Briefly stated, in the Croatian high school system, sociology is a separate subject that is taught twice a week for one year. Overall, the students listen to 70 hours of teaching sociology. In the French high school system sociology is taught within pluridisciplinary subject "Sciences économiques et sociales". In the final cycle of secondary education (i.e. the last two years of secondary education) students of French lyceum listen to 180 hours per year for this subject, the most important and main subject students of economic and social direction. Overall, over the three years of secondary education pupils audience of about 120 hours of pure sociology and sociology of politics. It should be noted that most of the teachers who taught "Sciences économiques et sociales" has the most economic higher education, not a sociological or political science which can significantly affect the way in which the subject is taught and special knowledge of sociology as a scientific discipline because teachers do not have the sociological academic education. On the other hand, Croatia professors of "Sociology" must be experts in sociology. They must have sociological academic education.

III. THE OBJECTIVES OF TEACHING "SOCIOLOGY" AND "SCIENCES ÉCONOMIQUES ET SOCIALES"

We compared the general and basic objectives of education "Sociology" and "Sciences économiques et sociales" that are listed in the latest curriculum.

In Table 1 we present a general and basic objectives of education "Sociology" and "Sciences économiques et sociales" listed in the curricula so that the similarities and differences are clearly visible in one place.

TABLE I. THE GENERAL OBJECTIVES OF THE SUBJECTS "SOCIOLOGY" AND "SCIENCES ÉCONOMIQUES ET SOCIALES"

Sociology	Sciences économiques et sociales
Gaining knowledge of social phenomena and the sociology, scientific approach society etc.	Progressive adoption of concepts, methods and basic issues of three social sciences - economics, sociology and political science.
Developing thinking and expressive skills of students, the use of concepts, categories, definitions, synthesizing ideas	Preparing students to continue their education and guidance to continue their education after graduation the state baccalauréat.
Developing beliefs and behaviors appropriate for inclusion in society, encouraging individuality and criticism as the basic values of a democratic culture, developing awareness of civilization, society and social problems.	Help students in the construction of identity as a civil citizen who is due to acquired knowledge and skills, able to participate in public debate on economic, social or political problems.

By analyzing and comparing the overall objectives of two subjects, we concluded that it is clearly visible individual and social aspect of both cases. On one hand, the student adopts the terms,

concepts and methods of sociology or social science and economics, thus acquiring knowledge and skills that meet individual needs. On the other hand, will satisfy the needs of society because teaching of both subjects tends to educate democratic citizens who can judge the social reality with “critical eye” and be aware of how it can participate. Clearly, teaching two subjects have a role to empower individuals to live in society, identity-building of civil citizenship and recognition of various aspects of the personality of individuals.

According to the Curriculum, one of the general objectives of the subject "Sociology" is to confirm that the sociological insights and special sociological view of society is indispensable component of education for every citizen of modern society (Curriculum for High Schools, 1994). The current curriculum for the teaching of "Sociology" comes from 1994. The programs are often criticized in Croatia and require the creation of new (the release of the National Curriculum Framework supports the development of new curricula and subject curricula). Many methodology and didactics experts complain that the programs are outdated and overly burdened by requirements for the acquisition of factual knowledge and historicism that is in non-compliance with the current changes in knowledge and technology (Halačev, 2002). "The students are mainly seeking to acquire the static knowledge, rather than knowledge of the search and synthesis of data" (Halačev, 2002: 62). The curriculum in Croatia has been developing in the last ten years. According to the National Curriculum Framework (NCF), which should serve as a starting point for defining the curriculum and subject curriculum, expected educational attainment (ie, outcomes of education or competency) students are not defined at the level of the subject Sociology, but at a certain educational areas.[5] We conclude that subsection *Individual, group, culture and society* in the second chapter of the expected achievements at the end of the fourth educational cycle of social science and humanities area relates to the subject "Sociology". Goals are operationalized in such a way that it should be clear what the student should be able to do at the end of the teaching cycle (as competence).

According to the NCC, students will (National Curriculum Framework, 2011:202):

(1) Explain the importance of knowing and valid evaluation of heritage and their identity as a Croatian, European citizens and citizens of the world and explain the importance of respecting the heritage and identity of the other.

(2) Explain the basic theoretical approaches and concepts and research methods of sociology and social sciences at the examples of contemporary society.

(3) Explain the basic social structure, institutions, social processes and relations in Croatian society.

(4) Apply the acquired knowledge in the analysis of Croatian society using simple research methods, reasoned discussions, writing essays, etc.

(5) Explain the process of European integration and globalization processes and their impact on the Croatian society.

(6) To compare and evaluate relationships: local - global, traditional - modern and postmodern, the majority - minority, Croatian identity - multiculturalism.

In summary, we conclude that the teaching of "Sociology" in Croatian high schools is focused on the acquisition of knowledge and skills that are the basis of sociological discipline and acquiring competencies that can allow students the active participation in the Croatian democratic society. Teaching "Sociology" seeks to raise civil citizen and to develop higher order of thinking skills.

The foundation of classes "Sciences économiques et sociales" is that each component of social life can be studied and explained in different ways, depending on whether we look at the eyes of sociologists, political scientists or economists. One of the main aims of the adoption of concepts and analytical instruments in each discipline from various angles is to compare and understand the various components of the social world (Programme d'enseignement Specifique de sciences économiques et sociales en classe de première de la série économique et sociale, 2010, 2-3). Each discipline has a different disciplinary and theoretical approach. Students need to see how different theoretical concepts, measurement tools and instruments allow the interpretation and explanation of the specific social problems. Students should acquire the knowledge and skills that allow them to observe the social world through the eyes of sociologists, economists and political scientists, combining elements of all three disciplines to explain social reality. Thus,

according to the Curriculum one of the main aims of the development of epistemological caution and critical thinking (Programme d'enseignement Specifique de sciences économiques et sociales en classe de première de la série économique et sociale, 2010:2), which is the concept of educational development higher order thinking. The Curriculum for the first year pointed out that the goal of sociology at the "Sciences économiques et sociales" is to develop a "sociological eye" to students, which should always be between inclusion and distinction, allowing the objectification of social services and an explanation of enigmatic and paradoxical social phenomena (Programme d'enseignement Specifique de sciences économiques et sociales en classe de première de la série économique et sociale). It also warns the difference between social problems and the construction of sociological problems and is trying to teach students how to construct a social problem. (Programme d'enseignement Specifique de sciences économiques et sociales en classe de première de la série économique et sociale, 2010). Students are also introduced to various forms of sociological research such as ethnographic or participatory observation, interview, questionnaire, and a combination of qualitative and quantitative research methods (Programme d'enseignement Specifique de sciences économiques et sociales en classe de première de la série économique et sociale, 2010). One-fifth of the overall teaching "Sciences économiques et sociales" is dedicated to the individual project with has one main goal and that is implementation of a short survey, processing of data collection and analysis of existing research.

Curriculum "Sciences économiques et sociales" in the final cycle (first and final grade)[6] is designed to gradually deepen the knowledge and skills of students. In the second class, the emphasis is on adoption of the basic concepts and skills, measurement procedures, instruments and methods of each discipline. In the first year all that knowledge and skills are deepen in order to mobilize knowledge in the final year and adopt the concepts and skills used at the highest levels of thought - synthesis (creation) and evaluation (evaluation)[7] - in order to explain and understand social reality.

IV. CONCLUSION

In most European countries, sociology is taught as an integral part of the subject Social Sciences, etc., which serves to promote citizenship and democracy (Kougioumoutzaki, 2008). Thus, within the framework of the French general education school system teaches sociology within the subject "Sciences économiques et sociales" (en. "Economic and social sciences"), and Croatia is one of the few countries where the "Sociology" is taught as a separate subject. Although the course "Sciences économiques et sociales " is pluridisiciplinary nature, there is a clear distinction between economic and sociological teaching material, as well as those relating to the sociology of politics (and there are instructional content that is included in" Sciences économiques et sociales "called" cross-eyes "and aimed at pluridisciplinary approach to social problems and phenomena). In Croatia, the subject "Sociology" is one of the subjects to be taught for one year, while the subject "Sciences économiques et sociales" is a major for students who have chosen economic and social direction in the Lyceum.

And in Croatia and France, professors should serve the curricula prescribed by the relevant ministries. While in France the objectives of the teaching process are defined as outcomes (although too general), Croatian curriculum focuses mainly on the content of the teaching process, not the outcome of the same. The outcomes were noted in other documents (such as the National Curriculum Framework and Test directory for state graduation in Sociology).

Comparison of the objectives outlined in the two curricula leads us to the conclusion that the general educational objectives are similar, as we expected. In both systems the goal is to raise democratic citizen of modern society that would be able, on a daily basis, to use the knowledge and skills acquired through the course "Sociology" and "Sciences économiques et sociales". The objectives outlined in the curricula are too general to be able to conduct a detailed comparative analysis of the two subjects. In any case, we believe that the Croatian curriculum is outdated and the objectives set out in the National Curriculum Framework too ambitious. We hope that the paper will serve as a database for future analysis and research papers on the methodology of sociology.

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[1] When we talk about sociology as a scientific discipline, it is written with a small letter. When we talk about sociology as a subject in secondary schools we write the term in italics and with quotation marks "Sociology".

[2] Croatia is not featured int he original work

[3] "Sociology" is not only taught in Croatian grammar. It is also taught in the Economic high school (if students selected secretary direction) and Administrative and Technical High School (if students chosen Administrative Officer direction).

[4] Students (with the consent of the teachers' council) before enrolling in the second year of secondary education enter one of three directions - economic and social (fr. économique et sociale), literary (fr. littéraire) or scientific direction (fr. scientfique). Students who did not select economic and social direction through their education do not have the opportunity to follow the teaching "Sciences économiques et sociales".

[5] The central part of the National Curriculum Framework (NCF) are student achievement in educational areas, developed by educational cycles and descriptions and objectives of cross-curricular topics that are aimed at developing students' key competencies and achievements. The NCC developed four educational cycle, and five educational areas. Educational cycles: the first cycle - that make I, II., III. and IV. grade, second cycle - that make the V and VI. grade, third cycle - that make VII. and VIII. class; fourth cycle - refers to the first and second. class and professional art schools, while in secondary schools covering all four grades. Educational areas NCF are the following: (1) language-communication area, (2) the mathematical field, (3) natural area, (4) and Technical Information area, (5) the socio-humanitarian field, (6) Arts , (7) physical and health area (National Curriculum Framework, 2011). For more information, see the National Curriculum Framework (2011)

[6] First class (fr. première) refers to the chronological second year after joining the Lyceum, and the final (terminal) on the third and final year that students spend in the Lyceum

[7] Concepts of synthesis and creation are taken from Bloom's taxonomy of educational objectives.

THE IMPORTANCE OF INTELLECTUAL EDUCATION CONCEPT BY JOHANN HEINRICH PESTALOZZI

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Abstract: Knowing different learning theories and theories of knowledge is important because of the clarity about the development of modern educational system, issues and problems of historical and contemporary pedagogy that can, in a way, contribute to the development of the strategy of educational work. This paper is about the theory of Johann Pestalozzi's intellectual program, which greatly influenced the development of modern pedagogical thought.

The task of this paper is to present the basic theory of Johann Heinrich Pestalozzi, to emphasize his commitment to changes in practical pedagogical work as opposed to older scholastic pedagogical practice, all with the aim of knowing the methods of education and for better understanding of modern education system, or even its improvement by applying some statemants from the given concept.

Therefore, we will pursue the issues and problems of sensory information, schools, classes, teachers' personalities, criticism of old educational system, educational objectives and complete conception of Johann Pestalozzi's intellectual program.

It should be noted that Pestalozzi based his concept of education on the belief that education involved every aspect of human development, from physical, through intellectual to moral, and that they mutually interpenetrated.

I. HISTORICAL AND SOCIAL CONTEXT

The end of the seventeenth and the beginning of the eighteenth century is marked by great social and economic changes that had a major impact on philosophy, the formation of new knowledge theory concepts, and therefore on all sciences that, to some extent, relied on philosophical thinking. As the result of the revolutionary movement of society, enlightenment ideas and movements appear throughout Europe and they introduce the idea of God, reason and nature into their substance, all synthesized into one comprehensive view: "The central idea of the Enlightenment is a celebration of reason as a power through which people understand the whole universe and improve their living conditions. Knowledge, freedom and happiness were considered to be the main features of rational man."[5].

In the mid-eighteenth century, the social system of Switzerland was almost identical to the French and English. Switzerland was mainly peasants' country, in which the nobility was in charge, they were getting rich at the expense of the common people led peasants to the edge of the existence: "In Switzerland, the attempts for the anarchy and misery to be extinguished did not lead to revolution as in France, but they expressed themselves in the actions of individuals and were more philanthropic "[2]. One of the "active individuals" who tried to change or at least influence the change of this social order with his ideas was Johann Heinrich Pestalozzi. He was born in 1746 in Zurich. After elementary school, he graduated from Latin high school and managed to enroll in the University of Zurich in order to study theology. Later, under the influence of Rousseau's work, he abandoned his studies. Since he had the opportunity to get to know the rough life of peasants in his childhood, and deeply convinced that proper upbringing and education could improve the quality of life, he became actively engaged in the attempts to reform the current education system by his literary work and foundation of slum schools. According to Pestalozzi, the main goal of education was education of the masses. He expressed his educational views in number of his works, the most notable of which is How Gertrude teaches her children (this paper will mainly refer to it, as well as to the works of intellectuals mentioned previously), written in epistolary form, in the form of 14 letters to a friend Gesner, without any strict scientific order. In the context of education of the masses, he founded slum schools, first in Birr, then in Stans, and then in Yverdon, but all of these attempts failed, mainly because of the difficult financial situation. However, despite the failed attempts to establish a school for education of the

large number of children, he deserves the title of a great educator and reformer of the education system as he devoted his whole life to it. The epitaph on his tomb, written by Augustin Keller, says a lot about Pestalozzi's greatness: "Saviour of the Poor in the Neuhof, Preacher of the People in 'Leonard and Gertrude,' In Stans Father to Orphans, In Burgdorf and Munchenbuchsee Founder of the new Elementary School, In Yverdon Educator of Mankind. Man, Christian, Citizen. All for Others, Nothing for Himself." [5].

A short review of the biography and socio-historical context will help us understand the importance and revolutionary character of his ideas about education better. In times of severe poverty of the people, he believed that education can create a man who would be beneficial for society, the state, and mostly to himself. He sharply criticized the existing education system which was based on the simple memorization of curriculum, and introduced a child's personality and sensory experience in education, as the starting points of his conceptions of education.

II. GOALS OF EDUCATION

When we historically review the understanding of the educational concept and setting of its goal, we can see a constant striving for a harmonious upbringing of man. As the process of awakening and self-development, education is the achievement of the highest human possibilities, or activity that provides intellectual, physical and moral development of the individual toward the complete self-awareness and control over oneself, and mutual compliance of requirements for communication and social cooperation.

Pestalozzi's concept of education greatly relied on Rousseau's, and even Locke's, with the exception that Pestalozzi believed that renewal of society could be achieved through education. According to him, the highest aim of education was in fact to "be freed from the misery": "For a long time, ever since my youth, my soul has been striving, vigorously and like a forceful river, only towards the aim to stop the source of the misery I saw all the people around me had fallen into."[4].

"According to him, education consists of the use of specific skills and knowledge based on the general powers and in special calls and some classes, because, for a man, the call is the environment in which he will live and work and thus practically show his skills."'(Vanlić, 1964). It is believed that it is essential that education starts from the cradle. This initial education Pestalozzi entrusted to mother, and he would attempt to create a textbook that she would use during the rearing of her child. He advocated education in schools and the benefits of such education. He developed a universal methodology of teaching - learning from perception to clear terms, from easier to more difficult.

III. CRITICISM OF THE EDUCATIONAL SYSTEM

Pestalozzi was not only dissatisfied with the existing educational system; but he fought against that system with his views and his work.

Pestalozzi insisted on the active participation of a child, both in the choice of classes and in mastering of the curriculum by making independent conclusions drawn on the basis of sensory experience. While expressing gratitude to the governor Schnell and Doctor Grimm, he said that these were the people who knew well "the soft sand on which our old, rotten schools stood and thought that it was possible that beneath this sand was the solid earth." [4].

IV. ABOUT INDIVIDUALIZED EDUCATION

Pestalozzi states that education in public institutions, if they are organized in a way that he himself suggests, is useful and necessary as much as the education at home, which begins with the birth of a child. In his book *How Gertrude teaches her children*, Pestalozzi emphasized that mother should take care about the child's upbringing immediately after his birth. Furthermore, he saw *the Book for mothers* as a kind of handbook that they should use in order to submit child's senses to the first elements of education right after the child's birth. Thus, mothers should take care of a child's upbringing upon themselves until a certain age, then it is preferable that the child is in school where classes would be organized according to the reforms that Pestalozzi himself proposes. He was also forced to organize group classes, where he was able to see some of the benefits of this kind of teaching in practice. "Since I was forced to teach children by myself and without any help, I have acquired a skill to teach many of them together, and since I had no teaching materials except for the living word, naturally I developed the idea to make them draw, write and work during study."[4]. In the same part of his presentation, Pestalozzi writes about speech rhythm, whose frequent changes may significantly contribute to the return of children's attention. Then he points out that children became more and more motivated to work and to learn through it all. Regarding the

fact that some of his knowledge was incomplete, children came to realize their own possibilities due to greater motivation, and in some cases, they even took the teaching upon themselves. “Children taught children. They tried to achieve what I was telling them, and this affected the development of self-learning in initial learning, and the revival and strengthening of the belief that the right education must arise from the children’s nature. First of all, trouble led me to this. Since I had no assistant teacher, I put one better student between the two weak. Joy and cooperation gave life to their souls.[4]. Many of these principles are applied in Preschool Education today.

V. THE BEGINNINGS OF EDUCATION AND PHYSICAL EDUCATION

Pestalozzi's theory was based on the claim that one must start with any kind of education (and he divided them into three types – that of heart, head and hand) from the moment of birth, with introduction of the basic elements of teaching - simple perceptions.

Pestalozzi believed that the education of a person had to be related to the simplest results of man's three basic sensory abilities - sound, shape and number. Every education has to start with these units, since the moment of birth. Mother is responsible for the beginning of the education, and by using these means, and the book for mothers and frequent repetition, she will etch into a child's mind the basics of the science of hearing voices, music, measurement skills, etc. Education begins with observation, then the sensory impressions about a thing observed in mind are sublimed into a concept, and analysis of concepts leads to definitions. Mother's role in the initial part of education is to enable the first perception. Furthermore, Pestalozzi talks about education for variety of skills, powers of the hand, in modern terms - the physical education. Pestalozzi connects the beginnings of physical education to the initial points he finds in some basic and simple movements such as a punch, shot, pushing, that later develope into various arts - painting, handiwork or a craft.

VI. INTELLECTUAL (MENTAL) EDUCATION OR POWERS OF THE HEAD, SCHOOL PROGRAMMES, CURRICULUM, AND LEARNING

Pestalozzi believed that teaching had to develop all children's abilities. In developing the theory of teaching, he relied on the psychology of a child, and thought that each teacher had to rely on it. He developed the theory of apparent teaching and special methodology of speech science, mathematics, geography and he also cognized the connections within teaching – that one skill relied on another, and so on. Education of the head, heart, and hands is the basis of any further education, and Pestalozzi associated notion of perception with these elements. Actually, the aim of teaching is to lead a child from vague perceptions to clear concepts. According to Pestalozzi's theory, initial points of knowledge are number, shape and word. These are not the basic nor the first learnings acquired in school, however, these are the basics of any knowledge of the truth and essence of all things and their properties. The essence of primary education is to teach children and people to use these basics. As far as the speech science, Pestalozzi believed that a child had to hear tones and voices before being able to pronounce them. That is why a primer has to include all voices the speech is made of, and one has to pronounce voices to a child in the cradle and by often repetition etche them in child's memory, so when it comes to spelling half of the work would be done. Then he advises mothers to cut out letters in various colors and paste them on the cardboard and the child will see the difference between, say, red vowels and green consonants by using them. This will be useful for mastering the art of reading and writing because the child is familiar with the shape of letters. The first reader is given to a child only after the child aaccepts reading. To begin the science of onomastics, it is necessary to use a book for mothers and through the power of sound improve it: “This science of onomastics consists of the sequence of names from all fields of the natural world, history and geography, human relations, and calls”[9](Pestalozzi, 1964). These sequences of words will serve as a preparation for learning. After that, Pestalozzi points out and how long it takes to teach a child to clearly express number and shape, regarding the fact that the child has learned how to use a sound. He teaches his students that by putting series of words in front of them, consisting of nouns and adjectives that go with them, and vice versa, and when students learn them, the sequences are expanded and verbs are gradually added to them, then singular and plural forms, and so on. Thus a child begins to adopt series of words and starts with single words, then makes sentences and learns grammar by putting them into a proper connection. When Pestalozzi talks about the second starting point of knowledge - shape, he introduces a new term – the alphabet of

observation, which he sees as the only means that can give an accurate opinion on the shape. The alphabet of observation consists of the division of equilateral quadrilateral into equal parts, and these parts are later used for measuring angles, circles and arcs. Then, straight lines in various positions should be placed in front of a child, one should talk to a child about how these positions are called and angles they form, thus a child can learn to recognize shapes and their relations, and this will enable him to master the art of observation. They use this skill later to make judgments about any object in nature on the basis of its shape. Drawing skill is built on this skill, and on it writing skill, which is, according to Pestalozzi, impossible to master without these previous. According to Pestalozzi, the third starting point of knowledge is number that leads us to calculation. Calculation skill is the only tool that has no subordinate means, it always leads us to the truth, Pestalozzi says. Children should begin to acquire this skill with a book for mothers where there are tables with pictures of objects and objects in different number, where children see different number and relation in the picture, and later recognize it in nature, so that during first mathematics classes children slowly get its essence.

"In our part of the world, education offered everywhere and publically in the name of people, does not recognize observation as the highest principle of teaching, and in the primal form of education of our people, derived from the essence of our very nature, education does not care; on the contrary, it submits the nature of every teaching to the mess of fragmented and individual morals and it kills the spirit of the truth itself by giving unrelated truths and it destroys the power of autonomy in men, which is based on the power"[4].

VII CONCLUSION

Pestalozzi's idealistic views, especially those dealing with political and social issues or religion, cannot be accepted from the perspective of contemporary science.

Rejecting medieval metaphysics and pedagogical practices, he indicated new pedagogical systems that had played a major role in the creation and development of modern pedagogy. He introduced the child's personality into educational practice, opened paths to the new method of education - through examples, sensory experience, observation, participation in class. He was forming and making a person – a man. He thought that education was the important element for the development, not just of an individual but of the entire society.

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MOTIVATION DYNAMICS IN THE CONDITIONS OF MIXED (ELECTRONIC AND TRADITIONAL) FOREIGN LANGUAGE EDUCATION

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Abstract - Contemporary behavioural theories define two components which determine behavioural patterns: associative and motivational. The motivational component is crucial to the design and realization of the educational process. The task of conceptualizing motivational patterns in the educational process and using these to develop a sequence of activities that can increase students' motivation contributes to their efficient cognitive functioning and social adequacy. The mechanisms that regulate foreign language learning can thus be exposed by revealing and analyzing basic motivational factors. The paper discusses an attempt to direct, maintain and regulate the individual motivation for learning in the conditions of mixed foreign language education with students majoring in Education Science. The results presented are related to the motivation dynamics of students in this context.

I. INTRODUCTION

Over the past decades education has turned into a strategic task for the postindustrial society and its successful completion depends not only on the development of the modern individual, but also on that of humanity as a whole, its creative, social, and economic improvement. The 21st c. is a time of changes in all ways of life; higher requirements are being raised to the individuals and the types of competences they master generally viewed as opportunities for the establishment of new cultural values and algorithms for quick and successful realization in a dynamic environment. This imposes certain personality- and activity-oriented goals as priorities of modern education which is mostly defined as continuous and open for all and turns into a main prerequisite for the solution of long-lasting controversies of ethnic, religious, and social character. This time-honoured quality of education and its ability to solve conflicts gives grounds for the search of new ways to turn it into a conscious, active, motivated, and creative activity pertinent to the personality. Its orientation to the free development of the individual and his creative initiative, self-dependence, competitiveness, and mobility requires a change of the educational paradigm – a process whose development lies at the basis of a variety of studies and serves as a hallmark for the present research.

The vision of the necessity for the student to participate actively in the cognitive process is certainly not a novelty. Contemporary conditions, however, demand that it should be transformed into a basic life philosophy and a 'highway' of personality development, which in turn has to match the continuous changes and innovations characterizing the development of society in the 21st century. These changes affect the contemporary individual and redefine his/her personality development and the educational paradigm as whole as it is related to the formation of new consciousness and value orientation for everyone. The search for new approaches to the improvement of higher education and an adequate utilization of information and communication technologies is thus a necessity directly related to the improvement of the quality of education and students' motivation and interest in the process of its realization.

The development of the creative potential of students is associated with the application of different technologies, forms, and methods. The problem of the utilization of electronic education with Education majors is topical and important in contemporary didactics of higher education. The issue of using electronic education in the teaching of Education majors is topical and significant to modern didactics of higher education and to university practice. The importance of these issues, their conceptualization and methodological

grounding orient the present study in the following planes of research:

- **social** – search for opportunities to solve the existing controversy between the objective social requirements to education and their realization by applying mixed (electronic and traditional) education;
- **theoretical** – theoretical grounding of the necessity of efficient application of the platforms for electronic education and their integration in traditional university education;
- **practical** – contribution to the improvement of educational practice and its orientation towards the formation and development of skills for life-long learning as a personality quality and a necessity.

II. MIXED EDUCATION IN HIGHER SCHOOLS

The growing requirements to the preparation of Education majors and the necessity to improve the quality of higher education on a continuous basis demand that more efficient educational technologies and practices should be applied. The development of information and communication technologies facilitates their successful integration on different levels of university education. Using electronic education platforms, students can determine the pace, place and duration of their studies themselves. The platforms are exceptionally flexible and facilitate the individualization of education with respect to the needs of the student and the specific character of the course. They give students an opportunity to study in big groups but at the same time make it possible for them to evaluate their achievements individually. The immediate communication between the instructor and the students through the electronic portal gives valuable feedback and evaluation of the adequacy of the education, its usage rate, as well as valuable points of orientation for its improvement. The students, on their part, have quick, easy and timely access to the course content, the inventory for evaluation and testing, and an opportunity for direct contact with the other participants in the education or with the instructor. Contemporary educational platforms for electronic education present the course content in an attractive way and adapt it so as to increase students' motivation. The present project is oriented to the search for opportunities to integrate and adapt electronic education platforms to the traditional university education of Education majors as an opportunity for increasing the quality of their achievements and motivation for learning.

Earlier studies characterize mixed (electronic and traditional) education from the point of view of students as its subjects and foreground important issues such as the following:

- Mixed education implies a mechanical link which is of low social and scientific order;
- Mixed education is a type of new rather than innovative education, which denudes it of its real heuristic power and creative initiative as not all novelty is a patent for innovation;
- Mixed education is supposed to change the structure of educational content, which is a component of the technology of education rather than an overall change of education and the social interaction with students;
- Mixed education implies information environment and sources as a prerequisite for turning the educational platform into an algorithmic rather than human space;
- Mixed education is impossible outside certain resources but only as a type of economizing of time, means and efforts rather than investing them;
- Mixed education and its potential results demonstrate the information level and the way it can be acquired rather than a spiritually motivated change in the communication with students [1].

Such research, without claiming to be comprehensive and conclusive, and regardless of the overlap between speculative thinking about the concept of *mixed education* and the opinions of students as its users is concentrated in the following basic fields:

1. *Concept* and *technology* are only complementary and education is a suitable social milieu for the scientific grounding of their difference to be clarified;
2. **The conceptual defense** of one educational idea is a vision of a pending future which brings with it not only expectations for change but constructive criticism as well as a part of its denunciation but as an opportunity for us to be realistic in our ventures without denying our will of inventors;

3. **The algorithmization** of educational ideas is part of their essence of reproduced knowledge, but the desire to be innovative is only contained in the mission educators serve;
4. **The philosophical interpretation of education** is a path to its occurrence as concepts which can be put to practice but may not always be proved because measurement is a marker in technology but only the immeasurable can be ahead of time [1].

In the context of these issues, the realization of mixed education at universities seems to be highly dependent on the level of motivation and interest on part of the students as its subjects as well as on its potential for information processing within the integration of elements of electronic and traditional education.

III. MOTIVATION AS A BASIS FOR A HIGH QUALITY OF EDUCATION

Students' motivation and interest is a basis for the efficient realization of educational activities.

Motivation lies at the basis of all human activity, it is "a process and a state characterized by a variety of interactions and diverse variables (needs, intensity of penchants, stimulating value of the goal, expectations of the organism, habitual behavioural patterns, conflicts and controversies of the motives, factors of the unconscious) which functions as a regulator of behaviour" [2].

It is unquestionable that the efficiency and "the quality of learning as an activity and as a process is goal-oriented, active, constructive, situational, adaptive, cognitive, practical and is thus a function of the motivation of the subjects, the learning strategies they use, their learning inventory, their participation in the methods, technologies, and forms of education, as well as their self-dependence" [3].

Modern theories of education present learning motivation as "a state and a complex of diverse incentives which serve as grounding and prerequisites for human learning" [2], while the motive for education is viewed as "a construct with its own referents: the things that provoke the students to learn and the significant reasons, causes and goal-setting factors which orient the individual to studying" [2]. In other words, motives occur on the basis of needs, experiences, perceptions, concepts and persuasions and are subjectively presented in feelings, proclivities, desires, aspirations, interests, ideals and dreams [4]. For this reason "the educational and cognitive process is a major cognitive motive for learning [4], while "the cognitive motive is a component of a cognitive activity that is conducted in the presence of students' interest" (Бабалова 2000: 85). Studies in didactics and psychology define interests as an important motive for human activity. Drawing of Merdzhanova [5] and her understanding of interests within the personality structure, "interest itself includes a cognitive element; an active cognitive orientation commensurate with the goals of the individual. Interests are a dynamic and complex structure; they change, accrue and interact in the course of time". Interest lies at the basis of the subjective realization of the needs, motives, and proclivities of the individuals and their attitude to the activity performed and the results obtained. This leads to the conclusion that motivation and interest are fundamental constructs whose referents are directly related with students' attitude to the educational and cognitive activity and its results (educational products).

Recently, attitudinal studies have come to be associated with a concept of *attitude* as a basic component of the structure of competence (as a personality property) integrated in the overall system of competencies. This preeminently operational level of attitude is directly related to students' motivation for achievement. The motivation for achievement in turn is a construct with the following referents: aspiration to success in one's actions and a fair appreciation of that success; inclination to solving difficult and challenging tasks; aspiration to the overcoming of higher-order difficulties; aspiration to receiving feedback on one's own skills and abilities; aspiration to high standards [2]. This construct (motivation for achievements) is crucial to the efficient realization of mixed (traditional and electronic) education at university, for the specific character of its organization, and for its potential to form and develop key competences.

Thus, forming positive motivation, interest and attitude in students with respect to the activity, we can give meaning to cognitive situations related to the formation and improvement of basic transversal competences.

IV. FOREIGN LANGUAGE TEACHING AS A TARGET AREA OF STUDY

During their first two years of study Education majors at South-West University are supposed to master a complex of skills, competencies and theoretical knowledge of linguistic categories at three levels:

- **communicative level, reading and listening comprehension** (abilities to perceive and get ideas across, present attitudes and points of view, discuss topics of social and cultural nature, express preferences, attitudes and opinions);
- s**tructural level** (master language categories such as tense, aspect, voice, possessive case, number of the noun, expressing gender at the morphological and syntactic level; noun-pronoun and noun-verb agreement; forming different types of messages – declarative, interrogative, imperative, exclamatory);
- **semantic (vocabulary) level** (acquiring knowledge of the correct use of lexical units both on word and phrase level, learning to differentiate between commonly confused words; learning to make relevant noun-noun, noun-verb, adjective-noun, and adverb-verb combinations; making correct use of lexical units with dependent prepositions and of polysemantic words; learning how to place groups of words in their relevant categories).

The educational content of the Moodle English course as an object area of this study is entirely oriented towards the mastering of the above skills and competencies. It is divided in two modules. Module 1 treats problems with word groups, words commonly confused, correct use of prepositions, synonyms, antonyms, phrasal verbs, fixed phrases employed on certain social occasions; phrases and expressions necessary for day-to-day communication. The types of exercises which present these lexical categories include cloze tests (the students complete a missing word to form a sentence or phrase); multiple choice exercises (a single target word out of a choice of three or four is selected to form a sentence); synonym and antonym exercises (students are invited to pick the most suitable synonym or antonym of a specific word); word group exercises, which invite students to categorize lexical items according to a certain criterion; matching exercises in which students have to combine nouns and verbs, nouns and adjectives, adjectives and adverbs or verbs and adverbs to form meaningful phrases which are then used in sentences.

Module 2 combines lexical and grammatical exercises. The lexical exercises are of the same types employed in Module 1 but the lexical items practised here are of a higher order of complexity and imply a more proficient use of English. They are complemented by grammar drills which exercise students' competencies in the following fields:

- the English tense system (the present tenses, the narrative tenses, the future forms in their proper contexts);
- passive transformations (active and passive voice);
- quantifiers and determiners (using the correct article of quantifying adjective in specific contexts);
- forming questions to specific words in the sentence (interrogative messages);
- subject – verb agreement (changing the narrator of a text);
- using the correct pronoun (subject, object, possessive or reflexive) in the sentence based on contextual clues;
- modal verbs (choosing the correct form of the modal verb to complete a sentence expressing request, permission or obligation);
- turning base forms of adjectives into comparative or superlative degree (sentence completion);
- reading comprehension exercises with *True/False* statements to check understanding;
- connecting ideas (expression of cause and effect, contrast, similarity, concession, etc. through conjunctions and conjunctive adverbs);
- summary skills (summarizing the key points of texts).

V. DESIGN OF THE STUDY

The basic components of the methodology of the study are directly related to its design and realization. The object of the research is *mixed (electronic and traditional education) at university level*. The specific research issue the paper addresses is *motivation dynamics and students' interest of Education majors* in the process of this type of education.

The exploration of their motivation and interest is conducted in the context of foreign language teaching. The contingent of the study includes 35 students in the professional sphere Education Science. The goal of the study is to diagnose the learning motivation and interest of students in the course of mixed education.

To achieve the research goal and solve the issues it poses about the survey of students' attitudes to mixed education (their claims, motivation, and interest) and its results, we use a *Study chart of the level of motivation* in the process of the activity and a *Test of learning motivation*.

The inquiry into the educational and cognitive motivation, students' claims and interest is conducted on two levels:

- During the solving of a foreign language drill, diagnostics is conducted through the study chart of the level of motivation in the course of the activity;
- Students' motivation level with respect to English is explored in a course of studies during which the research is conducted.

The study chart for the level of motivation consists of an introductory part with instructions for the evaluation and the completing of the questionnaire containing 42 statements which are handled with the help of a 7-stage evaluation scale in which the answers vary in the following sequence: completely agree (+3), agree (+2), agree rather than disagree (+1), neither agree, nor disagree (0), disagree rather than agree (-1); disagree (-2); completely disagree (-3).

The questionnaire is designed by V. K. Gerbachevski [7] to diagnose the components of the motivation structure related to the level of students' claims directly during the activity. The questionnaire meets the requirements for objectivity, reliability and validity. It is completed by the students in the course of doing a specific task via the electronic educational platform. The researcher proctoring the experiment determines a specific stage of the tasks upon whose completion the students fill out the chart and continue working on the other tasks.

The aim to be achieved in using the questionnaire is to study the level of students' motivation in the course of the activity.

To accomplish this goal and to receive a more comprehensive picture of the motivation dynamics, we also use a Test for learning motivation designed by T. D. Dubovitskaya so as to evaluate the level of motivation to study the specific discipline [8]. Rather than explore the motivation for educational activity as a whole, this test inquires into the specific character of educational motivation manifested in studying concrete courses. The methodology consists of twenty statements with four possible answers for each one of them (correct; fairly correct; fairly incorrect; incorrect).The content of the questionnaire does not offer statements concerning the personality of the instructor. Students are only supposed to describe how they feel during a class. The target audience of the methodology consists of learners after 12 years of age, who are eligible for self-reflection and self-evaluation of the type suggested by the author. The test is translated and adapted for Bulgarian students by S. Stoyanova and its validity and reliability (criteria and constructive) have been substantiated. In the author's own words, "the adapted test has good psychometric rates and can be used to measure learning motivation" [9].

VI. MOTIVATION DYNAMICS IN THE CONDITIONS OF MIXED EDUCATION (EXPERIMENTAL STUDY)

The goal of the diagnostics is to test the degree to which motivation in the process of mixed education (as registered by testing and observation) affects the motivation for studying English language as a university discipline.

In the course of several classes, students are assigned tasks and tests of their own choice. In the meantime they fill out the chart (questionnaire). The person proctoring the experiment determines the stage of their work upon whose completion the students fill in the chart and continue working.

The extent to which the students manifest their reactions to their success or failure in solving the tasks (high, moderate, low) and the increase or decrease in their desire to continue working are the basis for determining their level of motivation

during the activity. The experiment prioritizes the analysis of the motivation for achievement, which occupies an important place in the motivational regulation of the process of education by strongly affecting the goals, the content of the activities, the efforts made by students and is thus crucial to the individual behavior of the learner in the specific situation.

The analysis of the results shows that 65% of the students studying English as a foreign language are indifferent to their results at the beginning of the experiment and only 25% of them are interested by the tasks. More than 65% would do anything else rather than participate in the experiment. At the end of the experiment, only 10% are indifferent to their results and 78% are intrigued by the tests and tasks presented in the electronic platform of English language education. At the beginning of the experiment, 65% of the students are indifferent to their achievements, while 84% of the contingent at the end of the experiment find it important to succeed. There is a clear-cut tendency in the analysis of the results according to which 82% of the students at the beginning of the study have a presentiment that they would fail, but at the end 90% of them think that they have a chance to succeed. These results are partly related to the emotional attitudes of the students in the course of the activity and are indicative of their motivation in the course of mixed (traditional and electronic) education.

76% of the informants show indifference at the beginning and they are not interested in whether their results will be better than those of the others. This indicates that they are not inclined to search for alternatives to real success in solving the tasks and tests assigned to them. All this is also linked to students' desire to avoid low results after solving the tasks – 86% of the informants at the end of the study want to avoid having low results, while only 16% think this is important at the beginning. What is also of importance is the aspiration for high results of 75% of the students at the end of the experiment, while only 15% of their peers want their achievements to be among the best at the beginning.

Despite the fact that at the beginning and at the end of the research as many as 35% of the students consider the tasks and tests difficult, at the end 65% of them are motivated to do their best to accomplish the goals, while at the beginning only 19% are willing to do so.

The results obtained in the course of the experiment measuring the motivation rate in the process of mixed (traditional and electronic) education of Education majors are thus statistically significant and give a comprehensive presentation of its influence upon the motivation for achievement in general, which is of crucial importance to the overall educational motivation at university. Although the study of motivation is quite a complex process incorporating a variety of factors which regulate and lead individual actions in the course of education, its exploration in the context of mixed education leads to conclusions about students' attitudes towards the activities they perform and their results.

To establish the correlation between students' success in solving the tasks assigned as part of the experiment and their motivation rate, we use the χ^2 method because the empirical data are presented by variables of two scales – ordinal (success) and nominal (the motivation rate which is preeminently characterized in terms of its quality). If we formulate a zero hypothesis (H_0), according to which there is no correlation between students' success and their motivation rate in the course of mixed education, then the alternative hypothesis postulates that such correlation exists. The empirical characteristics of the hypothesis is $\chi^2_{emp} = 7,32$, while $\chi^2_т = 4,28$ (α=0,05). The comparison between the theoretical and the empirical characteristics of the hypothesis, $\chi^2_{emp} > \chi^2_т$ (7,32 > 4,28), gives grounds to reject the zero hypothesis to the advantage of the alternative one, which means that there is a correlation between students' success in the context of mixed education and their motivation for achievement.

The diagnostic motivation test designed by Dubovitskaya is not intended for the study of motivation as a whole but for the character of the learning motivation in the context of specific disciplines. As indicated above, the methodology comprises 20 propositions with 4 possible answers: correct; fairly correct; fairly incorrect; incorrect [8]. To simplify the analysis, we have reduced the possible answers to two: correct and incorrect.

The factor analysis of the test preceded by a substantiation of its validity and reliability in Bulgarian conditions [9] shows that the items it contains can be generalized in three categories. The first one includes items related to self-awareness, self-realizations, and self-dependence in the study of the discipline as it corresponds to

the proclivities of the individual and a tendency for serious dedication to the subject during the students' leisure time. This category can be entitled "I study because I like it when I cope with difficulties and learn more about myself". The second category includes items pertinent to the students' interest in the course, the study of difficult problems, the desire to understand the essence of the educational content and the importance, value and necessity of the knowledge it gives. The third category incorporates items associated with the requirements of the instructor, the unwillingness to study, working under the supervision of the instructor alone, lack of anxiety when the student is not prepared for class, difficulties in the study of the discipline which imply a necessity to work harder.

The analysis of the results of the survey demonstrates that at the beginning of the experiment only 23% of the students consider learning as something they like because they want to succeed by themselves in the venture. All this is related to self-knowledge and self-realization, as well as to coping with their foreign language education on their own and the interest that accompanies the process as it corresponds to both the proclivities of the individuals and their studying in their free time. The percent of the students who do not consider studying to be likeable is rather high at the beginning of the survey – 89%. Employing the opportunities offered in the course of mixed education, students show a tendency to increasing their interest. At the end of the experiment 60% of them study because they like it.

The second category of items is related to the interest in studying a foreign language when supported by electronic platforms, the solving of difficult problems, an aspiration to understand the essence of the educational content and the value of the knowledge it contains. An increasingly higher number of students become aware of the efficiency and usefulness of learning – 92% at the end of the experiment as compared to only 39% at the beginning.

The application of electronic educational platforms at university also leads students to a re-evaluate the role of their instructor. At the beginning of the experiment 75% of them consider studying to be forced by the instructor while at the end 85% of them think the opposite is true.

The third group of items is associated with the requirements of the instructor, his/her supervision, lack of anxiety when the student is not prepared for class as well as difficulties in studying the discipline, which imposes a necessity for the student to work harder.

The results obtained in the course of the study correspond to a new vision of the design of the educational environment, a different role of the instructor in this environment and a change of motivation for studying the subject within which the exploration of the opportunities of mixed education at university is conducted.

Taking into consideration the goals of the research, the criteria presented above are reflected indirectly in an observation protocol specifically designed for that purpose. The results are thus processed and reduced to the following indicators:

- students' interest;
- their positive attitude and readiness to participate in the process of mixed education;
- their attitudes and emotional experiences in the process of solving the foreign language tasks using electronic platforms as well as their desire to use them at home while studying for the subject.

Figure 1 shows the dynamics of students' interest in the course of mixed education. It is clear from the graphics that there is a steady tendency for it to increase and adapt.

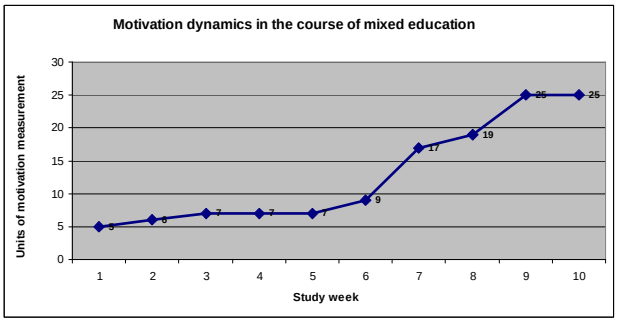

Figure 1 Motivation dynamics in the course of mixsed education

In summary we can say that during our pedagogical observation and in the context of the conclusions made in the process, an increase in students' interest to foreign language education is registered in the process of mixed education. This indicates that by employing this type of education it is possible to positively affect the students' readiness to participate, to study on their own and to develop a positive attitude to their educational activity and its results.

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ADJUSTMENT OF TEACHING OF MATHEMATICS TO VOCATIONAL SUBJECTS IN SECONDARY ELECTROTECHNICAL SCHOOL

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Abstract - This paper presents observations on the lack of knowledge of mathematics required to implement the plan and achieving the expected outcomes of the subject Fundamentals of Electrical Engineering in the second year of secondary electrotechnical school. Changes in the order of units and the content of the mathematics for first and second grade are considered, and experiences of implementing the adjustments are shown. Some proposals for further adjustments in relation to other professional courses in the educational profile of the experimental Mechatronics technician are also discussed.

I. INTRODUCTION

Many problems are being encountered while working in the secondary electro technical school some of which are goals, expected outcomes, teaching subjects and subject contents but the greatest problem represents the students' previous knowledge. The vocational subject syllabus is based on the students' previous knowledge of the various subjects especially of Mathematics. This also represents the main problem during the realization of the syllabus. That is the reason why the teachers are obliged to cover the certain curriculum that is essential for understanding the lectures or practices. The example of this problem is the subject Basis of Electrical Engineering. Overcoming and following of this subject requests knowledge of complex numbers which are the part of second grade curriculum in such extant which is not sufficient for understanding of this subject.

Due to all of these problems, we decided to write this paper and state them as well as our suggestions for adjusting the curriculum and its effect after the realization. We hope that this paper will draw the attention of those who assemble the curriculum and inspire better synchronization of time and topics of the subject content.

II. PROBLEMS IN TEACHING THE BASIS OF ELECTRICAL ENGINEERING II

Basis of Electrical Engineering is a second grade subject in electro technical secondary school in all courses and it is on schedule with two classes a week (three-year courses) or three classes a week (four-year courses).

The aim of the subject is [1] [2]: acquiring the basic knowledge of the theory of the electrotechnics needed for other vocational subjects. Subject tasks are [1] [2]:

- Acquiring of the basic knowledge of the elements in an AC circuit, their relationships and the concept of impedance,
- Acquiring of the basic knowledge of solving complex AC circuit,
- Acquiring of the basic knowledge of oscillating drive,
- Acquiring of the basic knowledge of three-phase systems

Subject tasks are [1] [2]:

Before starting with the official curriculum, the introduction of the subject must be mathematics. Dealing with the following concepts is necessary:

1. Definition of radians,
2. Definition of trigonometric functions,
3. Trigonometric circle and the flow of trigonometric functions (sinα and cosα),
4. Addition theorem,
5. Term of a complex number,
6. The display of a complex number (Cartesian and polar coordinate system),
7. Forms of a complex number (trigonometric, exponential, algebraic), and the links between them,

8. Operations with complex numbers (addition, subtraction, multiplication, division),
9. Alternate parameters sizes,
10. The presentation of alternate size.

All of the tasks except for 9th and 10th are the part of the curriculum in the second semester of second grade [1] [2], or they are not the part of the curriculum at all. The introduction of the subject may be lectured but it cannot be practiced in three or four-week time, which is 10% of, planned time. These tasks are necessary because the goals and the aim of the subject, which are given in Official Gazette, can only be realized by using complex numbers. Apart from that, vocational subject teachers and Mathematics teachers do not see eye to eye on the importance of certain task so it happens that Mathematics teachers pay more attention to the part of the syllabus which is not so important to vocational subjects. The curriculum is mostly the same for all specialized schools but the requirements of vocational subjects are different even inside the same working area.

III. THE CHANGES IN PLANS

In order to overcome these problems and hoping that it would make it easier for the students to follow lessons we started this cooperation. In the beginning the discussions were mainly about dealing with the mathematical terms in the introduction of Basis of the Electrical Engineering II then Mathematics teacher visited several Basis of the Electrical Engineering II classes and she ordered a book and a workbook and after that she decided to reorganize syllabus in first and second grade and teach complex numbers and the basis of trigonometric functions in first grade and at the beginning of second grade.

According to the Official Gazette [1][2] mathematics for first grade of the Electrotechnician for Computers course comprises (parts of the overall plan that was altered is being stated):

1. 9 classes of right triangle trigonometry (trig functions of the sharp angle are defined, introducing basic trigonometric identities and solving problems with a right triangle);
2. Class topic logic is studied on 12 classes;
3. Introduction to the geometry on 8 classes;
4. Isometric transformation on 30 classes;
5. Homothety and the similarity on 12 classes.

The following changes are introduced in Mathematics for I and II grade syllabus:

- 12 classes of logic are being used for the continuing of the trigonometry i.e. for expanding it by teaching angles that are not sharp (trig circle is being introduced where four basic trig functions are being defined and graphic functions y=sinx and y=cosx are introduced). While logic is transferred to second grade as the last teaching topic because the part of the trigonometry is transferred to the first grade.
- Introduction to geometry and homothety and similarity are replaced with the introduction of the complex numbers (which is being the extension of the real numbers teaching topic), then the complex numbers teaching topic is introduced, basic operations with the algebraic form of complex numbers, algebraic translation in trigonometric form and multiplication, division and exponentiation trigonometric form of complex numbers.

Basis of Electrical Engineering II classes are realized in the following manner:

- Basic calculation with complex numbers is removed from the syllabus;
- The number of classes for practicing graphic display of trig function $y=X_m sin(\omega t+\varphi)$ and switching complex numbers from one form to another is increased;
- The remaining number of classes is focused on using after teaching it and practicing topics such as elements in an AC circuit and connection elements in an AC circuit.

IV. LESSON REALISATION IN AN ELECTROTECHNICIAN FOR COMPUTERS COURSE

During the Basis or Electrical Engineering II lessons after the changes in the domain of mathematics that were being made in first grade it has been noticed that the students recognize complex numbers and perform basic calculations with them, further explaining was not necessary. While using complex numbers, the focus was on the vocational subject, which was not the case earlier. This change enabled easier overcoming of the vocational syllabus and made more time for practice, which led to the fact, that students understood it better. Trigonometry as a part of Mathematics was easier for students due to all the terms, which were learned and practiced, in first grade as part of Basis or Electrical Engineering II.

Logic, which was moved from first grade to the end of, second was made useful at the beginning of

third grade in subject Digital Electronics and Computers.We believe that learning logic is more suitable in that moment so it could be used for those vocational subjects.

Unfortunately the changes were planned to be done with one generation of students but they were realized with other, four years later when we both taught to Mechatronics Technician course. In that course which is still experimental suggested Mathematics syllabus is better synchronized with the needs of vocational subjects.

V. SUGGESTED MATHEMATICS SYLLABUS REVIEW FOR MECHATRONICS TECHNICIAN – EXPERIMENT

Changes in a first grade course Mechatronics Technician- experiment [3]:

1. In the second teaching module (vectors) scalar and vector multiplication were added (13 classes are planned);
2. Fourth teaching module (trigonometry) is enlarged, from the usual 9 to 30 classes therefore trigonometric circle is introduced, it is being defined and geometrically interpreted four basic trig functions and trigonometric functions are reduced to an arbitrary angle trigonometric functions nonnegative acute angle;
3. The last teaching module introduced consists of quadratic equations, complex numbers, where solving quadratic equations by formula is planned, the definition of a complex number, its display in different forms and performing calculations with them. This module is planned to be done in 22 classes.

Second grade changes are [3]:

1. Trig functions are supposed to be realized in 30 classes as the second module (addition theorems are used, sinus and cosines, solving trigonometric equations and inequalities);
2. Trig form of a complex number is supposed to be realized in 18 classes as a second module (geometrical interpretation of a complex number in the complex plane, switching it back and forth from the algebraic to trigonometric form and performing operations with complex numbers in algebraic form, including grading and square root);
3. Logic is being realized as the last teaching module.

Suggested Mathematics curriculum of the experimental courses provides better time and content synchronization of the teaching material due to better correlation between subjects. For now, it is only the case in experimental courses. Hopefully it will remain the same when the experimental courses become regular ones and that these changes will trigger official changes in teaching programs in secondary specialized schools.

VI. CONCLUSION

When we initiated adjusting the curriculum (during the school year 2003/04 for the second grade) the intention was making it easier for the students to overcome the vocational subjects. The adjustments were planned and realized unfortunately just one time during the school year 2006/07 in first grade and 2007/08 in second grade. For the next generation (2010/11 and 2011/12) we were teaching in some other courses therefore we could not conduct the altered syllabus. Then we noticed that the reformation of the experimental course Mechatronic Technician implied better correlation [3] (in even greater extend than it was the case with our plan), which was not the case with the course Electrotechnician for Computers.

Adjusting the curriculum and making it more suitable caused positive effects in many aspects. Most importantly, the students got and used the same knowledge in the right time frame. Acquiring of the knowledge was easier and there was more time for practice, students realized the importance of Mathematics.

We think that the changes like this would cause easier acquiring of the syllabus for other Electrotechical courses. Mathematics is being used in other subjects not just in Basis or Electrical Engineering II and the needed content was not always covered.

We applied for this conference hoping to hear someone else's experiences and thoughts on changing and adjusting the curriculum. We hope that our experience will initiate changes in other courses of specialized secondary schools, which are not experimental.

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APPLICATION OF GEOGEBRA IN TEACHING OF MATHEMATICS IN PRIMARY SCHOOLS

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Abstract - In this paper, GeoGebra will be presented as an interesting software tool, appropriate for young students of higher grades in primary school. Characteristics of GeoGebra, its importance and usage examples will be considered.

I. INTRODUCTION

Prior to everything, Mathematics is a general educational subject in a primary school. Contents of the Mathematics teaching on this level do not match the appropriate contents of Mathematics as a science. Teaching Mathematics based on specific social goals and tasks makes a special system according to its contents, approaches as well as terminology (usually terms used in teaching are narrower than in science). Therefore, it is crystal clear that there is a specific gap between Mathematics as a science and as a school subject. Despite this, teaching Mathematics does not contain anything that should be negated afterwards, neither can it contain only "The simple things". More subtle contents of Mathematics should be made more understandable, more acceptable and applicable by teaching it. Besides natural materials (different kinds of items that surround us), we also use educational and technical resources (models, pictures, scheme, diagrams, tables, accessories, equipment, devices, tools, text books…), which in a process of educational work contribute to understanding and gaining knowledge and skills or habits that are required.

Adequate, regular and various application of educational resources makes students develop their interest s in Mathematics, encourages development of cognitive function, speeds up and makes easier construction of mathematical concepts, establishment of their judgment, drawing conclusions in solving problems. Today, our modern equipment offers a host of new interactive tools that can be used in the classroom in order to improve the efficiency and interest of teaching. New solutions are suggested [4], and can be divided into "hardware" (the active panel, touch-screen technology, etc.) and "software" (various programs). As it is well known, hardware solutions are expensive for schools and therefore are not widespread, so we are forced to deal with the free software solutions for the use of which we have all the conditions in the schools. Today, as it is known mostly all schools have a "digital classroom", i.e. computer lab with Internet access, and that's about all of us that we also need to pursue a GeoGebra.

II. GEOGEBRA SOFTWEARE

GeoGebra is an educational mathematical program (software) that joins geometry, algebra and calculus. At Salzburg University, it was developed by Markus Hohenwarter, is used for mathematical education in schools. So far, GeoGebra has received several international awards including the European and German educational software award.

GeoGebra is interactive geometry software; it is such a software that enables the creation and manipulation of geometric constructions in the plane. GeoGebra can construct points, vectors, segments, true, function, curve II class and later all of these structures can be dynamically changed. This kind of study certainly provides a better understanding. Equations and coordinates can be directly taken in. By algebraic input fields, the user can generate new objects or change the ones that already exist. GeoGebra therefore makes it possible to work with variables such as the root and the power.

GeoGebra is characteristic for the output in the algebra window corresponds to an object in the geometry window and vice verse (see figure 1).

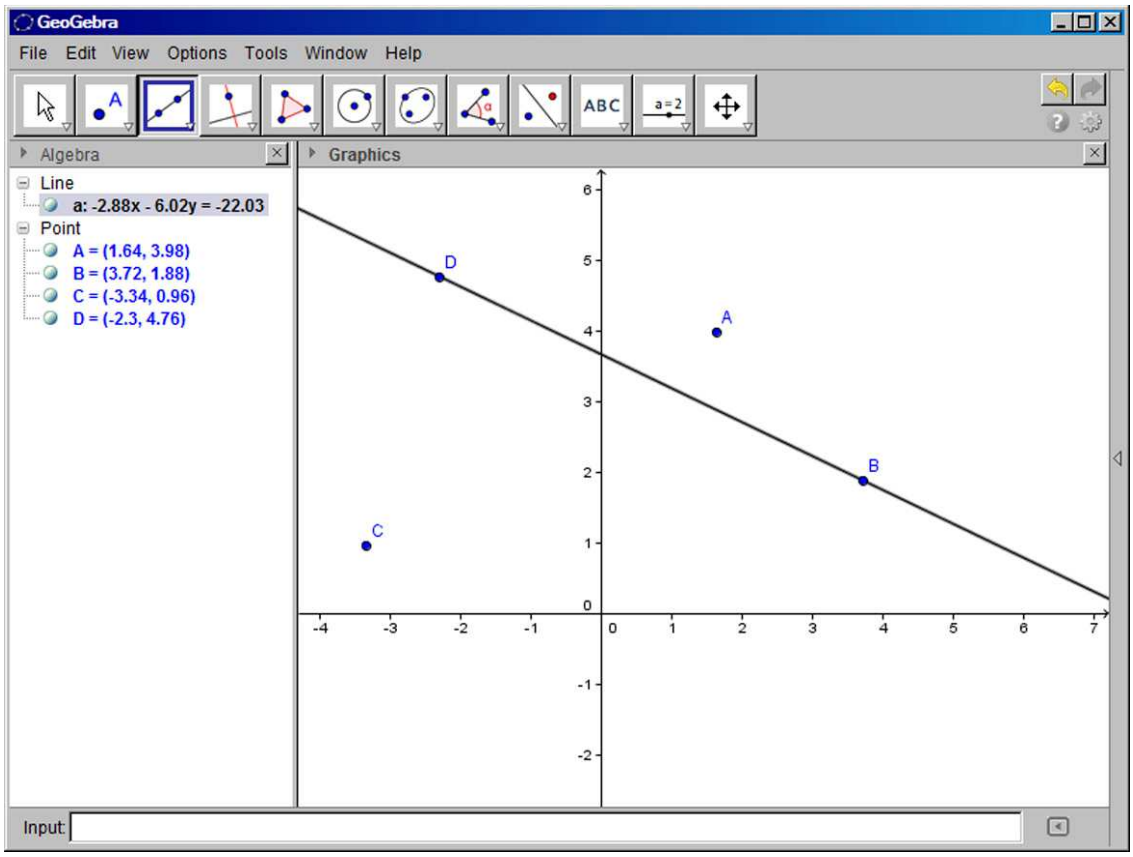

Figure 1. GeoGebra with algebra and geometry windows

That way, students at the same time using algebraic and interactive graphics window, can increase their skills knowledge.

GeoGebra is one of the most original and latest mathematical software currently available. It is translated into fifteen languages, and the latest version 3 is the translation of the sixteenth-Serbian language did by professors Dragoslav Herceg and Djordje Herceg.

Installing GeoGebra is simple. All it takes is to visit the site www.geogebra.org [5], click link Download, than there is a visible position on the front page where we get more options:

- *Webstart* option allows the files needed to use GeoGebra in the "instant" format on our computer off, then start up automatically using the Java platform, and almost without no installation can be used.
- *Applet Start* is an option that opens the entire GeoGebra in our internet-searcher .As with a moment before the priority, this option quickly and easily launches GeoGebre.If we decide to use one of these options we would have to have a constant Internet connection, which is not always possible.
- *Portable page* contains versions of GeoGebra that can be used offline, they do not need to install and are suitable for recording on a flash drive / USB stick. We copy the portable (portable) version on the flash and we always have GeoGebra with us. The relevant file starts and the program works.
- *Installers link* is used to download the installation version of GeoGebra to our computer. By installing this program we become independent from the Internet, and we still have functional GeoGebra on our computer, so we suggest this version. The vast majority of currently used operating systems is present: Windows, Mac OS X, Linux. Clicking on an icon of our operating system installation version of the program is recorded on the hard drive .The program is installed and ready for use without further adjustments. The current version on is 3.2.47.0.

III. APPLICATION OF GEOGEBRA

GeoGebra application in the teaching of mathematics can be of various types:

- The development of reflective functions:

- Detection of concepts
- Analysis and synthesis
- Generalization and specialization
- To formulate a hint - proving hypothesis

- Developing the ability to solve tasks:
  - Testing of borderline cases
  - Expansive interpretation tasks of image-making
- Check
- Geometric representation of mathematical concepts
- Development of support materials

Within the educational work of teaching, aids can carry pieces of information, but can only be transmitters of information, in which case we can name them the teaching recourses. Computers belong to computer electronic teaching recourses. Computers are electronic machines for receiving, processing and provision of information. In teaching they are important in that they contribute to the process of individually tailored learning process, students demonstrate a more positive attitude than the usual teaching; teaching using computers is more motivating and engaging for students. Computers have the ability to test pupils remember their answers, arrange them and immediately inform about the performance of individuals and groups. They can be used to help the teacher to manage the learning process.

During the use of computers in the classroom, a teacher has multiple functions. He is a lecturer, organizer and manager of the teaching, but it must be very familiar with the technical and didactic characteristics of the computer.

Contemporary mathematics involves incorporating new information technology in its implementation. It is therefore necessary that all institutions include in the educational system equipment such as hardware and software, and that teachers need training for effective implementation of new information technology in mathematics education.

One of IT solutions that can help increase the knowledge of mathematics to the teaching and learning of mathematics education benefits software that best meets the goals of mathematics education. Learning by using this software students always have feedback to their every action. This is a research study that is one of the active learning, not passive, in which the students only receive already prepared information. Discovery learning is highly motivating, and of course provides learning with understanding.

The following examples are aligned with the teaching contents [1] [2] [3]

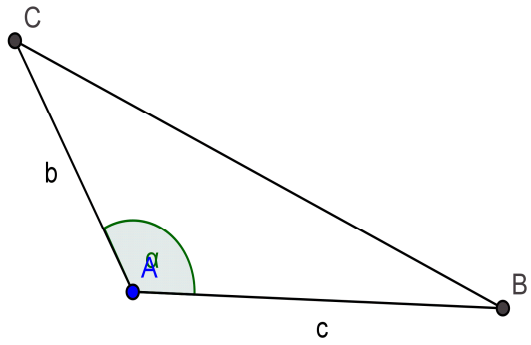

Figure 3. Example 1 analysis in GeoGebra

A. *Example 1*

Construct a triangle if the following elements are known: b = 4 cm, c = 4 cm, β + γ = 60˚.

From β + γ = 60˚ it follows α = 120˚

Analysis is presented in figure 2.

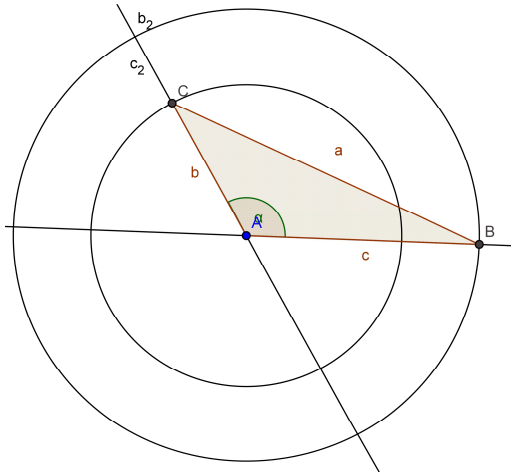

Figure 2. Example 1 construction in GeoGebra

Construction assumes: *k* (A, *c*), angle α, *k* (A, *b*). It is presented in figure 3.

B. *Example 2*

Construct a triangle ΔABC if the following elements are known: |AC| + |BC| = 6cm; |AB| = 3cm; angle at the vertex C is 30º.

Analysis. From the known elements one can concludes:

|CD| = |AC|, |AC| + |BC|, *k* (B, *c*), Angle 15°

Analysis is presented in figure 4.

Construction is presented in figure 5.

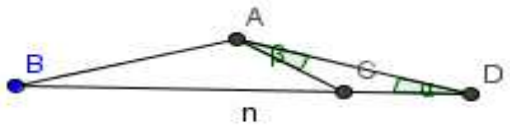

Figure 5. Example 2 analysis in GeoGebra

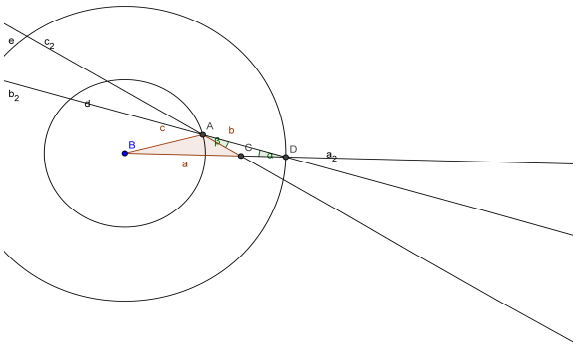

Figure 4. Example 2 construction in GeoGebra

IV. CONCLUSION

GeoGebra is a software solution, which students learn easily and quickly. Students with the help of this software in an interesting way overcome "difficult" tasks. In fact, now they perceive mathematics as an interesting game. The use of this software has enabled us to do a number of tasks for students to get the big picture of the curriculum prescribed syllabus. In this paper, we present the construction of triangles with GeoGebra.

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FUNCTIONS OF PRINCIPLES AS HEADMAN AND PEDAGOGICAL MANAGER

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Abstract - The school was always bore the stamp of the time and was exposed to the fluctuations. Changes in education are caused by technological developments and achievements of educational technology, as well as forms and resources in the school. With changes in education, changes the position and function of the principal. Principle today must possess certain knowledge about the organization and the specifics of school, and at all times act pedagogically. This is particularly important in the school, where the members of the collective rightly expect his pedagogical leadership.

I. INTRODUCTION

At school, it is important to create a democratic environment and democratic climate, depending on the style of leadership. We need to motivate and encourage the manager associates to support teamwork, to communicate with the environment, to act entrepreneurial, to be a leader and manager leader, to have good communication, which is the first condition for successful management, to ensure the quality of the educational process, administrative and technical operations, monitoring and evaluation of employees. Therefore, the principle shall promote human and material resources and contribute to the development of the identity of the school. The school principal must be a good organizer, strategist, innovator, founder and creator of the management.

Because of the nature and specificity of the goals that the school provides, the principle plays a dominant role in the management of schools. On its activity influences the position of the school authorities, and the establishment of functional connections between these bodies. He is required to create the conditions for the work of the management and to take care of the implementation of the decisions of these bodies. The principle is the most important expert in school and he guided it every day, but in order to achieve success, he needs to work as a member of a team.

II. FEATURES AND ABILITIES OF PRINCIPLE

To be able to implement the above mentioned tasks, the principal should be chaste and moral personality, which will be accepted by society and of the collective trust, who is going to be followed, both in success and in adversity. Principle, to be accepted, it must make sense to communicate with their colleagues, and that the collective should be the one who will humbly obey all his commands.

Before accepting duties, the principle shall consider the specific obligations and procedures, such as:

- the need to know more than the other members of the collective;
- be a positive role model for others;
- must successfully coordinate, promote and inspire the work of others
- know the real plans and programs the overall school life, not just a list of planning is pleasant and good wishes;
- be equal among others, without having to always be brave and to assume most of the responsibility for any possible failures in school, even when someone else is doing - he has to be the protector of all, but also the patron of the school;
- respect their associates and the success generously shared with them always stressing their contributions and minimize its merits.

Principle is observed and his work is checked and evaluated not only by the professional service and his closest collaborators, but the pupils and their parents. Among other things, It is taken into account the principle's behavior to subjects with whom he communicates in school, he should be objective, fair, unselfish, tolerant, and must respect dignity of teachers, students and their parents, and has to know how quickly and vigorously to respond to the case when there are some problems.

It is expected high professionalism and expertise from the principle. He must have a wealth of experience gained in practice. This is the first aspect of expertise. Another aspect should be the knowledge and ability to manage. Characteristics of a good leader are: the willingness of their own activities, the impact force on others, aiming toward the goal, the ability of decision-making, conflict management, endurance, self-criticism, communication style. Its central location allows it to hold a large amount of information and to communicate with many people [1].

III. COOPERATION SCHOOL PRINCIPLES WITH THE COLLECTIVE

Principle should create a noble atmosphere in a group and should have fair and balanced attitude towards his associates. Not to be insulting, or that they do inconvenience if oppose him, especially when the staff is right. This behavior creates an intolerant atmosphere of principles, and the tasks and goals are not achieved as planned. With his actions, the school principal should ensure not only his influence but also gain trust of colleagues. To achieve this, he should know the psychology of personality and has a strong psychological culture. Beside addition, he must know the individual's behavior and group psychology, and to know how to discover the spirit of the group. Its task is to avoid conflict situations effectively and on time prevents bad relationships among co-workers, to see further and notice them before. Principle must encourage people to be brave, to cheer and to restore them to their faith in justice and humanity. For a better understanding of the students, he must know the psychology of the child and developmental psychology. He is asked a lot of moral and character traits, such as:

- honesty,
- energy,
- determination,
- understanding of their associates,
- impartiality,
- tact,
- elasticity, etc.

Positive features of principles that contribute to the collective cooperation:

- good organizer work,
- good and just deal with the workers,
- consults with associates and takes into account their opinions and suggestions,
- independent and self- initiatory at work,
- he is consistent, it is not fickle and constantly changing their opinions,
- always praising good work,
- he is interested in personal difficulties workers
- maintain the good work discipline
- knows how to convey his knowledge to others
- tasks given clear and understandable
- sociable and cheerful
- calm and patient.

The principle is not and need not be an expert in everything, but we should be diligent, determined, genuine, responsible, have confidence in yourself, daring in terms of innovation, radiate inner strength, to arouse a sense of security and determination, have the characteristics of charismatic personalities. A good manager is no longer the one that stands out for its good teaching assignments. He did more sufficient knowledge of only its parent discipline or basic education. Today he solves complex problems that resemble problems of big companies. The school is changing from an institution of learning of students in a school that teaches [2].

IV. THE MOST IMPORTANT ROLE OF PRINCIPALS

Successful managers have a holistic view of the school as an institution that teaches ("In recent years, the school culture is viewed multidimensional and holistic ..." [3].

Quality of education, in some countries depends on the work of the school. High standards are set and maintained through the interaction between teachers and students in the classroom. Principle is the most important expert in school and on the daily charge, but in order to achieve school success, it needs to work as director of the team. Depending on the laws and decisions of the ministry, municipality or school board, the principal role of principles is as follows:

- Takes school and gives her an idea,
- Encourages quality education, constantly striving to improve standards,
- Encourages and supervises the provision of equal opportunities for all,
- The school creates a positive spirit that encourages mutual respect, hard work and a sense of responsibility among students,
- The community acts as a champion of school, and
- Effectively and efficiently collects financial and other resources for the school to
- Achievement of its educational objectives.

The most important role of a principle can be classified as follows:

1. Management staff - Principle is responsible for the progress helps teachers and other workers, and to providing working conditions that are conducive to quality work. The principle shall ensure that workers have clear terms and conditions of service and all agreements and regulations on wages, hours and working conditions are followed. Manager should be an open door where the teachers and other employees or representatives of their labor unions have complaints, and should try to correct them informally before it was necessary to resort to the appeal. Provide high-quality people, educate them, motivate and develop both professionally would improve the quality of achieving educational goals, the key function of human resource management in education [4] .

2. Delegating - It is important that the manager recognizes the expertise and leadership of teachers and other employees and to give them additional responsibilities. When delegating tasks and responsibilities, the principle must be aware that for the proper operation of the school and the office remains responsible for the development of education, municipalities and school boards. It will therefore be necessary to follow procedures that ensure acceptable standards. The principle shall appoint the Deputy Director, whose duties include important managerial positions in school and change of principles during his / her absence.

3. Monitoring of work - Principle shall ensure that all employees understand the importance of their role and encourage them in their work. There should be a director of a leading expert, who regularly visits classrooms and helps teachers indicating their advice and experience, in a careful and confidential manner. In cases where the teachers and other workers over a long period tenaciously follow unacceptable standards, despite the advice, support and training, the manager shall initiate the procedure for termination of employment.

4. Appeal and disciplinary procedures in the initial instance of the principle is to ensure that the institution of rules and procedures for the following cases:

- complaint by an employee against another employee or against the principle (appeal);
- disciplining workers, in cases where there are allegations
- misconduct or inappropriate carrying out the work (discipline).

5. Curriculum - The central role of the principle is to organize and implement the plans and programs of teaching, taking into account that the law requires that the teaching should be adapted to the abilities and capabilities of the individual. Apart from the national curriculum, the Principle is responsible for proposing school-based curriculum.

6. Financial management - In accordance with the law, the ministry provides funds to municipalities to carry out their activities in the field of elementary and secondary education. To municipalities then distribute the funds to schools, plan and manage these assets in a cost effective manner.

7. School Budget - Municipal principle of education will make the scheme proposal and approval of public budgets, which should be kept in a safe place along with the school's manual. The principle shall prepare a draft budget well in advance to comply with the deadline set by the Municipal principle of education. Then the principle comes to the school board with a draft budget that determines the amount of funds requested by the principles as required by the Municipal Directorate of Education (such as paying teachers, building maintenance, books, equipment, and administration), and should take into account all comments made before than the budget submitted Municipal Directorate of Education. The principle reports to the School Board on the outcome of the submission of the budget, including the distribution of the different items, and the school board and the Municipal principle of education, regular financial reports during the year [5].

V. PRINCIPLE AS A MANAGING DIRECTOR

The objectives of managers are diverse and numerous. They need to improve the organization, plan, direct, coordinate, control, and with that should take care of people and increase their motivation. The manager is the person who is in a greater degree than other people responsible for the success of the entire organization, to achieve better results with optimum use of available resources. It is believed that knowledge, success and optimal organization of work, are the basics of successful leadership. Who wants to achieve the goal needs to know the way. Success is a realized goal.. It is therefore very important that the manager sets goals and his associates. Often under the guidance, following activities are included: planning, organizing, coordinating, directing and controlling.

If it comes to school, management is:

- directing and coordinating personnel
- deployment tasks,
- determine how to act,
- motivating staff school
- the relationship between superiors and school employees on the basis of two-way communication.

The principal as leader, needs to know not only the pedagogy of teaching technology, but also human behavior that determine the various psychological, social, status, and other factors. Every manager should have the skills of analysis, evaluation and communication, and proceeding from specific conditions, tailors action. Goals, tasks, available personnel, means and conditions are to be linked into a functional whole and determine all the activities of the educational process [6].

VI. PRINCIPLE AS PEDAGOGICAL LEADER

Under pedagogy principal is meant: acting head of school that is based on the principles and methods of pedagogical science, and focused on the education of students in line with the social goals and tasks.

Pedagogical and instructive role of principle involves helping teachers and partners to successfully achieve the goals and objectives in education students. This means that the manager has to know more and more complete than the one, which helps in that area. The principle is not expected to instruct teachers in their immediate profession (cases), as normally assumed that they possess such expertise and to monitor the ongoing development of the area, but it is expected to help teachers in the selection of forms, methods, procedures, access to students. Also, his pedagogical and didactic instruction are expected.

For high educational standards, it is necessary that all the school works together drawing on the national curriculum, the Office of Educational Development, the municipality and the law.

Principle plays a key role and duty to:

- in teachers, parents and students to develop and maintain high standards of expectations, and constantly tries to rise;
- points out that the high educational standards require high standards of conduct and discipline, hard work and regular attendance at school;
- ensure that the school promotes mutual respect for people of all communities, encourages diversity and opposes discrimination;
- ensure that the contribution of all students is respected and that they develop the skills and confidence to become independent in their learning;
- maintain close links with parents and involving them in the education of their children;
- maintain relations with local leaders and representatives of the community and therefore to the work of the school had the support of the public and to motivate students.

VII. CONCLUSION

The individual must be aware of and able to understand that their work is not only achieving their own goals, but to help and contribute to achieving the goals of the entire organization. Roost, it means leading contributors to a successful self-affirmation. In the realization of complex tasks that the principle has in the field of management (good organization, managerial, programmatic, pedagogical and instructional, staffing, control and evaluative) style of leadership is not a matter of personality functioning, but the decisive choice of strategy. The principle has to know which style suits the requirements of a particular situation. Business leaders to deliver positive results and good results can hardly be sustainable if they are not related to the school as a whole. In the complex process of achieving educational goals, the manager and the manner of its leadership are "core" to create a climate in the school. Research shows that the social climate in the school one of the most relevant factors of quality implementation of the curriculum, and the main instrument for creating a good environment is effective communication.

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KEY ISSUES IN COOPERATION BETWEEN PARENTS AND SCHOOL MANAGEMENT

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Abstract - Starting school is an important moment in the life of a child and its family. When a child enrolls in school, all parents have the same expectations - quality education. Most of them then completely transfer this responsibility on professors, teachers, and assistants. To some extent, they are right, as their children will spend, in an average, 6 hours in school and their compulsory education lasts 8 years. The rest of the time, children spend with their family that like schools, provide child-specific forms of upbringing and education. Thus, the role of schools and families are turning to a common goal - the creation of high-quality, educated individuals of the society, and the responsibility for education is divided between family and school. The effectiveness of education certainly depends on the quality of cooperation between the family and the school. Nevertheless, many teachers believe that some parents are not interested in following and participating in the educational process of their children. It is necessary for parents to realize that only by successful communication with school and taking part in school life, they can increase the chances of their children to be successful not only in school but also in later life. Therefore, it is important to find the most appropriate ways and means of communication and cooperation between home and school.

I. FAMILY

The family is the basic unit of any society and is the first environment for every child. Therefore, it is a major factor in shaping the personality and upbringing. . "Family and school as fundamental and indispensable factors of education are interrelated and neither would be able to achieve the desired results in solving behavior problems without a common and unified action. [1]" According to The Vocabulary of Education, "in the family, the child becomes progressively conscious of himself and his surroundings, socializes, acquires basic forms of behavior and adopts the meanings attributed to phenomena, as well as the views of their immediate environment for them. [2] "It should be noted that the formation of attitudes and meanings of children are to be heavily influenced by moral and social norms and values of the family in which they grow up.

Types and characteristics of the family have been changing through the ages. Today's family is open to the society and its members are active in public life and seek to align their own interests with the common ones. The family is based on the base of shared love, desire for procreation, upbringing of children and achieving personal happiness. In terms of raising children, modern family tends to form a broadly educated and free individual, to develop positive character traits in children, their creativity, independence, self-confidence and to ensure the harmonization of domestic and social interests. According to M. Kuki, the modern family is nuclear – it is composed of two generations: a husband, wife, and children, and it is financially independent of the parental family. Women have equal rights in terms of ownership. The main responsibility of children is to complete their education. A reduction of parental authority is noted as well as the liberalization of sexual freedom. [3]

Families have multiple roles in order to meet both, their own, and social needs. Grandić lists the following family features:

1. emotional,
2. reproductive,
3. economic,
4. functions of providing protection,
5. educational and educational functions,
6. functions for fun and entertainment [4].

In the family, three developmental processes occur spontaneously: culturalisation, socialization, and individualization. Regarding cooperation between home and school, it is a particularly important educational function of the family.

II. SCHOOL

School is an institution whose roots go far back to time in ancient civilizations. Since then it has gone through various changes and reforms with the aim of adapting new demands of the society and its individuals. After family, school is the

second most important factor in the development of psychosocial personality. Historically, the institution of school is under the family.

"School is an institution whose main task is to achieve the objectives and tasks of education". [5] According to the Dictionary of Psychology School, school is "a specialized educational institution in which teachers, based on identified program, plan and systematically transfer their knowledge, attitudes and skills to students "[6].

The structure of the Serbian educational system consists of:

- Pre-school education - the first part of the compulsory education is implemented in kindergarten while attending the kids of age: 5 - 6 years in preparation for primary school
- General Education - compulsory education that is provided in elementary schools and lasts for 8 years. The children are enrolled in primary school with 6 - 7 years, and teaching takes place in two rounds: the first to 4th grade and 5th to 8 grade;
- Secondary Education – it is the first part of non-compulsory education. There may be secondary, and vocational schools;
- Higher education - students are enrolled and ranked based on their success in high school and entrance exam results.

Like family, school has a number of important goals and objectives related to the development of all aspects of the child's personality, knowledge and skills, fostering creativity, independence, forming attitudes, beliefs and values, communication skills, preparation for assuming the role of responsible citizen. The school is the process of secondary socialization as an extension of primary socialization within the family. It is essential that these two institutions work closely together in order to avoid a conflict between the school and the family that could lead to negative consequences in the overall development of the child.

III. PARENTS AND SCHOOL

Communication between school and family is one of the prerequisites of a quality school. In terms of the quality of schools, the most common are the four factors that are of particular importance: the general conditions of education, which are achieved by means of increasing the quality of the goals of education, quality of teachers and the cooperation with parents and the local community. Parents should actively cooperate with the school since they are the protagonists of education and not just passive observers. In order to do this the school management is faced with several tasks such as increasing the number of parents who will cooperate with school law actively and systematically, improving the quality of relationships between parents and the school principal, parents and pedagogical and psychological services. The cooperation extended to a large number of issues and questions of life and work of the school and students.

Family expects that schools assist in overcoming the problems encountered in the course of growing up a child who does not know or is not able to solve independently. In response to the needs of the family, their school curriculum offers various forms of assistance and training to parents: the organization of lectures, workshops and meetings.

On the other hand, school expects help from the family. This support is reflected primarily in the alignment requirements set for students - in terms of upbringing, education, problem solving. In the literature, five basic types of parents depending on their attitude towards cooperation with the school can be found. Professor Eva Gajdosova from the Department of Psychology at the University of Bratislava, lists the following types of parents:

1. type: a parent who avoids any form of cooperation with the school;
2. type: a parent who does not accept calls for cooperation and which is indifferent to cooperation;
3. type: a parent who needs encouragement and support for cooperation with the school;
4. type: a parent who is willing to work with the school and comes with its own ideas and suggestions to improve the quality of cooperation with the school;
5. type: pretty active, authoritarian parent who would like to dominate the independent school and takes complete collaboration [7]."

The importance of cooperation between parents and school tells us the fact that it is defined by the Law on the Foundations of education, the structure and operation of the school board and parents' school.

According to the basics of the education system, it is essential that each school has established Parents' Council. The Council members consist of one representative - a parent from each department of the school. Article 58 of This Act defines the responsibility of the Parents' Council:

1. proposes representatives of children's parents and students in the management body;
2. proposes their representatives in expert working for development planning teams and other institutions;
3. proposes measures for quality assurance and improvement of educational work;
4. participates in the nomination of elective courses and the selection of textbooks;
5. considers the proposed program of education, the development plan, annual work plan, reports on their implementation, evaluation and self-evaluation;
6. considers the intended use of funds from donations and from the extended operation of the institution
7. proposes to the governing body intended use of funds generated by the work of students association and collected by parents;
8. reviews and monitors the conditions of the institution, the conditions for growth and learning, safety and protection of children and students;
9. participates in the process of prescribing measures under Article 42 this Act;
10. approves the program and organizing excursions and teaching programs in nature and considers the report on their implementation;
11. addresses other matters specified in the statute. [8] "

The Parents' Council cooperates closely with school management and forwards their views, opinions and suggestions to it. With the membership in these bodies, parents represent the interests of students and teaching, and have the opportunity to participate in other aspects of school work.

IV. DUTIES AND FAMILY PLANNING OF COOPERATION AND SCHOOLS

Main tasks of cooperation between family and school are:

1. "By joint efforts and coordinated actions work resolves any problems that arise in relation to the education of students;

2. propagation of pedagogical knowledge (to detect parents pedagogical necessity of mastering skills and help them to raise their pedagogical culture) "[1]

In order to have successful cooperation and achieve these goals at the beginning of each school year, professional teams in the annual school plan, develop plans and programs of work: cooperation of school with parents, the PTA, the teachers and librarians regard to cooperation with parents, class teacher's cooperation with the parents. These plans define the forms of co-operation, the subject, the time frame and the implementing agencies. Attached to this paper are the plans and programs that include cooperation with parents who are part of the Annual Plan of the elementary school "Ljudovit Stuhr" in Kisač for the school year 2012 / 2013th year.

Individual contacts with parents are the primary and irreplaceable form of cooperation between parents and school. In this way the student's family is directly acquainted, which provide additional information about the student: the conditions of his life and work, family atmosphere, parent-student relation. Such cooperation may be achieved by home visits by school stuff or parents visiting the school and departmental officer. Cooperation with groups of parents takes place in situations where it is necessary to interconnect the parents of children (of course, with the participation of elders in a class), which in Educational achieving educational goals and objectives have similar outcomes.

Parent meetings are kind of cooperation that is regulated by law. It envisages the realization of at least four parent meetings throughout the school year. These meetings are commonly used for global notification and exchange of information in terms of the entire class and less for individual students. At parent-teacher conferences, in addition to discussions on current topics in the classroom, homeroom teacher should be able to handle parents and subject specific policies adopted by the Plan in a class of officers. Counseling for parents are organized within the school with the aim to help in solving problems by professionals - educators, psychologists, physiotherapists, speech therapists or pediatric physician. According to some research, this counseling is one of the rarest of applied forms of cooperation between parents and school.

Correspondence and text messages to parents are a form of cooperation that is most common in the first cycle of basic education. Generates by a text message to parents and prospective parents 'responses that can circulate through the notebooks, notepads or students' booklet. Most often, they are used to inform parents about a problem, calling on parents' meetings and individual contacts, information on the work and success of students. Besides these forms of cooperation, school management may depending on the needs or based on research conducted in schools, organize some other forms of cooperation with parents.

If you analyze the plans and programs of cooperation with parents, it can be noted that these plans cover most of the issues of interest to both parents and the school. Elementary school age child is special about the psychology, and adaptive changes. This period of life is very important for the overall development and it does the most critical period. During this period, an intensive development of intellectual abilities, there are new interests and needs of students. Some news are also introduced in school work - go to subject teaching, more cases that need to be overcome. All of these are potential problems for whose solution parents expect help from the school management. Most common questions parents ask are related to the child's academic achievement, achievement in school, improve teaching, student behavior and their intended safety at school.

V. PROBLEMS IN PARENTS AND SCHOOL COOPERATION

Based on the above, so far, it seems that the cooperation between families and school management works without a problem as it has been is planned previously, and applied in different forms of cooperation that covers all current issues. The successful cooperation of parents and schools, however, is affected by different factors. According to some surveys on school principals, communication barriers are parents themselves - their lack of interest in cooperation (lack of time, we are so busy) and the lack of communication skills. As a second factor mentioned, it is the lack of school resources to organizing and implementing better collaboration. The third factor is the teachers - their indifference (overload) and insufficient training and expertise to establish and maintain the quality of cooperation. "It is not common that parents do not come regularly, or very rarely to meetings. They do not consider the work with school as their continuous commitment to their children's education. They do not pay enough attention to their pedagogical and general elevation. They take care of the living and working conditions of school children badly. For the failure of the child unilaterally accuse the environment in which they live, their peers and the school and unfairly criticize teachers (usually when the child is getting poor grades, fines and when have to repeat the grade), and do not attempt to align their educational outreach to the educational measures taken by schools ". It is noticeable phenomenon that today's parents do not consider school as a key factor that contributes to the efficient implementation of student life and taking over their role in social environment. There are many other available sources of knowledge and information that provide interesting and engaging content. On the other hand, parents are very interested in their children's success in school, regardless of their real capabilities. The school is placed in an untenable position – not.

VI. CONCLUSION

Family and school life can be seen as a partnership. In order for a partnership to be successful, all stakeholders must develop their skills in communication, collaboration. Quality of mutual cooperation between home and school, provides children a sense of security and protection. Both, parents and school management can prevent misunderstandings, conflicts, problems, quality, and successfully solve problems and contribute to the success and quality of both the students and the educational process of the school.

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ARCHIVES - SOURCE OF KNOWLEDGE ON CULTURAL HERITAGE

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Apstrakt - The authors discuss the role of archives and archival materials in informing students of the cultural heritage. They look at contemporary changes in the use of archival documents, the relationship between archives and educational institutions, cooperation, archivists, and educators together to create the most reliable way to archive repositories. Special reference to the work related to the development of communication between the Historical Archives of Zrenjanin and The Educational Institutions in the Central District - City of Zrenjanin Municipalities Žitište, Sečanj, Nova Crnja and Novi bečej. The most important part is to develop cooperation in the field of education after the opening of the showroom in the Historical Archives of Zrenjanin.

„Where did all these years,
all these people when we are not
there ? "
Czeslaw Milosz

I. INTRODUCTION

Someone once said once that the archives of the mysterious temples, where each document relic. Parishes in which the life of past times calmed down, and the word on the events and people stayed to hear the silence of eternity. And these mysterious temples, as required by law, has been entrusted to take, store and arrange archival material.Evolving with the times and the society in which they are created and utemeljivane, have increasingly gained in importance as a "repository of human memory"“[i].

Archives are the guardians of cultural heritage of peoples and nations. Today more than ever the archives should be "made public institution in which citizens learn about the past and look to the future“[ii] In the time of information technology burst their mystery gets, a patina of past archives are opened as read-inexhaustible treasury of history, looking at the past and the acquisition of knowledge, as a sign of a possible roadmap for a more complete understanding of the present and futuristic thinking.

Archives are 'memory, source of knowledge, inheritors of culture and identity“. It is no accident that in the archival world there has become a philosophy, and that archives are among the most important state institutions. The value of treasures that are kept almost impossible to financially evaluate or express. "The invisible zone of global politics is one of the biggest battles still within the document. Who has the document, and thus the keys to history, that based on past projects not only his own, but someone else's future “[iii].

II. USING ARCHIVAL MATERIALS

Archives, as cultural heritage, has a general social significance of each, and so also for our country. As a multi-disciplinary source of information contains valuable information and data on institutional and individual human activities.[iv] It is therefore understandable that the modern study of the history of a people, nation or society is inconceivable without archival sources.

Archival material includes written, drawn, computerized, printed, photographed, filmed, microfilmed, phonographic or otherwise recorded documentary that is of particular significance for science and culture, whether it originated in the work of public authorities, public institutions, political organizations, religious communities or individuals. The most known archives and specialized agencies are Archives of Serbia, Vojvodina Archives, Historical Archives of Belgrade, Zrenjanin History Archive, the Archive of Yugoslavia, and others.

The principle of publicity and the principle of availability of archives are legal prerequisites for use in scientific, cultural, educational and other needs of the country and abroad. This implies the right of researchers (under certain conditions) for the use of archives. The practical application of such rights has long been used in international scientific and cultural relations.

Archives of the entire scientific and technical activities directed toward achieving two main goals:

- protection and preservation of archives as social memory of the past for contemporary and future generations;
- create more favorable conditions for its use, by applying scientific methods. The archieves have directed their overall scientific and professional activity toward two basic goals: create more favorable conditions for its use, by applying scientific methods.

The previous researches and experiences show that the archival material mostly used for scientific, cultural, educational and operational needs. They were most often used for history and other social sciences, but increasingly also for other empirical sciences. For science whose subject matter includes only archival materials archival stand out, the study of historical sources, arheography and auxiliary historical sciences. The archive material is being used for artistic creativity. Everything is more intense and its use for the state institutions (the process of restitution, etc.), public and cultural institutions, as well as citizens.

Archival materials have been used for a long time through history as a science. Archival records are the main source of knowledge of the historical past. Data show that the research historian in the archives of the largest and most comprehensive is in relation to researchers in other fields of science. During the 20th century, the importance of developing research and other sciences, and the momentum at the beginning of the 21st has been increased. Users archives for scientific purposes are scientific institutions, such as the Academy of Sciences, universities, and colleges and institutes as well as scientific and other researchers, as individuals. The holders of research in local history are often educational and cultural workers.

The archive material is being used for cultural purposes. However, to be judged at the national level, its utilization in Serbia is still not at the level of features, nor reaches purposes. Benefits of archival documents for information on cultural heritage citizens, especially young people, do not use enough. Although it is known that it can be a function of cultural and promotional activities and the development of awareness, archivists have almost no interest in encouraging research. Archives can significantly enrich the cultural events, the publication of publications, papers, essays and articles, documents, exhibits, lectures, papers, arranging visits the facility and meetings with archivists and researchers, and the media - print, audio and visual.

Each medium is unique, and has its own strength and weakness, strengths and limitations within which it operates. The use of media in culture often involves the use of their marketing opportunities. Depending on the target audience or the character of the product, each of the traditional media to create or limits marketing opportunities. In the book "Standing Room Only" Strategies for Marketing the Performing Arts of classification are meaningfully processed Philip Kotler and Joanne Scheff.

The development of new technology has improved communication to unimaginable proportions, allowing greater accessibility and exchange of knowledge and experience. The advantages are evident both in the archives, with regard to storage, sorting and possible use of archival materials and comprehensive insight into the cultural heritage, as well as branching channels of communication on their way to the public.

III. ARCHIVE – A TREASURY OF CULTURAL HERITAGE

The Historical Archives in Zrenjanin was established on 1 July in 1947. The decision of GIO APV with a mission to collect, collate, process and preserve archival materials and registration material that are created by the work entities in the five municipalities of Zrenjanin, Novi Bečej, Nova Crnja, Žitište and Sečanj. The law ordered that the Archives provides transparency and availability of materials for use for scientific and operational purposes.

It developed in harmony with society and economic, territorial and political changes, mainly reflecting them and changing the name several times. Today it houses more than 3,500 meters of archives in 645 funds and collections. The archive library has more than 12,000 library units and a significant number of newspapers and magazines, including the regional weekly "Zrenjanin", whose first issue was published on 1st Novermber, 1952.

Although it is estimated that period from 1993 until 2000. was characterized by stagnation in development as a result of political and economic conditions in the country, this is the period in which the Zrenjanin municipality donated the space for the depot and there are since 1996. The funds placed is of great importance. The Ministry of Culture has provided financial aid partially equipping depots of façade and donated a

computer and soon began application of programs for foreign service SPSL, within JAIS's, which has a historical step forward in the work of the Archives. The depot was finally fitted in 1999. year.

The political and economic changes in the country since 2000 to 2005 were reflected in the work of the Historical Archives of Zrenjanin. As previously in the basement storeroom conditions were poor, the employees were engaged in improving and efforts bore fruit. Even during the 2005th the body was partially relocated during the following year as a whole. Although the program in order to see JAIS archives is not in force, the computers are used for administration, inventory, historical notes, lists, and more.

In the meantime, propaganda and marketing, as well as cultural and educational activities have envolved. Solo exhibitions are notable, and the first was prepared by Nada Boros, archival consultant, "Great Bečkerek, Petrovgrad, Zrenjanin through documents. The Historical Archives," then "Contributions Banat history periodicals", "poster as a historical source," and the settings in collaboration with the National Museum of Zrenjanin City Public Library "Žarko Zrenjanin". Primary and secondary schools as well as visitors who come to the Archives organized, had the opportunity to attend interesting lectures.

It was a time in which the Church began microfilming registries from 1746 up to 1895, and in the meantime nuts have been microfilmed in Zrenjanin, Novi Belej and Nova Crnja. Then it made another significant step IT - digitized periodicals library fund.

Digitization of microfilm is among the most creative and the most modern sectors of The Historical Archives Zrenjanin. Its is a kind treasure in improving the quality of archive material. Technical equipment has also progressed - a new telephone system with accessories, fax machines, digital camera, scanner, copier, six new computers, such as Pentium 4, one of which is equipped with a server. It reinstalled nine computers to which memory was added for more efficient use of local and online Archive of Vojvodina, which is attached to the end of September 2005th year.

The Historical Archives of Zrenjanin for years gives its own archives of other institutions and facilities for exhibitions. It develops a cooperation in order to realize their own show, especially since the former photographic studio Istvan Oldal, the Popular Front Street, 5, on the lake shore in the centar of the city, opened showroom, in 2007. Archive is the first independently organized exhibition, five years earlier, in the Salon of the National Museum of Zrenjanin. In collaboration with the Museum, the Archives hosted an exhibition on the occasion of unveiling of King Peter, the first Karađorđević, just at the place where the Nazis destroyed the former one in 1941. In our own exhibition space, every month there is a new exhibition and the visitors' interest is growing. There is a greater interest, according to the visit in the use of National Archives of scientific research papers published by these institutions.

Publishing activity of the Archives developing in 1953. year. The balance of 13 volumes of the journal "Archives records" and 22 monographs, as well as the latest Guide to Archives - just released second volume. The Fonds archives are kept and a plan that has testified its urban development and have reflected changes over six centuries.

The Historical Archives of Zrenjanin is engaged in a fixed program and work plan. Thus, only in the 2011th century the archive material is arranged and scaled material of 51 archival holdings, an analytical inventory of a collection of photographs and fond of Zrenjanin 1966-1978 yearhas been made. It has completed the second and third volumes. It has started making the "Guide to archival fonds". It was a year of significant activity in the exhibition which started the cooperation with the Jewish Historical Museum Association of Jewish Communities of Serbia. Photo exhibition "Jerusalem, the holy city ... the eyes of tourists", opened in September 2011th year, written by Milomir Boškovic, an amateur photographer, it illustrates the most effective.

On 19th and 20th September of the same year, The Historical Archives of Zrenjanin hosted a two-day archive of counseling in the Hotel "Vojvodina", organized by the Society of Archivists of Vojvodina and Archive of Vojvodina, which is dedicated to the public archives in contemporary society and the improvement of the field of archives administration and public services. There were 59 participants from Serbia, B & H, Slovenia, Hungary and Montenegro.

In early November 2012 in the showroom, the Archive set a multimedia exhibition, published by Matica Serbian, entitled "Two anniversaries: 185th anniversary of the Serbian Matica and 250th

anniversary of Sava Popovic Tekelija". The setting was exhibited from 2nd to 15th November and on the last day in November an exhibition Archives of Yugoslavia in Belgrade "Portraits of Queen Mary and Princess Olga Karađorđević." The most frequent visitors were high school students from Zrenjanin.

During the "Night of Museums", a traditional cultural event, held on 18th May 2012 the Archives as the repository organized their own exhibition "From the imperial city of Vienna – to great Bečkerek". It was created from the Collections Charter (1765-1847). These are the charters and privileges of the Austrian emperors issued to the former Great Bečkereku - today Zrenjanin. Only during the "Night of Museums" this exhibition was visited by more than 600 visitors. the Association "Photo Archive" was given space for artistic and educational setting "EX.POZICIJE."

In cooperation with the Embassy of Russia in Belgrade, from 8th to 15th August 2012 an exhibition of "The First World War through documents and photographs was organized. " The Author's cultural attaché of the Embassy of Russia Alexander Konanihin exhibited a collections of the Central Museum of the Armed Forces of the Russian Federation. Then, in the second half of August 2012, an exhibition was organized in collaboration with the Jewish Community of Zemun, written by the President, Nenad Fogel, "Righteous Serbia - an exhibition of the good people."Dedicated to the brave and noble citizens of Serbia, non-Jews who saved their fellow citizens of Jewish origin, at the risk of their own lives.

One of the most interesting exhibits in the showroom of the Historical Archives Zrenjanin was opened on 11th September 2012, on the Day of the Beheading of St. John - just one picture. The image of Duro Jaksic, one of the greatest artists of the Serbian Romanticism, a painter, a poet, a patriot - The Beheading of St. John was exhibited. It was believed that this valuable painting, created in 1855 was lost, until a few months before the presentation in Zrenjanin, was found a collector Đuro Popovic from Novi Sad, redeemed and restored.

The Historical Archives of Zrenjanin, participates every year in the cultural European event the „Night of Museums“. The showroom was on 24th September 2012 as part of the event, an exhibition of „Zavičajac“, by Marija Čuka and Jovan Pančić, art photographer. For the „Museum Night“ on 18th May 2013th the exhibition was opened three days earlier, named „Ivo Andrić in diplomacy, 1920-1941,“ prepared in the Archive of Yugoslavia , which shows the life and diplomatic way of our only Nobel Prize winner, on the 50th anniversary of the delivery of the Nobel Prize - 152 documents that illustrate his diplomatic career in eight states and 10 cities, from the Vatican to Berlin.

In recent years there has been a notable publishing project in cooperation with the IP Belgrade, Zrenjanin - translation of Felix Milekera „History of the town great Bečkerek 1333-1918“. The German-language book was published in 1933 in Vršac and the translator was John Valrabenštajn In cooperation with the NIP Zrenjanin, 2012. The published book about ethno event „Story of Banat“, named „Banat is as the story“ was dedicated to Kombinat „Servo Mihalj“.

Educational Archives activities are realized through lectures on the history of homeland, as well as the importance of their own actions to protect cultural heritage. Only in the 2012th years they held more than 30 lectures which close to 1,000 students attended.

The 2013th year of historic archive Zrenjanin is dedicated, with regular activity and the realization of projects on a competitive basis, financed by the Ministry of Culture, Media and Information Society of the Republic of Serbia - „Restoration and conservation of books from the 18th and 19 centuries", Equipping special library reading rooms Historical Archives, „Supply cabinets for storage of church registers“ and exhibition „Banat on maps. Printing Guide to the archival fonds of the Historical Archives Zrenjanin has enabled the Ministry of Culture of the Government of Vojvodina.

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IV. INSTEAD OF A CONCULSION

Archives are the true source of information on cultural heritage. If you are open to pupils, students, educators, researchers and scientists, and media professionals, the more the archival documents serve to acquire new knowledge, better understanding of the past, the present and the future thinking - the search for safer roads worthy of living.

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SESSION 3

METHODOLOGICAL ISSUES OF REALIZATION OF TEACHING NATURAL AND TECHNICAL SCIENCES

Teaching methods is a discipline related didactics dealing with the theoretical and practical aspects of teaching. This category of methods, techniques and ways of working, and the pedagogical principles of the science used.

Contents teaching science is constantly changing. Scientific picture of the world's general perception of reality, an idealized model of nature that involves a most general scientific concepts, attitudes, principles and hypotheses as to assess the basic characteristics of the whole of material reality. Place of science in the education system determines the position and role of science in science. Understanding and adoption of natural scientific picture of the world it is important to form a general picture of reality, which is a synthesis of the results of all sciences (natural and social).

Objective methods of teaching technical subjects is to give future teachers the theoretical and practical knowledge, which will provide a modern way teach. Besides teaching methods in technical courses should help teachers to find even better solutions in the classroom and to encourage them in their own research and creativity. One of the main objectives is to continually enhance and improve teaching techniques to help teachers to better perform their tasks.

Review of papers and their contributions:

1. **THE INFLUENCE AND DEVELOPMENT OF INFORMATION TECHNOLOGY THROUGH THE SYSTEM OF INFORMATION AND IT EDUCATION**
   The main goal of technical and IT education as a subject is to provide practical and theoretical knowledge to students in mechanical engineering, electronical engineering, electronics, traffic, energetics, robotics etc. The fast development of informatics enabled the quick development of methods and techniques of exact determination and numerical expression effecting communication and specialization of methods for teaching technical and IT education.
2. **DEVELOPMENT AND INFLUENCE OF INFORMATION TECHNOLOGIES ON THE TEACHING PROCESS**
   This paper will is showing through examples how information technology development is influencing schooling, and how people change and are influenced by the new way of learning, opposed to the traditional way.
3. **WILLINGNESS OF PRIMARY SCHOOL TEACHERS TO ACCEPT STUDENTS WITH DISABILITIES**
   Inclusion means a broader inclusion of children with disabilities in regular education, and from the education system in all aspects of social life and work. In our country, the regular education system and the education of children with disabilities, functions separately and without any contacts. The results indicate the need for both these systems, primarily for the purpose of providing the necessary support to children with disabilities who attend regular schools, and the need for adequate informing teachers in regular schools, students, parents and the public about the specific needs of children with disabilities, their capabilities and potentials.

4. **EVALUATION OF DATABASE SCHEMA CORRECTNESS**
   The article deals with evaluation of students' project correctness of Database Systems course. Project contains one big table in non-normal form. This table is filled with data. It is needed to decompose big table into smaller tables, correctly define primary and foreign keys and modify final schema to satisfy integrity constraints and conditions of 3rd normal form or Boyd-Codd normal form (BCNF).
5. **IMPORTANCE OF INFORMATION TECHNOLOGY FOR KNOWLEDGE MANAGEMENT**
   This paper will analyze the undisputed importance of information technology for the success of knowledge management, which defines the difference between information system and knowledge management system, the similarities and differences between information system users and knowledge workers and provides information and analysis tools and resources for life-cycle stages knowledge management. A section is applicable to the current situation and analyzes the characteristics of knowledge management and information technology in organizations in Serbia, with special emphasis on organizations whose activities require the application of high technology, as well as opportunities to improve business organizations in Serbia, with the implementation of knowledge management.
6. **THE INCLUSIVE EDUCATION IN PANČEVO**
   Current education system is rigid and its inability to adapt the methods and the content of the education program results in many children "doomed to failure". This model does not meet developmental and educational needs of very large number of children. Therefore, it is necessary to make certain modifications of education system.
7. **PROFESSIONAL ORIENTATION AT THE TRANSITION TO HIGH SCHOOL**
   The professional orientation contributes to the establishing of the system of support to young people and the implementation of the tried models of professional orientation through which young people are encouraged to choose courses of professional development adjusted to the conditions of the real life they live and in accordance with their individual inclinations as much as it is possible.
8. **EVALUATION OF IT SKILLS AT TECHNICAL UNIVERSITIES**
   One of the important elements when accrediting higher education institutions is evaluation of students' knowledge. Evaluation at technical faculties is mostly done formally and is based on a survey of general parameters important for faculty or university (opinion about professors/assistants, curriculum, student service). Research based on evaluation of individual teaching curriculum and testing self-evaluation as a highest level of evaluation on technical faculties in the Republic of Srpska is rare and sporadic. Detailed analysis of evaluation of subjects at technical faculties could determine quality of curriculum, true percentage of passing, students' 'self-awareness' and maturity for self-analysis of knowledge.
9. **THE VIRTUAL NET IN EDUCATIONAL CONTEXT: NEW STAKES, NEW PLAYERS**
   The study offers a new insight into the virtual network as a socio-technological one. The ideas of Bruno Latour, Michel Callon and some Bulgarian authors on the topic are used as a basis of the study. The empirical study includes the expert opinions and evaluations of the problem given by computer science and information technology teachers in both schools and universities.
10. **EFFECT OF LEADERSHIP STYLE OF TEACHING THE PROMOTION OF MOTIVATION TO WORK WITH STUDENTS**
    This research seeks to emphasize the importance and seriousness of the problem of students' motivation; how students are engaged in school; the quality of communication between students and teachers, depending on the leadership style of teachers teaching. It points out how students feel at school and eventually how all of the above influences on student development and motivation for teaching.

11. **QUALITATIVE RESEARCH IN EDUCATION: ISSUES AND SAMPLES**
    Research conducted in the context of observed phenomenon or identified problem enables their deeper understanding and exploration. In some cases, the research goal is to investigate human behavior in the real situations or to collect experience or opinions about the studied problem. This paper outlines important issues in qualitative research, and also presents some illustrative samples from education.
12. **LEARNING SUPPORT: ASSISTIVE TECHNOLOGY FOR STUDENTS WITH VISUAL IMPAIRMENTS**
    The aim of the paper is to describe the application of assistive technology in the education of visual impairment students. Assistive technology enhances reading and writing skills, as well as communication with the world on an equal basis. Facilitating the learning process with assistive technology tailored for individual need improve quality of life of visual impairment students. The main requirements for the use of information technology and assistive technology in learning process are enough computers for all students, advisers to help teachers, and pedagogical support. Information technology and assistive technology is an important tool in the inclusion process and can promote independence and autonomy of students with visual impairment.
13. **TEAM BUILDING INFLUENCE ON PROJECT SUCCESS**
    This paper describes educational elements important for team building, especially for information technology projects. Those aspects could improve building successful teams and, in that way increase their success rate.
14. **SOCIAL NETWORKS AND THEIR INFLUENCE ON EDUCATION**
    Social Networking has become very popular during the past few years, and it plays an important role in our life nowadays. In my work I will explain advantages and disadvantages of social networks, opportunities and challenges of social networking sites and opportunities to use of social networking in education.
15. **THE APPLICATION OF MODERN EDUCATIONAL TECHNOLOGY ON THETEACHING PROCESS**
    This paper discusses the use of modern educational technology in the teaching process and the willingness of teachers to turn to modern educational processes. On the bases of the researches we can conclude that teachers need additional training in the management of contemporary educational resources.
16. **NATURE AND STRUCTURE OF STUDENTS INFORMATION**
    In this article the category of "information competence" and its noun-surface characteristics are studied. Based on the analysis of different approaches to the interpretation of the key definition criteria of information competence criteria are distinguished. The structural composition and levels of formed submitted competence are listed and described.
17. **INFORMATIONAL TECHNOLOGY IN EDUCATION**
    Technology is advancing at a fast pace, and is integrated part of our daily life. Technology, industry and society are creating pressure for teachers to use IT in the classrooms. On the same topic of technology advancement, challenge is presented to pedagogy which needs to keep the pace with technology, in order to create guidelines for teachers, redesign curriculum and assessments. This paper will address some of the challenges and potential solutions of using IT effectively in education.
18. **THE SHORT HISTORY OF THE DEVELOPMENT OF TECHNOLOGY, LIFE MANAGEMENT AND PRACTICE AND ITS ROLES IN HUNGARY IN THE BEGINNING OF THE 21ST CENTURY**
    Today there is a transformation in education. Technology, life management and practice, being an interdisciplinary subject, requires a special approach. In the present study we are delineating the goals and roles of this subject and we are giving an outline of the developments it needs.
19. **EDUCATION FOR MANAGERIAL PROFESSION**
    The paper presents the analysis of the empirical research results about the processes of education of the management profession in the Serbian society. The research of education for the management profession refers to the evaluation of management curricula at universities in Vojvodina, goals of managerial education and students' satisfaction with the quality of teaching at management universities.

20. **GEOINFORMATION TECHNOLOGIES IN EDUCATION – PERSONS WITH DISABILITIES IN EMERGENCIES**
    Use of geospatial analysis in the field of disaster risk management is an example of comprehensive approach to solving practical engineering problems. During the process of teaching in the field, it is necessary to use examples from real situations. Geospatial analysis of exposure to risks of persons with disabilities and modeling appropriate responses allows students to understand complexity of the risk management concept, as well as to learn how to use the GIS software.
21. **PREPARATION OF TEACHING MATERIALS FOR A C# COURSE**
    The main goal was to investigate how we can increase the students' motivation for learning, therefore providing for a high level of knowledge acquisition and retention. To this end we prepared an extensive set of teaching materials, and organized the course appropriately.
22. **THE IMPORTANCE OF CULTURAL DIVERSITY IN TEACHING THE ENGLISH LANGUAGE AS A FOREIGN LANGUAGE IN MACEDONIA**
    This paper elaborates this trend from two points of views. The first view is an effort to demonstrate through classroom observations and interview questions that ethnic diversity in classes is positive as regards learning process and there is more learning in diverse classes compared to other mono-ethnic classes. The second view is the positive impact of diverse classes on the society.
23. **THE ROLE OF MOTHER TONGUE IN ENGLISH FOR SPECIFIC PURPOSES (ESP) CLASSES**
    This article addresses a major issue in the South East European University in teaching EFL/ESL and ESP classes, where students' and teachers' perceptions are taken into account in designing a suitable teaching methodology. The article examines data from self-administered questionnaires and interviews to show the existence of the preferences of using Albanian as a facilitating tool in ESP classes and ways to improve the teaching methodology in such classrooms.
24. **MEDIA AND CORRUPTION IN HIGHER EDUCATION IN MACEDONIA**
    Corruption in higher education is a silent but well known phenomenon in countries in transition. The thesis presents a method of analysis of newspaper articles and news coverage on corruption in higher education in a way that it quantifies the coverage and in this way determines the most common corruption patterns in higher education as described by the media. The study offers additional alternatives to the analysis of corruption in higher education.
25. **EFFECTIVE VOCABULARY INSTRUCTION: DIRECT VS INCIDENTAL VOCABULARY INSTRUCTION**
    Teaching vocabulary is vital because we need vocabulary to communicate and it enables our learners to communicate in the target language, the more words they know and understand the better they will be able to communicate. Furthermore, the challenge teachers face is because that they want to do their best and want their students to learn as much as possible. And yet not all the words require the same depth of instruction, some are easier to teach and acquire and others are more difficult.
26. **KNOWLEDGE OF DANGER USING THE INTERNET BY ELEMENTARY SCHOOL STUDENTS**
    This paper presents the main ideas about how much elementary school students know about the dangers the Internet hides. A research including 150 elementary school students was conducted. The aim of the research was to find out the scope of elementary school children's knowledge of the dangers using unreliable Internet sites.

THE INFLUENCE AND DEVELOPMENT OF INFORMATION TECHNOLOGY THROUGH THE SYSTEM OF INFORMATION AND IT EDUCATION

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Abstract - The main goal of technical and IT education as a subject is to provide practical and theoretical knowledge to students in mechanical engineering, electronical engineering, electronics, traffic, energetics, robotics etc. The fast development of informatics enabled the quick development of methods and techniques of exact determination and numerical expression effecting communication and specialization of methods for teaching technical and IT education. The development of IT showed a major influence on technical and IT teaching. Multimedia packages have great pedagogical value. They successfully connect all those responsible factors of the educational work. According to didactic aspects there is an increased activity between student and professor which leads to faster and more efficient learning.

I. INTRODUCTION

Development and influence of information technology on teaching technical and mechanical education is evident.

Modernization of the subject technical and IT education was introduced through cultivation of new technologies, too. One of them is justified by information technology. IT occurs as part of the content, but as a part of teaching technology as well. It is much easier to do, for example, screening cases on the computer to achieve a virtual simulation of the observed effect or some phenomena, technical systems and motion mechanisms. IT is the result of scientific and technological inventions and processes of science and it develops rapidly. It is caused by discovering of new facts and inventions. In the series of changes informatics appears as a new discipline that interactively affects changes, causes and encourages them.

II. IMPACT OF IT ON TEACHING TECHNICAL AND IT EDUCATION

Information technology improves and accelerates the process of learning and teaching by providing the following conditions and environments for learning. These are the data sources that are available for student to use electronic networks. Teaching contents has been stored on laser disks, hard disks, and on video cassettes which will give us opportunity to demonstrate something in a virtual way. Students can get help i.e. necessary information that is relevant at a time when they need and thereby overcome a lack of information, lack of understanding, complexity or abstraction of the phenomenon, process information, using a database system as the Internet or compact disks (CDs). It contributes to a better understanding of the use of computer technology. The contribution of the Internet like a massive data source of knowledge, and students should refer to its use because it can easier solve their projects and problems. The student is referred to self study, and to search for solutions [1].

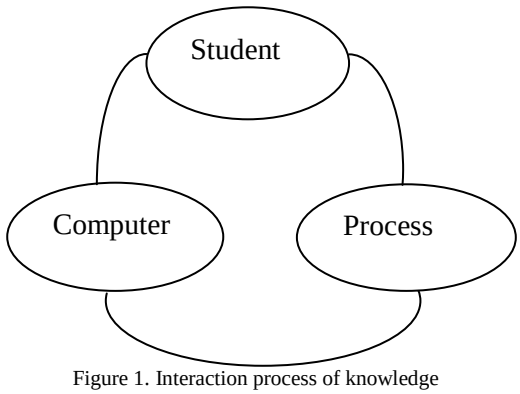

Figure 1. Interaction process of knowledge

IT is studied in technical and IT education from the fifth to the eight grades, allowing continuity the studying of Informatics and contribution to create a standard of Information literacy. This is necessary because in the process of implementing IT in schools there is unevenness of certain regions and schools in terms of the equipment.

In the course of Technical and IT education in the fifth grade the use of information technology is a computer system consisting of hardware and software. Hardware consists of all parts that make up a computer configuration, and software is a group of programs that are installed on it. There are in use the basic computer operating systems Windows environment, word processing program and drawing program [2]. . The emphasis on IT parts of the subject in technical and IT education is to develop students' basic information literacy, but also to recondition applied contemporary technology in communication.

In teaching technical and IT education in the sixth grade IT is applied in the design of buildings. These are the types of programs like AutoCAD that for many years were the undisputed as programs aimed at making technical drawings and still will be for a long time even though they have large and heavy competition. Unfortunately, any professional program designed exclusively for technical drawing is not intended curriculum of the subject matters of teaching technical and IT education in primary school. Programs for professional technical drawing are only mentioned in the teaching of technical and IT education.

GoogleSkethUp program is intended for creating models of buildings, Corel is intended for professional graphic processing of anything. MSVisio 2003 is designed for the sixth grade students.

AutoCAD is intended for drawing technical drawings in any field of techniques, it is possible to draw the 3D models or projects. Program like Floor Plan are programs intended to draw construction drawings and they provide full 3D object representation as well as virtual tour through the facility. The advantage of this program is reflected in the fact that the parts are not drawn, but only entries to the desired location.

The used constructivist materials and coating materials can also be changed quickly and easily by selecting different types of brick or coating the floors and walls, so that drawing is actually playing and with this program a child can draw like a professional. The best way to learn to work in some program is to work in it.

Curriculum provides the use of MSVisio 2003 program, which appeared as part of the standard Office 2003 package. This program provides opportunity to create good drawings, especially in areas that are designated for graphic images, graphic tables, etc. Its use in the sixth grade is recued by the use of individual programs in order to draw the basics of building facilities and input symbols. Students in the sixth grade are working with flash memory, record drawings. They also work with printer, use the Internet, and apply it to the study unit.

In the seventh grade students learn the basic concept of information and communication technologies, the role of information and communication technologies in various professions and walks of life. They also train to work in one of the operating systems and several commonly used application programs to acquire habits to use them in their daily activities. They use the computer with ready word processing programs and interface. Students should use computer to gather information as well as their processing and presentation. They use system-use interface connection to the computer, manage the models using the computer, then work with designers based interface technology, computer and management models.

In the eighth grade, students apply their knowledge in IT, their knowledge, skills, and awareness they are trained to use the information technology in teaching other subjects and work in everyday life. They are now expanding their knowledge and learn the basic concept of information and communication and learn the role of information and communication technologies in several professions and walks of life. Students expand their knowledge about the Internet use, and about basic operating system commands. They are trained to prepare presentations, where they apply previously mastered word processing programs, database, spreadsheets, and graphics. They can prepare presentations in different areas and subjects that are not related to teaching technical and IT education.

Through the mentioned implementation of information technology in teaching, students can make technical drawings independently, apply the knowledge they have acquired through the Internet and apply it to other subjects. Students are in step with modern technical achievements that develop creativity, self-initiation, and independence.

III. MULTIMEDIA IN TEACHING TECHNICAL AND IT EDUCATION

Multimedia is defined as the integration of multiple media. Multimedia has the ability to simultaneously create and display images,

photographs, sounds, words, text, animation, motion, video, etc. Students in relation to these opportunities can create their own multimedia creations that include images, attachments for that work is relatively simple to use and students can quickly create a variety of visual materials, their notes, databases, etc. Multimedia packages are usually implemented on a CD ROM and can be downloaded from the Internet using their own computers. Multimedia can be defined like this: "The teacher does not use chalk and blackboard, and we understand everything".

Students using multimedia programs can observe a virtual reality in which you can stop the events, processes, actions, appearances, carefully analyze them, study, repeat, decrease, increase, turning, etc. In that way they perceive relationship between events and make appropriate assumptions and conclusions.

Simulations can be used in various ways in teaching technical and IT education. They can simulate the simplest processes starting from the simulation of some machines (airplanes, automobiles), to simulating complex processes in nuclear reactors, chemical phenomena, biological and social processes. For instance, student does not have to change physically the composition of various chemicals, speed, and strength, in order to see what will happen. He can work on his computer by changing only the value of the symbol [2].

Computer and other technological tools can simulate the context in which the matter can perform certain tasks, and many real life situations, which improve and accelerate the learning process and facilitate cognitive functioning.

Animation allows students to observe process progress that cannot be studied in any other way, such as the work of the internal combustion engine, operation of nuclear reactor or change the center of gravity of a group of objects moving on space. In this way, some important aspects of the process are pointed out and what is not visible becomes visible.

Presentations allow representation of various multimedia materials using computers and video projectors.

The development of multimedia applications has showed a great impact on teaching of technical and IT education, i.e. the development of ideas among students and creating creativity.

There are a number of multimedia authoring tools and they are easy to use, especially for those with modest information knowledge. We have tools of the highest, medium and lowest levels.

Hypermedia in the educational process can be used in two ways, both as a "teaching tool" and as "learning tools". As a teaching tool, it helps teacher to improve teaching content presentation for his lecture, prepare better didactically, process a particular teaching topic that will be implemented in the learning process.

As a learning tool, Hypermedia is used to enable students to handle multimedia systems, i.e. all sources of knowledge and information in them, enter independently into interaction with an educational program (software), use Hypermedia as a tool for individualized learning in pairs, groups or remotely.

The difference between these two methods or manner of use is that the model using Hypermedia as a teaching tool allows students to exercise their own choice of subject matter in a computer program, while the models of using Hypermedia as as teaching tool, the teacher directs the way of learning. The first model provides individualized instruction, the speed of learning that suits each individual student that is adapted to their individual abilities and learning styles.

Hypermedia learning programs may be distributed or implemented in the educational process of the form: didactic presentations are enhanced with video materials; research ways of learning that provide students with various forms of media use of information; observations that enable students to various forms of multimedia use of the information; rating from within which testing students' knowledge[2].

These programs are useful and applicable in the educational process because they visually present knowledge they are the basis for a broad base of available knowledge with the possibility of using simulation tools or intellectual, educational games. Learning is also based on research and students via communication networks receive feedback.

IV. INTERACTIVE ELECTRONIC PANEL

A new modern device of information and communication technology is the electronic panel that has been applied increasingly in the teaching process.

The interactive panel is a sensor display fused with the computer. A special program allows you

to work with text, objects, audio, and video material. To use the interactive panel Walk-and-Talk there is no need to install software on your computer.

Johny Chung Lee from Carnegie Mellon University (Pittsburgh, PA) came up with a way to use the Wiimote controller wall or any work surface converting into electronic panel. This device is an excellent one suitable for teaching technical and IT subjects. Wiimote can be connected to a PC via Bluetooth (10m range radio link) and if it faces the camera it can trace infrared radiation coordinates and forward information to the computer. The infrared pen writes a crawl along the wall and on the other side it is detected. With Wiimote controler on the computer can find the trail. The computer image is projected on the wall. It is ideal for teaching technical and IT subjects[3].

V. PROGRAM OF TECHNICAL AND IT EDUCATION

The program of technical and IT education relies on the past experience and existing reality, but in addition aims to modernize the rationalization of teaching subjects and to relieve students, the program has evolutionary nature. The emphasis of IT work is to develop students' basic computer literacy and to apply modern technology to communicate. Computer training should enable students to use modern information and communication technologies [3].

Technical content and information should be implemented through thematic units into Informatics through the "game" to master the mouse and keyboard. Insisting on that every student is able to do an operation in working with the computer. The student will progress step by step in the field of IT that will be applied to other cases. In comparison to previous teaching tools, methods and forms of teaching and learning the computer technology offers you constant feedback, direct correcting any wrong actions, reactions and decisions. Any action on the keyboard or the mouse has its consequences. They display the error or allow further work of programs towards newer and higher level.

This option provides the students the knowledge that they can always know the real state of their capabilities, skills and knowledge, seeking the causes of errors and thus gaining experience. He rules among information, its knowledge and reactions. Information technologies have shown great development in teaching technical and IT education.

VI. CONCLUSION

Modernization of the subject technical and IT education was through processing and new technologies. One of them is the information technology. IT appears as part of the content, but also as a part of teaching technology. Information technology improves and accelerates the process of teaching and learning with a variety of knowledge sources that are available to students using an electronic network, then the interaction to see the consequences of their actions. The great importance of the use of computer technology is better understanding of students.

Multimedia packages facilitate the acquisition of permanent knowledge, encourage self-assessment, evaluation, and allow implementation of acquired knowledge in new situations and social life.

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DEVELOPMENT AND INFLUENCE OF INFORMATION TECHNOLOGIES ON THE TEACHING PROCESS

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Abstract - The awareness of the important influence of information technologies on everyday lives sometimes seems insufficient. They change one's life, habits and public behaviour bringing some new concepts of a new life and creation. This paper will show through examples how information technology development is influencing schooling, and how people change and are influenced by the new way of learning, opposed to the traditional way.

I. INTRODUCTION

The traditional schooling has taken some other forms of its existence long ago, such as distance learning, since the appearance of the first audio recordings, all the way to the contemporary technology achievements and influence of information technology on them. "Modern World" today is completely dependent on information technologies and on internet as their part with all accompanied services. Influence of information technologies on education is clear to everyone, and I, as one of the many witnesses, am putting emphasis on the internet streaming and its utilization for enabling and carrying out the distance learning; we'll go through definitions, user experiences, etc. Enjoy!

Definition of distance learning

There is more than one definition of distance learning, here are the most comprehendible ones: - Most of the educational process is done by having the teacher and his student apart one another in space and time.

- It is a process where the educational material is being delivered "face to face" to students by technological means when they are physically separated from the teacher.
- My explanation would be that distance learning is nothing but the interaction among one or more, physically separated participants, using contemporary information technology.

II. INTERNET STREAMING

Access to multimedia content over internet in real time or at user's request is enabled by streaming technology. In case of transferring an event in real time (live streaming) all generated audio/video signals of the moment are being transmitted. This enables the organization of the teaching process in such a way so as it can be followed by several users, regardless of their geographical distance. Video-on-demand implies already prepared material shown upon user's request. The basic principle of the streaming technology is its ability to divide a multimedia content into pieces, transmit these parts sequentially and to allow a receiving device to decode and replay the content as they come along [1].

The streaming technology is based on using specialized internet protocols, as well as communication technologies between a server and a client (Quality of Service), which makes synchronized transmission of multimedia content, in real time, possible.

The protocols directly tied to internet streaming are classified into categories:

1. Network-layer protocol, provides basic network services, such as network addressing.
2. Transport protocol, for real time transmission.
3. Session control protocol, defines messages and procedures for transmission control, while the session is being enabled.

Video streaming is a demanding transmission technique, which quality depends on different factors such as bandwidth, latency, jitter, package loss during a transmission, etc. Packages must arrive on time and without errors.

Streaming characteristics

Time relation – real time manipulation of data in package oriented network, demands that the time relations among the session packages remain intact. During the live on-line broadcast, a video is being digitalized and packed. There is a one second time delay between the moment when the server passes the information, and when a user sees it, but it is considered to be in real time. Time relation between the packages is preserved, so the one second difference is insignificant.

Jitter is an occurrence when the packages arrive with different time delays. *Timestamps* – solution to eliminate jitters. A timestamp (TS) is assigned to every package which points to the moment when the package is supposed to be shown compared to the previous package, after which the receiver can determine when it can begin with playback of the package.

Playback buffer – To be able to distinguish the time of arrival from the playback time, it is necessary to memorize the data on the receiver's side until it's time for the actual playback. Memorizing is done by integrating a memory element called *the playing buffer*.

Sequencing – Along with preserving the time relation, it is necessary to bring in another parameter which is called a *sequence number*. When a package gets lost, the receiver cannot know that it has happened. It is necessary for packages to have their sequence numbers, so as to enable proper addressing of these kinds of situations. A sequence number is assigned to every package in realization of a real-time transmission.

Multicasting – Data transfer rate is essential to multimedia applications, especially in video conferencing systems. In these situations data traffic can be very intensive because the data is being transferred by multicasting methods. In video conferencing it is also necessary to establish a two-way communication between a transmitter and a receiver, while the traffic being done in real time should support multicasting.

Translation – Sometimes, when the data traffic is done in real time, it is necessary to perform a translation. A translator is a computer which converts a high bandwidth video signal into a narrow bandwidth signal. The translation is in fact transcoding high quality information which needs to be transmitted into low quality information, so that it is adapted for the receiving network's bandwidth.

Mixing – If at some point more than one source can transmit data simultaneously (as in video-audio conferencing), it is said that the traffic is made by several sequences. In order to converge the traffic towards one sequence, the incoming data from different sources should be mixed. Mathematically, a mixer sums the signals coming from different sources and creates a unique output signal. Mixing is basically combining several data sequences into one sequence.

Transport protocol support – TCP protocol is not suitable for interactive data transfer. It doesn't have the ability to integrate timestamps, and it doesn't support multicasting. On the other hand, the TCP supports ordering (sequence numbers). One of things that make TCP unsuitable for interactive data transfer is its mechanism for error management. Interactive data transfer does not allow retransmitting of lost or damaged packages. With interactive data transfer, if a package gets lost or damaged it must be ignored. Retransmission disrupts the idea about TS and playback. On the other hand, UDP is much more convenient for an active multimedia traffic. That's because UDP supports multicasting and it doesn't have a built-in retransmission strategy. Unfortunately, UDP doesn't have TS capability, package sequencing (ordering), nor mixing, [4].

Example of video streaming utilization in class

Urbanized way of living has brought a fast life-pace. People are trying to tie "the nice and the useful" in one, having as little losses as possible. Many desire education, specialization, attendance to science rallies in other cities, but the way of life decreases the chances for that. There is a need for an individual to be present in several places at once, which is enabled by the advanced technology and informatics experts. They managed to bring education and the traditional classes into people's homes, on screens of their PCs, tablets, mobile devices. Many faculties utilize information technologies; some even do not have their building, classrooms and laboratories because their classes are taught remotely. Teachers can be in contact with their students through their computers. It is necessary to have input-output devices with proper software of course, and the classes can begin in real time over internet streaming. Students are informed about lectures via sms or e-mail. They access the lecture at the announced time from their homes, and they can watch the teacher on camera. The teaching process is not so different from the traditional way of giving a lecture, and all that the teacher is writing

down, and the presentations that he is playing are shown on screens of the attending students.

Communication between the students and the teacher is done through software, whether verbal or by typing. Software can be used to do tests, to send necessary studying material, as well to check on student's attendance by a roll call. The teacher is calling out the students, they show themselves on the teacher's screen so that he can take a snapshot of them by a software tool, and bring the lecture to its end. This way of lecturing is significant as it brings flexibility, saves money and, at the same time, it is at least equally efficient as the traditional way, although it's a matter of perception.

Differences in ways of learning

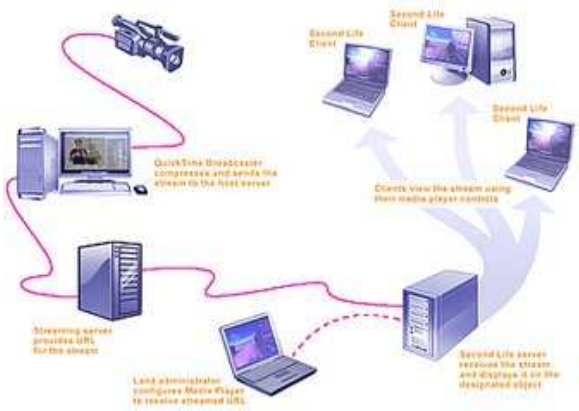
Distance learning brings along some new challenges for teachers opposed to the traditional lecturing in classrooms. They must understand the characteristics and needs of different students without ever meeting them, they must adjust their lecturing to the structure of their students; they also need to be very familiar with the technology used to deliver information, and to be focused on the teaching process itself, at all times.

An assistant's job consists of the adaptation of the work environment, signature collection, supplying the studying material, etc.

Educators – good software must have different tools and services such as student registration, work material distribution, book ordering, copyright support, report processing, etc.

Administrators – their contribution is important to both the process of planning the system and process of planning the software used for distance learning; from the moment when the system is operational, their job is technical maintenance. They are part of the technical support and ensure that the technological resources are serving its purpose. To the end-user, in this case a student, taking a class in a form of distant learning is not expensive equipment-wise, because everyone has a "trendy" computer (a computer with compatible hardware and software configuration). For such an organization of teaching, leasing of the equipment, bandwidth, internet provider, etc. can be expensive.

When considering the bandwidth needed in this kind of an educational model – the quality of a course varies, depending on the resources of media involved. For example, electronic learning can be simply done by a sequence of graphically enhanced pages, with animations and simulations; on the other hand, video streaming demands much higher bandwidth [2].



Picture 1. Graph of video streaming realization

III. CONCLUSION

Distance learning is very powerful and useful, offering the flexibility while saving the money and time, which is very significant for today's modern society. Concept of a video streaming has brought the distance learning to a new level, until we reach a point where a clone would do simulations and playbacks from distance, projections of humans and their behavior patterns, while passing the information-the most expensive item of today.

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WILLINGNESS OF PRIMARY SCHOOL TEACHERS TO ACCEPT STUDENTS WITH DISABILITIES

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Abstract - In recent years, not only in our country but all over the world as the ultimate form of integration develops the inclusion movement. Inclusion means a broader inclusion of children with disabilities in regular education, and from the education system in all aspects of social life and work. In our country, the regular education system and the education of children with disabilities, functions separately and without any contacts. The results indicate the need for both these systems, primarily for the purpose of providing the necessary support to children with disabilities who attend regular schools, and the need for adequate informing teachers in regular schools, students, parents and the public about the specific needs of children with disabilities, their capabilities and potentials . [Jablan, B., Kovacevic, J., 2008, p. 1]

I. INTRODUCTION

In many surveys of education in Serbia, it is said that the coverage of children in compulsory education are almost 100% (for example, UNESCO says that the net enrollment in Serbia about 96% - http://gmr.uis.unesco.org/ViewTable.aspx).
However, such a high percentage is "hiding" the fact that many children are not actually involved in the education system. This is primarily to children in need of additional support (children with disabilities) and Romani children, but many of the children from all disadvantaged groups are more likely to be excluded from regular schools. By some estimates, there are about 10% of children with disabilities, many of which are not included in the education system (OECD review "Educational Policies for Students at Risk and those with Disabilities in South Eastern Europe, 2006). In addition, according to official data, about 20% of Romani children are out of primary school, but if that figure included the Romani children who are not registered, who were displaced from Kosovo and those who were deported from Western countries, the percentage of Romani children who are not included in education can be even 80%! [CETI, 2006, p. 3]

Despite the large number of children who were not included in education, there is a significant problem with the education of children who are formally enrolled in a regular school. Specifically, our education system is inflexible, which means that the curricula and teaching methods are set against the modal child that is dominant majority. All children who do not fit into such curricula and teaching methods simply are not getting an education that would be consistent with their developmental and educational needs. This means that the current educational system is at risk, not just children who are excluded from school, but many of the children who attend regular schools. [CETI, 2006, p. 3]

One might reasonably ask are there children who are at "profit" with the education system that is not aligned with the developmental and educational needs of children. Or, phrased differently, would improvement of the capacity of schools and teachers to serve the needs of children, received only children from marginalized groups, or all the kids would actually get a better education? [CETI, 2006, p. 4]

In the future one of the important areas in the reform of the education system will be the foundation of inclusive education that is education will be in function of students and their developmental and educational needs. Inclusive education means that all children should receive a quality education within regular schools, regardless of gender, ethnic, religious and socio-economic background, abilities and health. At the same time, this means that schools and kindergartens should be adapted to the educational needs of all children, not only to educate the children who can fit into the existing educational process. [CETI, 2006, p. 4]

Inclusion is based on the principle of respect for the right to education. Every child has the right to a quality education in accordance with their abilities and capabilities. Inclusive education for all children the opportunity to be part of the school community and so to prepare, as adults, equal participation in social life. [CETI, 2006, p. 4]

II. CHILDREN WITH DISABILITIES

A child with a disability is primarily a child. "Every child, whether with disability or not, has the same basic needs - to be loved, accepted and secure," according to [Došen, Lj., Gačić-Bradic, D., 2005]. Disability should not be the basis for any kind of discrimination, but sometimes it's necessary to find specific ways to meet the needs of a child who has it. A child with a disability should be given the chance to grow and live within their abilities. [Hrnjica, S., 2004]

Language is a very powerful, and choice of words we use can be significant. Therefore, we use the term "child with a disability" rather than "disturbed child" and thus put the emphasis on his being, not a state. [UNICEF, 2007, p. 13] The term "child with a disability" is used to emphasize the focus on the child, not the disability that is only one of many determinants of that child, and the disability is not the essence of the child's identity.

A child with a disability, that is, a child whose physical, mental or emotional development, growth and maturation are disturbed, according to the Convention on the Rights of the Child, has the right to special care, education and vocational training, which will provide him a full and decent life and to achieve him the highest level of independence and social integration. [United Nations, 1989, p 20]

We must not, however, lose sight that a child with a disability is not a child less developed but is a differently developed child, it is unique in its organic and psychological structure. For example when a child with hearing or vision disability achieves the same thing as a child with normal development, then it means that a child with disabilities do all that in another way, or by other means. For educators and teachers is very important to know the characteristic path that should lead the child in educational work. [Vygotsky, L. S., 1996]

III. PREREQUISITES (ELEMENTS) OF SUCCESSFUL INCLUSIVE EDUCATION

The introduction of inclusion in practice, requires time and patience. Numerous are the prerequisites of successful inclusive education. It should be:

- Established by law, determined and defined,
- Economic and planned
- Scientific Research processed

After that, the focus is on informing and sensitizing public opinion on the needs, opportunities and rights of children with disabilities. It is necessary to prepare the parents of other children and themselves for peer acceptance friends with disabilities, creating a pleasant atmosphere in the class and all the children participate in school activities. Preparing children with disabilities at school requirements is also an important prerequisite for successful inclusive education. A child with a disability can be difficult to accept responsibility and accountability because they never have to do anything. Daily living habits are often insufficient in these children established (clothing, hygiene, etc.) Both the child and the teacher is an additional burden. Barely a social experience that is often characteristic of children with disabilities, it can result in a lower susceptibility of these children to the needs of others and rejection by peers. In most children the process of adapting to a new group or division takes place spontaneously, whereas children with disabilities need active support. This period is not time-limited and relies on the skill and creativity of educators / teachers. Creating a positive atmosphere, successful social experience and sense of comfort conditions for acceptance of school and homework assignments. [Hrnjica, S., 2004]

Preparation of parents of children with disabilities and building partnerships with them is also a necessary prerequisite for successful inclusive education in general. The surest way for the successful adaptation of the Child requires schools and further progress in the work is a good partnership with parents. [Kari, J., Butkovic, B., 2008, p. 63] The process of establishing the parent-teacher (a teacher / defeketolog) is mutual. It is based on introducing, establishing mutual trust, sharing information about the child, mutual agreement on the goals to be achieved, a unique school and family activities directed toward a

common goal and evaluation of results. [Lazor, M., Markovic, S., Nikolic, S., 2008, p. 19]

IV. OBSTACLES TO THE SUCCESSFUL DEVELOPMENT OF INCLUSIVE EDUCATION

Changes in the education system and society based on the principles of inclusive policies and practices generally are accompanied by difficulties. It is important to identify factors that can foster successful inclusive education, as well as factors that may pose significant obstacles. (CETI, 2006)

As the barriers that prevent or slowing down the development of inclusion often referred to as follows:

- Delay adoption of a clear national strategy for education that would be based on inclusive principles.
- Resistance to change especially pronounced in areas where inclusive education confronts deeply rooted principles, convictions and practices.
- The lack of systematic support, direction and encouragement to pilot initiatives in the area of inclusive education further developed and expanded, leading to a loss of motivation and confusion in this area.
- Lack of knowledge transfer and implementation of information obtained from different studies in the area of inclusive education.
- Lack of cooperation and good will among key stakeholders in the area of inclusive education: teachers and special education teachers, psychologists and educators, parents and children..

When you add to all of this lack of information of the general public and non-compliance to experts, there is a tendency to develop negative attitudes and fears that are difficult to overcome. [Lazor, M., Markovic, S., Nikolic, S., 2008, p. 36]

Negative attitudes towards children with disabilities stand out as the biggest obstacle to the inclusion of these children in mainstream education. Negative attitudes may have parents, community members, school teachers even the children with disabilities. On the negative attitudes affect uncertainty, fear, lack of knowledge and information and distorted value system, and their influence is reflected in every aspect of life of children with disabilities.

According to the results of research in our country, the most important barriers to inclusive education from the perspective of teachers themselves are:

- Consciousness of teachers that they do not possess the knowledge and skills necessary to work with children with disabilities.
- Overabundant school programs that force teachers to work frontally because it is the only way to realize a given program.
- Fear that the presence of children with disabilities in their class meant that they have to devote a lot of time in individual work, and that it would not have been able to realize the curriculum.
- The lack of regulations on evaluation of children with disabilities, and lack of support system in which teachers could rely on in their daily work with children with disabilities. [CETI, 2006]

V. THE ROLE OF THE TEACHER IN INCLUSIVE EDUCATION

Teachers and students are the main factors that by communicating make the learning process. Teacher, professor is expertly and pedagogicaly qualified person who planned, prepared and performed teaching and overall educational work in schools and other educational institutions. As a direct contractor of teaching, teacher plays a primary role in the successful upbringing and educational integration of children with disabilities in regular classes. He is the one who conducts, reviews and changing program requirements in accordance with the skills, knowledge, interests and needs of students, while also interacting with them. Because of this he plays a key role in schooling. [Boric, S., Tomic, R., 2012, p. 81] Teacher's job is not easy. You have a class of 40 students or more - and they are all individual for themselves. Have children with disabilities and special needs in your classroom means more work. [http://www.mpn.gov.rs/userfiles/UNESCO%% 20for% 20Vodic 20nastavnike.pdf]

Teacher of students in the inclusion: The main actor in the implementation of inclusive processes;

- Educator who need to respond to the program content for students with special needs;
- A person who adapts teaching materials, skills and abilities of each child (carefully determines scope of the subject matter and the proper dosage of instruction);

- Creator of classroom climate that affects the maximum child development, and reduces the effects of restrictiveness;
- A person who knows the special and individual learning strategies, respecting the wealth of individual differences;
- A person who minimizes the effect of labeling and stigmatization primarily in the classroom, and tomorrow one of those who would "be responsible for the social acceptance of individual differences";
- The mediator of learning;
- Interpreter and designer of software and learning materials;
- Leader, administrator and manager;
- A person who has in mind the child's cognitive style;
- It has a clear focus of educational goals;
- The central concept of "it's the best he / she can." [Borovac-Bekaj, A., 2007, p. 4]

Some of the principles that should be taken into consideration in working with children with disabilities:

- Warm emotional atmosphere,
- Individualization which is possible only after a longer observation and identification skills of the child,
- Use specific, apparent material in the adoption of concepts with respect to the principles of known to the unknown,
- Ensuring progression in teaching the child precisely defined program steps,
- Helping the Child with a reduced cognition ability to use their knowledge in new situations and to connect them with life,
- To serve, in working with children, frequent repetition of facts that are already in the learning experience for students,
- It is advisable to learn to use all areas of a child's sensory (vision, hearing, kinestetiku) and apply the program of basic perceptual-motor stimulation,
- Didactic materials, text, images, applications and everything else you need to adapt according to the diverse abilities of children,
- The consistent structuring of school situations to stimulate the socialization of children,
- Structuring situations in work with children in such a way as to enable each child to learn from each other, because children love it,
- It is necessary in the working with children a significant part of the program content of work activities,
- Encourage group work and pair, the workshops combined with very little frontal work. [Dosen, Lj., Shorts-Bradic, D., 2005]

Systematic monitoring and recording behavior of the child can be a very good basis for understanding the child. It should be carefully observed and record the child's reactions to success and failure. In the experience of children with disabilities it is often experience of failure. Observation should be noted which situations child reluctant or unsuccessfully done and whenever is possible to find a replacement for that. Children with disabilities have a strong need for praise by the teacher or teachers, but in the application of motivational tools should be careful. If praise is used too often can lose the incentive value of educational or create resistance by children to excessively praised child. [Hrnjica, S., 2004]

Counselors and teachers need to appreciate and look forward to the least progress of the child. If a child fails, it should not be blamed, but search for a strategy or method that will give results. Understanding the different abilities and needs of children, motivate teachers to find the time and strength to adapt the curriculum to each individual child. [Pearce, M., 2009, p. 6]

VI. ATTITUDES

Attitudes play an important role in our daily life. Behavior is motivated by attitudes, and therefore affect our actions and predict our behavior. To become a society that accepts the model of inclusion, that is, a society in which every individual has equal rights and opportunities regardless of individual differences, it is necessary to change attitudes towards people with disabilities. Therefore, knowledge of our views of individuals or social groups allows to predict their behavior. Attitude can be defined as a tendency to react positively or negatively to an object. Krech and Crutchfield are defined attitude as a permanent organization of emotional, perceptual and cognitive processes with respect to some aspect. Attitudes consist of three parts: emotional or emotional components that make up an emotional reaction according to attitude object (eg, another

person); cognition or cognitive components related to the thrust of the paragraph object (another person). They can be personal, and social. Personal attitudes were determined by individual characteristics, such as attitude to a friend, to parents, to an object, and social attitudes are common to a large group of people such as attitude toward races, nations, social system. Attitudes and the attitude of society towards people with special needs and disabilities has changed over the socio-historical development. [Boric, S., Tomic, R., 2012, p. 78]

VII. CONCLUSION

Inclusion by itself does not imply the equalization of all people, but respecting differences of each individual. It is in fact made up its value, because it is through the development of a general tolerance for individual differences and needs, contributing to the spread of knowledge, enriching experiences and the development of humanity. In this complex and lengthy process, the first step is to accept the child with disabilities in development within the family. Second, it is understood properly place the family in society, followed by education and training for independent living and working in the community. It is a social and professional affirmation of disabled people is the ultimate goal of inclusion. Inclusive education is focused on the identification and elimination of obstacles and difficulties in the implementation process of education on the one hand, while the other focused on the greater participation of all participants, which directly or indirectly affect the implementation of the educational process. [Jablan, B., Kovacevic, J., 2008, p.14.]

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EVALUATION OF DATABASE SCHEMA CORRECTNESS

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Abstract - The target of database design is to obtain optimal database schema. Optimal database schema consists of tables in the 3rd normal form at least. Prototype of evaluation of database schema correctness is based on normalizing techniques. These techniques are used for achievement of the optimal tables in database schema in compliance all integrity constraints. This prototype is intended in education and evaluates correctness of students' projects.

I. INTRODUCTION

The article deals with evaluation of students' project correctness of Database Systems course. Project contains one big table in non-normal form. This table is filled with data. It is needed to decompose big table into smaller tables, correctly define primary and foreign keys and modify final schema to satisfy integrity constraints and conditions of 3rd normal form or Boyd-Codd normal form (BCNF).

There are several approaches that could be applied to the evaluation of such project. One is a manual evaluation by the teacher visually, as well as the practical side. Another is a much more efficient use of normalization algorithms to check whether the resulting scheme is really in 3rd NF or BCNF.

In this process the algorithms used to calculate the closure of a set of attributes, determination keys, maximizing the right hand side of functional dependencies and many others. On this basis it is possible to evaluate and verify the accuracy of the solution.

We will need to create a new application or the possible use of existing solutions? Since several similar applications and programs have been designed, for our case was already modified one of the existing solutions. Normalization algorithms are open source and they were used in our solution. Final program was modified and added by the evaluation of students' projects correctness and modification of input to desired form [8].

II. NORMALIZATION AND NORMAL FORMS

Normalization of data model is set of rules and techniques intended to:

- Identification relationships between attributes.
- The combination of attributes to relations.
- The combination relations to database.

The main principle of normalization is elimination of anomalies in destructive operations in a database system [1][3]. The destructive operations in database are INSERT, DELETE and UPDATE operations. These operations modify database content and they can damage consistency of database. Not enough normalized table can show anomalies in database operations and contains data redundancy.

Update anomaly – the same data are stored in more records. Data modification must be realized in all records otherwise database won't be in consistency status.

Insert anomaly – all data must be known in insertion. If all data aren't known null value can be written or insert operation fails.

Delete anomaly – deleted data must be removed from all records and also we can lose last data about some object.

Normalization is process of decomposition of non-normal table into more tables in normal form.

A. Quality of Data Model

It is necessary to define relationships between attributes in data model. Quality of relation schema depends from:

- Semantics of attributes – grouping of attributes assumes certain meaning, understanding relationships between attributes and their semantics. Each relation can be interpreted as set of facts or statements.

- Reduction of data redundancy in relations - involves removing duplicate data in database.
- Reduction of NULL values in relations - represents removing and prevention of NULL values in relations. It is better to have relevant data about object instead of NULL values.
- Prevention of the occurrence of false records. Bad design of table can result false records which are effect of join operation.

B. Functional Dependencies

Functional dependency (FD) definition – attribute B is functionally dependent on attribute A ($A \rightarrow B$) if for each value of attribute A exists only one value of attribute B. Attribute can be functionally dependent either on one attribute or on combination of attributes.

Trivial functional dependency is functional dependency if attribute is dependent over the set itself.

Total functional dependency definition – attribute is total functionally dependent on set of attributes X if

- It is functionally dependent on X.
- It is not dependent on any own subset of X.

Transitive dependency is indirect functional dependency: if $X \rightarrow Y$ and $Y \rightarrow Z$ then $X \rightarrow Z$.

Multi-valued dependency is a constraint that describes how the existence of certain rows in a table affects the presence of other rows.

Join dependency – table T is the subject of join dependency if T can always be re-created by joining multiple tables and each table has subset of attributes of T.

Superkey – is attribute or set of attributes that uniquely identifies rows in the table.

Candidate key defines column or combination of columns in which all rows of table have unique values. One of candidate keys is primary key.

No-prime attribute is an attribute which it doesn't participate in any candidate key.

Primary key is candidate key that uniquely defines each row in table. It has unique values and it cannot take NULL value. [1][3]

C. Normal Forms

Database normalization is technique of design and modification of database tables (relations) [1][3]. Goals of normalization are minimization of duplicate data, prevention of logical and structural problems especially insert, update and delete anomalies and maintain database consistency.

Normalization is based on normal forms. Optimal database schema as result of normalization should consist of tables in 3rd normal form minimally. In general, normalization requires additional tables and in some cases it can be uncomfortable. If database schema contains some tables in non-normal forms database application must be prepared to solve problems such as data redundancy or no-consistency dependencies.

A table (relation) is in the first normal form (1NF) if all attributes of table are atomic, further indivisible. The table doesn't contain composite attributes, repeating groups of attributes and multivalued attributes. There are no duplicated rows in the table.

A table T is in the second normal form (2NF) if it is in 1NF and each non-key attribute of T total functionally depends on only primary key of T.

A table T is in the third normal form (3NF) if it is in 2NF and any no-key attribute is not transitive functionally dependent on the primary key. All non-key attributes must be independent of each other.

A table is in Boyce – Codd normal form (BCNF) if it is in 3NF and every determinant is a candidate key. Determinant is some attribute (simple or composite) on which some other attribute is fully functionally dependent.

A table is in the fourth normal form (4NF) if it is in BCNF and if it has no multi-valued dependencies.

A table is in the fifth normal form (5NF) if it is in 4NF and if it has no multi-valued dependencies [3][6].

Design of database structure is more or less intuitive process and normalization is formal method how to obtain tables (relations) in 3NF and to avoid problems in database operations (insert, update, delete).

III. NORMALIZATION ALGORITHMS

A. Attribute Closure

Finding of attribute closure is important part almost all normalization algorithms. Normalization algorithms are described in Milton and Diederich work [5].

AttributeClosure(S, F) method makes closure of set S. There are used all dependencies from F and there are obtained all attributes that are achievable from set S. All functional dependencies

are sequentially performed. If attribute set S is superset of left side of some dependency then this set is integrated with attributes of right side and testing again starts from begin. Tested dependency is removed from set of functional dependencies. If left side of tested dependency isn't subset of tested subset of relation R then algorithm continues and tests next dependency. Result of this method is adapted set S. Set S contains origin attributes and also next attributes that are possible to derive by using valid functional dependencies.

Calculation of the closure of a set of attributes is done by maximizing the right hand side.

B. Removing Duplicate Functional Dependencies

Closure of attribute set X on functional dependency set F is set of all attributes that are functionally dependent on X. Attribute closure can be used for removing duplicate FDs. It is useful for systematic normalization of relations (tables) [5][6].

C. Relation Keys and Minimum Cover

Key attributes of relation (table) are attributes from which is possible to derive all the other attributes by usage of valid FD. Algorithm of relation keys finding is able to find all keys of input relation with using of input set of dependencies. All these algorithms have exponential complexity but there are heuristics by which these algorithms can be improved [4].

At the beginning set S is created and it contains all subsets of relation R. They are tested whether it is possible to derive the whole relation from them using FDs. Inputs of algorithm are relation R and set of functional dependencies. Algorithm sequentially processes each subset and discovers by AttributeClosure method which attributes are achievable from given subset. If AttributeClosure method returns set of all attributes of input relation R it is necessary to find whether some subset of this set is not included keys. If it isn't algorithm adds this set to keys.

However, there may be further duplicity on the set of FDs in the form of redundant attributes determinants of FDs [6]. If these attributes are removed minimum cover on the set FD is achieved. Minimum cover must also have property of individual attributes on the right side of all FDs [4].

D. Web-tool for Normalization

It is another possible option for decomposition of tables and their normalization. It uses three simple steps of tables' decomposition.

Decomposition are possible when attributes on the right side of FDs have more than one copy and number of decomposed relationships is the same as the number FDs. It is possible to decompose relationship to 3NF by eliminating the external attributes of the right side of the functional dependencies. The so-called Cookbook of normalization is technique how to easy normalize without being required extensive experience in relational algebra and database theories [9]

IV. DESIGN OF SOLUTION

At present there are very little used tools for normalization of database and tables. Existing tools are mainly focused on normalizing tables with predefined functional dependencies. It is very difficult to design a tool that effectively and generally solved problem – is the schema in 3NF and also in BCNF? It depends on specific requirement and also solution if it is really necessary in order to final schema satisfied criteria for both forms.

One of tools designed for schema normalization is Web-based normalization tool [2]. It is determined for obtaining 3NF from universal relation T with defined functional dependencies. It is designed as an applet, written in the Java programming language. It is able to decompose input relation (table) into smaller tables in required 3NF. Other tools are DBNormalizer and JMathNorm programs [7]. Principles of both programs are similar. Given schema will be normalized and final tables will be in 3NF and also BCNF.

V. IMPLEMENTATION

DBNormalizer was designed and developed to automatically and faster identify and detect whether table of database schema are in normal forms [7]. Some parts of this program were used. They were modified for our needs. Own evaluation on the basis of specified criteria was added. Another advantage is direct connection to a database and instantly checks whether the required table or schema satisfies the conditions of one normal form. It is already possible to retrieve a particular schema or table directly into the program to automatically connect to that database. Input the program is an external XML file. Header contains a connection to the database, and the body is then defined by the individual tables with functional dependencies.

On the basis student project it is needed in order to a student prepared input file with functional

dependencies. This file is created by xml file generator [8]. A parser reads xml file and creates individual objects. A parser also reveals whether the FDs have been entered correctly and also whether it contains any primary keys. If an error has occurred and the data has been entered incorrectly, parser declares the error and student will be forced to fix these errors. However, if all went well, the objects were successfully retrieved and given a good FD will be offered the opportunity to create normalization proposal. The proposal decomposes non-normalized table and on the basis FDs partial tables with primary keys and domains will be created. The proposal itself guarantees the compliance with the conditions for BCNF form, thus resulting scheme will definitely be in the standard as well as all the tables. If input xml file is syntactically correct but content is not logically right it will be displayed information of evaluation – in which normal form it is the whole schema. Based on this information it is possible to decide on what percentage of the assignment was created correctly. Subsequently a teacher may consider and evaluate solution of student project manually. On **Error! Reference source not found.** is shown mechanism of the assignment evaluation of the projects.

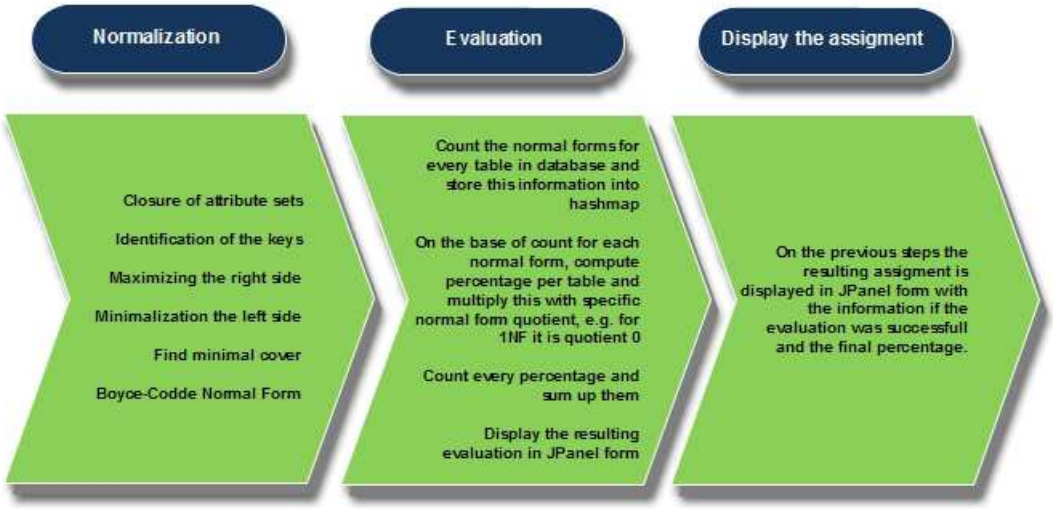

Figure 1. Mechanism of the assignment evaluation of the projects

This program was developed in Netbeans 7.0 programming environment, Java program language. This is a desktop application. Some libraries are necessary for starting application and database connection.

Specifically, in the program DBNormalizer the following functionalities were used and added:

- Import of database schemas (metadata) from database
- Specification and edit functional dependencies (FDs)
- Test if given FDs were correctly specified
- Find minimum cover
- AttributeClosure calculation
- Test of normal forms (NF) from 1NF to BCNF
- Creation of normalization proposal – new relationships, FDs for new relationships, normal forms (3NF or BCNF)
- If database connection is established SQL script is created for database transformation. The script consist of:
  - Statement of Data Definition Language (DDL) for creation of new table
  - Statements of Data Manipulation Language (DML) for data migration from old table into new table
  - Statements of DDL to remove old table
  - Statements of DDL to add foreign keys and constraints for new tables
- Evaluation of final schema

- Verifying the success of normalization proposal
- Ensure the development database connection and retrieval. xml file by password
- Delete and list partial tables
- Modification of final product
- Removal of unwanted and unnecessary functionality of the product
- Display violation of NF at each table at the specified FD

On **Error! Reference source not found.** is displayed architecture of application.

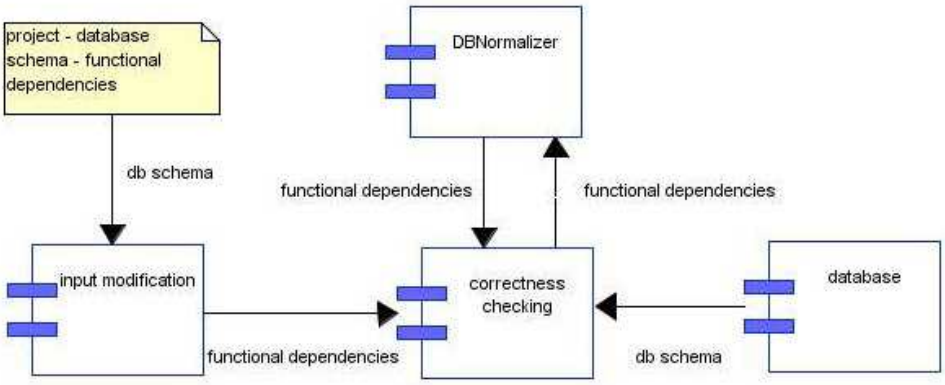

Figure 2. Component diagram application

VI. EXAMPLE

Our example describes order processing

Table of non-normal form or 1st normal form follows:

(order_num, item_id, product_id, product_name, order_date, quantity, price, supplier_id, supplier_name, supplier_address)

On the basis of normalization algorithms we write functional dependences of attributes and obtain 2nd normal forms of tables:

product_id → product_name, price

Table products (product_id, product_name, price)

order_num, item_id → item_id, product_id, quantity

Table items (order_num, item_id, product_id, quantity)

order_num → order_date, supplier_id, supplier_name, supplier_address

Above functional dependency includes transitive dependencies and it must be decomposed:

order_num → order_date, supplier_id

supplier_id → supplier_name, supplier_address

Tables:

- orders (order_num, order_date, supplier_id)
- suppliers (supplier_id, supplier_name, supplier_address)

The final design of database schema is following:

orders (order_num, order_date, supplier_id)

suppliers (supplier_id, supplier_name, supplier_address)

products (product_id, product_name, price)

items (order_num, item_id, product_id, quantity)

On **Error! Reference source not found.** is displayed screenshot with final database schema as result of normalization process.

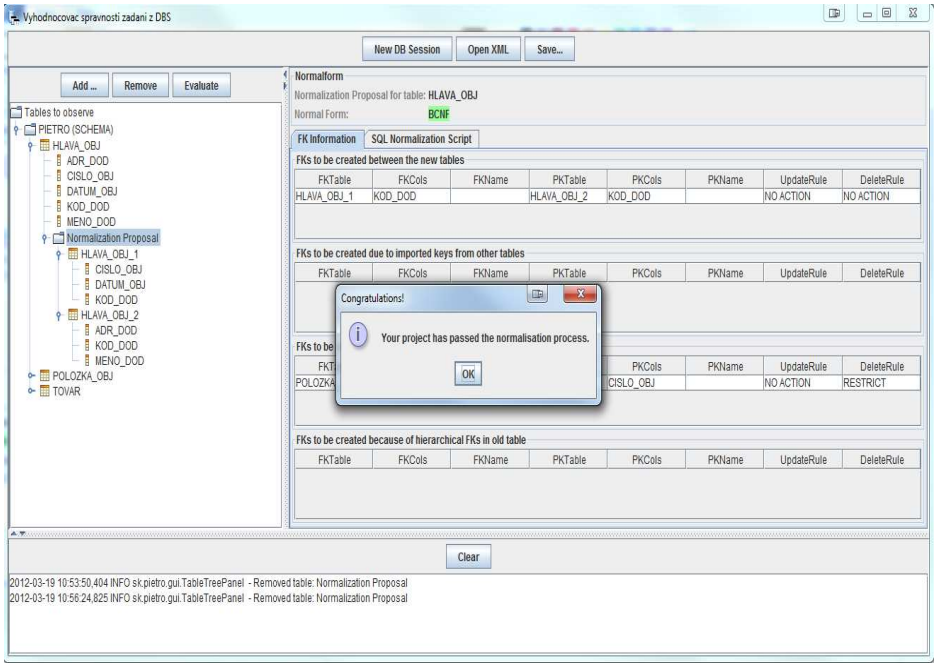

Figure 3. Screenshot of application – creation of normalization proposal

VII. CONCLUSION

The goal of this work was to design mechanism established on normalization algorithms for evaluation based on normal forms for each table. The method provides some advantages. Using this program it is much easier to check the resulting scheme and all tables. Secondary, some partial optimization may be brought into the software implementation process and also for normalization algorithms.

There are also some disadvantages consider. Every FD must be written on correct way, on the other hand program will not be able to check them. With Assigment Evaluation in LMS Moodle 5 growing number of tables in the database, the time needed for adding new tables into the design grows. Therefore the application of this method is effective for smaller database [8]. These disadvantages might be improved by the next research.

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IMPORTANCE OF INFORMATION TECHNOLOGY FOR KNOWLEDGE MANAGEMENT

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Abstract - This paper will analyze the undisputed importance of information technology for the success of knowledge management, which defines the difference between information system and knowledge management system, the similarities and differences between information system users and knowledge workers and provides information and analysis tools and resources for life-cycle stages knowledge Management. A section is applicable to the current situation and analyzes the characteristics of knowledge management and information technology in organizations in Serbia, with special emphasis on organizations whose activities require the application of high technology, as well as opportunities to improve business organizations in Serbia, with the implementation of knowledge management.

I. INTRODUCTION

The importance and usefulness of technology in particular, it focuses in particular on the analysis of the basic elements of knowledge management. Not only does it stand out as one of the basic elements of the concept of knowledge management, the people and processes, but, emphasizing the importance of technology in knowledge management, sometimes ignores human nature and social knowledge. Although, no doubt, information technology provides a powerful and effective technique that plays an important role in the strategy of knowledge management, but only such projects guided orientation and perspective, and challenging strategic management and human factors, often fail in practice.

Knowledge derived exclusively from the man who is able to create it by connecting information, using the experience, ideas, concepts, intuition, connecting it with other knowledge, and judgmental attitudes, taking the appropriate action based on knowledge. Technology is seen as a necessary and essential tool in the management of knowledge defined in this way. About what is and what is the role of information technology in the literature, there are different views. We conclude that knowledge management cannot be equated with technology or to invest heavily in technology can provide a successful knowledge management programs. However, the role and impact of information technology on knowledge management program and this is a great feature of the concept of knowledge management deserves attention, but only when considered in the context of the other two elements - people and processes. This means that the technology as a means to facilitate knowledge management has its place in the management of knowledge, if we take into account the person's ability to create and share knowledge, and through these processes creates additional value for the organization.

II. KNOWLEDGE MANAGEMENT

Knowledge management is an interdisciplinary business concept that has its focus on organizational learning [3]. Knowledge management can be described as the most effective use of the intellectual capital of a business. It involves connecting drain right people to exchange, reasoning and collective action have become almost instinctual and part of everyday work. Knowledge management is linked to the so-called learning organizations. All companies using management knowledge in their special way. In the information system based on knowledge paperwork is routed through memos, meetings and projects. Knowledge is transferred through personal communication, phone calls or meetings. Know-how and values of knowledge create through this process. They then become part of the company's knowledge.

Knowledge management is the decision to use their organizations to create, capture, store, share and apply knowledge that the company will launch forward. In practice, knowledge management involves the identification and labeling of intellectual assets within the organization, generating new knowledge to achieve competitive advantage in the organization, creating a sufficient

amount of available corporate information, achieving best practices and technologies that enable everything that is mentioned above.

III. INFORMATION TECHNOLOGY

Information technology, in addition to people and processes, the basic element of the concept of knowledge management and the understanding of its nature and essence, it is necessary always to be seen as the unity of these three elements. In addition to the successful implementation of program management skills necessary to start with, as we have repeatedly emphasized, the social nature of knowledge, it is indisputable that an important and irreplaceable role in the dissemination and sharing of knowledge, its promotion, organization and current collection, have just, information technology.

The application of information technology in our environment in the last 20-30 years mainly reflected through the prism of a few standard applications ADP (Automatic Data Processing) such as general ledger, customer-vendor, payroll, fixed assets, material management, etc. Under this system was carried out and is still very significant percentage of data processing. However, it is important to note that the application of modern information technology does not begin and end with these applications, as is commonly thought, [7].

Experience has shown that in companies that have an organized system of ADP a wide range of problems, 53 that are listed above. Therefore, the aim of this chapter to get through the prism of application software as a component of information technology attempts to define a framework for a more complex understanding of the application of IT in modern business. In accordance with such a defined goal, we will give the main characteristics of some segments of the application software that can be used to improve the effectiveness and efficiency. For some of the applications we give a brief passage from the so "Success stories" to show the experience of some leading companies in the application of information technology.

In modern business, there is very strong demand from top management to the IS department of the company, and information technology in general, the quality of the information base of decision-making. For this purpose, the so-called decision support technology, i.e. software application whose main purpose consists in improving the information base of decision-making. These are programs intended not only to decision makers, but also the different profiles of analysts who participate in the creation of information base.

IV. KNOWLEDGE MANAGEMENT VS INFORMATION TECHNOLOGY

It is essential to identify similarities and important differences between conventional information systems and knowledge management systems.

A. The differences between the information system and knowledge management system

Below are necessary differences:

- Engaging in systems in the conventional sense, a matter of doing with the data and information acquired by a person. Their use depends largely on the analysis of the solutions. In knowledge management system operates with the knowledge acquired from people who have known knowledge in the organization. Using knowledge, in this case, depends on the people themselves.
- The connection with the construction of information system is realized with a new user who knows the problem, but no solution. Otherwise, in the construction of knowledge management system emphasis on the relationship with the person who knows the problem but and solution.
- Develop a conventional system is sequential and consists of individual steps that occur in a specific order. Knowledge management system is an incremental and interactive, not built in a few large steps, but evolved to final form.
- The development of conventional information systems, test performance at the end of the cycle, after the system is built. In knowledge management system, testing is performed since the beginning of the cycle.
- Developing and maintaining a conventional information system is much more extensive than the knowledge management system. Maintenance management system knowledge is entrusted to those who share their knowledge with others, and his job is to ensure the reliability of the system and to improve the standards.
- The conventional information systems focused on process and documented oriented system whose main goal is to ensure the flow of data. Knowledge management system is focused on the result.

- Development of a conventional system is not supported by tools such as rapid prototype because it consists of a set of steps that follow. Knowledge management system using fast prototype, changing on the go and thus improve their knowledge, until it is ready for use. In this way, the prototype evolves into the final system knowledge management.

B. Similarities between information systems and knowledge management

However, it is necessary to specify the essential similarities that exist between information systems, in the traditional sense of the word, and knowledge management systems:

- Both systems start with a problem and end solution. Solving the problem significantly affects the well-being of the individual and the organization as a whole.
- After strategic planning, early stage in the cycle of conventional information system to collect information in order to clearly understand the problems and requirements of the users. The initial phase of management knowledge required gathering knowledge, which would later become the basis of the knowledge base of the organization. Information and knowledge in order to be displayed and presented to the system to gave results.
- Verification and Validation of Knowledge Management system is similar to the conventional testing system. Verification should ensure that the management system of knowledge there are no errors, a validation of the system should ensure that the user requirements have been met. Verification and validation methods used in practice, they are very similar in both systems.
- In both systems, great attention is paid to the selection of appropriate methods for the design of the system.

V. ROLE OF INFORMATION TECHNOLOGY IN SUCCESSFUL KNOWLEDGE MANAGEMENT INITIATIVES

The growing importance of knowledge as a critical business resource has compelled executives to examine the knowledge underlying their businesses, giving rise to knowledge management (KM) initiatives. Given that advances in information technology (IT) have made it easier to acquire, store, or disseminate knowledge than ever before, many organizations are employing IT to facilitate sharing and integration of knowledge. But, considering the complexity of KM initiatives and the variety of IT solutions available on the market, executives must often confront the challenging task of deciding what type of IT solutions to deploy in support of their KM initiatives. This paper aims to shed light on the IT-KM match by investigating the role of IT in successful KM initiatives. There are two basic approaches to KM for which IT can provide support: codification and personalization [9]. With the codification approach, more explicit and structured knowledge is codified and stored in knowledge bases. The main role of IT here is to help people share knowledge through common storage to achieve economic reuse of knowledge. An example of such IT tools is electronic knowledge repositories. With the personalization approach, more tacit and unstructured knowledge is shared largely through direct personal communication. The main role of IT here is to help people locate each other and communicate to achieve complex knowledge transfer. Examples of such IT tools are knowledge expert directories and video-conferencing tools. Both these KM approaches are fundamental to understanding the role of IT in KM.

VI. INFORMATION TOOLS IN PRIMARY STAGES OF LIFE CYCLE MANAGEMENT SKILLS

A. Funds of knowledge management were being developed and knowledge creation

1) Cognitive maps

In any field of knowledge, each of us has its own technology or cognitive map of a particular area. Map is a visual representation of a particular area of interest or knowledge, which makes explicit the mental concepts that exist within a given area of knowledge, as well as the interconnections between them. In many cases, these maps are likely tacit (tacit) and unarticulated within the individual or the organization. This tacit knowledge is in fact the key to competitive advantage, it is difficult to articulate, to imitate, the specific content and has direct practical value. Cognitive maps represent the fund that provides the ability to present knowledge of the individual, as well as his experience and look at the reality.

2) The storage of information

The objective is to present information and storage of information, i.e. knowledge representation that can be useful or relevant to the user. Storage of information consists of two processes: first, indexing a database that facilitates

the location of the text or document and another addressing the needs of information users in the form of questions and ranking algorithms results in the form relevant to the user.

3) Speed search (search engines)

A large amount of information that can be obtained via the Internet must be available as quickly as possible. That is why the search is done on the Internet searching for the index, and not the whole text, because it would slow the process of obtaining the necessary information. "Search engines" based on the "crawler - indexer architecture", which sends the request to the web server requesting a new or an updated website. The most common application consists of two words. The search engine index has processed through a large number of algorithms and ranks the results.

4) Agent Technology

Agents are computer systems that are able to act independently in particular, given the environment to perform a given task. Such systems can operate without human intervention. Basically, these systems share large complex problems into smaller, simpler and more convenient to manage. Any data input by the user such a system is treated as a new lesson, and, after some time, the system is able to predict the behavior of the user based on the entered pattern.

5) Personality

The main goal of all the technologies that are based on personalization is to predict with great accuracy the needs and desires of each person. In terms of information, technology-based personalization can be used to shorten the time to seek information specific categories [8]. This technology can purify the search for specific information using exactly certain key words used in the requested document.

B. Funds of Knowledge Management at the stage of evaluation of knowledge

1) Case - based reasoning (CBR)

Case - based reasoning offers the technique of collecting and storing of past problems and their solutions as well as the logic that preceded their resolution. The user types in the description of the problem and checks to see if the solution of similar problems in the past can be applied to the current problem. If a case from the past can help, ongoing problem with his assessment and solutions added to the existing problem for further similar situations in the future.

2) Online Analytical Processing (OLAP)

Online Analytical Processing technique is used when a large amount of data have to be analyzed from different perspectives, for example in the case of an organization which has thirty-five products in the region, it is necessary to analyze all these factors in relation to the factor of sales, expenses and profits.

3) Knowledge discovery in databases (data mining)

The term "data mining" is similar to the observation, searching and discovering new things about the man and the means of observed data filtering, data analysis, interpretation and integration of the results [2]. Tools and resources that are used in the knowledge discovery in databases are simple, concise and easy to use. Tools and resources can be expert systems, decision trees, rule induction, genetic algorithms and genetic programming, neural networks, associative memory and clustering techniques.

4) Machine-based learning

Technology of this kind is suitable for problems in which very little is known about the specific area from which it originates. This technology is constantly evolving and finding its way into many databases.

C. Funds under management knowledge sharing knowledge

1) Internet, Intranet and Extranet

Internet, intranet and extranet are the most widely used forms of communication and sharing of knowledge and information in the modern business world.

2) Text based conferencing

Text based conferencing conference are channels through which individuals can share their knowledge and information.

3) Groupware tools

Groupware tools encourage collaboration among people to increase knowledge sharing among them. Groupware tools tend to apply to information technology that supports collaboration, communication, and coordination of activities in space and time as transmitted and the

information. Two main technologies used are e-mail and Lotus Notes.

4) Videoconferencing

Videoconferencing allows that two or more users hear see each other through their computers and thus collaborate and share knowledge with each other at the same time without leaving your workspace.

5) Expert "yellow pages" (expertise yellow pages)

To enable knowledge sharing within an organization is often necessary to find individuals or groups from one part of the organization that have the necessary knowledge and skills needed in the second part of the organization. In this sense, the "yellow pages" contain a listing of the employees from the organization, with a summary of their knowledge and skills. Access these data have all employees who have the password to enter the intranet system.

6) E-learning

E-learning is a generic term used to describe online learning, computer-based training and web training. E - Learning is the use of internet technology in order to support the expansion of learning, skills and knowledge. E-learning does not necessarily depend on the Internet, but has a tendency to use different Technology of learning such as mentoring, chat rooms, expert discussions, web seminars, online meetings and virtual classrooms.

7) SAP

SAP (translated Systems, Applications and Products in Data Processing) is the worldwide leader in the production of software for electronic management of business [6]. The main product of SAP is MySAP ERP application that provides a complete set of functionality for business analytics, finance, human resources, logistic and corporate services. A growing number of modern organizations are turning to the use of SAP, which allows the maximum sharing of knowledge in the organization and extremely high data availability. SAP is now able to cover everything that happens in the operations of the company, taking into account the specific features of different industries and thanks to special industry solutions that add functionality to the standard ones that are unique to a particular industry.

D. Funds under management knowledge storage

1) Data warehouses (Data Warehousing)

A data warehouse is a large database that contains a large amount of information that come from a wide range of sources. The idea is that the data warehouse serves as a "warehouse" of data that can be used for various analyzes. Characteristics of the data warehouse are: [4]

- Subjective orientation - the data can be organized among businesses
- Uniformity - common data relevant to different types of application
- Time variability - data and constantly update the variable
- Volatility - the data in the data warehouse can always recover from it.

2) Visualization

Visualization is a technology that enables users to understand the complexity of the rich information by using computer graphics. Previous theoretical analysis we solidified the belief that successful knowledge management program requires the necessary use of modern information technology. The role of these technologies is of great importance in all phases of management knowledge, but the phase of sharing and storing knowledge we point out that their application is indispensable.

VII. EXAMPLE OF RESEARCH ON THE RELATIONSHIP MANAGEMENT KNOWLEDGE WITH IT IN ENTERPRISES IN SERBIA

The survey was conducted on a sample of 131 respondents, members of top management, middle management and operational management of 10 organizations from the Republic of Serbia. The initial idea for the study was that, given the low level of knowledge management programs in companies in Serbia and its very beginnings of which we are witnessing, sharing of knowledge will be the experience in practice, first worn, just for the application and development of information technology. The study involves two tasks:

1) Demographics
2) Use of Information Technology

TABLE I. SHOWING DEMOGRAPHICS [1]

Male	Female	20-30	31-50	> 51	Secondary school	Faculty	Master and Doctoral
56%	44%	11%	74%	15%	13%	81%	6%

After the results, we conclude that the 131 56% of respondents were male and 44% female, with regard to demographic data pertaining to the largest number of respondents between 31-50 and that percentage is 74%. Most people of respondents have with the university, expressed as a percentage gives 81%.

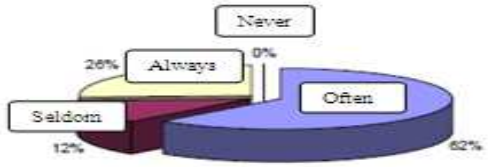

Figure 1. Use of Information Technology [1]

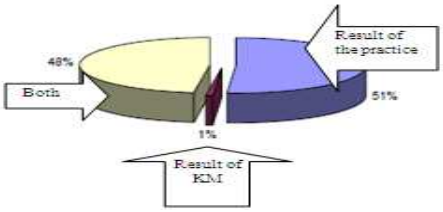

Figure 1. The reasons for the use of information technology [1]

When asked to what extent the use of information technology for the exchange and sharing of knowledge in their organizations, respondents was offered a response scale often, rarely, always and never. Answer often opted by 62% of respondents. Information technology is always in his work used for the exchange and sharing of knowledge 26% of respondents, and 12% never.

One of the aims of the research related to the application of information technology in knowledge management is an attempt to determine the extent to which the organizations in Serbia use it informational resources, programs and techniques defined in the literature and in practice, the most common cause associated with program management skills.

The means by which the existence of organizations in Serbia can be improved and how information technologies contribute to knowledge management are: Internet, Intranet, E-mail, Online Chat, Knowledge Maps, Search Engines, Agent Technology, Case Based Reasoning, Online Analytical Processing - OLAP, data mining, teleconferencing, videoconferencing, Communities of practice, think "yellow pages", E - learning, data warehouses and SAP.

VIII. CONCLUSION

When we talk about information technology as an element of the management process that facilitates the full use of the knowledge management program, it must come from repeatedly punctuated the statement that human knowledge is still a social category [5]. Only with respect to the position that is the creator and driving force of all innovative and creative skills, and always just a man, not a technology, information technology can give its full support in the implementation of programs of knowledge management, dissemination, sharing and advancing knowledge in organizations. Only in this way can be prevented unsuccessful projects introducing knowledge management program, which relied exclusively on information technology. Looking at the Serbian companies in this context, we conclude that the use of IT in everyday spreading and sharing organizational knowledge at a very high level. In fact, 62% of respondents frequently used information technology to exchange and share knowledge. Serbian companies have more resources and application of technology, whose main application just sharing and dissemination of knowledge among employees (Communities of Practice, SAP, etc.). If the development and use of information technology is more advanced, especially the technology that we have brought into connection with the sharing of knowledge, we believe that this is the beginning of a solid basis for full implementation of the programs of knowledge management in Serbia.

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THE INCLUSIVE EDUCATION IN PANČEVO

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Abstract - In many surveys of education in Serbia, it is stated that the percentage of children comprised in the compulsory education is 100%. This high percentage is not realistic and it hides the fact that there are a lot of children who are excluded from the education system. It primarily refers to children who need additional support (children with disabilities), Roma children and children from marginalized groups who are in most cases excluded from schools. According to some estimations there are 10% of children who are not included in education. There are also unregistered children, internally displaced children from Kosovo, children who are deported from the Western countries, so the stated percentage may even be higher. Current education system is rigid and its inability to adapt the methods and the content of the education program results in many children "doomed to failure". This model does not meet developmental and educational needs of very large number of children. Therefore, it is necessary to make certain modifications of education system.

I. INTRODUCTION

Inclusion is based on the right to education. Every child has a right for qualitative education, without discrimination and in accordance to their abilities and talents, [7].

International documents that support inclusive education are:

- Universal Declaration of Human Rights (1948),
- Convention on the Rights of Child (1989),
- World Declaration on Education for All,
- Standard Rules on the Equalization of Opportunities for Persons with Disabilities (access to education in public school system),
- The Salamanca Statement ("ordinary schools should accommodate all children, regardless of their physical, intellectual, social, emotional, linguistic or other conditions"),
- Education for All (EFA), 2001.

Documents adopted in Serbia:

- The Law on Fundamentals of Education System,
- Law on Prevention of Discrimination against Persons with Disabilities,
- Draft Law on Pre-school Education,
- Poverty Reduction Strategy in Serbia,

II. THE INCLUSIVE EDUCATION

The inclusive education model aims to improve education system, increase the inclusion of students and incorporate changes that will bring benefits to an individual, school and society.

With the incorporation of inclusion, we are leaving the medical model of estimating students and their inclusion in education system, which treats a child with developmental disabilities as a patient who is dependent on other people and has a problem. All the decisions are based on the difficulties and aim to "improve the child" and adapt it to the society. This model is based on the idea of mercy and charity and as well as the exclusion from public schools, even when it is not in line with the needs of the child.

The introduction of social model is based on different assumptions: the social position of an individual is socially conditioned, deficiencies in learning are attributed to environmental constraints, respect for human rights of an individual, the person is observed as a whole, starting from his/her needs, not the weaknesses. Skills and strengths are emphasized, the model of exclusion is abandoned, inclusion and individual approach are prioritized. A person no longer adjusts to the environment; on the contrary, the environment adjusts to him/her creating conditions for more successful interaction with peers and adults in the community, [5].

A. Forms of inclusive education

There are three basic methods of implementation of inclusive education in Serbia: in the classroom (which is both the tendency and the recommendation), on-line learning (which is still rarely applied since it involves a lot of resources and thorough preparation) and

consultation (whose implementation should cease over the time)

B. Inclusive education implementation requirements

In order to include successfully a student with disabilities into the education system, it is necessary to provide him/her with support. It can be done in various ways making adjustments to:

a) Methods, materials, teaching aids (visual aids, lesson recording, additional time for tasks given, reduction of learning material),

b) Space and learning requirements (removal of physical barriers, light indicators for bells, distance learning using computers, installation of handrails in halls, ramps...),

c) Modification of learning content and achievement standards (reduction or extension of the content in one or more subjects, lessening the requirements).

There are other types of support:

- customizing textbooks,
- adapting teaching resources (adjusted timetable, recorders, computers etc.),
- engaging pedagogical or personal assistant,
- providing transport for students,
- education within a special group or a class,
- legal assistance,
- staff training.

Nowadays, the support is provided for children there where the necessity for it is previously estimated. These are primarily the following: children with physical, mental and sensory disabilities, behavioral disorders, emotional disorders, deprived families, children without parental care, abused children, refugees, gifted children).

Before proceeding to determination of the need for additional support and making IEP (Individual Education Program) it is necessary to comply with the established sequence of activities within the school:

- Every student is monitored and it is determined whether there are any difficulties in the educational process
- If problems are identified, individualized approach to the teaching process i.e. adapting program, methods and content is then carried out.
- If the student does not make any progress after the individualized approach have been implemented, the IEP is to be made,[5] .

Before making an IEP, it is necessary to make a pedagogical profile on the basis of detailed description of child's situation and to collect the data about the student from various sources (student's papers, interviews, tests, observation of the student, interviews with parents and all available documentation of the child). Pedagogical profile contains the data that refer to four key aspects of student's behaviour:

1. **learning** (the estimation of achievements and their level, the pace of progress in relation to student's peers, thinking skills, interests, special skills, attitudes, and attitude towards school … the need for support);
2. **communication skills** (estimation of communication modes, potentially disabled senses, vocabulary, speech …., the ability to express needs, wishes, feelings … and the need for support);
3. **social skills** (estimation of student's interrelationship with others, conforming to general rules, the ability to adapt, specific reactions, the gameplay, greeting others ... and suggest the need for support);
4. **indepedence and self-care** (estimation of daily routines and activities performance in everyday situation, potential interference associated with self-service, movements, overall health status ... and suggest the need for support).

Having done the previous, the support team identifies strengths and weaknesses of a student and recommends the strategies for support to the IE team in one or more of the above areas. In order to start preparing the IEP, it is essential for school to have a professional team for inclusive education whose role is to identify the vulnerable group of children, plan measures for implementation of inclusion, take into consideration teachers' competencies, take care of cooperation with parents, suggest teams for support (IEP teams), propose the making of IEP to the School Collegium, monitor the implementation, evaluate it, cooperate with Inter-departmental Committee, and other teams within school and school Collegium.

An IEP team or support team consists of: a form teacher, a subject teacher, a senior associate

(in a special school – individual teachers such as a speech therapist, a re-educator of impaired psychomotor functions, a social worker, a special pedagogical assistant), a parent, if needed, teaching assistant, medical expert, or any other specialist on parents' request.

The IEP has the following elements:

1) Student's personal data;
2) Pedagogical profile with the current status of the child;
3) Priority areas where support is needed in order to achieve the set goals;
4) Types and levels of support with operational activities where specifically stated: who will work with the child, which activity, how many times during a week and how much it will last;
5) Period of monitoring and evaluation time.

The IEP is made throughout the year depending on the needs. Consequently, it can be made at the beginning of the school year, when the child is transferred into a new environment and when it is in his/her best interest, at the request of the teacher or parents. It is important to point out that it is not possible to implement it without parents' consent. Therefore, it is necessary to inform parents after they have been given the annotation that they are the part of the team for support and that their propositions and activities can help the implementation of the IEP. The IEP is a written document and it shall be adopted for a period of one, three or six months. It is regulated by the Regulation on Establishing the Right to the Individual Education Plan (Official Gazette of the Republic of Serbia, no. 76/2010).

There are three types of IEP:

1) **Adapted curriculum IEP** – the aim of providing support is carefully planned in relation to adjusting and enriching the classroom, the conditions in which children study, teaching methods, textbooks, activities, timetable, introduction of teaching assistants who provide support.
2) **Modified curriculum IEP-** apart from the contents, standards of achievement are precisely planned and adjusted in relation to the enacted, for one or more subjects.
3) **Enriched and expanded IEP –** for students with exceptional abilities.

If the implementation of an IEP requires additional funds, the institution sends a written request to the Inter-departmental Committee to assess the need for additional support.

The Committee is established by the Municipality and it consists of three permanent members and two temporary members who may be: a preschool teacher, a teacher, an associate, a social protection representative. In accordance with the law, Interdepartmental Committee recommends support in the first, the second or both of the following areas.

Immediate support that requires additional financial resources: textbook customizing, assistive technology, pedagogical assistant engagement, providing training for students, teachers, parents (e.g. using the alternative forms of communication), providing an escort, education in a special group or classes attended by children with disabilities, hiring a specialist (a psychologist, a therapist, …), health service not otherwise covered by medical insurance, free participation in cultural, sport and recreational activities.

Indirect support that requires additional funds: adapting the environment, required professional development for teachers working with the child, peer education, counseling parents within school, health and social institutions, providing child's extended stay at school, daily care, school meals, footwear, clothing, transportation, legal aid etc., [4].

It is important to emphasis the following:

- the student educated using the IEP is assessed in compliance with the regulation for the evaluation of primary and secondary schools students. The final exam is in accordance with the regulations, with the necessary adjustments proposed and explained by the Team for additional support.-the implementation of the IEP continues after the evaluation, with the possible amendments and parental consent;
- when the lack of need for the IEP is identified, the decision that the further progress of the child or the student can be achieved by individualized teaching method is made, taking into consideration the consent of the child (according to his age) or parents;
- the institution is obliged to ensure the protection of data in the course of ensuring the right to an IEP;

- children with disabilities do not acquire higher education on the basis of the specific curriculum, depending on the degree of disability, but each institution (preschool, elementary, and secondary school) proposes an individual education plan. It can be used during moving to the next grade, if the student has low grades in certain subjects.

III. MOTIVATION FOR THE SELECTION OF THE SUBJECT

It is obvious that the approach to students with mild or severe disabilities requires primarily the training of the teaching staff and the cooperation with their parents. In practice, one of these conditions is not fulfilled and it directly affects the quality of education of such students.

Many years of my and my colleagues' personal experience in working with these children provided me with the new insight into the approach and methods that helped me to achieve better results; therefore the aim of this paper is to present it.

IV. THEORETICAL APPROACH TO THE PROBLEM

Elementary School "ISIDORA SEKULIĆ" in Pančevo is a model of inclusive education school and the teachers have got a lot of experience in making IEPs and they can see their advantages and disadvantages. Also our students' parents have an insight into the progress of education of their children and they can express their opinions, which is sufficient to form a picture of the process of inclusive education.

The European standard states that the number of children having the IEP is between 1% and 5% of the total number of students of a school. In Pančevo, this number is around 1% and in the Elementary School Isidora Sekulić, this school year, 7 students are having the IEP. In other schools, it also depends on the total number of students, but it is not either a definitely confirmed or an exact number.

V. REASERCH RESULTS

"The analysis of the data can be perfomed using several methods. (*Adamović, 2007, p. 143*): Accordingly, the research was carried out using the following techniques:

- data assessement,
- composition of the collected data,
- comparing the content of the research data with the contents of the previous research data of the same or similar subject,
- assessement of the expert group in the field,
- determination of the interrelationship of the data withing the same research.

The relevant data, analyzed in the research were obtained by answering the following questions and statements:

- Teachers' attitudes towards the potential for mastering the regular educational program.

Can students with disabilities, according to their abilities, master the regular education program?

- Teachers' attitudes towards the mutual benefit of the inclusive education.

There is a mutual benefit in the inclusive education for both students with disabilities and their peers.

- Teachers' attitudes towards the preferred educational environment for students with disabilities.

In which school would students with disabilities master their program more successfully?

- Teachers' opinions about the most common problems in achieving educational goals when working with students with disabilities.

Problems in achieving educational goals

- Teachers' willingness to accept students with disabilities in relation to the involvement in the project of inclusive education.

Are teachers willing to accept students with disabilities?

VI. CONCLUSION

According to the practice, and the questionnaire it is confirmed that teachers have a positive attitude towards joint education of students with disabilities and their peers, still a certain number of them believe that this process requires a selective approach to the type and severity of disability. They support the inclusion from the humane point of view, but a number of them expressed doubts about the academic success of the class in which students with developmental disabilities are included.

There is an evident division of teachers' attitudes towards the preferred environment for the education of students with disabilities – primary school or special schools.

The largest number of teachers had experience in working with students with disabilities. The following problems were pointed out as the most common ones by the teachers: students with disabilities are rejected by their peers and parents, the lack of an adequate assessment of these students and the lack of funds necessary for adequate preparation to school. Teachers associated problems in achieving the educational goals with reduced capabilities. Suggestions provided by teachers for enhancing their work that should be taken into consideration are: the need for reorganization of teaching which requires the implementation of individualized teaching and individual education plans making while having a close cooperation with specialists, professional development of teachers and fewer students per class.

Further research should be directed to examining the factors that influence the formation of positive attitudes toward inclusion and children with disabilities. This could be accomplished by gathering information about the quality and content of the training provided to teachers and getting familiar with the experiences of teachers working with different categories of students who have developmental difficulties, [6].

It would be interesting to carry out a study about teachers' attitudes towards inclusion. It would allow the assessment of the transformation of teachers' attitudes and detailed insight into the process of their change. Testing strategies that will enhance teachers' motivation to make efforts to improve their professional skills for inclusive education process, could be an interesting research project.

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PROFESSIONAL ORIENTATION AT THE TRANSITION TO HIGH SCHOOL

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Abstract – The professional orientation (PO) at the turn between the primary and the secondary school is intended for young people who constantly encounter situations in which it is necessary for them to make decisions related to the choice of their education and future profession. The professional orientation contributes to the establishing of the system of support to young people and the implementation of the tried models of professional orientation through which young people are encouraged to choose courses of professional development adjusted to the conditions of the real life they live and in accordance with their individual inclinations as much as it is possible.

I. INTRODUCTION

The term of orientation refers to the different meanings of contents. The orientation denotes both ''the state'' and ''the process'' [4]. The orientation can also denote a characteristic orientation of an individual as well as an activity or an influence on somebody's orientation, regardless of the method [6].

The importance and the priority of different programmes of professional orientation are reflected in the steps implemented by each state. From a social point of view, professional orientation stands in the cyclic system with other processes that depend mutually from each other. Professional orientation contributes to better functioning of labour and employment market. This leads to the creation of new jobs and looking for new profiles. Then appears the need for competent and better trained workforce, and higher quality jobs and better working conditions represent stages in the process of establishing the principles of the modern economic context of education and employment of individuals on the one hand, and economic prosperity of the country on the other hand.

II. THE CONCEPT OF PROFESSIONAL ORIENTATION

The term of ''professional orientation'' describes a great variety of steps in the process of orientation. It goes from the information on education and occupation to individual councelling. It also includes the so-called ''intrinsic'' (internal) understanding of professional education in teaching that represents the view of students' own personality as well as an ''external'' view which is a view into the real world of occupation, and it goes all the way to monitoring and coaching in the process of career choice and decision-making [5].

Professional orientation also includes a specific preparation for the profession, work experience, practice, steps of general vocational education, and offers of concrete help in decision-making, as well as the help that leads to a successful transition into the profession or opting for vocational education. Systematic professional orientation should contribute to information about expensive and long-therm sideways at all levels of education, finding out alternative careers and their development. The decision about career choise is certanly up to students, young people and their parents. The freedom of career choise and workplace choice belongs, after all, to the fundamental rights [2].

III. THE PROGRAMME OF PROFESSIONAL ORIENTATION

Ministry of Education and Science and Ministry of Youlth and Sports, in cooperation with the German Association for International Cooperation (Deutsche Gesellschaft fuer Internationale Zusammenarbeit GIZ BOSS), are implementing the project called *Professional orientation at the transition to high school*. The project's goal is to establish a functional and sustainable system and programmes of professional orientation for students at the transition from primary to secondary school, for the seventh and eight grade students. The Project is expected to be included in all primary and secondary schools in the Republic of Serbia from the years 2011 to 2013, in accordance with the

agreed structure and the implementation dynamics of the project activities [7].

The professional orientation programme is based on an interactive five-stage model of professional orientation that focuses on the development of competences in career choice among young people. It is based on the positive experience of its implementation in the wider region, and the programme preparation is entrusted to experts in the field of education.

The main goal of the programme is to encourage the development of the capacity of young people to adopt and implement thoughtful, appropriate and independent decision about school and career choice, as well as to plan a career and enter the world of work. Classes for young people in the programme are carried out through workshops that allow students to participate actively in building their knowledge, skills, abilities and values necessary to achieve their goal.

IV. STAGES OF PROFESSIONAL ORIENTATION

The programme of professional education consists of five modules (stages) [4]:

- **Self-knowledge** – students recognize their own potential, affinity and willingless for achievement
- **Information about occupation and careers** – to enable informed decisions on career choice, available information is prepared in a structured way and the information on occupations that are yet to be provided is also determined.
- **Getting to know the ways of education**– the possible ways of education (school network) and careers that lead to the achivement of desired occupation are intoduced.
- **Real encounters with the world of work**– exploring the reality of a particular occupation and testing out some occupations through meetings with representatives of the profession inquiring into business and professional practice in companies.
- **Decisions about school choice and occupation** – decisicions about school choice and occupation are made independently, prudently and responsibly.

The programme of professional education is implemented through workshops lasting one or two lessons. The goal of the workshops is to work actively with children who are divided into groups and using materials provided by the project (portfolio, stickers, felt-tip pens, flip chart board, thich paper, markers...)

V. STUDENTS' MOTIVATION FOR PROFESSIONAL ORIENTATION

In an interview with the students who volunteered to participate in the programme of professional orientation (with mandatory parental consent), we have learned that their intrinsic motivation was crucial: they like the field, the subject matter of this programme is interesting and the way the workshops are presented to them is also interesting. It is noticeable that they expressed their need to demonstrate, to outperform themselves and gain recognition of the community. They are curious, they want to know more. Sometimes, some other motives are crucial for participation in professional orientation. Sometimes this is attributed to the ambitious students' parents, sometimes to their teachers, and in some cases the school environment atmosphere is encouraging to work. From the interviews with students it can be seen that they are also motivated by their teachers who are members of the School's team for professional orientation, and there are students who have personal motives for getting to the desired professions the easiest way.

The students generally express a positive attitude when it comes to the activities related to professional orientation. From this we can conclude that: [6]:

- the students are well-informed about the possibilities of continuing education
- the students are encouraged by their teachers to seek additional information
- the students get some advice on school/career choice
- the teachers emphasize the need for permanent education and continued schooling
- the teachers help the students in assessing their own abilities, knowledge and skills to continue their education
- the information related to professional orientation, which they receive at school, are accurate, clear and current
- the students have the opportunity to be introduced to various profiles through presentations, visiting education fairs etc.

- the students are satisfield with quality of available information and counseling

The teachers belive, in a slightly higher percentage, that the desire for knowledge is the most important motivation of students. In addition to expanding their knowledge and the desire for achievement, students also choose to attend workshops because of socializing.

Like their students, the teachers also express a positive attitude when it comes to the activities related to professional orientation [6]:

- the programme of professional orientation is implemented in schools through various forms of teaching and work
- class teachers implement the goals and the tasks of professional orientation according to the fixed plan of the class
- all activity holders (class teachers, professional associates, teachers...) participate in implementing peofessional orientation contents
- students are given assistance in making decisions about continuing their schooling
- students have the opportunity to learn about high school programmes and educational profiles
- teachers/professional associates responsible for professional orientation are well informed about students' needs and provide them with clear, accurate, relevant and current information
- parents are given assistance in directing the professional development of their children.

VI. THE TEACHERS' ROLE IN MOTIVATING STUDENTS FOR PROFESSIONAL ORIENTATION

The teacher initiates activities and with his knowledge and experience he encourages students to professional orientation programme which can be implemented at school as an individual subject, project or in any integrative way. Teachers are asked to increase their personal engagement. Regular classes, extracurricular activities and individual work represent increased opportunities for work. Teachers notice that nowdays it is not easy to motivate students to participate in professional orientation programme.

In the older theories of motivation we find the notion that each motive has a dimension of attraction and refusal. According to recent theories of motivation, this statement cannot be generalized, but the notion remains that in a number of motives precisely the dimension of attraction and refusal is identified. The student wants to achieve good results, to do the workshops well (attraction), but he also wants to avoid the effort in writing, making... (refusal). A number of mechanisms acts in students, consciously or subconsciously, in deciding for or against professional orientation. The teacher needs to know that mechanism and, based on that, he needs to prepare childrens' motivation strategies for participating in professional orientation. It is needed to know that external incentives can help motivate students, but it is necessary to arouse the inner desire for orientation.Whether the students will be motivated to engage in the professional orientation programme, it all depends on teachers' approach to the programme and its contents, on the means of communication with students, as well as on the teachers' motivation. As a person who knows pedagogy, didactics and methodology of the professional orientation project, he needs to put additional learning to the students in a way that attraction should be stronger than refusal [1].

VII. RESEARCH

The research was carried out in the primary school " Vojvoda Stepa" from Lipolist, municipality of Šabac. It should be noted that this was the first school in the municipality to enter into the project of professional orientation, and as such, it gained the status of the Mentoring school. In solving all the obstacles and problems that the school encountered during the study, it was dependent on the project's holders in Serbia (GIZ) as well as on its own strenght. The school has been in the project of professional orientation since November 2011.

The research was done in April and May of the school year 2011/2012. The study included 30 eight-grade students (which is 60% of the total number of eight-grade students at the school). The gender structure of the tested children is: 16 girls (53,33%) and 14 boys (46.67%). Selection of students for professional orientation was done like this: teachers/professional associates suggested that there were no selected students but instead, the students signed up themselves - 30 of them (100%).

The presence of students at workshops that are planned by this project, is given in Table I:

TABLE I. The students' presence at workshops

a)	Rarely	2	6,67%
b)	Mostly	5	16,67%
c)	Constantly	23	76,66%

Students were asked what professional orientation meant to them. Their answers are given in Table II:

TABLE II. The importance of professional orientation

	I totally agree	Tend to agree	I have no opinion on the matter	Tend to disagree	I do not agree at all
1.Expanding and deepening students' knowledge	20 66,7%	4 13,3%	2 6,7%	1 3,3%	3 10%
2.It allows direct work with students	15 50%	7 23,4%	1 3,3%	4 13,3%	3 10%
3.Introducing PO at school	18 60%	8 26,7%	2 6,7%	1 3,3%	1 3,3%
4.Appreciation for school	17 56,6%	7 23,4%	3 10%	1 3,3%	2 6,7%
5.Pointless to students	1 3,3%	4 13,3%	2 6,7%	5 16,7%	18 60%
6.It takes a lot of time	2 6,7%	3 10%	2 6,7%	6 20%	17 56,6%

From Table 2, it can be concluded that most of the students commented on the issue number 1, 20 of them (66.7%) said that they totally agreed, while 3 students (10%) said that they did not agree at all. For the issue number 2, half of those interviewed said they totally agreed, and 3 students (10%) said they did not agree at all. It is interesting what students commented on issues number 5 and 6: for the issue number 5, 1 student (3,3%) commented that he totally agreed, while 18 of them (60%) said they did not agree at all. And for the last issue, 2 students (6.7%) said they totally agreed, while 17 of them (56.6%) said they did not agree at all.

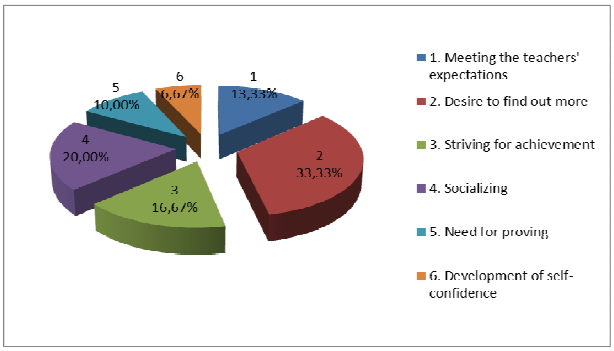

Figure 1. Motive for participation in PO

When students were asked what they thought of the motive for participation in professional orientation, the largest number of students, 10 of them (33,33%) responded that it was the desire to find out more, 6 students (20%) said that their motive was socializing, 5 students (16,67%) responded that it was striving for achievement, 4 students (13,33%) wanted to meet the teachers' expectations, 3 students (10%) said they had the need for proving themselves and 2 students (6,67%) wanted to develop self-confidence.

VIII. CONCLUSION

Based on everything said so far, we can conclude that the project of professional orientation was very applicable in primary schools. The project was implemented through the cooperation and improvement of institutions: primary schools, secondary schools, Regional centres for professional development of employees in education, the National Employment Service, local authorities, youth offices and others. Therefore, if there are more institutions involved, there will be more information at all levels about specific needs in the world of work. This contributes to a better career choice.

The project *Professional orientation at the transition to high school* introduces a unique five-stage model which, with good planning and division of labour within school teams, allows an intense dealing with the issues of professional orientation at the end of primary schooling. It achieves that:

- professional orientation is implemented with a larger number of students than before;
- the same five-stage from-school-to-school model is adapted to the local school conditions and to the needs of young people;

- parents and local partners are involved actively in the programme.

This way, the whole community shares the responsibility for the professional orientation of young people, and the school becomes the holder of such activities in the local community, where it mobilizes a larger number of participants, partners and associates. In primary schools, this programme has encountered a remarkable reception in both the students and the teachers. At school, the coordinator for professional orientation is in charge of organisation, coordination and monitoring of the programme implementation.

Based on the research that was conducted at the school for the first time, we can say that the students' response was satisfactory, 76,6% of the students used to come to the workshops constantly. When asked about the importance of professional orientation, most students have opted to answer *the expansion and the deepening of the students' knowledge* (66,7%), while 3,3% of the students answered *professional orientation was pointless to students.*

From all of the above, we can conclude that the students' response was as satisfactory as the parents' interests. We can expect that the future generations are giong to take part in the project of professional orientation more increasingly. We can also expect that many students and their parents are going to have an easier choice of secondary school.

This programme has showed valuable results in a number of countries across Europe, and as of last year, it is also accredited in our country under the name of *Professional orientation at the transition to high school* as one of the compulsory programmes of professional development of employees in primary education [7]. This project is expected to be a sustainable system of professional orientation which operates across the country, and also to have a reinforced capacity for all the beneficiaries.

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EVALUATION OF IT SKILLS AT TECHNICAL UNIVERSITIES

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Abstract – One of the important elements when accrediting higher education institutions is evaluation of students' knowledge. Evaluation at technical faculties is mostly done formally and is based on a survey of general parameters important for faculty or university (opinion about professors/assistants, curriculum, student service). Research based on evaluation of individual teaching curriculum and testing self-evaluation as a highest level of evaluation on technical faculties in the Republic of Srpska is rare and sporadic. If we want to create a quality evaluation report, reports on curriculum for individual subjects cannot be omitted. Detailed analysis of evaluation of subjects at technical faculties could determine quality of curriculum, true percentage of passing, students' 'self-awareness' and maturity for self-analysis of knowledge. Teachers would be encouraged to change possible gaps in teaching activities, improve, expand or adapt the curriculum.

I. INTRODUCTION

With the introduction of information technologies at technical universities, the role of the IT teacher and students is largely changed, in relation to the previous decades. The teachers, together with the students can overcome the classroom frames, even the university frames, by the means of contemporary Teaching the NET-generation[1] of students based upon the tele-learning Internet learning. Therefore, the teachers have more time for interactive work with students, which implies individual work in smaller groups. Such a manner of organization of educational system is founded by the Bologna process.

With the purpose of education quality in the information education at technical universities, it is necessary to improve the education process using computerized classrooms and appliance of syllabus, adopted for contemporary education. IT knowledge is based upon the general informational alphabetization (EDCL courses) as well as higher informatical level courses that are applicable in the field of technical universities.

II. STUDENTS' IT EDUCATION

The students are gaining basic IT education in primary and secondary schools. The equipment in the computer laboratories, use of adequate textbook, software legalization and the teachers' level of skillfullness in high schools and primary schools are influencing the basic informatical skills. As a part of of primary and secondary education reform, the Ministry of Education of the Republic of Srpska marked the significant asset percentage for equipment of the computer studies and school informational system formation, as well as informational education of personells. As a result of these investments, we are gaining better informatically educated students from primary and secondary schools, who are represeenting the quality entrance material for technical studies. The important factor for informatical education of students at technical universities is also represented in previously gained informatical knowledge as an important foundation for informatical skills building.

III. INTERNAL EVALUATION OF SUBJECTS AT TECHNICAL UNIVERISITIES

During the organization of the subject Informatics at technical universities, the question arises if the universal model for monitoring and education evaluation should be used, or, every technical university should make a mode, that is adjusted to the personal needs. The syllabi of vocational subjects at technical universities contain IT knowledge necessary for vocational subjects realization. In that sense, monitoring and evaluation of vocational subjects imply also the informational skills evaluation. In that case, it is necessary to determine the adequate measurement scales and general information knowledge evaluation, as well as evaluation of IT knowledge, applied in the vocational subjects.

Measuring the informatical skills comprehends the operation of points number allocation to the informatical modules in accordance to the regulations that are following the logic of knowledge evaluation. The term „measure“ implies a certain standard, that is used for the IT skills level measurement, namely for comparison of IT skills, where “measure“ also marks „the object that is used for measuring“. One of the ways to measure the IT skills at technical

universities is evaluation for the subjects, that include IT skills.

Since the education may not be considered as modelled as the general system, thus the evaluation is not founded nor developped as one complex system. „Complex evaluation system must move, generize the developmental changes in didactic-methodic, as well as in pedagogical organization of faculty education as a whole“ [2].

IV. EVALUATION AS A MEASURE OF INFORMATICAL ACHIEVEMENT OF STUDENTS

One of the basic evaluational parametres of IT knowledge and skills is the student's achievement measurements system. Various measurement instruments and scales are used to evaluate the variant IT parametres, out of which the scales with two grades (satisfactory – unsatisfactory), up to the scales of four, five, or ten grades.

At technical universities we mainly have a unique model of evaluation for the subjects with IT content, with 6-grade scales. Positive grades are from 6-10, while the negative grade is 5. In the educational curricula, beside the goals, content, methods and media, the subject evaluation plays an important role.

Evaluation process for IT learning represents one of more significant components of the complex evaluation system. The process of achieving of certain results from the developmental changes point of view can only in evaluational sense have higher meaning than the very effects, that are expressed through the number of ESPB points, study results, namely, some quantity and quality of knowledge adopted. The student would reach a lower knowledge fund through the self-activity. “The knowledge gained at the level of critical and creative transformation of learned content will have a higher value level than the knowledges gained at the level of cognition, reproduction and information”[4].

Some IT contents can be learnt slower, while they are also some that demands thinking and knowledge discovering (instead of adoption), engaging various thinking skills, as well as creative-critical approach to the IT subject learning. In that manner, students achieve high level knowledge, that is not easy to forget, and is easier structured into the existing cognitive schemes, applied, transformed and used in different vocational subjects, that demand IT knowledge.

The evaluation is made for determining three of the most important parametres in the IT knowledge system, and they are: assesment, measurement and evaluation.

- IT skills assesment is used by professor/assistant to gather information about students' knowledge, educational goals respectivelly. The assesment can also be non-quantitative (observing and supervision). Valuation of sutdents' IT knowledge is also part of knowledge assesment.
- Measurement helps to determine quantitative abilities, achievement, and students' properties.
- The evaluation represents student's knowledge formulation, in accordance to the previously determined criteria.

Evaluation process at technical universities could have multiple benefits. The process of evaluation could be used on account of students' benefit, technical universities, universities and the Ministry of Education. The purpose of the evaluation processes at technical universities is explained at the Table 1.

TABLE 1. THE EVALUATION GOALS AT UNIVERSITIES

MAIN EVALUATION PURPOSE	*Why?*	*For whom?*
Feedback		Students
Motivation	***PROFESSOR***	Universities
Selection		University
Valuation		Ministry of Education

A. Information intended for students

- The information about realistic knowledge and improvement
- The insight into proper learning strategies
- Discovering the areas where additional efforts should be made.
- Motivation for students – feedback about the test results can be motivational for students.
- Grade – students see the value in good grades, as it is an indicator of their success:

B. Information intended for professors/assistents

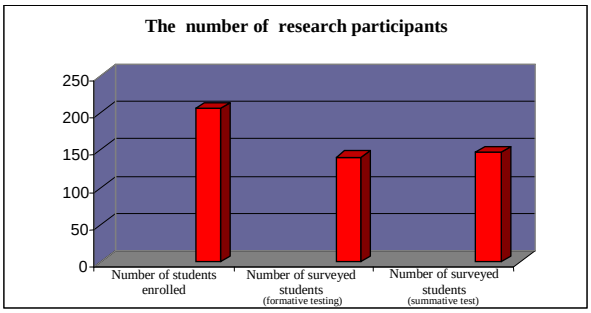
- Evaluation of students' pre-knowledge

- Formational verification – knowledge verification adopted during IT classes – enables better educational content planning and education organization at higher quality.
- Summary verification – stands for students' knowledge after IT classes – information can be used for students' evaluation, but, it stands for the IT education efficiency
- Diagnostic function – as far as students do not experience success continuously (low level of achievement at the course) – the reasons must be diagnosed.

C. Information intended for the Ministry of Education

- Information is used for success evaluation of faculty or university.
- The information about relevance of educational syllabus towards students.
- Information about advantages of certain teaching methods – references for work with professors and assistants.

206 active students have been enlisted to the first year of the studies in the 2011/2012. The polled students have followed the IT subject course in the school year 2011/2012, and they were divided into five study courses (city and road traffic, railway traffic, post office traffic, logistic and telecommunications). The number of polled students (formative and summative evaluation) is shown in Chart 1. in accordance to the number of enlisted students at the first year.



Graph 1. Number of research participants

In accordance to gender, 93 male students and 48 female students took part in the formative evaluation. Graph 2 shows larger number of male participant population. The reason for such a great number of male participants is that the research has been implemented at the technical university where we have significantly higher level of enlisted male population.

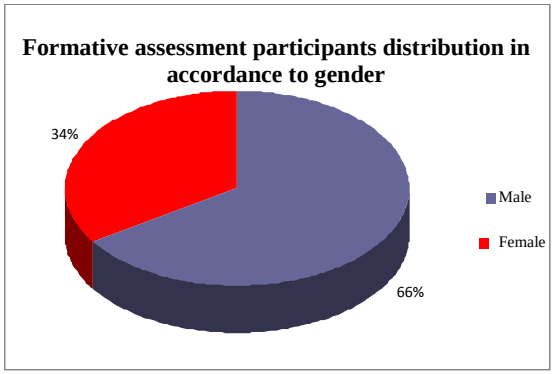
D. Information intended for faculties/universities

- Beneficial information about entrance student selection.

V. RESEARCH AND RESEARCH RESULTS

The research idea has been set in direction to implement the formative and summative evaluation of IT knowledge and skills at the University of Traffic Engineering in Doboj. The basic goal of this research is to gain adequate information about the achieved competence in the field of IT education, if the goals regarding the IT education are fulfilled respectivelly, and to what degree.

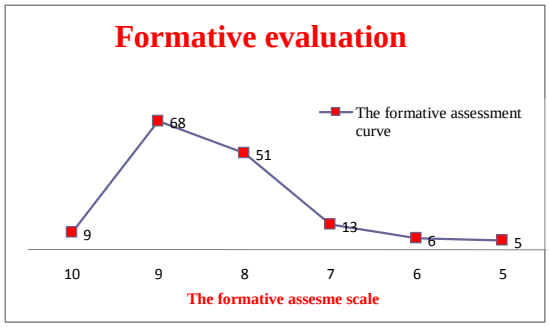
The IT education evaluation also has a role to give feedback to professor/assistant about the education itself, to enable him to make the educational decision and accomodate educational goals to the basic pre-knowledge of students. 141 student took part in the research and in assesment of formative evaluation, that has been implemented at the University of Traffic Engineering in Doboj, while 147 students took part in the verification summative evaluation. The students who took part in the research were the first year students with five study programs.



Graph 2. Demographic data for formative research, students gender (male, female)

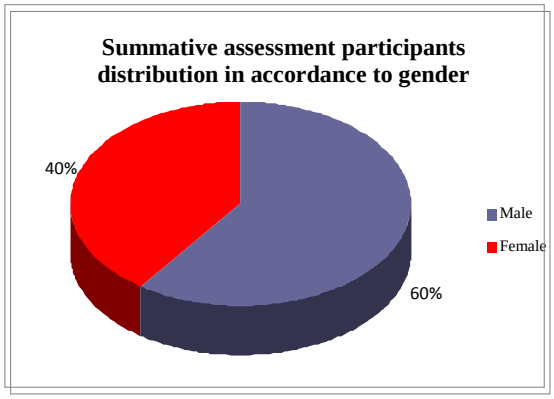
.Demography about the gender with the significantly higher male population are showing us that the case in hand is the technical university where such relation among the genders is expected. Evaluation of the IT education at the University for Traffic Engineering has begun with the appliance of ECDL test which has been used to assess the basic IT knowledge of students before they started to attend the informatics course (formative evaluation). At the entrance test,

141 polled students have replied to 36 questions about the basic IT knowledge (ECDL course). The normal grade scale, accustomed at the universities (5-10) has been used for measuring of IT knowledge. We can see the results of the IT knowledge assessment at the Graph 3. By the curve analysis, we can conclude that the largest number of students are students with the grade 9 (68 students) and the grade 8 (51 student), which tells us that the majority of students in primary and secondary school education received excellent, or very good general IT knowledge. As it has been mentioned above, the material assets have been invested into the primary and secondary school education, which probably resulted in higher level of IT education of students at the entrance test.



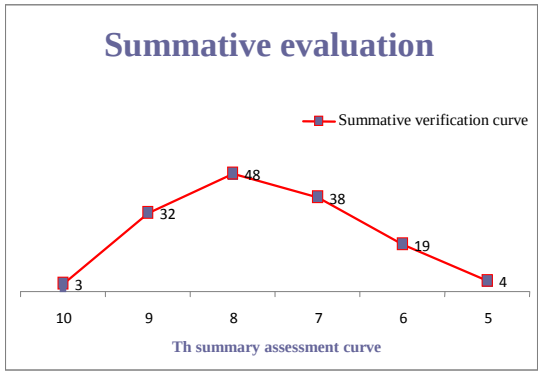
Graph 3. The results of formative knowledge verification

After completing the IT course, the summative knowledge verification was carried out. The used questionnaire contained subjective evaluation of students' IT skills personal knowledge. In accordance to gender, 88 male students and 59 female students took part in the summative research. As well as in the previous research, the larger number of male population is evident, which can be seen in Graph 4.



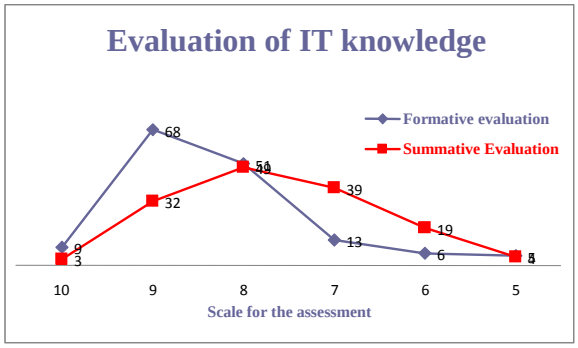
Graph 4. Summative research demography, students gender (male, female).

147 students took part in the summative test, and they gave answers to 35 questions related to IT knowledge, that has been taught during the course. As well as in formative evaluation for IT knowledge measurement, the accustomed grade scale for universities (5-10) has been used. Graph 5 shows the verification results for summative IT knowledge. Taking into account the curve analysis, we can conclude that the largest number of students are the ones with the grade 8 (48 students), grade 7 (38 students, and the grade 6 (32 students). Graph 5 points out that the summative curve of the IT knowledge verification at the University of Traffic Engineering in Doboj, has the similar form as Gaussian curve for evaluation, with small deflections at the scale from (7-8) and (6-7).



Graph 5. The result of summ1ative knowledge verification

Using the diagnostic function at the end of semester at the first year, the decline in instruction of regarding the instructions,in relation to the previous generations that attended the course, has been noticeable. The assumption is that the reasons are multiple, and they can not be brought down only to one – transfer to Bologna system, the insufficiency of clear directions in regard to the education system changes, tendency of Ministry of Education to reduce the material sources intended for the technical universities, insufficient readiness of technical universities to change the plan of studying, etc.



Graph 6. IT knowledge evaluation

We have compared the research results of formative and sumative evaluation at the Graph 6. The blue line at Graph 6 marks formative evaluation, and the red line marks summative evaluation. The curve of formative evalutaion is leaning towards left side of coordinate system and it reaches the highest point at the grade 9. The right hand side of the curve of formative evaluation assesment is unequal and it forms a curve which falls abrupt towads the lowest grade at the scale (5). Such a form of formative curve is a result of unequality of previously acquired IT knowledge. Students, participants of research are coming out of various profiles of high schools (different teaching plans and programs). The curve of summative evaluation is represented with the red color at the Graph 6 and represents the assesment IT knowledge of students after the course. Summative and formative evaluation curves are intersecing in one point, which is almost identical with the average arithmetic grades, represented at the evaluation scale.

The curve of summative assesment is eqable in relation to the formative assesment curve, which strives toward Gaussian curve for review, by its design.

VI. CONCLUSION

Based on the existing experiences and evaluation results at technical universities, we can consider the needs and possibilities for redesigning curricula, that imply IT skills and knowledges, as well as their realisation, with the goal of education process optimalization and adequate ballast over students with the (pre) teaching activities and obligations. The evaluation process at technical universities is a very important link and inseparable segment of educational activities overall. With disregard if we are speaking about the formal or summative, or if it is good or bad, education by any means has an important role in feedback of the teaching process. We use the valuation system to control the future steps in teaching syllabus organization. Further research in the field of IT knowledge assesment should be directed toward the process of evaluation outgrowing, into self-evaluation, to enable us to raise the level of educational-cognitional process to a higher level. Evaluation, as a complex validation system is driving the changes at the didactic-methodic and pedagogic organization of IT knowledge at tecnhical universities.

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THE VIRTUAL NET IN EDUCATIONAL CONTEXT: NEW STAKES, NEW PLAYERS

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Abstract: The study offers a new insight into the virtual network as a socio-technological one. The ideas of Bruno Latour, Michel Callon and some Bulgarian authors on the topic are used as a basis of the study. The educational projections of the idea are discussed with respect to:

- **overcoming the opposition between nature and culture in a hybrid socio-technological net;**
- **the relation *knowledge-situation-knowledge* where the situation is a prerequisite for the catalyzation of knowledge in education;**
- **the mediators, the most important amongst which seems to be information and its social effect.**

The empirical study includes the expert opinions and evaluations of the problem given by computer science and information technology teachers in both schools and universities. The possibility to re-evaluate the educational messages of a virtual network where there are both human and non-human actors (people and machines) and the nature of the mediator is being changed (the information as a sign capital) as a constructive criticism for the education itself.

I. INTRODUCTION

Modern society is a society of networks. The notion of a network has many different interpretations based on the contexts it is used in. However, the notion of 'a social network' interpreted in a strictly scientific manner has been introduced and defined by Bruno Latour in collaboration with Michel Callon and Steve Woolgar. "Networks are simultaneously real in their essence, interpretive as discourse and collective as a society" [1]. Bulgarian philosophy and sociology at the end of the 1990s provided interesting interpretations of the notion *socio-technological network* by authors such as Kalin Yanakiev (1995), Vassil Penchev (1997), Ivan Chalakov (1997) [2, 3, 4, 5], etc. In the present paper *the virtual network* will be analyzed in the terms of 'the socio-technological network'- one employing a language foreign to the network and the possibility for this language to renew its own meta-language. In order to successfully complete this analysis the following questions will be discussed:

- Why is 'the virtual network' a 'socio-technological network' in its essence and why is it not simply an 'information and communication network' or digital network based on the resources it uses or the ways in which it manifests itself?
- What are the educational opportunities and references of the 'virtual network' seen as a 'socio-technological' one?

II. A SOCIO-TECHNOLOGICAL NETWORK-CONCEPTUAL ASSUMPTIONS

In the concept of Michel Callon and Bruno Latour in the 1980s, the notion of socio-technological network was actively used and had its own specifics. What distinguishes this concept of a network from all other concepts is the overcoming of the opposition *natural - social*. Within this network there is an interaction between human and non-human actors. These types of a hybrid networks rely on all possible kinds of mediators such as scientific articles, computer programmes, etc. The role of a mediator can also be played by a social actor while the most important condition for the existence of a network is its building and stabilizing. The main focus of this social movement is not the activity itself but a communication activity where agreements, talks and contracts are seen as new social messages.

This allows the relation regarding knowledge to be changed from *'Situation-Knowledge-Situation'* where knowledge is a mediator, to *'Knowledge-Situation-Knowledge'* where knowledge has turned into capital. In this way a history of science characterized by the capital as a form of movement also becomes possible. Ivan Chapkanov (1997) sees science as a possible 'enhancer' of capitalization of knowledge through a system of representation such as 'investment in forms.' Is it possible for a small number of people to represent the majority and to simultaneously control it?

There is a possible mechanism which requires the existence of a core and periphery of the network and maintenance as an asymmetry. The reliability of the representatives and the existing

mediators as a control source is the condition for the stabilizing of the networks. Science has no analogue in dealing with heterogenic networks which combine human and non-human actors on the basis of investment in forms. Thus, science's biggest investment is the laboratory. Isomorphism is a tendency in the development of networks and network societies in which the scientific, political and economic aspects overlap. Obviously, education can be a part of this isomorphism despite the danger of extrapolation [4]. In his latest works, Bruno Latour talks about re-assembling of a social doer-network where the doers must be manifested as a network of mediators. The manifestation is not equivalent to a 'general description' or 'removing of the masks' of the 'acting social powers' 'behind the backs' of the doer [6]. The network is a world of different types of mediators and negotiations among the social doers where the activity is totally dislocated for the aim 'living together.' The new vision of what is social as a connection between the doers neither guarantees the coherence of the network nor secures it. It does however problematize the existence of the world as a social connection. The point is that the social activity in the informational society as a cause and a product of the virtual refuses to be a 'link' for the benefit of the 'expression' [7]. The latter is part of the 'culture of distance'.

The virtual network as a socio-technological one – nature, relations and context of interpretation

The new information technologies of the 21st century change the key conditions of the socio-technological network from a correlation of a core and periphery to a focus on the core only; the mediator replaces the social actor and the virtual network becomes a natural environment. The consequences of those shifts are still unknown.

As far as the relation 'Knowledge- Situation-Knowledge 1' is concerned as a form of an investing capital of knowledge into education, there is a danger that lies in the misinterpretation of the situation and Bulgarian Pedagogy has been refusing to view thing in a situational manner, i.e. locally. By turning knowledge into a taboo or a fetish Bulgarian pedagogy only sees its global manifestations and scales. This syndrome is mostly spotted in turning the meta-discourse into an aim itself or its recognition as a discourse. On the other hand the time for capitalizing of knowledge is so prolonged that instead of becoming a valuable asset, knowledge constantly loses its value. A proof in this respect is the fact that the curriculum knowledge is always way behind the scientific one. If this is to some extend acceptable in schools, it is absolutely intolerable in university institutions. However, it is a fact that only few universities can afford scientific work that leads to 'discoveries.' Scientific discourse has no analogue within the frame of common thinking. It has no empirical subject in the classical sense of the word because it is a system of ideas which only finds its empirical object in the applied technology of science and its popularization [8]. On the other hand the introduction of new forms of education, such as mixed, internet-based or distance learning is a type of a change in organization. This change is related to reforming, experimenting or transferring of knowledge. A virtual network can be realized on any of the above mentioned levels but its realization depends on the abilities of the social actors. Generally speaking, in education it is difficult to create and apply new approaches to change the organization of schools and higher educational institutions mostly because of the influence of the media. A change of the organization suggests the forming of semi-independent groups of specialist and each specialist within these groups should take personal responsibility for the tasks he/she performs; removing the hierarchy levels of organization and delegating more rights to the participants is also a possible change. There is no demand for new forms of virtual communication in education as consensus integration. The nature of the change in organization is the opportunity to redirect the attention and effort from the activity itself to the communication activity in education. The topic becomes even more complicated if we accept Scott Lash's idea that in the world of a media society there is much more disorganization than organization. What kind of change in organization can then be discussed? Moreover, the virtual network does not exonerate knowledge but focuses on action. Action as a social phenomenon is mostly a statement, message, and discourse.

Therefore, through the virtual network and within the educational context a re-evaluation of the new discourse practices imposed should be made. Or at least we should ask if they are new and discourse practices? The virtual network as a socio-technological one can not solve its main contradiction and namely that between natural and cultural. The only possible tool for solving this contradiction seems to be language or the

encounter of natural and cultural in literature, i.e. in a meta- discourse.

The mediators: In the context of a media theory the question about the mediator is doubtful. A mediator can be a computer programme, information product, even the information itself to the extent where we can speak of the means as a message and of the computer as an information machine. In the classic definition of Michel Callon 'the mediator is everything that transforms form one actor into another an by doing so constructs both form and function, as well as the relation between them' [4]. Media theory transforms or at least problematizes this status due to the following reasons: the media enters the world as a technology, we meet technology as we become its users; the media is the content produced by these machines, the content of the media machine is neither artifact, nor art, nor an item to be sold, nor discourse: it is the information itself; 'the new media is not a media of representation but one of exposure' [7]. Scott Lash sees a possible solution to this crisis in criticizing the information within the information itself. Hence, he sees the problems denoted by symbols and by a certain change in their denotation. It allows him to cause a reverse in the interpretation of difference as essential for the scientific discourse and of information towards the social and its hidden potential as such. The change of denotation in the modern media is possible for many reasons, among them the classification of technology as a symbol for a symbol; information as a symbol capital, the turning of the media into a goal and the shift of accent from the needs to personal interests of independent closed subjects, as well as the domination of the signal as an immediate and motivated form of representation that replaces the image symbol. In announcing the 'empirical phenomenology of communications' the author proves that all technological forms are in fact informational [7]. The culture of technology has two important manifestations in education- games, which have a space dimension and happen not in the symbol or imagination field but in the field of reality. The latter is dominance not of essences but of intuition of the visible. It allows communication with the world of subjects and objects both in a dialogue and interaction. The other important thing is the fact that the actor acts through his/ her habits as a logical practice and not through his/her logical thinking. Then knowledge turns from a reflective to a reflexive one i.e. a thorough knowledge with no gaps interwoven in actions and expressions.

III. DESIGN OF THE EMPIRICAL STUDY AND ANALYSIS OF THE RESULTS

The main components of the methodology of the study are directly linked to its design and realization. The object of the study is the virtual network as a socio-technological one. The people interviewed for the purpose of the study include university professors and experts in the field of virtual networks in the context of university education. The goal of the study is the analysis of the contexts of interpretation of the 'virtual network' as a 'socio-technological' one in the conditions of mixed (internet-based and traditional) training in higher-education institutions.

In order to realize the scientific goal and to accomplish the tasks set, an Interview Card was used. The results from the interviews show that 52% of the interviewees see the virtual network as one of a hybrid nature. 28% see it as a homogenous network, 12% - as a coherent network, 8% see it as a heterogeneous. The interviewed describe the virtual network through the following socio-cultural metaphors; a labyrinth- 68%, a journey- 35%, a laboratory - 25%, and a masquerade- 12%. The corresponding social actors of the virtual network are seen as: an explorer – 56%, tourist- 23%, wonderer - 42%. A large group of the interviewed (85%) identify the educational context of a virtual network as a possibility for the realization of the relation Situation-Knowledge-Situation while only 15 % think that the virtual net is a user-friendly educational service, 25% believe that the virtual network is the mediator of the educational service while 8% think virtual networks concentrate on the source of the educational service. There are diverse opinions expressed in the Interview Cards about the role of the virtual net in the educational context. 56% believe that the virtual network is an opportunity for the learners to realize their social attitudes; for 25% of the interviewed the virtual network helps the forming of technology competences and only 12 % think that through the virtual network it is possible to motivate the behaviour of the learners and to stimulate their interest. The re-evaluation of education through the possibilities of the virtual net, the respondents see as a way of communication - 64%, information mediator - 43%, educational technology - 28%, educational contents -23%, motivation and interest for learning-12%; creating values and attitudes in the learners -8%.

IV. CONCLUSION

The studying of the virtual network as a socio-technological one, allows its interpretation as an interaction of human and non-human actors, which reveals its hybrid nature and the social affects it can produce; the most important one being the overcoming of the opposition *natural-cultural*.

The redirection of the attention within the virtual network to *a situation* which generates, realizes and capitalizes knowledge, allows the discussion of the possibilities for 'change of organization' in education. The possibilities for organizational change, however, can be questioned because the educational possibilities of the virtual network are used inefficiently.

There are various opinions regarding the mediators in the virtual net. Information itself can be seen as a mediator and so can the social affects it produces. Therefore the most important consequence of the application of the media theory in the conceptualization of education is not its technologization but the critics for education itself.

The overlap of the conceptual assumption and the empirical study regarding the virtual network as a socio-technological based on the following criteria: nature of the network, social actors and social metaphor, prove that the respondents see the virtual net as an anthropological one.

The difference between the conceptual assumption and the empirical study regarding the virtual network as a socio-technological with respect to the relation 'Situation-Knowledge-Situation' and 'Knowledge-Situation-Knowledge', shows the latter and its educational consequences are dominant, which proves that the respondents continue to see the virtual network as an original type of education opportunity but not an innovative one. This type of education can change the social attitudes and create the prerequisites for a new type of communication but not a radically new type of education.

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EFFECT OF LEADERSHIP STYLE OF TEACHING THE PROMOTION OF MOTIVATION TO WORK WITH STUDENTS

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Abstract - Motivation is one of the most important factors of success in learning. In the teaching process, it can be built up through passivity of teachers, unconditional obedience, and measure of the pressure. Emphasis should be placed on internal motivation. The teacher should be willing to work on his motivation to students to work. This research seeks to emphasize the importance and seriousness of the problem of students' motivation; how students are engaged in school; the quality of communication between students and teachers, depending on the leadership style of teachers teaching. It points out how students feel at school and eventually how all of the above influences on student development and motivation for teaching.

I. INTRODUCTION

The question how to connect a school learning and success with motivation, attitudes, interests, is the essence of educational theory and practice. Today there are few answers to this topic. In my practice, every teacher can find enough space and time to seek his way in this field. The ability to provoke and stimulate intellectual curiosity and enthusiasm, and intrinsic motivation for learning is one of specific personality characteristics of teachers that could have a significant impact on achieving success in school learning. Teachers who are lively, curious, able to stimulate and enthusiastic in teaching, exposing their subject matter were characterized as successful by professionals who have evaluated them. Such behaviors and encourage teachers are much more efficient and productive.

Overall, if you want to learning exists and the students be mentally activated, the internal drivers and external stimulation are needed. Therefore, it is necessary to motivate students, encourage their desire and need for learning, because motivated student learns much better, faster and more readily than students who are not motivated. Therefore the task of teachers to start teaching and learning stimulate students' motivation and create a favorable stimulating environment. In order to students be active and successful in learning, they need to be motivated and encouraged, as in school. Teaching can best be achieved by the teacher.

Today, the student must learn actively, discovering and to understand himself too. There is a tendency to study through playing in a creative, exemplary, easy, and interesting way. In teaching, there is a tendency to achieve the ability of content learning and resolving during the operation (work). The student should develop knowledge, skills, and habits, but also to cultivate the proper attitude to work, and to progress in all of that in accordance with their abilities. Motivation of participants in the classroom is a prerequisite that can greatly contribute to a better implementation of teaching, and thus better results in learning and progress. Therefore, motivation is of one of the most important factors in teaching because its presence can facilitate and enhance the learning process and just learning, but also its absence lead to devastating results [2].

The problem of student motivation is expressed in many schools. Causes of lack of interest in teaching students the content, or for any other school activities are in most cases in the entire school system.

II. MOTIVATION

Motivation is a very complex concept. It represents force and impulse forces and encourages individuals to take action and effect. Because of that, motivation is particularly important in the learning process. From motivation depends how many students will participate, and how to engage not only in class but also how much will be their desire to learn something, expand their knowledge, and develop their skills. Motivation depends on many factors: the personality of the students, the social environment, family environment, the need to succeed, school, teacher's personality, and so on.

Motivation is the process that moves us towards a certain aim. Every impulse that directs behavior toward a specific goal reflects this behavior also determines the intensity of the motive. [1]

Motivation of participants in the classroom is one of the basic requirements that greatly contribute to better implementation of teaching. If learning is quality, it gives (provides) better results and progress in learning. Therefore, the motivation is of one of the most important factors in teaching. Motivation facilitates and enhances the learning process and just learning, and lack of it leads to bad results.

Motivation to learn means a person is motivated to study and learn something. It is important for the students to be interested in the subject matter and motivated in order to achieve success in learning. For motivated students the intellectual effort and level of cognitive activity is greater. Motivation marked concentration of attention that leads to significant results in learning. To be motivated means a state in which an individual is motivated to learn, have a motive to do something to learn and teach. It is necessary the students to be interested in it, not just to learn. When a student is motivated to work his activity is higher [2].

R. Kvaščev discusses the following features of an individual who is highly motivated:

1. development of a strong motivation for learning,
2. well integrated personality,
3. self-confidence, emotional stability, self-control, independence, developed character traits and strong super ego,
4. risk appetite and tolerance to frustration,
5. mastering the methods and techniques of teaching. (according Muminović)

Most of the authors based on the assumption that external motivation is a phenomenon that is contrary to the phenomenon of internal motivation. Internal motivation is usually defined as the willingness of the subject to engage in a particular activity in the absence of any external coercion or control. Similar to this view, some authors speak about primary and secondary motivation. Under primary motivation we mean a state in which an individual is active for the activity itself (insideyearly motivation), while the secondary motivation can be understood as a condition in which an individual becomes active because they want to achieve something in this activity which is deliberately refers to the activity itself (external motivation) [2].

Internal motivation by some authors is called intrinsic motivation according to the English intrinsic- internal, essential, essential, true. The best-known definition of intrinsic motivation given by Desai is: "Internal motivated activities are ones for which there is no apparent reward except own activities. People engage in activities for their own account, and not because they lead to some external reward [5].

Teachers should be able to be successful in encouraging the largest number of students. Since working with a large number of students, teachers are often not able to get to know their students and how to organize classes. Classes' facilities attract students to varying degrees. Motivational characteristics of learning content depend on how successful they are structured in certain parts. From the above it follows that the implications of educational facilities should be a challenge for students. So not only to contain facts, information, conclusions ready to play, but to encourage learning, thinking, independent work, etc. Students should learn to compete, should use cooperative learning, students learn to divide tasks into smaller chunks (do not set aims too high or too low), assign tasks to the gravity of effort and connect with success (individual approach to student). Intrinsic motivation in students can be supported in various ways, but of course, it depends on a number of factors that occur in the learning process. The most important ones are: the way of exposure to teachers, more complex levels of learning material, intellectual stimulation of students by teachers, realistic and objective assessment, the character of the relationship between teachers and students, socio-emotional climate in the classroom, etc. [2]

To be interested in learning, and to achieve good results in learning, you need to be motivated to do so. The teacher should do all he can to motivate students to learn. Teacher can directly influences on motivation of the students by his behavior and actions, organizing different activities, different activities and teaching methods, evaluation, rewards, punishments, and so on. Students directly affect teacher's motivation. His personality, character, and properties that are not shown explicitly, but students do very well the evaluation and perception. Many studies by domestic and foreign authors have shown that most students

perceive that their interest and motivation for learning are affected by one person. [2]

Teacher by his actions and organizing classes encourages students mainly with external motivation. They are, therefore, motivated to work due to an external stimulus, which is located outside of the learning activities, for example reviews, awards, punishment, praise, etc. While his personality and characteristics as well as the atmosphere created in the classroom, the teacher develops intrinsic motivation for learning. He has to create an atmosphere in the classroom and with students to establish a relationship based on mutual trust to develop students' intrinsic motivation, because that is what encourages and develops mostly (Lunglov, 2010).

Viewed from the perspective of motivation, with all these qualities teachers have a significant impact on students' motivation in the learning process. This influence can be positive or negative. Many students have been identified with the positive characteristics of their teachers and this is a significant impact on the quality of their teaching, and some have opted for a particular professional field solely because of the positive characteristics of their teachers. It is necessary for teachers to engage students more in the learning process, to accept their ideas and suggestions to show more understanding and better cooperation. A strong factor for more active participation of students in the classroom is awards for their achievements and dedication to work. The teacher with his personality, actions, and behavior should arouse interest and motivate students to learn. It happens that students are very interested in a particular subject or field of teaching. The teacher with his teaching style or some negative characteristics can affect students to lose interest in learning the subject. The opposite thing also happens. The subject that is not particularly interesting to students, but the teacher who teaches, his characteristics, behavior and atmosphere created by the department fails to interest and motivate students to learn [2].

Competitive atmosphere in the class emphasizes the role of skills in academic achievement. Therefore, students who fail feel incompetent. Competition leads to better results in learning when tasks are simple and repetitive. Collaboration is a better method in the most situations. If students competing will be inclined to share information, they may try to thwart each other in achieving success. They develop different strategies to avoid the sense of failure and save face.

Pedagogical relationship is not unidirectional behavior of action, in which adults work in a facility that only accepts and responds. It is a relationship of mutual influence, or in modern terms interactions [1].

The questions of how you can shape successfully a pedagogical relationship, and how the teacher can help the student in learning that, how the teacher can help developing student's capabilities and that such assistance to be accepted with confidence by students leads to the thinking of teacher authority.

Teachers can fulfill their function only when they have gained trust and respect of his students. That assumes valuable trust and respect. It is not about special virtues such as kindness, patience, and fairness, but also general skills and qualities that are valued in society. Virtues, in addition to knowledge and skills are in all states in the central aims of education. As knowledge can intervene only if the teacher has the knowledge, so the moral attitudes and behavior can be transmitted only if the teacher possesses them. Moral education can succeed only if the teacher is trustworthy, if his behavior and words of approval are present [5].

The intention of teachers to work for the good of their students is still not sufficient to established pedagogical authority. It is more important to the student to experience that the teacher is ready to engage himself to achieve the set aim. Children and young people need education that will help them in the orientation and search for meaning of existence. This requires not only competence and superiority, but also the willingness of teachers to engage the students. Therefore, the authority is not something given in advance, but it gradually acquires teacher. The authority also can be lost if the teacher is no longer fit enough to engage students. If the pedagogical relationship has been established with the aim of becoming independent learners and "setting up on their own feet," then the main feature of this relationship should be a gradual withdrawal of authority. Placing authority in the background is appropriate until the abolition of the need for it. The authority is therefore required the student in the process of its independence, not "insurance" teachers. Authority includes trust, but excludes intimacy and confidentiality. The authority knows the distance, necessary for the relationship between the participants in the relationship (pedagogical tact). Teacher fondly refers to a student, but he does not need a strict and constant control. Teacher's authority is

founded on the efforts to improve the student's independence and responsibility, as well as critical and creative relationship with the world. A final aim is to establish the authority of the adolescence. In contemporary literature, the problem of authority in the teaching process appears under different names, most commonly as a matter of educational teaching style or question type social interaction in the classroom [6].

It is shown that in addition to many challenges offered by modern society and modern technology, the motivation for what students should learn in school is difficult to maintain. This is especially true of children in puberty and adolescence, when their development problems direct their activities to other facilities that are outside the classroom. This is only one factor that deserves a study in motivating students in the classroom. An example of the United States shows that the students during a school year spent in front of the television screens as much time as they do during compulsory education in school (W. Glasser, 1999). Viewed from a motivational point of view, the television and with ten times fewer hours more influences students than the existing classes no matter how well organized. What will the television in terms of directing the activities of the individual to do so if the representation and if so influential? These are just two examples that govern the activities of the individual in the other direction, outside of the class against the class. Thus, teaching is hard to defend from factors that are against it. Regardless of all these, teaching is a reality and its motivational effect to expand and fight distractions and control the factors that contribute to its realization. Without motivation in the class, and motivation of its direct participants, the process of education will have no good effects [2].

III. TEACHING STYLES

"Style" is encountered in many areas of life: the driving style of a driver, the artistic style of an architecture or music, talking on the Romanesque, Gothic, Baroque style, the style of skiing, swimming, but also the style of writing, the style of leadership in the company and school, etc. In the dictionary of foreign words under style is as follows: (Greek. Stylos - handle, pen) 1 set of characteristic works, architecture, literature, and also artistic or literary direction, school. Epoch style is associated with conceptual content of the work, with the outlook of the world with the development of an artists and artistic direction resulting in certain socio-economic and literary-historical conditions; 2 The way of writing that the writer (or written composition: business, service style, method 3, method of work, play, performance, 4TH transferred: habit, habits, manners, refinement, refinement. There can be so different meanings of the word "style". In some areas, it can determine some characteristics that are common to all the senses. Soon style is not something temporary, but relatively permanent. It means I have less content and more the manner of its expression, which is achieved by selecting different funds and their combination. Style is relatively a stable and enduring pattern of behavior or expression, which is achieved by selecting different options and resources, or a combination there of. [2]

Education is a style of teacher's behavior, or tutors. However, individual actions still make a style but it is a dominant characteristic behavior towards students. The teacher selects from the many opportunities and resources that choice of education is done at the same time and the choice of style of education. [2]

Discussion about the style of teaching and the leadership style typically relies on the findings of the psychologist Kurt Lewin. Lewin. In 1939 in the USA the first experiment was posted with eleven-old students involved in different groups of extra-curricular activities: knitting, modeling, design, fabrication of small pieces of furniture and so on. Students during the 18 experimental weeks were more hours under the guidance of the same host. Each group leader had to have the same length of time to apply different leadership styles; demonstrated by three groups of young people autocratic, democratic, and indifferent behavior. The students' reaction was monitored by other parameters. Autocratic leader behavior is described in the following categories: warning, threatening, scolding, punishment, commanded, disgrace, vituperation, expressed a lack of understanding and disrespect. The results the group members' behavior showed aggression, exhaustion, discouragement, apathy, anxiety, poor concentration, rejection, the tendency to distract distrust. [2]

It is important to respect the teacher and the students' cognitive diversity or a successful motivation in the classroom. Characteristics of a good teacher are ranked as follows: to understand the students, it is a good contributor to the Democratic treated to a good, loving and patient and has a great interest; outside the pleasant, mild in treat-

ment; makes sense of humor; poised and consistent; properly allocated to praise.

The relationship of teachers to pupils can be democratic, authoritarian and indifferent [6].

Autocratic leadership style means that all power and authority are in the hands of one person. Such a style is represented by the old traditional teacher who has high expectations of students. It can be noticed in his governmental work, order, and discipline. His lectures are mostly oral presentations where students accurately recorded lecture notes and exams to come. He is very strict, and does not allow termination of his lectures, no questions are welcome. His teaching is highly structured with clear rules of behavior in the class to keep control. He keeping tuition attained by threats and punishments. In his work, he creates a climate of fear. He says that students must remain silent. Prices obedience, arguably the execution of the tasks obtained exactly as he ordered. It causes the majority students predominantly to have negative experiences, they feel they are under pressure and not free. They are misunderstood and not respected by their own desires and interests. Only a small number of students (highly sociable) cope with such style and after he adjusted it as a positive experience. Academic success can be achieved by autocratic leadership as well as cognitive and psychomotor skills. The spiritual autonomy, cooperation, solidarity and other social-emotional and willingly aims are low. This style requires frequent takeover opinions of assumed authority. The term authoritative means certain advantages over the term democracy because it suggests the idea that a teacher has ultimate responsibility for managing the classroom. This guidance is successful in developing cognitive structures and mechanisms of behavior that enable children to develop independence and responsibility. Behavior authoritative teacher should help the student to understand the classroom rules and to behave towards them. Teacher explaining the reasons for the rules set helps students to understand why a particular order in the classroom is needed. [5].

The democratic style is a leadership style where the teacher allows students to participate in the decision-making process. During his lectures he uses dialogical method of teaching. He knows students' abilities and requirements are beyond the ability of his little person. Every decision, before deciding, he likes to discuss with students and loves to express their opinions. He always communicates with students, likes to break the lecture if something is not clear or understandable. He considers the opinions of his students showing great care and understanding to every problem in the class. He acts as a friend to students, and its effects on others are very positive. In their work, he encourages self-esteem and self-confidence of students. His students make decisions about their learning and thus take responsibility. For most students satisfaction the followings are very important: to feel relaxed, free; the teacher to understand their opinions and them, to take into account their needs and interests. Only a few young people who had previously experienced an autocratic style and has already identified this style feel insecure in a democratic style [5].

Indifferent style is such a leadership style where the teacher does not interfere with the work of students who have great freedom and free rein in their behavior and work. He is preoccupied with themselves and their problems, not too interested in what goes on with students and educational process. Each received job is done with a minimum expenditure of energy. During teaching he is very passive and leaves the initiative and responsibility to students. The main goal is to do his job quietly and with little conflict. The assessment is compliant. There is no need to change their lessons, without introducing new teaching methods and new content. Students continue to impose their own rules, lower academic criteria. What matters him is that the end of classes and everything go without prompt and conflict [5]

IV. CONCLUSION

Students' motivation for teaching depends on the leadership styles of teaching characteristic of our school system, regardless the type of work. As in all areas of modern society, and in education it is cost effectiveness. Prices are personal success they are interested not only in participants of the educational process, but also in the society as a whole. The expected success of school, parents, and society, why education is directed to the achievement of students who are motivated to work in the classroom. Students' motivation depends on the leadership style of teaching by teachers.

The teacher quality management education affects students' motivation. A high level of motivation for all participants of the teaching process leads to a different, more creative approach. We offer different ways of content processing because obtained knowledge obtained is becoming more

useful for application in practical life and not just stacked the facts.

The action of certain teaching styles can be observed regularly: as a child gets older (with a degree of maturity and independence), it strengthens the action of the democratic leadership style of teaching.

Democratic atmosphere strengthens students' responsibility to make it work, while autocratic attitude creates a feeling of depending solely on teacher's engagement. Mastering their dominant behavioral style affects the engagement of students working on the style of learning, the social relations among students and the emotional atmosphere in the classroom. The class can be distinguished mainly by atmosphere of competition or cooperation in an atmosphere of such leadership style of teaching. Style of teaching is variable and at the same time connected to the personal characteristics of the character. That is the reason why the change is gradual and often difficult.

Personal characteristics of teachers are an important factor in the formation of the authority in the classroom.

The school plays an important role and the size of the group (grade / educational groups), school organization and the requirements placed student and teacher. Spatial conditions are also important for the teaching style.

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QUALITATIVE RESEARCH IN EDUCATION: ISSUES AND SAMPLES

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Abstract - Research conducted in the context of observed phenomenon or identified problem enables their deeper understanding and exploration. In some cases, the research goal is to investigate human behavior in the real situations or to collect experience or opinions about the studied problem. These situations are suitable for qualitative research methods. Qualitative research methods are mostly used in social sciences and medicine, but recently gained attention in education and technical sciences. This paper outlines important issues in qualitative research, and also presents some illustrative samples from education.

I. INTRODUCTION

Detailed understanding or exploration of a phenomenon or a problem can be achieved only if the research is conducted in the context where they occur. This is even more important if the research goal is to investigate human behavior in the real context or setting or to get their opinions about studied problem. Understanding the context or the settings in which problems or issues occur is appropriate case for qualitative research techniques. According to Morse [1]:

> *... qualitative methods not only provide us with the means to explore such complex and chaotic real-life situations, but also provide us with methodological choices - multiple options about how to tackle such a setting according to one's identified research problem and long-term research goals.* (p. 393)

Qualitative research consists of a set of interpretive, material practices that make the world visible. The main characteristic of qualitative research is that qualitative researcher studies things in their real settings and attempts to interpret phenomena based on information obtained from people. From the perspective of sociologist Silverman [2], the particular strength of qualitative research, for both researchers and practitioners, is its ability to focus on *actual practice in situ*, looking at how organizations are routinely enacted. According to Creswell [3], the following factors contribute to the quality of a complex and rigorous qualitative study:

- The approach of inquiry,
- Research design,
- Assumptions, worldviews and theories.

Fieldwork is the main source of qualitative data, which means that researcher spends time in the setting under the study. Therefore, important issue for understanding qualitative inquiry is the context because it influences all aspects of human behaviour. This means that a description and interpretation of a person's social environment, or an organization's external context, is essential for overall understanding of a qualitative study.

Generating useful and credible qualitative findings from collected qualitative data requires discipline, knowledge, training, practice, creativity, and hard work [4]. In most cases, qualitative studies are based on a relatively small number of special cases and provide a valuable source of lessons learned from practice. According to Patton, qualitative findings grow out of three kinds of data collection [4]:

- *In-depth, open-ended interviews*. Interviews with open-ended questions are used to collect in-depth responses about people's experiences, perceptions, opinions, feelings, and knowledge.
- *Direct observation*. Data collected during the fieldwork aimed at observing human experience in real setting consist of field notes. Field notes contain rich, detailed descriptions of activities, behaviors, interactions and processes, including the context within which the observations were made.
- *Written documents*. Data consist of excerpts from documents captured in a way that records and preserves context. Typical documents used as a source of qualitative data are: memoranda and correspondence, official publications and reports, personal diaries, letters, artistic works, photographs and memorabilia, and written responses to open-ended surveys.

II. ISSUES IN QUALITATIVE RESEARCH

The main characteristic of qualitative research is that any component of the research design can be reconsidered or modified during the research study. In practice, it is not feasible to predict in advance all components of the research design and logical strategy and to implement them faithfully. Rather, the design of qualitative research is an ongoing process that evolves during the research. It is not possible to define a fixed sequence of steps and to follow it, because issues such as proposed goals, theories, research questions, methods, and validity threats influence each other during the whole research.

A. Approaches to Qualitative Research

Qualitative research can be undertaken by using variety of available approaches. These approaches are classified by using different topologies [3]. Creswell [3] distinguished five qualitative approaches as the most representative and mostly used in the social, behavioral and health science literature:

- *Narrative research*. The usual approach to narrative research assumes that researchers collect descriptions of events or happenings and then configure them into a story about a single individual. Types of narrative research are biographical studies, a life history and oral history. Researcher collects comprehensive information about a participant, which requires deeper understanding of the context.
- *Phenomenology*. This type of research enables deeper understanding of experience of a concept or phenomenon for several individuals. Phenomenology is usually used to discover knowledge common for groups such as therapists, teachers, health personnel, and policy makers. Data are usually collected during multiple interviews.
- *Grounded theory*. Grounded theory research goes beyond description of a phenomenon and generates or discovers a theory as an abstract analytical schema of a process. Grounded theory is both the methodology for research and the final product of the research. As a final product, grounded theory explains the practice and provides a framework for further research. The basic idea is that theory is generated or *grounded* in data collected from participants who have experienced the process. Methodology is based on *constant comparative method* that takes information from data, compares them with other data and emerged categories in order to develop a theoretical framework.
- *Ethnography*. Ethnography describes and interprets the shared and learned patterns of values, behaviors, beliefs and language for entire group. Ethnography involves observation of the group, most often through participant observations and in depth interviews. This assumes that researcher is involved in the day-to-day activities of the observed group of people.
- *Case study*. Case study research involves the study of an issue explored through one or more cases within a bounded system. Researcher explores a bounded system (a case) or multiple bounded systems (cases) over time through detailed data collection involving multiple sources such as observations, interviews, documents, and audio and vide material. The research reports a case description or description of case-based themes.

B. Ethical issues

Ethical issues are part of the everyday practice of doing research in all scientific fields. Qualitative research is concerned with social problems and interpersonal relationships, and therefore, should be guided by important ethical principles. According to Clark and Sharf [5], the primary ethical principle is related to our responsibility for informants. Researcher is challenged to accurately interpret informants' voices in order to construct new understanding of the researched phenomenon through research. In practice, researcher will deploy her or his good professional judgment that should be guided by the broad guidelines set by the researcher's discipline.

Guillemin and Gillam [6] distinguish two different dimensions of ethics in research: procedural ethics that is govern by standards or requires approval from a relevant ethics committee, and ethics in practice or the everyday ethical issues that arise in the doing research.

Christians [7] emphases the following general ethical guidelines, or codes, that should be considered in qualitative research:

- *Informed consent*. This document describes the research in order to provide all relevant details for informants. By signing this document informants accept to participate in the research based on his/her free will.

- *Deception*. Both researcher and informants should avoid any kind of deception during the all phases of the research.
- *Privacy and confidentiality*. In many cases, it is important to preserve informants' privacy and anonymity (for example, students, ill persons, employees) in order to avoid unintended consequences.
- *Accuracy*. It is concerned with fabrication of research results, fraudulent materials and omissions.
- *Beneficence*. It is the obligation of researchers to act in ways that benefit other people, or at least in ways that do not harm them. The principle of beneficence applies not only to the individual subject, but also to groups of subjects, like particular socio-economic groups, professional communities, organizations or companies.

Ethical principles should help in preventing or reducing harm and in coping with the unpredictable nature of qualitative research [8].

C. Validity

Validity depends on research methodologies and paradigms that guide each particular research project. It refers to the *goodness* or *soundness* of a study. Validity is not fixed concept, but rather it is complex construct grounded in the processes and intentions of particular research [9]. In practice, most researchers that do qualitative work agree that the validity of the research should ensure that research procedures remain coherent and transparent, research results are evident, and research conclusions are convincing. In Encyclopedia of Sociology Bohrnstedt stated [10]:

> *Validity refers to the degree to which evidence supports the inferences drawn from a score rather than the scores or the instruments that produce the scores. Inferences drawn for a given measure with one population may be valid but may not be valid for other measures.*

According to Koro-Ljungberg [11], researcher is responsible for doing meaningful, trustworthy and valid research, which means that researcher should consider all conditions that influence research and also be aware of the limits of her or his knowledge. This means that validity should be framed in the context of researchers' responsibility and decision-making during the research process. Continuous reflexivity and self-scrutiny of researcher are essential in qualitative research to ensure research validity.

III. SAMPLES FROM PRACTICE

The following samples illustrate the usage of various qualitative methodologies in education research.

Devlin and Gray [12] presented qualitative study on the possible reasons for plagiarism within Australian universities. They use a series of group interviews, and gathered views of 56 students. Analysis included reading of interviews, identification and refinement of themes and categories. Categories were illustrated with quotations from interviews. The authors identified the following categories: inadequate admission criteria, poor understanding of plagiarism, poor academic skills, teaching/learning issues, laziness/convenience, pride in plagiarizing, pressures.

Paper [13] reports an exploratory study of qualitatively different ways in which teachers experience change in their understanding of subject matter they have recently taught. In the study participated 31 teachers from the major disciplinary fields (Business and Law, Health Sciences, Humanities and Social Sciences, and Science and Engineering). Each teacher was interviewed related to their experience of understanding of their subject matter. The interviews were transcribed and analyzed using analytical procedures developed for similar phenomenological studies. Through analysis was identified an initial set of categories based on reading of transcripts, and later, stable categories were refined and their relationships were established.

The paper [14] reports the outcomes of a phenomenological study of academics' ways of experiencing or understanding being a university teacher. Study was based on semi-structured interviews with 28 academicians. Participants were asked what being teacher meant to them, how they went about teaching, what they were trying to achieve, and why they did things that way. Interviews were transcribed and analyzed in an iterative manner, which resulted with the ordering of categories and the positing of hierarchical relationships between them. The outcome was a structured space of variation, representing key aspects of the qualitatively different ways of understanding being a teacher. The following categories were constituted: a teacher transmission focused experience, a teacher–student relations focused experience, a student engagement focused experience, and a student learning focused experience.

Article [15] presents the authors experience of employing qualitative research to explore the

advantages and disadvantages of software maintenance services in a virtual networking laboratory, which is has been used for teaching computer networks concepts at the university [16]. In research participated students from the final year of bachelor studies, and students of master studies at the Information Technology Department. The experimental sessions lasted between 120 and 150 minutes. The first step was informing students about all relevant experiment details through an informed consent document [7]. After that, a short presentation was made about the research topic. During the experiments, students had the opportunity to specify an arbitrary number of software change requests (SCR) by using three approaches: paper document, web form, a service integrated in the software. After that, each student filled in the questionnaire with open-ended questions [17]. The questionnaire related to the evaluation of SCR services was divided in three sections that corresponded to the stated research goals: discovering advantages and disadvantages of three approaches for specifying SCR (research goal 1), comparing technical complexity of services (research goal 2), and comparing user-friendliness of services (research goal 3). Data analysis is based on grounded theory analysis guidelines proposed by Charmaz [18]. In the article are discussed relevant ethical issues related to informed consent, participant anonymity and benefits.

A three-phased study, based on grounded theory methodology, on a teachers' virtual community in order to understand the knowledge flows among community members from different organizations is presented in [19]. The study objective was to identify essential factors in individual, group, organizational, and environmental contexts, which affect the knowledge sharing and creation in the professional virtual community. The study was organized in three phases. The first phase included six special interest groups (SIG) and lasted for two months. The second phase also included six new SIGs and lasted two months. The third phase included ten SIGs and lasted for seven months. The last phase is conducted in order to ensure theoretical saturation. Researchers collected various data by using: information shared in SIGs, activity logs of members in corresponding SIGs, semi-structured interviews and questionnaires. The study presents and links the causal conditions, knowledge sharing strategies, and consequences of a virtual community. Research findings were discussed on both individual and group levels. For example, consequences at individual level are self-efficacy and professional social network enlargement, while consequences at group level are goal attainment and product quality.

IV. CONCLUSIONS

This paper presents some basic issues related to qualitative research, which is an approach that has been widely used in social and behavioral sciences, health science and education for over 80 years. Qualitative research can be implemented by using different approaches. Since the research is oriented towards humans, ethical issues should be seriously considered. Some illustrative samples from education field are also presented.

Although in literature dominate studies that employ various quantitative approaches, using qualitative methods can be very fruitful for some situations where the goal is to explore the state of the practice. A qualitative approach yields results that cannot be gathered using quantitative methods, which is especially important when the goal is to gain deeper understanding of behaviors, organizational functioning, social movements or interactions.

Case and Light [20] argued that methodological decisions should be more explicitly represented in research reports and that researchers should consider a broad range of methodological options in their research study design. In addition, they noted that a number of studies use more than one methodology.

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LEARNING SUPPORT: ASSISTIVE TECHNOLOGY FOR STUDENTS WITH VISUAL IMPAIRMENTS

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Abstract – The aim of the paper is to describe the application of assistive technology in the education of visual impairment students. Assistive technology enhances reading and writing skills, as well as communication with the world on an equal basis. Facilitating the learning process with assistive technology tailored for individual need improve quality of life of visual impairment students. The main requirements for the use of information technology and assistive technology in learning process are enough computers for all students, advisers to help teachers, and pedagogical support. Information technology and assistive technology is an important tool in the inclusion process and can promote independence and autonomy of students with visual impairment.

I. INTRODUCTION

All students with visual impairments are entitled to the independence and efficiency afforded by Assistive technology. Appropriate assistive technology enables students who are visually impaired to access information and to complete tasks efficiently, and in that way enabling them to achieve the highest level of independence possible. Emerging research suggests that technology promotes acquisition of literacy, provides more equal access to information required for employment, and for access to information, in general, and facilitates social and community networks [1]. Assistive technology is an interdisciplinary field of knowledge comprising products, resources, methodologies, strategies, practices, and services that aims to promote functionality for visually impaired people with regard to autonomy, independence, quality of life, and social inclusion [2]. A visually impaired student in schools requires special attention. The teacher should be able to competently manage assistive technology resources. The assistive technology resource applied to educating visually impaired students, can be defined as computers with programs that allow students to access the digital environment, promoting individual life and social/education inclusion. Inclusive schools provide all students with a regular classroom, thus ensuring adequate and challenging educational opportunities fitted to their abilities and needs, according to the principle of educational inclusion. With regard to degree of vision, the student population includes persons who are totally blind or persons with minimal light perception, as well as persons with varying degrees of low vision. For some individuals, blindness or visual impairment is their only disability, while for others, blindness or vision impairment is one of several identified disabilities that will affect, to varying degrees, learning and social integration, e.g. some students who are blind or visually impaired also have hearing, orthopedic, emotional, or cognitive disabilities. In the educational field, students with low vision have residual vision, which enables them to read printed material with the aid of didactic resources and special equipment Blindness is the term used to describe total loss of vision and conditions in which individuals need to rely predominantly on vision substitution skills. In the educational field, a blind student does not use vision in the learning process [3]. In addition, persons with similar degrees of vision loss may function very differently. A significant visual deficit that could pose formidable obstacles for some students may pose far less formidable obstacles for others. This is because adaptations to vision loss are shaped by individual factors, such as availability and type of family support and degree of intellectual, emotional, physical, and motor functioning. According to the nature and extent of vision loss, a variety of factors needs to be considered in designing an appropriate educational program for blind or visually impaired students, and these factors could change over time.

The challenge for educators of blind and visually impaired students, including those with

other disabilities, is how to teach skills that sighted students typically acquire through vision. Blind and visually impaired students have used a variety of methods to learn to read, write, and acquire other skills, both academic and nonacademic, e.g. for reading purposes, some students use braille exclusively; others use large print or regular print with or without low vision aids. Still others use a combination of methods, including braille, large print, low vision aids and devices with computer-generated speech, while others have sufficient functional vision to use regular print, although with difficulty.

The loss of visual ability generates psychological, social, and economic problems, problems concerning quality of life. Students with low vision may have difficulties with reading and writing activities, even when they use optical aids (that magnify the image) and non-optical resources. Those students can benefit from the combined use of these resources with information technology, such as screen enlargers and text to speech synthesizers. Information technology allows individuals with visual impairment to overcome a major part of the difficulties in daily life and offers them independence and autonomy concerning information management and access to communication [4].

Voice synthesizers are the artificial production of human speech. A computer system used for this purpose is called a speech synthesizer, and can be implemented in software or hardware products. A text to speech (TTS) system converts normal language text into speech. Most TTS systems do not generate semantic representations of their input texts, as processes for doing so are not reliable, well understood, or computationally effective. As a result, various heuristic techniques are used to guess the proper way to disambiguate homographs, like examining neighboring words and using statistics about frequency of occurrence. Recently TTS systems have begun to use hidden Markov models (HMMs) to generate "parts of speech" to aid in disambiguating homographs. HMM-based synthesis is also called Statistical Parametric Synthesis. In this system, the vocal tract, vocal source and duration of speech are modeled simultaneously by HMMs [5]. Speech waveforms are generated from HMMs themselves based on the maximum likelihood criterion. This technique is quite successful for many cases such as whether "read" should be pronounced as "red" implying past tense, or as "reed" implying present tense. Typical error rates when using HMMs in this fashion are usually below five percent. These techniques also work well for most European languages, although access to required training corpora is frequently difficult in these languages.

Many voice synthesizers and screen readers are available for purchase from companies or nongovernmental organizations or are available for free use on the Internet. These programs allow access to Internet websites. Assistive technology resources are increasingly becoming a significant method of access to information, communication, and social inclusion.

II. ASSISTIVE TECHNOLOGY AND LEARNING SUPPORT

Assistive technology must be adjusted for individual needs. Every student with a visual impairment needs appropriate solution for access to assistive technology. Students with the same visual loss may require instruction in different types of assistive technology based upon their special needs. Students with visual impairments may require assistive technology which may focus upon speech access, braille access, print access, tactile communication systems, or any combination of these access modes. Skilled specialists must determine appropriate access mode to education of students with visual impairments. These instructors must have comprehensive expertise in blindness and low vision specific assistive technology and who can also access individual learning characteristics. These specialists must collaborate with other special educators, general assistive technology specialists, general educational technology specialists, and educational evaluators to conduct thorough diagnostic evaluations to determine the specific needs of students with visual impairments. Then they must insure that those needs are met by planning, implementing, and continuously monitoring instruction in the use of appropriate technology, including sufficient training in the efficient use of specific technology. Students with visual impairments must have access to and instruction with blindness and low vision specific assistive technology tailored to individual unique needs, learning styles, visual abilities, and preferences to maximize lifelong efficiency, interest, and productivity in their education, home, and community lives [6].

With appropriate instruction, assistive technology can provide a powerful array of tools for students with visual impairments. Appropriate instruction includes designing a plan of

individualized assistive technology instruction and teaching a specialized hierarchy of skills that is based upon diagnostic evaluations, e.g. developing the ability to navigate a computer desktop, using word processing software as well as other commonly used mainstream software programs, and effectively using the Internet to search for specific information, send e-mails, and participate in online learning may be goals for students with visual impairments [6]. To develop these larger goals, most students will begin with keyboarding skills. These skills must be taught systematically and consistently. Students who master basic keyboarding can then be taught to use a word processing program to proofread, check spelling, and compose and revise documents. Students who master basic word processing can then be taught to use the Internet. The ability to effectively and efficiently use the Internet will allow students to have independent access to a wide variety of information and to participate in online communication [7]. Instruction in the use of appropriate assistive technology devices--speech, large print, and/or braille--must take place concurrently with instruction in keyboarding, word processing, and in use of the Internet. Also, appropriate instruction may include introduction to or mastery of other blindness and low vision specific assistive technology devices such as electronic note takers, video magnifiers, scanners, optical character recognition (OCR) systems, accessible global position systems (GPS), braille translation software, braille and print embossers, screen magnification software [8]. Students with visual impairments and additional disabilities must have access to instruction in the use of appropriate assistive technology such as switches and communication boards tailored to their particular visual abilities.

Access to and instruction with assistive technology must be driven by individual needs, not by logistical constraints such as availability of equipment, location or model of service delivery, or funding restraints. Some students with visual impairments have access to a wide range of blindness and low vision specific assistive technology devices, while others have none at all. Also, some students with visual impairments have access to teachers who are well-prepared to deliver special instruction in blindness and low vision specific assistive technology, while others do not. This inequity must be eliminated. To assure that appropriate assistive technology devices and instruction are available to students, educational teams must carefully assess students' needs, considering both current and future needs, and must specify goals and objectives for meeting these needs on the individual education plan, including intensity of instruction, who will provide the instruction, and the specific type of assistive technology required. University programs must address the lack of blindness and low vision specific assistive technology knowledge in future teachers of students with visual impairments. Professional development opportunities must be provided through partnerships among school districts, universities, organizations, and assistive technology vendors to ensure that professionals stay abreast of emerging technologies and have the opportunity to become proficient in the use of the assistive technology that they will be teaching students with visual impairments to use [9].

Fundamental component of the curriculum for students with visual impairments is instruction in specific assistive technology that must be adjusted to individual needs through diagnostic and ongoing evaluation. Students with visual impairments should have appropriate instruction in the use of blindness and low vision specific assistive technology by a highly-qualified educator. Instruction should be goal-oriented; focused on academic, vocational, and independent living skills; and should build on a hierarchy of skills. Teachers of students with visual impairments and orientation and mobility specialists are responsible for collaborating with other professionals to identify and address individual needs while also staying abreast of current and emerging assistive technology. School districts are responsible for providing equipment and supporting professionals in the provision of instruction as documented by

TABLE I. USE OF INFORMATION TECHNOLOGY AND REASON FOR NOT USING IT FOR STUDENTS WITH VISUAL IMPAIRMENTS [10]

Characteristic	No.	Percent
Use of information technology (n = 58)		
Yes	3	5.2
No	55	94.8
Reasons for not using information technology (n = 54)		
There are no planning courses with information technology	38	70.4
There are no programs for students with visual impairment	28	51.8
Resources are not available for students	13	24.1
Students with visual impairment do not know how to use a computer	8	14.8
The students' visual impairment does not allow them to use such technology	3	5.6

TABLE II. NECESSARY REQUIREMENTS FOR INFORMATION TECHNOLOGY TO BE USED IN SCHOOL ACTIVITIES [10]

Requirements for use of IT with students (n = 134, multiple answers)	No.	Percent
Enough computers for all students	120	89.5
Information technology adviser to help the teacher	101	75.4
Pedagogical support to develop computer projects	100	74.6
Enough ability to use computers	93	69.4
Appropriate programs	92	68.7
Internet-connected computers	80	59.7

the educational team. Universities are responsible for providing instruction in the area of blindness and low vision specific assistive technology that effectively prepares professionals with expertise in the broad array of assistive technology that is appropriate for students who are visually impaired. Collaboration between all stakeholders will facilitate readily available, up-to-date, and on-going professional development [9].

Research made in Brazilian public school for students with visual impairments represents a sample data that are easily the same as other developing countries. The results showed that most teachers (94.8%) did not use assistive technology with visually impaired students. The reasons were not having previously included in the course program the use of information technology in class (70.4%), the lack of specific programs for students with visual impairment (51.8%), the fact that the school administration did not make information technology available for teachers and students (24.1%), the fact that students with visual impairment did not know how to use the computer, and the belief that the disability did not allow the individual to use the computer (20.4%) as shown in Table I. Regarding the necessary requirements for using information technology in schools, the teachers indicated the need for enough computers for all students in the class (89.5%), a computer technology advisor to help teachers (75.4%), pedagogical support to use information technology as a learning strategy (74.6%), enough ability to use computers (69.4%), programs for students with visual impairment (68.7%), and Internet-connected computers (59.7%), shown in Table II [10].

The use of assistive technology contributes to the use of residual vision and to the preservation of visual function. It is an important tool in the inclusion process. It allows health and education professionals to develop combined actions and to promote knowledge sharing and quality of life for visually impaired students. Assistive technology is applied to education of students with visual impairment, but teachers indicate the need for infrastructure and pedagogical support.

III. CONCLUSION

Assistive technology seems like a formidable challenge and matching a student's needs and circumstances. The reading demands of typical students with blindness or visual impairments are very time intensive. For students with visual impairments reading, the time it takes to complete a task is far greater than that for their peers with full functioning vision. Assistive technologies are designed to help students fully participate in all grade-level activities. The challenge for students is that these assistive technologies are sometimes unreliable, take time to learn, and students with visual impairments do not always have the same opportunities to learn as their peers with normal vision. Access to technologies came directly through teachers, and in cases where teachers kept current on assistive technology platforms, students were able to experience and practice with a variety of tools. When teachers help their students learn how to do an Internet search on a computer, they are doing so much more than helping them become comfortable with a new technology. They are opening up the world for them. In cases where teachers were unfamiliar with emerging assistive technology systems, students were greatly diminished. The opportunity to learn and practice with different assistive technology devices varied by student and in that way developing a standardized test to assess student assistive technology knowledge may be difficult. Equally challenging task is for teacher to develop a technology-assisted reading assessment, because student experience varies widely and because there are not standards on which types of platforms students may use. Teachers showing students how to select the most effective way of accessing information and the world around them and performing the tasks they need to do. Teachers are in effect enabling those students to be active and successful citizens today. Assistive technology provides a valid learning support for students with blindness or visual impairments to demonstrate knowledge and improve quality of life.

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EDUCATIONAL ASPECTS IMPORTANT FOR TEAM BUILDING IN CASE OF IT PROJECTS

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Abstract – Considering the fact that projects present generally accepted way of business realization, even in the area of education, and the fact that people are important element of project success, it is significant to build successful project teams.

This paper describes educational elements important for team building, especially for information technology projects. Those aspects could improve building successful teams and, in that way increase their success rate.

I. INTRODUCTION

Team represents a group of people who engage joint efforts to accomplish a common goal. It is a synergy of skills and knowledge of all team members:

- **T**eam
- **E**veryone
- **A**chieve
- **M**ore

This is a group of individuals with different needs, wishes and fears. Because of that, groups, working groups, teams for design and innovations, etc. all have processes which mostly influence on atmosphere in the team and its productivity. It may have either positive or negative effects and lead to the complete inability or even breaking the group apart.

Responsible person (team leader or project manager) should recognize those processes and be able to: recognize them, meet them readily, prevent and direct them.

Some of relevant methods and techniques used in project team building are: training, building team activities and rewords and acknowledgments system.

Important educational aspects in team building significant for information technology projects (IT projects) especially, are stressed in this paper. IT projects are the ones that are dealing with hardware, software or networks [1]. Considering IT projects success rate (about 32% [2]) those aspects could improve building successful teams and, in that way increase this rate.

II. TRAINING AND TEAM BUILDING IN IT PROJECTS CONTEXT

During the organizations' lifetime everyday experience has the greatest impact on education. That experience is not only from everyday work that people do, but from the way of their interactions with others, their opinions and personal values. If work is continuous, development could be too, only if people think about it and learn from their experience (problems, challenges and successes in everyday activities).

Development may be defined as a significant change considering an individual or a group in their knowledge and understanding, acting, attitudes and believes. Development may be reflected through different processes, and training is only one of them. The remaining processes contain over watching, consulting, learning at work, reading books, watching videos, etc.

Training may be organized in a several ways that include:

- Open courses or seminars that are mostly directed towards one or more specific subjects with candidates from different organizations;
- Closed trainings, realized inside of the organization.

Project managers often recommend that people improve their personal and team knowledge and skills during special trainings or courses. Beside traditional courses, many organizations enable e-learning for their employees, in order to gain special skills anytime and anywhere for them. It is established that in some cases e-learning presents

more economical method of learning than traditional courses. Also, organizations established that it is sometimes more economical to train their own people than hire new ones with requested skills and knowledge. Employees should think of training as a reward, and organizations as an investment which will pay off after application of new knowledge and skills in project realization.

This is especially significant for IT projects that, on the contrary to projects in other industries, are extremely different and have particular specifies. There are:

- *Number of engaged people* that varies from a few team members to a several dozens or even hundreds of members;
- *Areas of realization* that could be related to hardware, software or networks. There are differences in this case too. For example, one computer networks project may demand network equipment that could be: wireless or based on phones, cables or with satellite connection. Furthermore, project nature of software development projects may concern simple Microsoft Excel or Access application development or creation of sophisticated e-commerce global system using particular programming language, and so on;
- *Different industries and business functions supported by IT projects*. For example: animation department of one movie company demands knowledge and skills of project manager and team members different from the one for improving state tax collecting system or for installing communication structure in undeveloped countries;
- *Characteristics of IT project team members.* The nature of IT projects demands people with different specialties and skills. For example: business analyst, programmer (that also have categories such as: Java, XML, C/C++ programmer, etc.), networks specialist, database analyst, quality insurance expert, hardware engineer, software engineer and system architect;
- *Different technologies*. The abovementioned example of programmer type is enough to imply on different technologies used in IT projects. Those narrow specialized positions harden project manager to form and lead project team. Also, information technologies advance quickly and demand constant team members' trainings. [1]

In order to reconcile the facts that time for training shortens and the need for training grows, there is online training club. This is an interactive training platform for employees training. On the basis of this modern educative instrument, project managers have opportunity to start team members training by the system *just in time, just in place, just for you*. It means that team members may train themselves when they want, where they want and at their own speed.

By investing in training platforms, companies have possibility to apply their employees in the club. Online training club programs should be installed on companies' intranet and in that way become available for every employee all the time.

Collection of soft skills programs becomes permanent property of the company and in that way e-learning platform for adopting skills necessary for future team members or managers.

Online training club has large number of training programs for key managerial skills development, with multimedia and interactive content divided in four groups: video presentations, audio training, textual training and training manual (exercises).

There are free online programs too, such as lections, whose content may help to advance skills and knowledge of team members.

III. DIFFERENT WORK STYLES

Team building should be aligned with different work styles of particular team members and they may be:

- *Doers*. This group of people is often of the ones that get initiatives going, that take steps to put plans into action. The downside of this type of work personality is that they often do not take time to think and plan. Because of that, they have to either re-think or re-work.
- *Interactive personality*. This person almost always wants to talk things through and the conversation often centers on that person and their relationship to the work. Typically, these people are found in jobs that involve interacting with other people frequently and are less represented in the IT field. The downside of this personality type is that they can focus the conversation on them and distract the group from discussing the more relevant issues, and sometimes they can be time wasters.

- *Team player*. This person often works to assess the team environment and works to ensure that everyone on the team is participating. This person will often subordinate his or her own needs to ensure the team's needs are met. The downside of this type of personality is that they can overlook their own needs or become too involved with the team and its dynamics to be effective.
- *Analyst*. This person is the type (often found in IT and very often in programming, engineering, and accounting positions) that enjoys understanding every last detail so he or she can organize things. The downside of this personality type is that may have difficulty finishing tasks on time (or at all) because they may feel they do not have sufficient data to make a decision or come to a conclusion. [3, 4]

According to this classification IT manager, is to leverage the skills, talents, and personalities of the team in order to get the best possible result. That means learning to maximize the strengths of each work style and minimize the weaknesses of that style. [3]

IV. SEMINAR EXAMPLE

Some seminars are designed in a way that use interesting approach, sometimes through the game, to involve people in making conclusions, establishing errors that they made and realizing what important for team work is.

In an open seminar there are people from different organizations that usually do not know each other. Seminar's games demand that candidates form small groups or teams and solve specific task in a certain time. At the end, every team completes a task according to its possibilities, interests and mutual interactions. After that, examiners at the seminar ask questions such as: "are there team members who try to suggest their own opinion?", "why some team members were silent most of the time?", "why the "dominant ones" did not show more interest in "quiet ones" in order to provoke the best solution?", "were there enough listening and appreciation between team members?", "what was the team energy?" and so on. At the end, examiners, concerning the team tasks appointing on: errors, praise good solutions that team members made, explore the story of successful team work, etc.

V. TEAM WORK AS A KEY OF SUCCESS

Team force is well-known fact, as well as the one that one team member may accomplish much more using the team force than by him/herself. For successful teams also important aspects are:

- *Mutual backup and confidence*. If team has members who trust each other they will work more efficiently and have more motivation. Positive and supportive working environment is efficient in every case. The care for team members needs motivates people to give more and the best of them.
- *Main goals and sub goals of team work*. Team members should know what the group goal is, and according to that they will form sub goals. Also, it is necessary to establish short- and long-term goals.
- *Rolls division*. Every individual, as a person, is unrepeatable in combination of its possibilities and specialties, and in that way especially important for team existence and work. Team will be more productive if it contains of persons with different occupations or abilities. That is why is necessary to establish tasks and rolls for every individual at start. Everyone will know its own obligations then and results will be more valuable. Team leader should be appointed and he or she should be the first among equals. This statement concerns democratic defined groups. However, gaining certain results sometimes demands different relations in the group. Autocratic leader is often needed in order to improve group efficiency.
- *Motivation for successful work ending*. Motivation is a driving force for achieving goals and satisfying needs. The roots of all human motives lie in the personal satisfaction. Each team member should be motivated and eager to succeed. Team members' activity is something that is valuable and appreciated. Everybody in the team must have special knowledge but, at the same time he or she must be open for gaining new information, knowledge and everything else that could help in his/her work and goal accomplishment. Nowadays long life learning is understandable. Team member should be interested in other colleagues' work and their ideas. Furthermore, each team member should be ready to help his coworkers, because the work result demands the whole team engagement not only individual one. It is important to define if there are some team members that may not interact with others and give expected result. Sometimes it is

enough to exclude one person from the team in order to improve team efficiency.

- *Good communication as prerequisite of successful team*. The awareness of the importance of good communication between all team members is prerequisite for team success. However, having this awareness is not enough. It is necessary that team members know the rules of good communication and how to maintain that communication. One of the parameters of good communication is to be open for new ideas and to have democratic environment in the team in which everybody may express their own opinion and feelings and participate in problem analysis. Communication is a basis for efficient team work. Sometimes, there are conflicts in the team. Team leader or project manager must be capable to resolve this conflict adequately so each person remains satisfied. The most motivating thing in the team is belonging to it and moving towards common goal in the atmosphere of mutual trust and respect. This is a task for team leader that is fulfilled through communication.
- *Good listener*. It is important to be open for new ideas. Those ideas should be recommended; person should be active in work and take responsibility for accomplishing final goal.
- *Good mood*. Good team is more productive in a friendly environment. Associating with other team members beyond working time may help to create this environment. Team members are the ones who are responsible for the atmosphere of their work and everybody should give its own contribution in creating the pleasant one.

VI. CONCLUSION

This paper appointed on the important aspects of education in team building, through demonstration of relevant trainings, building team activities and its important issues. Especial attention concerns information technology project teams, as the most present ones in the field of education as well.

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SOCIAL NETWORKS AND THEIR INFLUENCE ON EDUCATION

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Abstract - Social Networking has become very popular during the past few years, and it plays an important role in our life nowadays. In my work I will explain advantages and disadvantages of social networks, opportunities and challenges of social networking sites and opportunities to use of social networking in education.

I. INTRODUCTION

Social media consists of online tools and websites that encourage people to interact with companies, brands, and people (including celebrities and journalists) and form communities by creating, publishing, and sharing content.

Social networking is built on the idea of how people know should know and interact with each other. It gives people the power to share, making the world more open and connected.

There are six different types of social media: collaborative projects (Wikipedia), blogs and microblogs (Twitter), content communities (such as YouTube and DailyMotion), social networking sites (Facebook), Virtual Worlds (the World of Warcraft), and virtual worlds (Second Life social).

II. THE BEST AND WORST WAYS SOCIAL MEDIA IMPACTS EDUCATION

A. The Negative

1. Many students rely on the accessibility of information on social media specifically and the web in general to provide answers.

2. The more time students spend on social sites, the less time they spend socializing in person. Because of the lack of body signals and other nonverbal cues, like tone and inflection, social networking sites are not an adequate replacement for face-to-face communication. Students who spend a great deal of time on social networking are less able to effectively communicate in person.

3. The popularity of social media, and the speed at which information is published, has created a lax attitude towards proper spelling and grammar.

4. The degree to which private information is available online and the anonymity the internet seems to provide has made students forget the need to filter the information they post. Many colleges and potential employers investigate an applicant's social networking profiles before granting acceptance or interviews. Most students don't constantly evaluate the content they're publishing online, which can bring about negative consequences months or years down the road.

B. The Positive

1. Social networking has increased the rate and quality of collaboration for students. They are better able to communicate meeting times or share information quickly, which can increase productivity and help them learn how to work well in groups.

2. Social networking teaches students skills they'll need to survive in the business world. Being able to create and maintain connections to many people in many industries is an integral part of developing a career or building a business.

3. By spending so much time working with new technologies, students develop more familiarity with computers and other electronic devices.

4. The ease with which a student can customize their profile makes them more aware of basic aspects of design and layout that are not often taught in schools.

5. The ease and speed with which users can upload pictures, videos or stories has resulted in a greater amount of sharing of creative works. Being able to get instant feedback from friends and family on their creative outlets helps students refine and develop their artistic abilities and can provide much needed confidence or help them decide what career path they may want to pursue.

III. OPPORTUNITIES AND CHALLANGES OF SOCIAL NETWORKING SITES

A. Connection and Access

The primary function of social networking sites is to provide ways for an individual to make connections with others. Some common connections include:

- Sharing interests and goals with current friends
- Maintaining contact with friends in different cities, states, and even countries.
- Finding old friends and former classmates
- Furthering professional development

B. Increased Awareness

Social networking sites have created a new social dimension where individuals can develop increased levels of awareness. Interacting with these sites, students can become more globally knowledgeable, tech-savvy, and even more self aware. With most sites, users must create a profile which exposes various parts of their personal identity: likes and dislikes, their membership in different groups, ideas they support, etc. Sites are visible, in varying degrees, to peers, parents, teachers, future employers, and the public at large. Students who are conscious of this exposure are able to evaluate which information they feel is appropriate to reveal.

C. Publicity and Advertising

Some social networking sites allow their members to publicize events, movements, or products. Social networking sites provide an advertising medium for students, extracurricular clubs, sports teams, musicians, and large-scale companies alike. There are significant benefits to advertising on social networking sites. Everyone has equal access to some forms of publicity on the site; Many sites, including Facebook and MySpace, allow individuals to create events or fan pages (promoting causes, musicians, artists, politicians, etc.) for free. Even for paid publicity, it is often significantly cheaper to employ online social networking strategies than to pay for advertising.

D. Privacy

Facebook is now open to anyone with an email address and draws people of every age, ethnicity, income level, and academic background. On personal profiles, Facebook users voluntarily list personal details (favorite TV shows, address, phone number, etc.). Although much of the information individuals supply on social networking sites is voluntary, users (especially younger students) are increasingly more comfortable with revealing a great deal of personal information online.

E. Real Friendship?

Thanks to social networking sites, an individual may now be able to boast that her friends number in the hundreds. But the quality and integrity of these friendships is not always what society is used to. Most parents are concerned about online predators; what many don't realize is how readily social networking sites allow for cyber-stalking and unwanted communication to occur. Voluntarily-provided data is not always 100% honest and reliable, and social networking sites do not verify personal details (age, location, etc.) of their members.

F. Miscommunication

Issues of honesty aside, when individuals cannot communicate in person, misunderstandings can occur much more frequently. Whereas interacting face-to-face allows individuals to perceive physical clues like tone, inflection, body language, in an online environment, these are lacking.

IV. OPPORTUNITIES TO USE OF SOCIAL NETWORKING IN EDUCATION

In the field of education, social-networking sites offer a student the opportunity to connect with other students, educators, administrators, both within and outside his current institution. There are some of opportunities in the use social networking in education I will mention some of them.

A. Flexibility

Flexibility is one of the most attractive elements of online learning in social networking. Blended approaches that combine face-to-face and online learning are preferable to an online pedagogy alone. Face-to face classes are likely to enable high levels of emotional understanding, while the convenience and flexibility of online components can motivate students to complete educational tasks. The education theories confirm that human interaction is a vital element in the learning process. It should be noted that social

networking provides participation through such virtual classrooms, chat rooms and meetings by video.

B. Repeatable

Remember information depends on all of our sensory, while the response depends on the features of individual and the motivation to learn. So, it must be therefore provided a way that has offered for a learner the possibility of repetition, which is rarely offered by traditional educational methods. The social networking has offered this way through their sites and gives the opportunity for learners to retrieve the information immediately or later.

C. Convenience and accessibility

The social networking is easy and quick in term of accessing accessibility, reviewing, updating, and editing learning material needs any time and any where.

The social networking helps to reduce stress and increase satisfaction among students. It allows each student (slow or quick) to study at their own pace and speed (self-pacing). Furthermore, it is easy to join bulletin board discussion any time, or visiting classmates and instructors remotely in chat room. The social networking allows access to courses available in their sites, allowing the learner to follow-up online at any time it deems appropriate, and overcome the limitations of space and time in the educational process.

V. CONCLUSION

Social networking has become one of the most important communication tools among people nowadays. They are playing a big and influential role decision making at the events of the global world economically, politically, socially and educationally.

There are some advantages and disadvantages that face the using the social networking as educational tool. Privacy, real friendship and miscommunication are the most important challenges facing education through the social networking. On the other hand, flexibility, repeatable and convenience and accessibility have a vital influence in the use of social networking in education.

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THE APPLICATION OF MODERN EDUCATIONAL TECHNOLOGY ON THETEACHING PROCESS

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Abstract - This paper discusses the use of modern educational technology in the teaching process and the willingness of teachers to turn to modern educational processes. On the bases of the researches we can conclude that teachers need additional training in the management of contemporary educational resources.

INTRODUCTION

The expansion and development of ICT in society have led to the implementation of ICT in education, and in the formation of modern education technology. Modern educational technologies have become an integral part of the educational process, with a tendency to improve the learning process, to develop certain skills in students and teachers given the opportunity to make teaching more fun and more interactive. This paper will explore how teachers are prepared to change the current mode and the turn their innovations and technologies. Define the role and importance of educational technology in the implementation of modern educational processes and interactions in the classroom, the role of professional development in relation to the quality of teaching and motivation of both teachers and students.

EDUCATIONAL TECHNOLOGY

Most studies of the educational process started from the three factors that make up its basic elements: educational programming, teacher and student. However, analysis of modern teaching process shows that there is the fourth factor that connects all the three and it is educational technology. If we understand it as the connective tissue for the other elements then it is one of the most important requirements for the organization, verification, and implementation of modern education and learning process, (Soleša, 2000). It actually includes ways to achieve educational goals, different methods and means of successful teaching (Namestovski, 2008). Association for Educational Communications and Technology (AECT, 1977) is an educational technology defined as a complex integrated process involving people, equipment, ideas, procedures and organization, for analyzing problems, implementing, planning, evaluation and implementation of the solution of problems, in situations where the learning purposeful and directed. While it was for teaching technology the U.S. in 1970, defined instructional technology as a systematic way of implementing, planning and evaluating the total process of learning and teaching in terms of specific tasks, based on the study of human learning and communication by using human and other resources for effective teaching[5]. According to (Soleša, 2000), we conclude that educational technology involves ways to achieve educational goals, different means and different procedures for successful teaching. In doing so means that the methods and content of education mediated by specific technical media and technologies. All elements of educational technology in order to be effective must be appropriate to the learning objectives, contents and characteristics of students who will use it. Not one element of educational technology is perfect for transmitting any content, to achieve all the objectives, as well as for students of all ages, their different abilities and learning styles. For each application of educational technology it is necessary to determine the role and importance of certain elements, preferring their strengths and avoiding their weaknesses. Then along comes the media didactics, which are the main issues: how to use media and technology to improve the process of teaching and learning, the development of teaching and learning strategies, which will release the needy for best efficiency, design and evaluation of multimedia projects and communications issues in distance education.

A. *Changes in Education*

The model that has at its center the students because changes flexible approach to receiving knowledge. The teacher is no longer the

"guardian" of knowledge, but a designer, so that students have more access to information. Traditional lectures require students to be at a particular time in a particular place, if we use educational technology it does not have to be that way. Learning time is adjusted to the student and the knowledge that can be accessed from several places. To realize this approach to education is necessary to change the way of instruction. In Table 1, we compared traditional teaching and more modern approach to teaching[6].

TABLE 1. CLASSIC AND CONTEMPORARY APPROACH TO TEACHING

Traditional teaching	Modern teaching
The teacher teaches students.	Teachers suggest, motivate and provide information. Students present, analyze and solve problems.
The work of the individual student is the price.	Less weight is given to individual, more appreciation for the work in groups.
Knowledge is divided into objects that are considered separately without interconnection.	Items integrate knowledge from several areas, in order to develop different views, knowledge and skills.
The material is based on facts.	The material is based on problems and their resolution. Students perform tasks for which they must collect and process real data.
The teacher is considered a primary source of information.	Use many sources of knowledge. Teachers help in finding a variety of sources.
Printed materials are the primary means of interaction between students.	In addition to printed materials are extensively used and other media such as images, video, audio. In this way, students gain experience in the use of the media not only in reading and writing skills.
It is believed that the material is learned when a student is able to store and display material.	Lessons are learned when a student presents information, you can communicate about the material and you can solve a problem when students learn how to learn.

PREREQUISITES FOR THE USE OF ICT IN CONTEMPORARY TEACHING

Teacher competence - ICT competence of teachers directly affect the methods and techniques that will be used in the classroom. Teachers go through several stages of development:

- Initial phase – teachers use ICT to print instructional materials, have no control over students and they usually do not allow it.
- Acceptance - the use of word processing programs, are being used slide presentations and educational software with elements of interaction and students working in VIDOK controlled circumstances.
- Active use - organizing activities so that students use word processing, graphics, spreadsheet, research, students use the Internet to search and retrieve information.
- Customization - teacher is confident in the use of ICTU work in the classroom, students independently use educational technology and learning, but is an emphasis on interaction.
- Innovation the teacher has the role of a facilitator, educational technology is used to reinforce the interaction between students, students exchange knowledge and skills.

Material - technical prerequisites - Lack of equipment is the most common reason cited as barriers of implementation of ICT in teaching. In the majority of schools MEIS project is equipped with modern equipment that allows access to ICT resources in the classroom, and it was shown that the main problem is the efficiency of utilization of modern technology and the availability of teachers. In addition to the use of specialized computer classrooms, it is necessary to create the conditions that each classroom has at least one computer with the Internet connection and auxiliary equipment[7].

INTERACTIVE TEACHING

Design, adequate preparation and proper organization as well as combining with other

didactic models such as the exemplary, programmed, individualized, problem solving or team teaching, interactive teaching alleviates the shortcomings traditional system that results in more modern and efficient teaching process. Interactive teaching helps overcome Schematic organization of teaching that encourages students' memory and ability to reproduce the stored material. This teaching is based on learning aimed at students and provides an opportunity for students of different psychological and physical abilities to develop their potentials. Basically, interactive teaching is an interactive learning that involves the interaction between the individual with other people or members of the group not only in schools and classrooms, but also in the wider social environment.

Interactive teaching methods to implement interactive learning: team method, mosaic method, we learn together, group-project method, the structural approach, cooperative, collaborative learning, etc.[8]. The rapid development of computers, there has been intensive development of input and output unit of a computer system. Devices for interaction can be classified as follows: keyboard , devices for creating speech and auditory interfaces, printers, pointing devices, Devices with direct control (light pen, touch screen), indirect control devices (mouse, pointing device with a ball, joystick, touchpad, graphic tablet), newer devices (control steps, 3D monitor, touch response, two-handed input, digital paper) according to [2].

EXPECTED TRENDS IN EDUCATION FOR 2013TH YEAR

If you look at the year 2012 you will notice a variety of ICT in teaching. In Serbia, an increasing number of electronic courses, more common is the exchange of experience among teachers through online training, web application tool in the classroom, the development of applications for mobile devices and turning the digitization of documents. All this has opened up new opportunities for 2013. Although late to the global trends when ICT is in question, it is expected that the impact of global trends in the use of ICT in education and the impact on education in Serbia. Agency for Research Gartner, the United States, conducted a survey at the end of 2012 and identified the ten technologically trends for the 2013th year. Although the study does not directly touch the education, we have seen that the general trends in the development and application of technology affect the application of technology in education. The list of technology trends that will mark 2013 mobile devices and mobile applications take up to two places. "Smart" phones are not just for messaging and chatting, they contain a browser, planners, notebooks, calendars, and allow you to download free applications for various fields of education: an application for learning math, foreign language dictionaries, formula. Experts Predictions are that there will be an increase in the use of personal "cloud" (cloud computing), i.e. online storage space. This means that the teacher does not have to maintain records on their computer, but also on the internet. Documents are well protected, and the teacher can choose which folders and documents will be shared and with whom, and how they will be divided: sending a link through e-mail letter that the recipient is invited to access a document or installation code to access the document if information appears on the web page. In addition to good care, the most important thing is that the data is always available wherever the user is located, which is the main advantage of the "cloud" and which further supports the previous prediction of increased use of mobile devices. With the help of smart phones, tablet computers, mobile devices, we are concerned only for desktop computers, but the documents are always available everywhere, can be synchronized between multiple devices using the same teacher-school computer, smart phone, laptop home [9].

PROFESSIONAL DEVELOPMENT OF TEACHERS

If the teacher is the key values of quality education, it is a very important competence and preparedness for the job because of the quality of education depends on the quality of knowledge that students acquire.

A new Law on Basic Education in Serbia an important role in the education system is given the professional development of teachers. Professional development of employees in the education system is a process that involves continuous development of its resources in order to provide high quality business and improving practice.

According to the Official Gazette RS13/2012, Article 2 integral and mandatory part of the professional development training of existing competences important for the improvement of educational education, educational, professional work and child care.

Employed in a professional capacity to develop because of: Statutory obligations, Personal interest in training, The achievement of better educational results, social identification and recognition of employees who achieve results above the compulsory acquisition-ability of different positions, Obtaining financial compensation stipulated in regulations. B.Suhodolski says: "In order to meet the current education, and the needs of the next decade, it is important continuously to improve the organization, content and methods of teacher education. In certain situations it will be necessary to explore new strategies and concepts of education, taking into account the specific social and cultural circumstances in which schools and teachers need to fulfill their main function. "(B.Suhodolski, 1972) quoted from Jovica Tasic. According to the Official Gazette No. 13/2012 of the Republic of Serbia, Article 4 vocational training for teachers, educators and associates focus on the following activities:

1. Assume institutions within their development activities, as follows: - Perform experimental classes and activities with discussion and analysis; - exhibiting at meetings of professional bodies and entities related to the vanquished program vocational training or other forms of professional development outside the institution - modernization - research (scientific, action);
2. Approved training programs and conferences in accordance with the new regulations are conducting;
3. Take charge of he Ministry of Education, Institute for the Advancement of Education and the Institute for Education Quality and Evaluation procedure these regulations through:
4. Training Program: Expert meetings (congresses, symposia, conferences, forums, seminars, counseling, summer and winter schools, Education and Study Tours.
5. Achieve higher education institutions on the bases of accredited programs in the lifelong learning.
6. Activities are organized on an international level, and are relevant to education and participation in international seminars and conferences;
7. Takes a teacher, counselor and associate according to personal professional development plan and to activities not listed in items 1 through 5 above [3]. Competencies for the digital age is a term defined as a group: The quintessential knowledge of his profession, the ability to adopt, implement and expand knowledge, think critically and solve complex problems, communicate effectively, collaborative work, learn to learn, aware of the global context of lives[10].

RESEARCH

Wider research problem was to determine the dependence of educational technology and the quality of teaching, to determine the dependence of quality of teaching and teacher expertise and establish motivation for teachers to work and a willingness to change some of the educational technology. We need to determine how many teachers used the modern educational technology in the teaching process. In this paper we examine the willingness of teachers to use modern educational technology. Case study is to examine whether teachers with the necessary training to manage modern technology. The primary objective was to test explorations teachers know how to manage a modern educational technology and how it affects the performance of teaching, and the willingness of teachers to use. It is also important to determine which teaching aids used in the classroom and what they want to use in the classroom. Secondary goal of the research is related to the narrower issue of research. The secondary goal is to connect years of service with the attitude of teachers towards teaching that is contemporary. The use of modern teaching aids as well as their attitude towards professional development in education. For a given problem, and the object of research, in accordance with the purpose of research raises the main hypothesis: Teachers insufficient use modern educational technology in the teaching process. The main hypothesis will be checked through the auxiliary hypotheses: Years of work affect the willingness of the introduction of modern technology in the classroom. Teachers need additional training management of modern technologies in education. The research was conducted in the Technical High School of Kikinda a sample of 70 teachers aged 30 to 60 years. The school has more office / workshop with the classic board, overhead projectors, video beam, which indicates that it is mainly about the traditional way of presenting course content. It also has modern classrooms for teaching computer education. In both offices, the computer network

connected by twenty computers with an Internet connection. The main computer speakers connected to the video beam that projects an image onto the canvas. Cabinets still do not have the interactive whiteboard while teachers are trained to work with it.

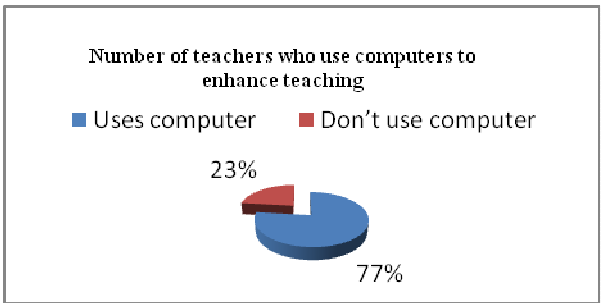

Figure 1. Total number of teachers who use a computer daily

Although teachers need more time to prepare the lesson with the help of modern educational technology, most like you could do something creative to show students and thus keep their attention.

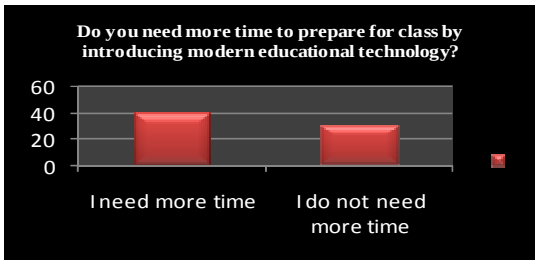

Figure 2. The time required to prepare for class by introducing modern educational technology

When asked if more time is needed to prepare for class by introducing modern educational technology with DA the answer is 40 and the NE 30 teachers. Modern educational technology is used to improve teaching and interactivity, it has been proven that students remember before picture and when replying to try to remember the pictures, but they will remember the text. Educational technology makes teaching funny, increase students' motivation and facilitate mastering the material.

The majority of teachers, according to the survey was 45, in the Technical School of Kikinda would like to have a computer in the classroom, in order to vividly as to present instructional content, because they believe that students are more active when given visual content displayed.

TABLE 2. TEACHING MATERIALS TO TEACHERS LIKE TO HAVE IN THE CLASSROOM

Teaching Aids	Number of teachers
Overhead projector	5
Slide	4
Magnetic board	9
CD recorder	5
TV	5
Video recorder	5
Beam projector	38
Computer	45
Interactive table	23

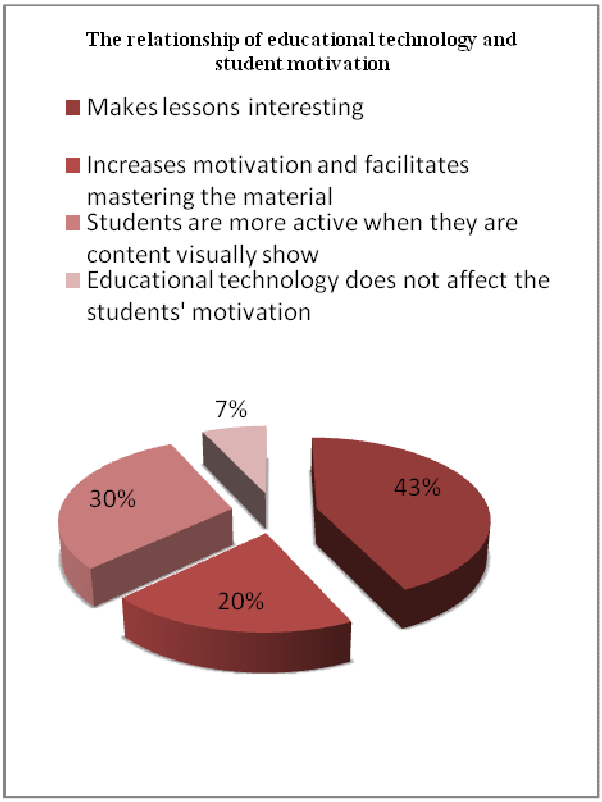

Figure 3. The relationship of educational technology and student motivation

Teachers opinions about whether modern educational technology affects students' motivation are different. While some claim that educational technology enhances students 'motivation and interactivity to motivate them in work and learning, facilitate mastering the material - others are of the opinion that educational technology does not affect the students' motivation.

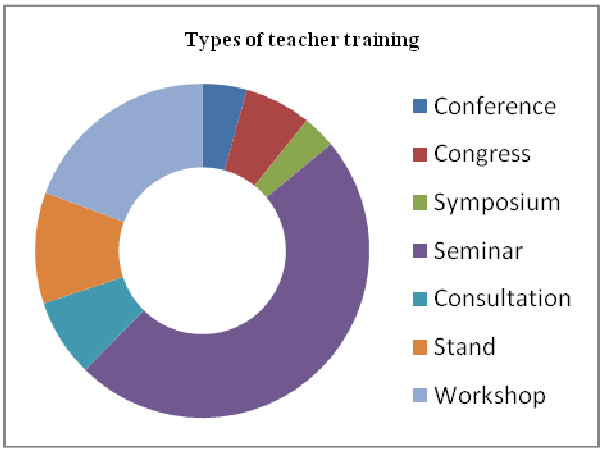

Figure 4. Types of training attended by teachers

Other types of professional development for teachers attending are: The field trip, Training facility and Self training.

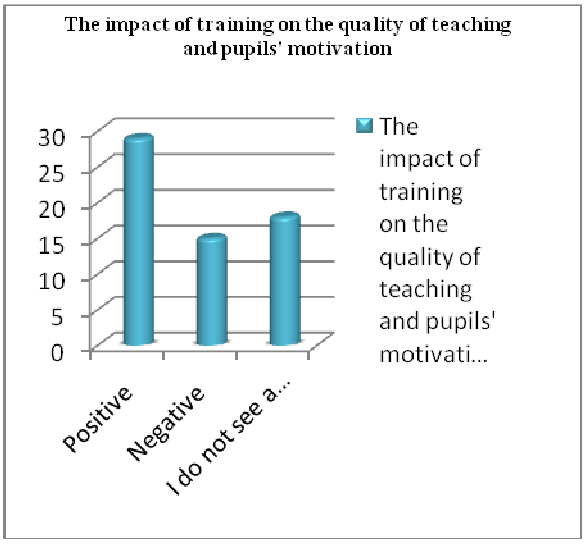

Figure 5. The impact of training on the quality of teaching and pupils' motivation

From Figure 5 it can be seen that the positive opinion of teachers in terms of professional development and its impact on students' motivation because I can always learn something new and if it is possible to implement in the classroom. New and interesting technologies attract students' attention and motivate them to work and increases motivation and understanding of the material.

CONCLUSION

Modernizing educational educational system requires some changes in the organization of the education system in order to accommodate school students, not the student. School is no longer the only source of knowledge for most students, but learning through the Internet, in interekaciji with friends. Interactive teaching relieves individual differences students and also gives them the.opportunity for the application of modern teaching aids. In addition, interactive teaching is compatible with the traditional, so the teacher does not have to change their past experiences and current practices of work, but you only need to build on existing knowledge in order to accommodate the students.

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NATURE AND STRUCTURE OF STUDENTS INFORMATION COMPETENCE OF PEDAGOGICAL INSTITUTIONS

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Abstract - In this article the category of "information competence" and its noun-surface characteristics are studied. Based on the analysis of different approaches to the interpretation of the key definition criteria of information competence criteria are distinguished. The structural composition and levels of formed submitted competence are listed and described.

I. INTRODUCTION

In connection with the development of the information society professional activity of a young specialist vocational activity is not fixed for the entire period of his labor activity, but on the contrary, requires continued education, a willingness to continuously improve his professional competence. Ability to adapt to frequently changing conditions and technologies relevant is actual to the teacher. Indeed, under modern conditions, even in training future specialists there are several generations of hardware and software, new information technologies, changing and clarifying the content of informatics as a science. Therefore, in the process of training teachers it is necessary not only build subject knowledge and skills, but also promote the development of the personal qualities of graduates that would enable them in the future to address new pedagogical problems. Integral characteristic of such training can be a professional competence determining the ability to deal with the typical professional tasks, as well as problems encountered in real-life situations of his teaching work as a subject teacher with the knowledge and professional experience. The professional competence of a history teacher is provided by the formation of a number of key, basic (pedagogical) and special competencies, special competencies reflect the specificity of his subject sphere.

As one of the competencies that characterizes the quality of professional competence we consider information competence.

In modern researches the concept of "competence" involves a complex, capacious content, integrating the professional, social, educational, social, psychological, legal, and other characteristics and means:

- as a special ability required to perform a particular action in a particular subject area, including highly specialized knowledge, skills, ways of thinking and a sense of responsibility for their actions as a;
- measure incorporating human activities, while knowledge is not regarded as a set of information, but as a means of mental transformation of the situation;
- set of interrelated abilities (knowledge, skills, ways of activity), defined in relation to a particular range of subjects and processes necessary to efficiently and effectively act against them.

Information competence is understood as the ability to navigate the flow of information, as the ability to work with various sources of information, find and select the required material, categorize it, summarize and critically treat it as a skill on the basis of obtained knowledge to solve a problem specifically and effectively . Information competence is regarded as a fundamental component and information culture, which, in turn, is part of individual culture. [1].

We consider the competence of the student information system as a property of the individual that characterizes his deep domain knowledge, personal experience of a subject teacher aimed at the prospect of working towards the sum knowledge transfer, modern scientific world outlook development and personality of the students, open to dynamic enrichment and self-improvement by obtaining, evaluating information and the ability to create new information, the

ability to achieve significant results and the quality of professional work.

Based on the work of researchers in informatization of education, we single out the following information competence criteria:

- dualism - the presence of an objective (external evaluation of information competence) and subjective (inner - self-esteem of its information competence of an individual) parts;
- relativity - knowledge and knowledge base grow old and can be onsidered as new only in conventionally defined space-time warp;
- structured - individual organization knowledge base;
- selectivity – received information received is not transformed in full into knowledge included in existing organized knowledge base;
- accumulate - knowledge and knowledge base tend to accumulating, become wider, deeper, more volume;
- self-organization - the process of spontaneous occurrence of non-equilibrium systems of new knowledge structures;
- poly-functionality - the presence of a variety of domain-specific knowledge bases (semantic component of the knowledge base is poly-functional) [2].

II. RESEARCH

According to our opinion the structure of the student's information includes:

1. The value-motivational component:
   - motive to expand knowledge in the subject area, building information models and information development technology;
   - motive of the use of information technology in education and self-improvement;
   - motive of personal development of students and knowledge transfer to others;
   - motive to achieve their goals.
2. The cognitive component:
   - basic knowledge of computer science, information models, modern information technologies and ability to apply this knowledge in their professional activities;
   - ability to identify possible sources of information and strategies to find information, receive and transmit it, ability to analyze the information and evaluate it;
   - ability to create and store information in the form of knowledge for use in professional activities.
3. The activity component:
   - information technology and computer as a tool for professional and information problems as a means of knowledge, self-improvement and creativity;
   - communication as a human interaction with a computer and another person in the learning process.
4. The communicative component:
   - reflects knowledge, comprehension, application languages (natural and formal) and other types of sign systems, means of communication in the process of transferring information from one person to another through a variety of forms and methods of communication (verbal, non-verbal).
5. The reflexive component:
   - ability to self-realization and self-expression in professional activities;
   - awareness of their place in the virtual world, the need to diagnose yourself as a creator and consumer of information and information technology;
   - ability to carry out diverse approach to the analysis of the situation, depending on the objectives and conditions;
   - ability to self-control and self-esteem themselves in their professional activities.

Each component formation is associated with the formation of its characteristics and properties as part of a complete system. The value-motivational component includes motives, goals, needs in vocational training, improving, self-education, self-development, values update in professional activity, stimulates manifestation creativity of personality in professional activities. It suggests the existence of interest to the profession that characterizes personal necessity in knowledge, in learning effective ways of

organizing professional activities. The value-motivational component also comprises theme of educational activities aimed at transferring the sum of knowledge and personality development of students.

Besides theoretical knowledge on the subject and skills of operating information, the cognitive component includes knowledge of ways to get information and transfer skills to improve professional knowledge and skills, knowledge of interdisciplinary connections, knowledge of history, etc. . The level of development of the cognitive component is determined by the completeness, depth system knowledge in the subject area and in conjunction with the information component.

The activity component is the active use of information technology and computer professional activities as a means of knowledge and information development culture of self-improvement and creativity, as well as the education of these qualities of students.

The communicative component is revealed in ability to establish interpersonal communication, to choose the best style of communication in different situations, to control the means of verbal and non-verbal communication.

The reflexive component information competence of teachers is determined by attitude of teachers to themselves and to the world, to his practices and his implementation. It includes self-awareness, self-control, self-esteem, understanding of his performance, responsibility for the results of his activities, self-knowledge and self-fulfillment in his professional activities [3].

For example, a bachelor's degree in the direction of training 050100 Teacher Education prepares for the following types of professional activity: pedagogical, cultural, educational and research. Specific types of professional activity to which bachelor is mainly prepared are determined by institution of higher education in conjunction with students, research and teaching staff of higher education institutions and employers' associations.

According to our opinion information competence is formed by the study of Mathematics and Computer Science, Computer Technology in Education, Fundamentals of Mathematical Information Processing, Historical Computer Science [4].

III. CONCLUSION

We distinguish three levels of information competence formation: high, medium and low. Defining the level formation criteria of information competence of teachers of history we guided by its essential characteristics and conditions of criterion approach: criteria must fix activity-state of the subject, carry information about the nature of activities of the motives and ways to implement it.

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INFORMATIONAL TECHNOLOGY IN EDUCATION

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Abstract – Technology is advancing at a fast pace, and is integrated part of our daily life. Technology, industry and society are creating pressure for teachers to use IT in the classrooms. On the same topic of technology advancement, challenge is presented to pedagogy which needs to keep the pace with technology, in order to create guidelines for teachers, redesign curriculum and assessments. This paper will address some of the challenges and potential solutions of using IT effectively in education.

I. INTRODUCTION

For many years now, educators are optimistic about use of technology in schools. And despite falls in hardware prices, increase in computing power, and availability of information (e.g. via internet), their vision is not realized as expected.

Today, computers are present in many schools around the world. Learning tools are developed for these computers: learning games, computer assisted instruction software, teacher assisting software, etc. Challenge with these tools is that in order to be effective, they need to be appropriate for student age, course, and it's not clear how to effectively track learning progress of the students, and how to use this data to improve teaching and learning process.

Schools are connected to internet, and teachers, as well as students have access to large amounts of information, and learning materials. However teachers need to learn how to use these resources, and also students need to be guided, and taught how to self-motivate in order to learn.

Distance education evolved with IT, as computers replaced correspondence schools and educational television. Communication between teachers and students is more proactive, and more real-time with use of email, instant messaging and video conferencing. With all computers already in school systems, isn't it strange that we are not observing major changes in the way education is managed, and how young people learn? Most experts in the area agree that changes are much smaller than expected, yet that the potential for change is great. [1]

Informational Technology has impact on several areas of education, and few that will be analyzed in this paper are impact:

- on teaching and learning;
- in the management of education;
- in the work process in education;
- in the training of educational personnel.

II. IMPACT OF IT ON TEACHING AND LEARNING

It is believed that IT can empower teachers and learners by making the learning process student-centered, and that this will result in increased learning by students, encouraging creativity, problem-solving, increased motivation to learn, and improved communication. However, despite large number of studies, the impact of IT on student achievement is open to debate, and it's difficult to measure. [2]

Goal is that teachers will use computers to aid and improve teaching process, students will use computers to maximize learning, data will be gathered on learning progress, and that data will be analyzed and used to improve teaching and learning process further. This is good in theory, and many agree that IT has great potentials to improve teaching and learning, but it is introducing challenges as well. Many students have computers at their home, and are comfortable using them. Challenge is presented in the fact that many teachers are not computer-savvy, and they are not comfortable using computers while teaching, hence they are resisting use of IT in their classrooms.

Teachers who use computers during teaching are creating new learning environment which is introducing more uncertainties. Fixed lessons don't exist anymore, and as a result, teacher needs

to be more flexible during class, and to adapt to unexpected events/information due to external resources, e.g. internet.

Most of the schools have added computers to classrooms, and/or have computer laboratories available to students; however, computers alone are not enough to be effectively used in education. Also needed are:

1. Education of teachers to use IT in teaching;
2. Educational software which is appropriate to student age and course, and which delivers knowledge to students, evaluates progress in learning, and gathers valuable information that can be used to improve teaching and learning process;
3. Even if we get the information on the progress of learning (point #2 above), we need to have personnel with knowledge on how to interpret results gathered, and suggest as well as implement improvements.

Due to these challenges, use of computers, and technology overall in schools is quite limited in education. Teachers are mostly using computers for administrative tasks, and ones that are using IT as part of their teaching, are mostly using it as addition to prepare for the class, and as an additional way of data gathering for students, e.g. so that they use internet to gather data needed to perform task such as completing homework.

Besides many teacher-assisting resources available online that require financial investment in order for teachers to access them, there also are many resources available on the internet, free of charge. However, if teachers are not trained to use e-resources available in the classroom, they will not leverage that potential.

III. IMPACT OF IT IN THE MANAGEMENT OF EDUCATION

IT contributes greatly to networking among schools, and among individuals in schools. Many school districts now communicate internally and externally through email.

Beginning in the 1970s US school districts use computers to store student and personnel data. IT systems today are used to collect enrollment data, student attendance, test results, basic information on teachers, students, and on schools. Most of this data is available to personnel and to the public through Web sites. IT is used to gather data and provide statistics, but improvements to existing process are still left to the schools themselves. Questions are: Is IT used to improve attendance, or student test scores, or to hire/make better teachers, or to improve teaching/learning process?

We could use test scores, and compare them with curriculum to asses where teaching/learning should be improved. However, many educators claim that measuring learning through achievement tests pushes schools to teach tests, and it's not a real measure of content taught/learned. [1] So, how come we are not using IT to monitor student progress on curriculum-based assessment?

Few obvious barriers would be teacher resistance, and also, lack of data analysis skills among teachers, as well as lack of user-friendly software for analyzing results, as mentioned above.

Today, test results are available in electronic form, however analyzing of results (if any) is done on the highly centralized, usually state level. This high level data is not useful for teachers or students. In order to be useful to improve performance data needs to be available on the level of school, classroom, student, as well as per teacher. In this way teacher can see progress on specific course/topic, and use this data to improve teaching methods. Also, if this data is available on student level, each student would be able to analyze learning progress, and to make improvements where needed, e.g. to learn specific topic better. Another possibility of use of IT is to reduce costs through analyzing spending. If we can gather data on where school is investing time and resources, and have information on return for that investment, schools would be able to more effectively organize and prioritize their spending.

IV. IMPACT OF IT IN THE WORK PROCESS IN EDUCATION

When computers are available to students and teachers are trained to use them, students can do major part of the schoolwork on the computers using Web resources. Teachers can consult databases for lesson plans, can interact with other teachers to share ideas, and can help students become more self-sufficient and creative in their school work.

Use of IT in schools provides students with possibility to be more proactive in their learning by acquiring knowledge online, learning at their own pace, and getting valuable feedback while learning, and on demonstrated knowledge.

However, to successfully use IT in schools, both infrastructure and teacher competencies are required. Buying computers in schools is administrative decision, but using them needs to be implemented by teachers. Teachers are resisting use of computers in education mostly due to lack of knowledge in how to use them, and fear of unknown; also observed is that many students know more about using computers than teachers, and during class that diminishes role of a teacher as a person who will deliver knowledge, and it is a hit to the ego of a teacher.

Many schools are investing in buying computers, but not many are investing in training teachers in how to use technology available. Besides increasing investments in teacher trainings, schools should introduce various incentives to promote effective teacher participation and professional development, such as: certifications, professional advancements, pay increases, paid time off to participate in trainings, recognition, etc.

It is observed that teaching with IT takes generally longer than with traditional methods. Besides preparing from the curriculum and specified course books, teacher will do additional research, and use information from other electronic resources, such as internet in order to prepare for teaching.

Challenge to teachers who use computers is that by opening to the information on the internet, they are introducing uncertainty, which is not present if teaching of a topic is limited to a given book and inputs from the teacher, as in traditional methods. These teachers need to be flexible, and ready to adapt to new information and way of learning that is available with IT. Role of the teacher will change, from main source of knowledge to person who is managing the teaching/learning process, especially in areas of lesson planning, preparation and follow-up. Role of a student is changing from (mostly) passive reception of knowledge to a role where student needs to proactively research and explore in order to understand the given topic.

When we observe IT use in Universities, we can notice that teachers are much more knowledgeable in using computers. That leads to larger use of IT, and impact is more visible: teachers are using internet to get materials for their course, they are communicating via email with students, test results are available on the web sites, etc.

V. IMPACT OF IT IN THE TRAINING OF EDUCATIONAL PERSONNEL

IT will not be used in education if teachers are not trained to use it. Besides learning how to use technology on its own, educators need to learn how to leverage technology and effectively embed it as part of their teaching in order to improve and optimize teaching process.

Teacher training is an industry where private firms, such as Sylvan and Teachscape, see the potential for growth. These trainings aim to improve pedagogy with goal to improve teaching/learning. When trained to leverage IT, teachers also have access through Internet to course content, lesson plans, and can network with other teachers. This approach is used by NetSchools and the IBM Foundation. These trainings focus on improving course content.

VI. CONCLUSION

Researchers agree that IT can have much more impact than it currently has. Conclusion is that the lack of teacher computer skills is the largest barrier to increase impact of IT in schools. It is important to note two more facts: first, is that the training of teachers is not cheap, and second is that even if teachers are trained in using computers, student skills might not be adequate to leverage vast amount of information available on the Internet.

If we train future educators to use IT-based management tools, and in statistical analysis, younger generation of teachers will be able to leverage IT to assess their own and their students' work. Traditional education didn't change in a very long time, where teacher was the main source of knowledge to students. Now teachers need to accept that technology is bringing to education challenges as well as possibilities to evolve education as we know it. Teachers need to adapt to the changes, so that they can educate students for the future.

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THE SHORT HISTORY OF THE DEVELOPMENT OF TECHNOLOGY, LIFE MANAGEMENT AND PRACTICE AND ITS ROLES IN HUNGARY IN THE BEGINNING OF THE 21ST CENTURY

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Abstract - Today there is a transformation in education. Technology, life management and practice, being an interdisciplinary subject, requires a special approach. In the present study we are delineating the goals and roles of this subject and we are giving an outline of the developments it needs.

I. INTRODUCTION

In the school education the subject of Technology, life management and practice has gone through some remarkable changes in primary education. The new vocational education law necessitates the revision of this subject. The government is encouraging young people to turn to technical courses, it is trying to make education more practical, and after assessing shortage occupations, it is promoting vocational education.

In the documents of training and education, in addition to the problem centered topic acquirement, the material conversion that requires manual creativity has been given more and more emphasis. These two areas are connected, and they can strengthen each other. Technical knowledge is part of our general knowledge. Technical knowledge means the application of engineering and social sciences in the process of creating products, the craftsmanship that has been accumulated during history.

II. HISTORICAL BACKGROUND

Work and practical education has been a problem for centuries. In history, in the ancient societies, passing over the experience was a central activity in the tribe. In slaveholding societies working was a "privilege" of the slaves, while in the feudal era it was something that only villeins would do. In this era, education was a duty of the church.

In the modern era handicraft boomed together with embourgeoisement, and work education was given an outstanding role.

In Apáczai Csere János's scientific course book[1], The Hungarian Encyclopedia (1653), the title of the eighth part was "technology and agriculture".

The goal of this subject was to develop the skills and knowledge that are necessary for human life, or in other words to prepare the students for practical life, farming, work, handicraft, independent life management, taking care of the family, practical housekeeping, the division of labour, choosing a profession, and getting a job. At the same time it was meant to help private and professional life to support individual, social and economic development.

In 1777 Maria Theresa issued the first Ratio Educationis. From this moment on, education, which had been an internal matter of the churches, became a duty of the state.

For the first time, this document integrates the whole system of education (from primary school to universities). It prescribes a syllabus, defines the development goals and briefly describes the curriculum. The latter was divided into subjects and school years, but the order was not defined.

In the guilds, which were founded by the artisans of the different crafts, students could learn to read and write, and at the same time they were practicing the profession. After they have learnt all

[1] Pedagógiai Lexikon I-IV., ed.: Nagy Sándor, Akadémia Kiadó Budapest, 1976

the phases, they made their masterpiece, proving their competence in the profession.

It had been a long time before the so called Scandinavian *szlöjd* movement (szlöjd in Swedish means handwork) started in the second half of the 20th century, according to which the development of the homecraft was a social issue. It was realized that the curriculum of the schools of the period did not contain subjects that would improve manual skills. The newly introduced subject prescribed work with paper, wood and clay as well as needlework.

At the same time Karl Marx encouraged education allied with productive work, according to which students had to learn all the principles and tools of the basic production branches. The three main factors of education were defined: physical, intellectual and polytechnical education.

Polytechnical education meant a wide general knowledge, awareness of the different industries.

In Hungary the proposal for the foundation of the polytechnical was first raised in the parliament of 1832-1836 by the Public Education Subcommittee.

From 1820 bookbinding, paper and woodwork were taught in the Protestant-Lutheran College in Debrecen.

In 1868, the first Hungarian law of public education made it possible for students to choose between industry, agriculture and housekeeping. If the school did not have a demonstration farm, the required knowledge was shown on a nearby farm: truck farming, viticulture, pomology, apiary, stock breeding and arable farming.

According to the public school curriculum of 1879, students had to learn a branch of the local industry in the workshops.

From 1921 public education was controlled by Act. XXX. The goal was clear: "an educational system that is based on practice, which starts at the elementary school, and by workshops it is trying to raise the interest in children towards the joy of work, develop their intellectual and practical skills and an aptitude towards crafts, and make them honor handiwork". Education was defined according to the principle of stimulation, a training that was based on the activity of children. The new public education law came into effect in 1941, and different curricula were prepared for urban and rural schools.

In 1946 a subject called workshop practice contained the following: the students should learn the most important raw materials and tools, they should be inventive and resourceful, and they should experience the joy of creation. Education was practice oriented. This subject was unique among the others because of its characteristics. From the ages of 6 to 14 a unified school system was developed with unified curriculum in the elementary schools.

From the fifties a curriculum type educational program was used, which described education as a process, from the goals to evaluation. There is a centralized educational system, where the succession is strictly prescribed; only one course book is allowed on which the education is based.

The 1958 education reform defined the name of the subject: practical lesson. Its two varieties were the industrial and the agricultural program, twice a week. The principle of polytechnics prevailed. Its goals were to teach processing and fixing methods, and to improve the intellectual skills, the constructive, productive and reproductive fantasy, and technical thinking. The boys and girls were divided into groups, and in secondary schools, in the form that is known as 5+1, the students spent a whole day every week in a production plant. Teaching is supported by visual aids and the development of educator's guides.

In 1978 the subject was introduced with a more modern content under the name of Technology. Its task was to develop skills and crafts that were considered to be necessary for the practical aspects of everyday life, and for the professionalism that was defined by the rapid developments in technology and science. For the workshops and demonstration farms, the raw materials were provided by the central workshops. The teachers were given bigger freedom, and the curriculum was modernized. Grouping by gender was abolished and boys and girls worked together.

In the '90s the NCC (National Core Curriculum), as it was based on cultural fields, restructured the contents of the subjects, which can be clearly seen from its name: Life management and practical skills. The topics of this subject are connected to human environmental transformation, focusing on architecture, transportation, housekeeping and professional guidance. There were a few new components, and topics like health education, healthy diet, the basics of child-rearing, environmental protection, consumer protection, self-understanding, and preparation for the labour

market came into view. Information technology got separated. Unfortunately, at this time, the workshops were liquidated for lack of tools and materials.

The 8 § 1999 LXVIII Act. on Public Education amended the 1993 LXXIX Act.: "In the section of school education and teaching laying down the foundation of general knowledge the unity of the contents of school education and teaching, the interchangeability between schools are ensured by the skeleton curricula based on the areas of general knowledge included in the National Core Curriculum". In other words, the National Core Curriculum defines the development goals, while the curricular frameworks, which became necessary, delineate the content of the educational program, and with the local curriculum the schools could develop their own image.

Lower lesson numbers were prescribed to prevent overstress on students, but the contents remained the same.

Currently the name of the subject is Technology, life management and practice.

III. EDUCATIONAL TASKS

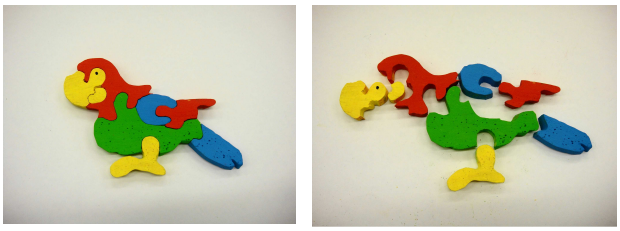
The task of Technology, life management and practice is to familiarize the students with the connection between nature and technology, to teach them environmental awareness, and to show them the productive work of people.

Technical knowledge is part of our general knowledge, so by improving one we can improve the other too, directly or indirectly. Students will understand that with social development the needs of the people have increased, which have fostered the creation of new technological solutions, and their historical and technical comprehension will also improve. They will know the composition of materials through system approach and the hierarchy of the system. However, the same elemental compositions may result in systems that are completely different in their characteristics and structure, as characteristics depend on the methods by which the different elements are connected to each other and on their structure as well as on the components. The composition-structure-characteristics-function chain applies to all systems. By composition we mean the proportion of the components, while by structure we mean the connection between them.

The technology, life management and practice subject aims to the direct and consistent development of a system approach, which would reveal the complex relationship between man, living in nature and in society, and the technological environment that he created. Furthermore, the subject wants to present the context and the requirements of sustainable development, and the methods of environmental management that understand the system and the core of problems.

When students create a simple tool based on a natural law, their technical knowledge improves and at the same time they deepen their scientific understanding. At the same time, when they see the beauty and harmony in the finished work-piece their aesthetics also improve. On the lessons of Technology and life management, besides learning the correct use of simple tools and procedures, students also learn technological thinking and system approach, and their problem solving techniques and creativity can help them in other aspects of their lives.

Another goal of the subject is to show the students the use and developments of technological tools, equipments and systems in the household, living environment, workplace, transportation, which would teach them on correct life management. This means that the subject must be in constant development, to be up-to-date with the developments, to be able to present and teach these modern machines and tools.



Picture 1. Creativity and games. Three-dimensional puzzle, student's work (wood working)

The subject area set as target the following developments:

- The recognition of needs, requirements and possibilities: to recognize the needs and possibilities of designing and technological processes, by studying activities at home, at school, at social environment, in free-time, in business, in industrial and agricultural context.
- Designing: forming ideas into projects, thinking through the necessary theoretical basis, and based on these the elaboration of a real, appropriate and feasible plan.

- Organization and implementation of work: means doing the work according to the plans; environmental transformation, creating simple objects, devices and equipments, implantation after planning and preparation, and familiarity with the necessary processes and resources, and their skilful use.
- Evaluation: means understanding and discussing proper and each other's plans, planned technologies and technical systems, and the assessment of their results and effects; evaluation of the plan and the work-piece; comparison of systems from other cultures or ages, recognition and utilization of common characteristics[2].

To achieve the above mentioned goals, two lessons per week and group division (ideally 15 students per group) are necessary.

The objects made on Technology, life management and practice lessons are not valuable because of their usefulness, but because they are the product of the students thinking, planning and creating together. These work-pieces are not goals, rather tools, by which students learn about materials, tools, and work phases.

The government is trying to direct students towards technical professions and to make education more practice based. These goals should be grounded in elementary schools.

As we understand it, the environmentally friendly nature of sustainable life (style) can only be obtained if our behavior is environmentally friendly, we know the technical environment and we can evolve an orientation skill in the environment. The current contents and development goals of the core curriculum show a greater cooperation between natural and social sciences, and a development of technology. This way we can arrive to work, family and community life education, the acquisition of healthy lifestyle, transport culture and professional guidance. The complexity of practice can only be obtained by the cooperation of the fields.

[2] www.nefmi.gov.hu/letolt/kozokt/ii/technika2.rtf (Access: 20/03/2013

Picture 2. Measurement with TIC

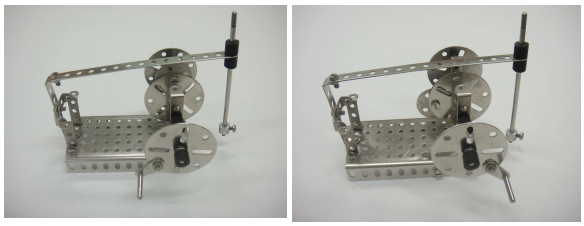
IV. THE CONTENTS OF THE CURRICULUM

Analyzing the topics of the subject we can see some big groups.

The subject of Technology, life management and practice plays a great role in the presentation of different materials. It deals with different materials, starting from natural ones, knowing the plasticity of clay and plasticine, students examine, shape, process and apply other materials as stone, paper, wood, plastic and metal. The topics are not broadened in the different age groups, rather deepened, especially in the case of fuels, metals and building materials. With the processed materials the notion of technology comes into view.

The topic of energy deals with the knowledge about mechanics, kinetic energy, power plants and electricity.

The preparation and examination of mock ups and models provide an opportunity to study and know the technical systems.



Picture 3. Movement transformation mechanism (modeling the eccentric mechanism) students' work

Planning, putting ideas down to paper and technical representations as a form of communication are important in creative work and they undoubtedly get an important role.

Information technology is present in the topics of primary school education from the notion of information to modern communication devices as

systems of technology. It shows students the application of information technology through control, guidance and regulation.

The topic of transportation includes traffic systems, the rules of pedestrian, bicycle and public transportation, and it also concerns the history of transportation. In the upper classes it is worth having a few lessons about bicycle maintenance and fixing.

The topics of housekeeping and life management are the household, clothing and farming. In this topic emphasis is put on the value creating aspect of work.

The agro-technologic part includes the basics of plant care, forming small gardens, plant guides, and the practical presentation of the learnt material in the school garden if possible.

The processing of the different topics is always supplemented by the history of technology, through which students can understand the development of human civilization, and by passing through all the steps, they themselves can become drivers of the development.

V. TEACHERS WHO CAN MEET THE CHALLENGES OF THE ERA

Even when teacher training colleges were founded it was obvious that work and handwork education were necessary, however, this need was not formulated explicitly.

As a precursor to the technology department, in Szeged, handwork (szlöjd) was present from 1928 as an additional study group only for men, and from 1940 it was housekeeping and farming only for women.

After the World War, in 1947 the Teacher Training College started its work in Szeged. In the ten-years development plan, discussed in December 1958, besides the organization of other faculties, the polytechnics was also mentioned. In September 1959 there were two majors to choose from: Agricultural studies and practice and Technology studies and practice.

The historical departments were founded: the Department of Agricultural studies and practice and the Department of Technology studies and practice.

In 1987, after the unification of the two historical departments, a new modern department was founded, that of Technology.

The environment of the people is in constant change, so knowing the laws of nature and applying the technological rules is essential for everyone.

To teach students, we need teachers who, by adapting to the current needs and according to the needs of the students, are capable of giving effect to their professional aspirations and building their subjects independently to offer a differentiated education based on a common ground.

Today, the institutions of higher education are trying help their students become such teachers, who would be able to follow the modern developments in technology, to be absorbed in the different topics, and who are capable of self-renewal, of the rational use of the results and of the development of the students' creativity[3].

VI. CONCLUSION

"Technology is the total of those methods and processes with which people can apply the laws of nature for their own benefit[4]". It is important for this subject to be of integrative nature, to involve ideas, planning, organization, economy, and system approach. Developing the ability of engineering and innovation, the students are capable of individual and community creation according to the instructions of the teacher.

The topics of the subject Technology, life management and practice, can be presented and endeared to the young generations by the description of technical systems, knowing and analyzing their characteristics, and creative planning and work.

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EDUCATION FOR MANAGERIAL PROFESSION

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Abstract - The paper presents the analysis of the empirical research results about the processes of education of the management profession in the Serbian society. The research of education for the management profession refers to the evaluation of management curricula at universities in Vojvodina, goals of managerial education and students' satisfaction with the quality of teaching at management universities. Furthermore, the authors have analyzed students' plans for the future. The sample of the survey represented 255 students on their final years at four universities. Data were collected using the survey method and their processing was conducted using the statistical method.

I. INTRODUCTION

The unquestionable element of a profession present in all theories of profession sociology, from Parsons (1968) as the first theoretician, through the structural functionalist Greenwood theory (1957) and critical theory of Gyrate (1974) and Light (1974) to the historical school of Wilensky (1964) is the establishment of schools and their branching, and the development of study programs for the education of large groups of people in order to perform one activity for which there is a need in the society.

Over the last decade there is a constant growth of the faculties and studies of management in Serbia, as well as the growth of the interest among young people for such studies. The statistical data of this growth have motivated authors to research empirically the features of recruitment and educational process for managers in contemporary Serbian society [1].

II. METHODOLOGICAL FRAME OF RESEARCH

The objective of this research was to examine the features of educational process for managers in contemporary Serbian society. The following tasks have resulted from such an objective:

- examining the students` perception about desirable and achieved objectives of manager education in Serbia today
- examining students` satisfaction with lectures at the faculties of management
- examining students` attitudes regarding structures of syllabi

The authors of this research have assumed the following:

1. Since managerial profession is a young and modern profession, knowledge gained at the faculties for this profession should be contemporary
2. Similar to students prepared for other modern professions, such as engineering and computer science, management students also expect more practical than theoretical knowledge within their studies

A poll was conducted with a standardized questionnaire among students from two state and two private faculties during the school year 2010/11, on the sample of 255 students. The received data were processed by the following statistical methods: Chi-squared test, T-test and the variable analysis. Chi-squared test was used for analyzing nominal data; T-test was used for testing statistical significances of the arithmetic means between two groups of respondents, while variable analysis was used to test the significance of a large number of differences between arithmetic means.

Finally, the received results were compared to the results of similar research conducted in the region and abroad.

III. RESEARCH RESULTS AND DISCUSSION

A. Important features of educational process for managerial profession

Within the analysis of the socialization process for the managerial profession, the research is focused on a) evaluation of study programs by students of management, b) perception of expected and achieved educational goals by students of management and c) satisfaction with teaching quality.

a) Evaluation of study programs done by management students

Considering the evaluation of the knowledge gained at the faculties of management this research has shown that most of the respondents (72%) believe that faculty offers more theoretical and less practical knowledge. On the other side, more students believe that knowledge is modern and contemporary (15.2%) than those who do not think so (6%). Finally, 6.8% believes that gained knowledge is not appropriate to the manager profile.

However, while comparing students from the private and from the state faculties regarding this question, we have concluded that there are statistically significant differences between these to groups ($\chi2=28,86$, df=3 p=0,00). Almost one third of the private faculty students (27.7%) believe that gained knowledge follows contemporary scientific achievements, while this opinion is shared by only 3.8% of the state faculty students. The next significant difference occurs regarding the amount of theoretical and practical knowledge gained at the faculties of management. Students from the state faculties (82.4%) consider their study programs to have more theoretical than practical knowledge, while 60.5% of private faculty students share their opinion. Finally, there is a difference among the students` opinion that the structure of the knowledge gained at the faculties of management is not appropriate for the manager profile. 8.4% of students at state faculties shares this opinion and 6% of students from private faculties of management.

In order to find out the students` attitude towards the syllabi at their faculties, we have asked them the following set of questions: `If you could influence at the syllabi at your faculty, name the scientific disciplines that you consider necessary for the managers and that are not involved or not involved enough in the syllabi.` and `Name the exams you have taken or you should take, and which are redundant for qualitative manager education.`

The first question was answered by more than a half of the students (53.7%) who believe that practical work is not involved enough at the faculties of management. There are statistically significant differences ($\chi2=12,13$, df=5 p=0,03) between two groups of students that show that more state faculty students (62.5%) than private faculty students (48.2%) see the lack of practical knowledge in the structures of their study programs. According to the research results of the magazine Business Week, this perception is shared by the managers of the leading companies in the United States, where almost 86% of the managers told that faculties of management pay more attention to the theoretical than practical knowledge [2]. The criticism of the study programs at American faculties of management was given by Spender (2007) who has given the following arguments: `Managerial education has professionalized only in a sense of a quasi scientific research method and regulated knowledge that is far from the knowledge needed for managers in their practice` [3]. Research shows that in the recent years the executives prefer to employ graduates or PhDs from other faculties of social sciences whom they consider more creative and willing to adjust, while students and graduates at faculties of management are limited by the irrelevant, but rigid theories and questionable ethical attitudes [3]. The researchers of the socialization processes of the engineering profession and the computer science profession have gained the similar results in the last decade at the Serbian universities. The engineering profession research shows that 49% of the students at the engineering faculties believe that study programs lack practical knowledge [4]. The research about socialization processes for the computer science profession have similar answers. In the research more than a half (51%) computer science students lack practical knowledge [5]. Although the documentation for the study programs` accreditation shows commitment of the faculties to the practical preparation of students for their professional work, that is not the case in reality. Objective conditions, such as the lack of material means and the fight for survival on the market limit the practical work in the institutions.

A relatively small number of the students believe that there is a lack of psychological and organizational behaviour knowledge in their study programs (8.1%). We think that these students`

attitudes are the result of the fact that a lot of attention is paid to these disciplines at the faculties of management. At all faculties of management there are some subjects as human resource management, management psychology, communication science, work sociology, company economics, economics principles, financial business, management accounting, etc. We assume that the students who think they lack such knowledge are in fact very interested in this segment of management and therefore want to deepen their knowledge in these areas. Perhaps it would be good to include subjects that are connected to psychology, organizational behaviour and economics, such as: team work, work motivation, human resources planning, corporative finances, financial markets, etc. The least number of students express the need for a larger attention to be paid to marketing (3.6%), foreign languages (3.6%) and organizational businesses (3.6%) which shows the appropriate level of their presence at the faculties of management.

On the second question, used for examining the relation of students to their study programs, we got the following distribution of answers. Many students, primarily those of engineering management said they had too many engineering subjects (60.7%) such as electro-technical subjects, mechanical subjects, ecology (13.4%) and computer science. 10.6% of the students considers mathematical subjects unnecessary, and far less students said that subjects from social sciences are redundant, such as business law (2%), economical subjects (2%), business ethics (2.4%) and sociology (7.9%).

While comparing the answers to this question between the two groups, state and private faculty students, certain statistically significant differences have been noticed. Private faculty students state in larger extent that sociology 12,4%, ($\chi2=6,52$, df=1 p=0,01) and business ethics 5%, ($\chi2=6,76$, df=1 p=0,01) are redundant for qualitative managerial education, and at state faculties some 3.8% of students think so about sociology, and none of them thinks so about business ethics. This kind of result can lead us to thinking that maybe the areas within these subjects are not innovative enough or adjusted to the students of management. This kind of the students` attitude towards business ethics is especially interesting since it is a very important part of the socialization for managerial profession. Considering its importance for managerial education, it is necessary to bring it closer to the students. This can be achieved through examples from practice and applying simulation method of specific themes or situations from business ethics. On the other side, state faculty students emphasize the redundancy of electro technical subjects (electro-technique with electronics and electro-technique), 39.1% ($\chi2=59,49$, df=1 p=0,00), mechanical 29,3%, ($\chi2=41,92$, df=1 p=0,00), mathematical 19,5%, ($\chi2=23,38$, df=1 p=0,00) and computer science 18,8%, ($\chi2=15,03$, df=1 p=0,00) subjects. It is important to note that statistically significant difference between the groups of students regarding groups of electro-technical and mechanical subjects is the result of the fact that these subjects can be found only at state faculties, while they cannot be found in the study programs of private faculties of management.

The results considering subjects that, according to the students, lack or are redundant at the faculties of management are compatible to an extent to the conclusions of a study conducted by a former dean of Dallas University, Thomas Lindsay. Lindsay claims that at faculties of management too much time is dedicated to enable students to master technical skills, and too little time for mastering interpersonal skills and practical work. According to the results of this professor, students of management almost 95% of their time study how to make a larger profit, and only 5% of their time is dedicated to business and professional ethics and development of interpersonal skills [6].

b) Perception of desirable and achieved educational goals for the managerial profession according to the students of management

For examining the goals of the managerial training we have offered students a relatively wide range of possible goals and they were asked to mark them from 1 to 5 depending on their importance for managerial profession, and depending to which extent they have been fulfilled during the process of education at the faculties of management. The list of goals is a modified list of skills that a manager requires, and which is made by the American Management Association. For a better understanding, we have put the skills into four groups as follows: conceptual skills, communication skills, efficacy skills and interpersonal skills. The received results point out the following.

Generally speaking the respondents highly value all the given goals of managerial education, meaning that most of the goals were marked over 4. The most important goals are, according to them,

communication skills (4.74), negotiation skills (4.69) and presentation skills (4.63), enabling for perceiving and solving problems (4.67) and team work (4.67) and making efficient teams (4.66). On the other side, students consider teaching and mentoring (4.35), working with different people (4.35), social support within an organization (4.31) and outside of it (4.28) and enabling for parallel work on several jobs (4.26) less important.

When examining the extent of the achievement of these goals we can see a different situation. The achievement of most of the managerial education goals this population of students marked 3. As the most accomplished goals of education students marked development of communication skills (3.58), presentation (3.57) and team work (3.48) which are also the most preferable educational goals. It should be emphasized that even though students said there is a lot of attention paid to teamwork, they said that creating efficient teams (3.12) is neglected. If the faculties of management know that teamwork is one of the most important goals, then the same attention should be paid to enabling future managers for making efficient teams. Students believe that least attention is paid to enable them for practical use of technologies (2.83) and spreading social support outside the organization (2.78).

When the answers to these questions are seen through the prism of different student groups, regarding whether they study at private or state faculties, a conclusion can be made that there are statistically significant differences only in their estimate of the accomplished managerial educational goals. It is evident that state faculty students tend to give lower marks to the real domains of managerial education in our society. The students statistically significantly differ regarding estimates of the following managerial educational goals that we have ranked from the highest point of statistically significant difference to the lowest:

TABLE 1.

	t	df	p
Practical use of technology	4,558	230	,000
Dealing with resistance to changes	4,141	225	,000
Spreading social network outside the organization	4,100	223	,000
Creative problem solving	3,456	229	,001
Work on mutual goals	3,048	228	,003
Parallel work on more jobs	3,009	230	,003
Business projection	2,536	230	,012
Negation skills	2,480	232	,014
Spreading social network within organization	2,830	228	,005
Working with different people	2,621	226	,009
Identification of key information	2,660	230	,008
Setting goals	2,495	231	,013
Teaching and mentoring	2,459	226	,015
Seeing potential innovations	2,626	231	,009
Using information in order to solve problems	2,796	230	,006
Oral presentation skills	2,113	232	,036
Understanding the work of the organization	2,003	229	,046

c) Satisfaction with qualitative teaching

Generally speaking the students are satisfied with the quality of teaching at their faculties. Some 8% of them are completely satisfied, 77% is mostly satisfied, while 14.7% of them said they are not satisfied with the quality of teaching.

When asked to name the good characteristics of teaching at their faculties, we got the following answer distribution: most of the students emphasize qualitative lecturers (38.7) and interactive teaching (24.1%) as good characteristics.

Although the largest number of students believes that qualitative lecturers at their faculties are a good characteristic, 21.7% of them said that certain professors and assistant lecturers that teach them are not satisfactory. They named the arguments to their discontent with certain professors and assistants for example: insufficient dedication to work and only retelling the book without any explanations or examples; the lack of wish to transfer knowledge; teaching while sitting at the desk. Finally, students consider some lecturers not innovative and some segments of the lectures not appropriate for the terms of business in Serbia. A number of students are dissatisfied with the lack of practical work (10.2%) and with bad work organization at the faculty (10.2%). A significantly smaller number of students mentioned boring lectures (4.7%) and low criteria of marking (3.9%) as negative characteristics of teaching. Some 5.1% of students have no remark to the work and teaching at their faculties. While comparing the two groups of students (at state and private faculties) considering this question, statistically significant differences have been noticed ($\chi 2=11$, 82, df=5 p=0, 04). The results show that more private faculty students (14.8%) than those at state faculties (1.3%) criticize low criteria while marking. More private faculty students (11.5%) than state faculty students (6.3%) also consider their lectures boring. On the other side, more state faculty students are dissatisfied with the bad faculty organization (20%) and the lack of practical work (18.8%), and even 43% of them finds certain professors and assistant lecturers non-satisfactory.

IV. CONCLUSION

Research results about education for managerial profession show several important facts.

This research has confirmed the first hypothesis about contemporary study programs at Serbian faculties of management. The students have evaluated the knowledge they gain at the faculty as contemporary and appropriate to the manager profile.

Our assumption that study programs at the faculties of management are primarily theoretical with not enough lectures for developing practical knowledge and skills has also been confirmed in this research. The students said that they get too much theoretical and less practical knowledge, and this was especially emphasized by state faculty students who also said that the knowledge they gain is not appropriate for manager profile. As it was expected, all the students, especially those at state faculties, emphasize the need for more practical work at the faculties of management.

State faculty students stated that engineering, mathematical and computer science subjects should be eliminated from syllabi. On the other side, private faculty students believe they are burdened by the contents from sociology and business ethics. Both groups of students believe that ecology is redundant for manager education.

As far as the goals of managerial education are concerned, the students have positively marked the goals of developing communication and presentation abilities and teamwork, which they consider the most wanted and needed goals of education. Although they stated that more attention is paid to teamwork, they gave worse marks for teaching how to create efficient teams. At the same time, students believe that the worst results at the faculties of management are achieved regarding the following goals: enabling them for practical use of technologies and spreading social support outside the organization.

Students are on the average satisfied with the quality of teaching. As good characteristics at the faculties, they emphasize qualitative lecturers and interactive teaching. On the other side, the things they are not satisfied with are the work of certain professors and assistant lecturers, less practical work and bad work organization at the faculty.

In order to improve the process of professionalization of managerial profession it is important to expand study programs at the faculties of management. It is important to:

- adjust study programs with the demands coming from the economic surroundings. It is necessary to have better cooperation between universities, or faculties and departments on one side and economic and other organizations on the other side;
- research results about education for a managerial profession show the need for more classes of practical work for management students.

Since this research has been done on a relatively limited sample, the received information is hypothetical to an extent. If it motivates more systematical and deeper research of this problem area, the goal of this study will be completely achieved.

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GEOINFORMATION TECHNOLOGIES IN EDUCATION – PERSONS WITH DISABILITIES IN EMERGENCIES

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Abstract - Within the Department of environmental engineering and occupational safety, Faculty of technical sciences in Novi Sad, students have an opportunity to attend the lectures at the subject "Disaster risk management". During the lectures the special attention is devoted to a holistic problem solving approach and application of fundamental knowledge in practice. Concept of lectures is developed so that students are trained for geospatial analysis of hazardous events occurrence possibilities and modelling reaction scenarios. Special atte1ntion in planning of emergency response is given to identification of potentially exposed areas and populations with increased vulnerability, particularly persons with disabilities.

I. FIELD OF DISASTER RISK MANAGMENT

Identifying risks of disasters occurrence and developing strategies to reduce these risks has become one of the key tasks of the United Nations [1]. Within the study program "Risk and fire protection management" students are acquiring knowledge about multidisciplinary aspects in the field of disaster risk management. Managing the risks of catastrophic events occurrence usually require joint efforts of different profile experts in solving complex problems of the field.

The field of disaster risk management is relatively new and takes a structured approach to managing uncertainty related to threat of natural and man-made disasters [2]. Disaster risk management (DRM) accumulates all activities, programs and measures, which can be taken up before, during and after a disaster [3]. Measures taken before occurrence of disastrous event are at least as important as the measures taken during and after the occurrence. These measures represent, among other things, identification of possible hazard realization risk, exposed area and vulnerable population.

Hazard represents a potential situation or event that could be harmful to people, property or the environment. Hazards can be classified into two categories: natural and man induced [4]. Disaster occurs when hazard affects a vulnerable population or area and causes damage, human lost and disruption of usual activities of the community [4]. It is necessary to manage disaster risk in order to minimize the consequences of a catastrophic event. The main activities of disaster risk management are: detection of vulnerable population and/or area and exposure analysis of identified population and/or area.

Vulnerability can be defined as the extent to which a society, structure, service or geographical area may submit a hazard on account of its nature and structure, and the distance from areas prone to hazardous events [5]. Exposure represents the number of people and/or other elements at risk that can be affected by a particular event [6]. By determining vulnerability and exposure of community of interest, it is possible to make decisions and take necessary actions in order to minimize consequences of a catastrophic event.

Based on analysis of catastrophic events realization frequency at the territory of Novi Sad, there have been identified increased risks of floods, fires, very high and low temperatures, industrial (chemical) accidents, terrorist attack. Also, contemporary urban risks have multiple causes and are highly interactive [7], so multi-hazard realization at the territory of Novi Sad should be as well considered. The most vulnerable population groups identified in Novi Sad are

children, seniors and persons with disabilities. Universal design approach to meeting the needs of persons with disabilities before and after a disaster will benefit many people without disabilities, such as the very young or the aged [8].

II. PERSONS WITH DISABILITIES IN CATASTROPHIC EVENTS

Disaster preparedness for persons with disabilities is critical in minimizing the impact of a disaster [8]. While planning for every situation that may occur in every type of an emergency is impossible, being as prepared as possible is important [9]. Therefore phase before the occurrence of a catastrophic event should become a priority for disaster risk management where equal attention should be paid to population with disabilities as well as to nondisabled citizens. During the process of planning the disaster risk management strategy related to persons with disabilities, it is of most importance to keep in mind different types and subtypes of disabilities [10].

A. Classes of Constraints and Types of Disabilities Significant for Planning a Response in the Case of Emergencies

According to US NFPA Emergency Evacuation Planning Guide for People with Disabilities [9], a standard building evacuation system has three components:

- The *circulation path* - a continuous and unobstructed way of travel from any point in a building or structure to a public way. A circulation path is considered a usable circulation path if a person with disabilities is able to travel unassisted through the circulation path to a public way.
- The *occupant notification system(s)* include but are not limited to alarms and public address systems.
- *Directions to and through the circulation paths* include signage, oral instructions passed from person to person, and instructions, which may be live or automated, broadcasted over a public address system.

During construction of infrastructure for the evacuation and planning of necessary actions during and after catastrophic event, every single type of inability requires a special approach and consideration of various types of constraints.

Thus, disaster risk managers have to recognize and consider at least general categories of disabilities.

According to Fair Housing Act Design Manual [11] there are five general categories of disability: mobility impairments, visual impairments, hearing impairments, speech impairments and cognitive impairments [9]. In addition to inability categories, there are different levels of disabilities, which also affect the functionality of people in a catastrophic event. Also, one person may have multiple disabilities, while another may have a disability with fluctuating symptoms [9].

Further, it cannot be predicted when anyone may need assistance, such as in the case of a broken leg or the development of heart or lung disease [8].

Mobility impairments. Persons with mobility impairments may use one or more devices (canes, crutches, wheelchair, etc) to maneuver through the environment. Typical evacuation problems include maneuvering through narrow spaces, going up or down steep paths, moving over rough or uneven surfaces and negotiating steps or changes in level at the entrance/exit point of a building. If there is a person with mobility impairment in the company or building, it should be at least two employees responsible for his/her evacuation.

Visual impairments. Persons with visual impairments may be partially (e.g. can distinguish light and dark, color, close-readable labels) or completely blind [10]. That is why exits should be marked by tactile signs that are properly located so they can be readily found by a person with a visual impairment from any direction of approach to the exit access. It may be practical to physically show new employees with visual impairments where are all usable circulation paths located in a building [9].

Hearing impairments. Hearing impairments may manifest as a complete disabling hearing when person rely on sign language as the only means of communication. Persons with hearing impairments whose sense of hearing is not fully disabled can receive sound information using hearing aids and lip-reading [10].

Persons with hearing impairments, in most cases, cannot hear alarms and voice announcements that warn of danger so it is extremely important that they know what visual notification systems and what visual devices are in place (e.g. flashing strobe lights). Another

alternative is to develop push services for smart phones for notifying people with hearing impairments promptly about evacuating.

Cognitive impairments. Cognitive impairments can be caused by a wide range of conditions but they all result in some decreased or impaired level in the ability to process or understand the information received by the senses.

All standard building egress systems require the ability to process and understand information in order to safely evacuate. However, persons with cognitive impairments usually do not need special physical assistence during the evacuation. To reduce the risk of injuries and suffering due to inability to evacuate to minimum, it is necessary to pre-drill and practice evacuation strategies regularly with persons with cognitive impairments.

Based on the above considerations, there is an evident need to get to know persons with disabilities with possible strategies and evacuation routes from the building in case of a catastrophic event. It is also necessary that all employees, especially employees in the sector of security and doormen at the entrance, are aware and trained to deal with disabled persons in extraordinary circumstances [9]. In addition, persons with disabilities can be included in developing accessible communications and reliable assistance technologies [8], so disaster risk managers can cooperate with them in order to create comperhensive evacuation and rescue strategy.

For implementation of the actions for persons with disabilities to disaster risk management strategies it is necessary to acquire data about locations and places of meetings and activities of target groups at the area of interes, and to bring obtained data into appropriate context. It is necessary to integrate heterogeneous data and to provide their interoperability [10].

III. CONTEXT AND FORMAT OF DATA

In the context of discussed phenomena and population of interest, it is extremly important to identify centers where persons with disabilities gather daily as well as the type and degree of disability of people who spend time in the centers. Also, there is a need for data on the temporal distribution of persons with disabilities in the centers on a daily and weekly basis. Acquiring of specified data is a process which requires different methods which includes combination of theoretical research and field work. Acquisition of data has been performed within Disaster Risk Reduction Research Center at the Faculty of Technical Sciences.

Collected data about centres and institutions where persons with disabilities gather in Novi Sad, as well as types of activities they perform, are a set of raw data in the form difficult for use for the purpose of disaster risk management. The way these data are used should be in accordance with the aim of their application and prescribed standards. Type of information necessary for the decision making process in the field of disaster risk management defines, to a great extent, the way of processing raw data. Bringing data into spatial relation and database organization of attribute data provides a comprehensive approach to problems of persons with disabilities in emergency situations.

It can be concluded that geoinformation technologies are an inevitable tool for geospatial analysis and modeling of vulnerable population exposure in the case of catastrophic events occurrence. Based on the previous considerations, we decided to use Quantum GIS software for modeling and geospatial analysis of possible actions during and after disaster, for the purpose of students' education.

IV. GEOSPATIAL ANALYSIS OF PERSONS WITH DISABILITIES IN CATASTROPHIC EVENTS AND MODELLING OF RESCUE ACTIONS WITH THE AIM OF STUDENTS' EDUCATION

During the realization of practical exercises of the subject "Disaster Risk Management", students were trained to model possibilities of emergency situation realization and planning of evacuation actions and rescue of people with disabilities in the case of catastrophic events. Spatial data analysis has been performed in QGIS software for the purpose of real system modeling. The initial input for the creation of the model, students received in the form of Quantum GIS vector layer with the locations where persons with disabilities gather at the teritory of Novi Sad. Attribute data about address of center and type of activity that persons with disabilities perform in each center are associated to the vector layer. For the details about technological framework of described vector layer creation please see J. Simic et all, Persons with Disabilities in Catastrophic Events – Exposure and Geospatial Analysis [10].

The task of each student was divided into several phases:

- Choose, from received vector layer, one center of interest for modeling necessary actions in a case of emergency.
- Consider hazardous situation with the highest probability of realization in the context of the selected center.
- Identify data that has to be collected for planning of the successful response in the case of predicted event realization. Consider if the format of necessary data is suitable for further processing and analysis.
- Develope a method for data organisation and creation of disaster risk management model for the predicted event (visual representation of the real situation and organization of attribute table about selected elements of the physical system in Quantum GIS).
- Based on the realized model consider possibilities and constraints in planning disaster risk management actions for designed case study.

Case study graded with the highest mark is shown in the Figure 1. Selected center is a primary school for persons with disabilities called "Milan Petrovic" and is located in Braće Ribnikara street. Primary school represents a center with a high frequency of arrival and departures as well as with long time of retention of persons with disabilities during the work days. Also, high percentage of the total number of the persons with disabilities between the ages from 7 to 14 at the teritory of Novi Sad attend this school. In the vicinity of the school, at the distance of 280 meters, there is a petrol station where the services of pouring the fuel into the cars are performed daily and service of refilling depot for the fuel is performed from time to time. During mentioned activities at the petrol station accidental situations such as leakage of oil products, fire or explosions could happen. According to discussed parameters, selected school represents a site with increased level of exposure and vulnerability in terms of potential hazardous events realization in the considered spatial environment.

With the aim of planning responses to potential catastrophic events and rescue and evacuation of people with disabilities from exposed location, additional vector layers are produced in Quantum GIS. Vector layer which displays location of the petrol station contains data about the type of fuel in use, capacity of fuel storage, address and phone number of petrol station and the distance of petrol station to the school. Specified data are organized in the form of attribute table of described vector layer. To the vector layer which displays locations of the services responsible for reactions in emergencies (ambulance, fire department and police station) location of the nearest taxi station were added. Attribute table of the vector layer contains information about address, phone number, total number of vehicles that are available during the day, for any particular emergency service listed above.

In order to analyze the possibilities of evacuation in the case study, vector layer which displays the most suitable access roads to the location of accident from the emergencies services were produced.

By the use of Quantum GIS function for calculating a length of the LineString geometry, data about distance in meters were assigned to the each road.

The overlap of described vector layers provides a model of the real system. Decisions regarding disaster risk management of the predicted event could be made by analysis of the model. By brief examination of the case study display in Quantum GIS, necessary information are ensured for planning evacuation of particularly vulnerable population of persons with disabilities from the spatial environment of the realized accident at the petrol station. By bringing data into spatial relations, interoperability is achieved, which enables exchange of information between experts from different fields whose promptly and coordinated cooperation is necessary in a case when time for reactions and decisions making is limited.

V. CONCLUSION

Use of geospatial analysis in the field of disaster risk management is an example of comprehensive approach to solving practical engineering problems. During the process of teaching in the field, it is necessary to use examples from real situations. Geospatial analysis of exposure to risks of persons with disabilities and modeling appropriate responses allows students to understand complexity of the risk management concept, as well as to learn how to use the GIS software. Use of geoinformation technology develops spatial thinking skills among

Figure 1 Map of the case study graded with the highest mark

students and the ability to observe interrelations between acquired data. By putting data into the proper context and bringing obtained information into relation with previously acquired fundamental knowledge in the field of risk management, students are trained to independently draw conclusions and decide about future reactions. Dealing with practical engineering problems through application of current software during lectures also contributes to the quality and competence of future engineers.

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PREPARATION OF TEACHING MATERIALS FOR A C# COURSE

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Abstract - We teach an introductory course in object-oriented programming for first year students of Mathematics at the Faculty of Sciences, University of Novi Sad. The course is taught in C# and aimed towards developing general programming skills and building a foundation for scientific applications of programming. Our main goal was to investigate how we can increase the students' motivation for learning, therefore providing for a high level of knowledge acquisition and retention. To this end we prepared an extensive set of teaching materials, and organized the course appropriately.

I. INTRODUCTION

At the Faculty of Science, University of Novi Sad, one elective course, named Programming 2, is taught to the students of the first year of Mathematics. The goal of this course is to teach the students object-oriented programming (OOP) in C# for scientific applications. From our experience and the polls, we conduct each year at the beginning of the course, we assume that the students are not familiar with OOP, or advanced procedural programming. Some of the students may have studied Pascal or C in high school. Therefore, we were met with a difficult task of guiding our students from the first steps in C#, through the basics of OOP, to building relatively complex programs which solve practical problems.

Good teaching materials should provide good coverage of course content, samples and exercises for self-study, references to other materials and textbooks, as well as samples of real-life problems. For students who are attending lectures, the materials are a form of backup for any information they may have missed; for distance learning students, the materials are the essential source of information. Quality of a course is directly affected by the quality of the accompanying materials [1].

We based our course on the first part of the book "Microsoft Visual C# 2012 Step by Step" [2], which is available in the Serbian language, and recommended "Mala škola programiranja u C#" [3] as the secondary textbook. While the scope of our course is wide, we were not able to cover all topics in detail, due to limited time. Therefore, we opted for a pragmatic approach; we introduced only the necessary concepts of OOP when they were needed, and covered only the necessary minimum. However, we provided references to textbooks, MSDN documentation and additional examples, and strongly encouraged students to use them for individual study.

The paper is organized as follows: Section I provides an overview of the course; Section II describes the preparation of teaching materials, and the software used; Section III contains our experience while giving the course in a traditional way and online; Section IV contains quiz results, and the conclusion is presented in Section V.

II. COURSE OVERVIEW

Programming 2 is a 14-week course, with 2 hours per week of lecture time and 2 hours per week scheduled for supervised and independent computer lab work. Two hours a week are determined as office hours for consultation, and the lecturers can also be reached via e-mail.

The course is divided into three parts, covering the following topics:

- Procedural programming in C#
  - Variables and data types
  - Flow control statements, arithmetic operations, mathematical functions
  - Error handling, arrays and lists
  - Methods, parameters, value and object types
- Object-oriented programming in C#
  - Classes, private and public modifiers, contructors
  - Inheritance
  - Class fields and properties, is and as operators

  - WPF applications
- Examples and projects for independent work
  - WPF calculator
  - Working with files
  - Generating a non-repeating list of random numbers
  - File system operations and classes
  - WPF graphics, plotting function graphs, timers and animations
  - Dynamic Link Libraries

It takes significantly longer than 14 weeks to learn object-oriented programming, especially if the students are expected to independently develop programs to solve practical problems. However, we assumed that the students would be able to learn even those topics which were not explained in detail in class, with the help of good teaching materials. Having the textbooks and many online sources of information, the role of the teacher has changed from the sole source of information to that of an advisor offering guidance.

III. TEACHING MATERIALS PREPARATION

There exist several approaches to instructional design. We chose a set of simple principles, which we followed when preparing teaching materials:

- Learning goals must be clearly presented to students.
- Organize the course and the materials from simpler to more complex topics; from theory towards practice.
- Give assignments and tests after each topic; check whether learning goals are being achieved.
- Provide feedback to the students, so that they can assess their knowledge and plan further learning.

For each lecture, we prepared appropriate text materials with C# sample programs, assignments for individual work, textbook, references, and links to web sites with relevant information. Furthermore, we created a set of instructional videos [4] and published them on a YouTube channel [5].

A. Text materials preparation

Text materials were prepared to be short and concise. Only the concepts that are essential for the lesson were explained, and illustrative examples provided. References to textbooks, MSDN documentation and YouTube videos were also provided, for students who may wish to explore the subject in depth and work independently.

Text was accompanied by examples prepared in Visual C# 2010 Express (VCSE). Important sections of code were commented and included in the text. Algorithms were explained, and suggestions for dividing the work into smaller units included. Traditional topics on algorithms, such as searching, sorting and recursion, were introduced as needed.

We used PrimoPDF [6] to convert the text into the PDF format. VCSE projects were cleaned by removing all temporary and executable files, and packed into ZIP archives. Examples, which were developed in classes, were also added.

B. Video materials preparation

Video materials for the course consist of short screen recordings with narration. We used CamStudio [7] and headphones with a microphone to record our interaction with Visual C# Express. In order to make screen text readable on YouTube, we shrunk the VCSE main window to approximately 800 pixels wide.

Recorded videos were edited and processed in Windows Live Movie Maker [8]. Unnecessary parts were cut, text captions and lesson reviews were added (Fig. 1).

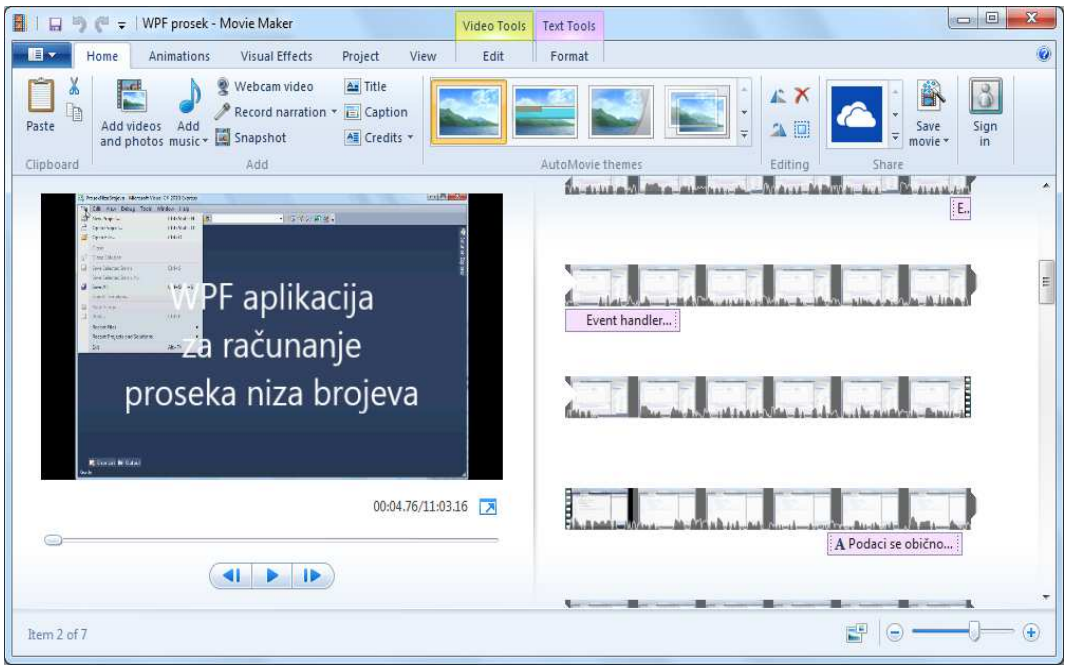

Figure 1. Video clip editing in the Windows Live Movie Maker

Finally, processed videos were saved in 720p resolution and uploaded to YouTube (Fig. 2).

We adhered to these guidelines while preparing videos:

- Video must not exceed 10 minutes;
- Focus on one topic;
- Explain the used classes, methods and techniques just as much as necessary;
- Gradually introduce complex problems;
- Use captions to emphasize important points;
- Provide review at the end of the video

The main idea is that compex problems are better explained through a series many short examples, instead of a single long one.

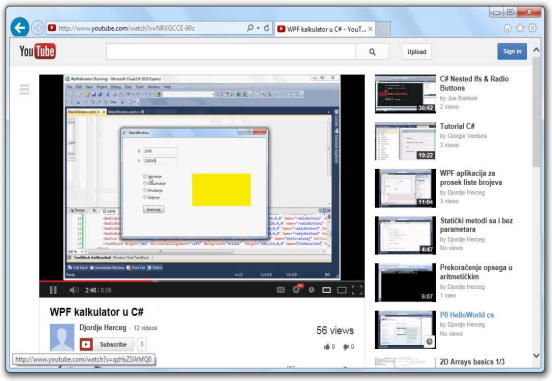

Figure 2. Our C# channel on YouTube

C. Materials sharing

Completed materials were published on SkyDrive [9] and YouTube. We used the SkyDrive Windows application, which greatly simplifies uploading. The teacher only needs to copy the desired files into a specific folder on her/his computer, and the SkyDrive application then silently synchronizes that folder with the cloud storage.

The students can freely download the materials

videos were published on the course web page. The students used this web page as the starting point for accessing the published teaching materials.

IV. TAKING THE COURSE ONLINE

A poll was conducted at the beginning of the course, order to explore how the students' general attitude towards learning and self-study affects the learning outcomes. The poll is a part of a larger research study, which is in still progress. We offered the students a chance to study from home, using Moodle [10], but were surprised to find that only 19 of about 70 students have chosen this option.

One of the poll questions was "I chose to attend the course in person instead of on Moodle because...", and we received the following answers (multiple choices were allowed):

- I don't have a computer or Internet access – 10.42%;
- I don't want to spend to much time at the computer – 16.67%;
- I think I will learn better if I attend the classes – 79.17%;
- I never took an online course and I don't know what it's like – 91.67%;
- I would have to put in additional effort – 2.08%;
- I am afraid that I won't be able to keep up with the course on Moodle – 47.92%;
- My parents won't let me skip classes – 2.08%;
- It is easier to learn after taking classes – 58.33%;
- It will take more time to follow the course on Moodle – 22.92%;
- It does not fit my schedule – 6.25%;
- I think personal contact with teaching staff is better – 60.42%;
- I am not sure if it is easier to pass the exam with Moodle – 41.67%;
- I use the Internet only for fun, not for learning – 2.08%;
- Other reasons – 2.08%;

Obviously, the students prefer attending classes from taking an online course. Many students have heard about Moodle, but they were afraid to take an online course. Some students (8.33%) have tried other online courses before but they were not satisfied with their quality. The most common remark was that they missed the personal contact with the teaching staff. Besides, they mentioned that self-study is boring and not as interesting as being in class. A more significant remark was that the course materials were not well prepared. This remark prompted us to invest additional effort into improving our teaching materials.

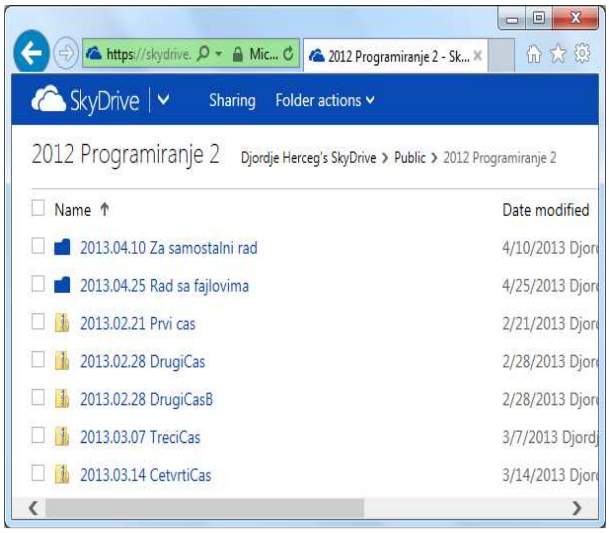

Figure 3. Course materials on SkyDrive

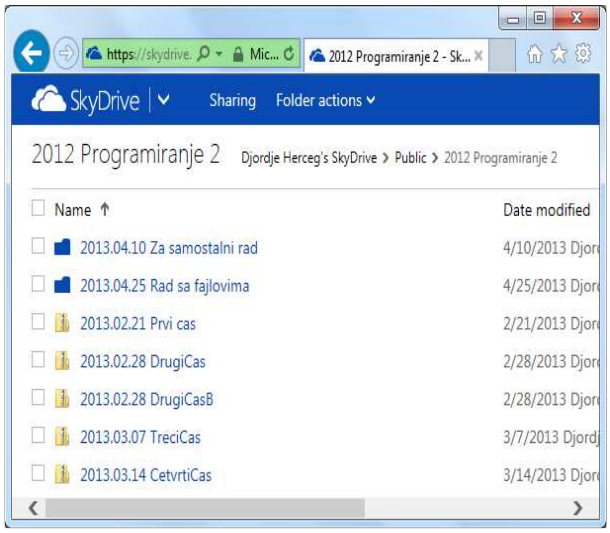

Figure 4. SkyDrive synchronization with the cloud

V. QUIZ RESULTS

In order to track the student's success, we decided to give quizzed after each lecture and three major quizes, in the 5th, 9th and 13th week of the course. Homework was also assigned after each class, with a deadline of 14 days.

After the first five weeks we observed a polarization in students' success, as some students' test scores clearly lagged behind the group. We then decided to award additional points to those students who did their homework correctly and on time. We also assigned homework in a more open-ended manner, where goals were not strictly stated, hoping to promote autonomy and sense of purpose in students. The students were also constantly reminded to use the online teaching materials.

The results of our approach were positive. A comparison of results from the first and the second quiz shows a shift up in the grade curve (Figure 5). We divided the scores into four groups: from 0 to 3 points – fail, from 4 to 7 points – pass, from 8 to 13 points – good, from 14 to 17 points – excellent. While there were 36% of excellent scores in the first quiz, in the second quiz this increased to 42%. However, the number of students who failed the quizzes remained the same. It should be noted here that the percentages in the second chart do not add up to 100%, as 10 students have not taken the second quiz.

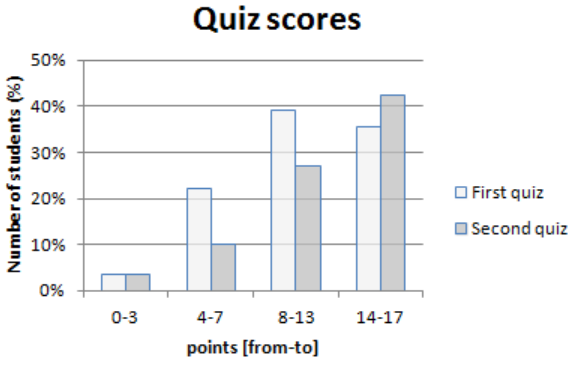

Figure 5. Comparison of quiz results

As the course is still in progress, we hope to have the complete data after the end of the summer semester in 2013.

VI. CONCLUSIONS

Preparing a good set of set of teaching materials is essential when teaching a course. Mastering object-oriented programming is a difficult task, especially for students who have not had much experience in programming. We approached this challenge by covering a wide range of topics, and relying on combined text, example C# projects and instructional videos which were published online. Due to a short timeframe alloted for this course, we encouraged the students for self-study and independent work. By awarding extra points for activity and homework during the course, we further motivated the students to learn. Preliminary quiz scores show that our approach gives results.

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THE IMPORTANCE of CULTURAL DIVERSITY in TEACHING the ENGLISH LANGUAGE as a FOREIGN LANGUAGE in MACEDONIA

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Abstract - The only subject and class that brings together students from different communities is the English Language. The English language class curricula are designed to be attended together by all ethnic groups. The purpose of the paper is to highlight the importance of the English Language Courses to this issue.

Moreover, this topic is about different ethnicities learning English together in the same setting and environment compared to other study programs where students are apart and attend the lectures solely in their native languages.

This paper elaborates this trend from two points of views. The first view is an effort to demonstrate through classroom observations and interview questions that ethnic diversity in classes is positive as regards learning process and there is more learning in diverse classes compared to other mono-ethnic classes. The second view is the positive impact of diverse classes on the society. From this view the article explores and elaborates how the involvement of students in diverse classes help them understand better the multiethnic society of our country and from the classroom environment start to get used to differences so later in life are capable to cope with diverse nature of community needs. The outcome from the classroom observations and interview questions imply that teachers and students value the ethnic diversity in classes. They find it useful and supportive for their status as students and their future career as an employee.

I. INTRODUCTION

Macedonia is one of the most culturally diverse countries in the Balkans. The cultural, ethnic composition of the schools has become increasingly diverse. Almost in every school there are students of different ethnicities. Each of them study in their native language and usually ends up in linguistically homogenous classes. In one way, this is not an arguable issue since students decide themselves to study with pairs from the same language background, but the point is, at the same time, to emphasize the necessity and the benefits of ethnically diverse classes.

There have been many authors who did write for the value of ethnic diversity in the classroom, its benefits for students and the community, respectively the opportunities ethnically diverse classrooms offer for enriching teaching and learning process. Many discussions have been going for differences between classrooms with no ethnic diversity and classrooms with ethnic diversity, in the sense of where students have an optimal environment to learn the language, where do they have multiple opportunities to practice the language skills. Many other writers and researchers have also pointed out the importance of ethnic diverse classes for the multiethnic societies, its reflection to the society and the positive things that students can draw out of this experience. Moreover, classroom can be the mirror of the society and the right place to introduce students to the country as it exists in reality, with many different linguistic, ethnic, and religious groups. We live in diverse society. We need to know how to get along with people from diverse cultures and backgrounds (Cited in Rasmussen, 1999, pp. 1–2).

Above all, merit must be defined in light of what educational institutions are trying to accomplish. In our views, ethnicity is relevant in determining which candidates “merit” admission because taking account of ethnicity helps institutions achieve three objectives central to their mission-identifying individuals with high potential, permitting students to benefit educationally from diversity, and addressing long-term societal needs (Bowen and Bok, 1998)

Kane and Orsini (2003) note that literature in this field also give prominence to the influential role a multiethnic teaching and learning force plays in reducing cultural intolerance. Other researchers maintain that alongside supportive policy and practice at an administration level, students engagement with culturally diverse classes is instrumental in developing a school-

wide culture that is more tolerant of different ethnicities (Beynon, 1998; Gorodon, 2002).

There are, however, examples of other writers who describe the negative aspects of surroundings where students are not part of diverse classes. Young children are not born with attitudes that cause them to discriminate against others. However, they quickly learn such attitudes as they watch and learn from what others do and say Ramsey (1982). So being part of a class with pairs who correspond to your background language can only lead you to the creation and setting up of prejudices and stereotypes for other students with different language background from yours.

On the other hand, there have many other findings regarding the learning outcome of students who studied in ethnically diverse classes compared to those students who studied in classes with no diversity. Most of the researchers speak of a strong positive impact diverse classes have on learning achievements, permitting students to benefit educationally from diversity.

In an increasingly diverse country that is connected inextricably to a larger "global" community, such as Macedonia, University mission statements should assert the role that diversity has in enhancing teaching and learning in higher education. In a statement endorsed by the presidents of sixty-two research universities, the American Association of Universities argued:

We speak primarily and foremost as educators. We believe that our students benefit significantly from education that takes place within a diverse setting. In the course of their university education, our students encounter and learn from others who have backgrounds and characteristics very different from their own. As we seek to prepare students for life in the twenty-first century, the educational value of such encounters will become more important, not less, than in the past.(Association of American Universities, " On the Importance of Diversity in University Admissions," *The New York Times, April 24,1997*)

With this paper we hope to contribute affirmatively to these two views concerning ethnic diversity in classrooms. The learning benefits of diversity and the meeting of societal needs of students. Additionally, for this purpose we present qualitative survey questions conducted with teachers of diverse classes, and assessments from observations in diverse classes, to conclude with recommendations for promoting and utilizing ethnically diverse study programs.

II. LITERATURE REVIEW

In developing this paper I conducted a multidisciplinary analysis of the research literature, and examined studies that help to increase our understanding of the value of ethnic diversity in the teaching of English Language as a foreign language. The discussion in this paper regarding the value of diversity uses a two dimensional framework that considers the ways in which students benefit from diversity: (1) language learning and (2) social development. *Language learning* refers to the way in which the learning outcomes and experiences of students are enhanced and endorsed by the presence of diversity in the classroom. *Social development* is defined as the ways in which diversity in the classroom impact quality of life issues in the larger society. Examples of these include the achievements of democratic ideals, the development of an educated citizenry ready to address the eventual conflicts and issues that could arise in multicultural societies such as Macedonia.

There are many researchers who offer strong convincing arguments about the ways in which diversity expands and develops the educational activity through the benefits that it provides to students, to universities, and to our society. Some of the researchers through the Association of American Universities on the importance of diversity ("The New York Times"1997) claimed that if the institutional capacity to bring together a genuinely diverse group of students is removed,-or severely reduced-then the quality and texture of the education we provide will be significantly diminished. More research has focused on the ways in which ethnic liveliness in classroom influence student outcomes. Gurin (1999) describes the learning outcomes that are influenced by the ethnic diversity. He refers this to the active learning process in which students become involved while in college, the engagement and motivation that students exhibit, the learning and refinement of intellectual and academic skills, and the value that students place on these skills after they leave university.

Furthermore, Gurin (1999) discusses another category that is related to the ability of students to live and work effectively in a diverse society or social development. Specifically, he refers this to the extent to which university has prepared students to be successful in their lives after

university and the extent to which the university experience is successful in breaking a pattern of continuing segregation in society. This is relevant to Macedonia, respectively its society, where segregation on the name of free choice is evident everywhere, schools, public places, sports facilities, cafeterias etc. Although this is not a classical segregation, since different ethnicities choose themselves to study and live separately, it is still bad for our increasingly diverse and complex society.

Pascarella (1996) report an interesting evidence for diverse classes, arguing that participation of students in ethnically diverse classes led to measurable gains in critical thinking for students during class activities. Gurin (1999) presents further indication regarding the ways in which diversity enhances the learning outcomes of students. Students who reported higher levels of contact with diverse ideas and information and diverse people were more likely to show growth in their "active thinking process" which were represented by increases in measures of complex thinking and social/historical thinking. In addition, students who had greater exposure to diversity were more likely to show higher levels of intellectual engagement and motivation and had higher post-graduate degree aspirations.

There are other research findings signifying that high levels of engagement with diversity in classroom lead to engagement with diversity out of the classroom or after University. In terms of this Gurin (1999) revealed that diversity experiences during college had impressive effects on the extent which graduates in the national study were living racially and ethnically integrated lives in the post-college world. Students who had taken the most diversity courses and interacted the most with diverse peers during college had the most cross-racial interactions five years after leaving college. This confirms that the long-term pattern of segregation noted by many socials scientists can be broken by diversity experiences during college.

Based on this research of the literature, and our assumption that ethnic diversity in teaching of English is a value, we created survey questionnaire to conduct an interview with teachers of the English language. The focus of the survey was to gather data and information from teachers' classroom experience with diverse groups. The analysis from the survey showed that most teachers enjoy the experience in diverse classes, appreciate it, and believe that most students benefit from ethnic diversity in the classroom.

III. METHODOLOGY

Qualitative research methods were employed in the study. The findings of the qualitative analyses recommended that teacher attitude toward ethnic diversity in class was positive and most teachers appreciated diversity during the teaching. They also found out that diversity influences their teaching style and way, respectively it enhances their teaching capacity. The qualitative analysis revealed one significant fact from teachers' classroom experience. The fact is that most teachers enjoyed teaching in ethnically diverse classes and they think that students in such classes learn to the best of their ability. There is more opportunity and interactions among students. Diverse students with diverse ideas and information were more likely to show growth in their "active thinking process", higher levels of intellectual engagement and motivation.

Teachers were given a survey asking them about their opinion for the ethnically diverse classes. The survey included 5 open ended interview questions. Twenty teachers of English with more than ten years practice in TEFL/TESL completed the survey. The questions were compiled in cooperation with the Instructional Support Center. The idea was to gather from respondents as many data as possible for the value of ethnic diversity in the teaching of the English Language. Most of the interviewed teachers were chosen randomly and all of them had both experiences, experience from teaching in ethnically diverse classes such as experience in classes with no ethnic diversity. This is very important for the study since this enables teachers to express their views from the perspective of contrastive analysis.

The survey included the following questions:

- How important is ethnic diversity to you for Teaching the English Language Courses?
- Do you think that students' learning outcomes are better in ethnically diverse classes?
- From your own perspective, describe students' reactions and feelings in ethnically diverse classes.
- Do you think that diverse classroom environments would help the students develop into responsible caring citizens,

tolerant, and respective of other ethnic groups, and their culture? If yes, how? If not, why not?

- Thank you for all that valuable information, is there anything else you'd like to add before we end?"

IV. DATA ANALYSIS SUMMARY

As stated in the introductory part, the purpose of the study was to confirm the hypothesis that ethnic diversity in the classroom is a value and a positive element for both students' learning outcomes and the multicultural society of our country. Actually, twenty experienced teachers were interviewed in this study and they all yielded great interesting results with many positive comments and stories from their academic experience. They welcomed this research and all the twenty interviewees commented on the first question. Their responses on the first question were very positive, and they find diversity relevant and important to the English language courses. They report that ethnic diversity is the key to their English class. In ethnic diverse classes there are always more diverse ideas and more questions raised for discussion. This stimulates students thinking capacity and subsequently develops their speaking skills. The most prominent comments given to this question were by five participants who claimed that: Diversity is important in class because society is diverse, everything is created diverse and the best place for students to get familiarized with this fact is the classroom. Moreover, students in diverse classes do not feel bored. They hear concerns of different types, from different cultural view, different students' reactions. All this motivates students to be involved and participate actively in class activities, group work, debates and other presentations in class.

In several questions participants mentioned that classes with diversity are more lively, the climate is more opened. There is a tendency from each student to leave a good impression to the student from the other cultural background. In a way, this creates a beneficial competition among students that is necessary for the good sprit in the class. As for students learning outcomes most of the interviewed teachers responded confidently. They think that there is no doubt, students learning achievements are higher from diverse classes compared to other classes with no diversity. They base this to their formal exam checking and assessments throughout the semester.

Another aspect mentioned was related to the students' reactions, feelings in ethnically diverse classes. The qualitative analyses revealed three primary findings. First, students appear to have understood that from diversity they could have only educational benefits, they have more opportunities to learn, more interactions and less boredom in class. Second, levels of stereotypes among students of different cultures declined. Students learned that difference is not danger to them but just something part of them. Finally, students were able to recognize and accept ethnic diversity in class as one more tool to achieve their aspirations to their full integration in the multicultural society of the country.

Of the five open ended questions, all twenty teachers answered the first and the second question, fifteen teachers spoke in details about this and two teachers said it is important and three teachers were not sure. Thirteen teachers answered the third question and gave details, seven teachers had nothing to say for this question. As regarding the fourth question, all the teachers in a way responded affirmatively. They all stated that diverse classroom environments would serve usefully students to develop into responsible caring citizens, tolerant and respective to other ethnic groups in the society.

As regarding the last question, every single teacher stated that he likes this practice, students from different ethnic groups attending English classes together. They expressed their positivity this practice to continue in the future and to be promoted and recognized more by the management of the University.

V. CONCLUSIONS

With this research, we exhibited that ethnic diversity classes is a value, teachers appreciated and enjoyed the atmosphere in such classes. Their responses were affirmative as regards the educational benefits of diversity. They proved this by accepting to take part in the interview where they spoke highly for ethnic diversity classes of English. The positive aspects of English classes with ethnic diversity are enormous. We managed to disclose many of them by reviewing the appropriate literature from many researchers. As noted above most teachers agreed that English should continue to be attended together from different ethnicities, compared to other courses where there is no linguistic and cultural diversity. This can be seen in the answers the teachers have given as something positive for both classroom

learning environment or students' educational needs and their future career in the multicultural society of our country.

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THE ROLE OF MOTHER TONGUE IN ENGLISH FOR SPECIFIC PURPOSES (ESP) CLASSES

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Abstract - This article addresses a major issue in the South East European University in teaching EFL/ESL and ESP classes, where students' and teachers' perceptions are taken into account in designing a suitable teaching methodology. The article examines data from self-administered questionnaires and interviews to show the existence of the preferences of using Albanian as a facilitating tool in ESP classes and ways to improve the teaching methodology in such classrooms. The data would also show the journalistic approach of How, How much, and When to use Albanian in English classes.

I. INTRODUCTION

My study is about the role that mother language plays in second/foreign language acquisition in general and particularly its role in teaching English for Specific Purposes (ESP). Using first language (L1) as a necessary and facilitating role in the second /foreign language (L2) classroom, as well as in ESP classes has been a very hotly debated issue among teachers of English. This report will investigate the role of L1 (Albanian) in order to find out how much L1 prepares students understanding and comprehending lessons of ESP and texts combined from different contents. These ESP courses are designed to help students coming from different faculties, like: Law faculty following lectures in English; Business faculty students following their lectures in English; Communication and IT students following their lectures in English. This article will report on a piece of research that will be carried out in my own teaching/learning environment at South East European University in Tetova, and will present a comparative study of students' and teachers' perceptions regarding the use of L1 in ESP classes in the monolingual classroom.

One of the objectives of this study is to find answers to the following basic research questions and to examine answers in the context of theories which describe the relationship between ESP and mother tongue:

1. What is the relationship between L1 and English for Specific Purposes (ESP)?
2. How much is L1 (Albanian) used in ESP classes?
3. Is L1 helping students mastering ESP lessons?
4. What are students' perceptions when using L1 in ESP classes?

The main focus of this study will be the student's and teacher's perception about how to ameliorate the process of teaching/learning in ESP classes whether they prefer instructions in L1 or L2. The research itself will find students preferences and needs when learning ESP; what is the best way for them to understand the unfamiliar vocabulary or any terminology related with their major fields, such as: Economics/Business fields, Law terminology, IT terminology, or any unclear grammatical structures or instructions.

This is a worthy problem to be studied because there have been many theories related with what teaching methodology to deploy in the classroom environment and which of these teaching methodologies whether direct or indirect ones bare more fruits and are more successful. Also, to what extend and how much of L1 to be used in such teaching environment. Therefore, this study will analyze both sides of the issue the students' perspective in one edge and on the other edge teachers' perspectives. Thus, perception, reliability, feelings will be some of the main concerns in this research.

From the early 1960's, English for Specific Purposes (ESP) has grown to become one of the most prominent areas of EFL teaching. There hasn't been much and profound research concerning the role that a mother language plays in English for Specific Purposes classes. Mother tongue is considered as a legitimate tool with the potential to facilitate learning mainly in accuracy-based tasks. In the fifties and sixties Behaviorist and Contrastive Analysis proponents saw the first language as central in language learning but

mainly as a source of interference with the development of habits in L2. Using the mother tongue is by no means a theoretical approach to the use of the L1. On the contrary, it is specifically designed to offer practical ideas and become a helpful resource for the foreign language teacher. Books or articles advise against the use of the L1 in the L2 classroom, which has been a view widely accepted by language teaching professionals over the last 50 years. Nevertheless, times are changing and so are perspectives and attitudes to language teaching are changing. Thus, Deller & Rinvolucri (2002) emphasizes the idea that the foreign language teacher should use the students' mother tongue only in certain situations, for example:

- comparing English grammar with the mother tongue's grammar can be very positive for some learners
- beginners will probably progress at a quicker pace if the use of the mother tongue is allowed in the classroom
- translation exercises may also be the perfect practice when there is a grammar point that is causing trouble to students

English for Specific Purposes are specialized courses. It is different from general English courses since its focus is mainly the content based learning. The syllabi of these courses is mainly divided and organized in a thematic order. Therefore, Dudley-Evans (1998) defined the use of ESP as follows:

1. ESP is defined to meet specific needs of the learners
2. ESP makes use of underlying methodology and activities of the discipline it serves
3. ESP is centered on the language appropriate to these activities in terms of grammar, lexis, register, study skills, discourse and genre.

Using or not using the mother tongue in second or foreign language acquisition deals mainly with the teaching methodology. In classes where teachers use L1 are referred to as using the traditional method or the grammar translation method, whereas classes where teachers do not use L1 are referred to those that use the direct method as a teaching methodology.

Nowadays, modern EFL classrooms are changing in its better shape. Old and new instructional elements and procedures gain in importance. For instance, grammar, after 20 or more years of open debate, has come back to most textbooks when only 10 years ago it was almost banned in language teaching. Likewise, teachers are looking at L1 as a valuable resource in their teaching, because it was as a facilitating tool for giving instruction during lessons. Today Deller and Rinvolucri's *Using the Mother Tongue* brings new ideas to endorse and value L1 in foreign language instruction

There has been very little research on what extend to use L1 in practice in the ESP classroom. In the other hand, finding out the perceptions of students, teachers and teacher educators on this subject is a fact that should not be neglected by those who conduct needs analysis. So, we will now turn briefly to research students' and teachers' perceptions when using L1 in SLA and ESP classes.

II. LITERATURE REVIEW

Using L1 in EFL and ESL classes has been a very debatable question. The question has divided English teachers into two groups. The first group is for using L1 in a foreign language acquisition and that in certain occasions and conditions. For the use of L1 in EFL/ESL environment were the proponents of the ***Grammar Translation Method*** (GTM) the oldest method, which concentrated on reading texts, studying grammar rules and translating sentences from the mother tongue of the learner (L1) into the target language (L2). This method was originally designed for studying dead languages, such as Greek or Latin.

The second group is against using L1 in EFL/ESL classes. They oppose using L1 because it risks creating L1 dependence while acquiring a foreign language. Thus, students will become dependant from L1, and will not try to understand meaning from the context and explanation, or they would try to express within a limited command of the target language. There were also theories that opposed using L1 in target languages. The proponents of this group were those that preferred the ***Direct Method***. They believed that languages are best learnt in a way that emulates the natural language learning of the child. Furthermore, L1 was seen as a collection of already established linguistic habits which would interfere with the establishment of the new set of language habits that constitute the target language.

On the other side some other theories which had an ambivalent approach, preferring neither one

nor the other side but maintained an "it depends" attitude. The proponents of this group were the Reform Movement who expressed moderate views.

Among a number of teachers in second language acquisition, there seem to be an increasing conviction that the fist language (L1) has a facilitating role in the second language acquisition (Schweer, C 1999). Also Ferrer, V (2000) states that a good number of teachers feel and based on their experiences as learners of a second language, that the mother tongue has an active and a beneficial role to play in instructed second language acquisition/learning. Among the first advocates of mother tongue use is David Atkinson (1987). He pointed out from his experience that mother tongue can be used mainly in accuracy-oriented tasks. In a research conducted by W. Schweers (1999), where he used his Spanish students and researched teachers and students feelings about the use of mother tongue. A high percentage (88.7%) of the student participants felt that Spanish should be used in their English classes. He also found out that two of the teachers never used Spanish to address to their classes. One of the teachers permitted students to answer questions in Spanish, and the other only used one Spanish word in the frame "How do you say 'X' in English? So, the main reason why some teachers use Spanish in second language acquisition was to keep students who do not understand every word on track as to what is happening in the lesson. Terence Doyle (1997), in his presentation at TESOL'97, reported that some L1 was used approximately 90% of the time in their classes. Some 65% of the students preferred the use of L1 in their classes. Noor, Hashim H (1994) in his research found out that the learner's L1 is very determining of second language acquisition. The L1 is a resource of knowledge which learners will use both positively and negatively to help them sift the L2 data in the input and to perform as best as they can in the L2. Schweers (1999) in a report of the outcomes of his research on the use of the mother tongue in English classes concludes that a second language can be learned through raising awareness to the similarities and differences between the L1 and L2.

Auerbach (1993) states that L1 provides a sense of security and validates the learners' lived experiences, allowing them to express themselves. The learner is then willing to experiment and take risks with English. Auerbach (1993) suggests the following possible uses of the mother tongue: negotiation of the syllabus and the lesson; record keeping; grammar, phonology, morphology, and spelling; discussion of cross-cultural issues; instructions or prompts; explanation of errors; and assessment of comprehension.

Theories on cross-linguistic transfer may provide a better understanding of how a student's knowledge influences his or her ability to acquire literacy in L2 (Hagan et al. 2007). They also argue that the transfer of reading skills may vary based on students' initial literacy in L1 and L2, the strengths and weaknesses of L1 will be reflected in L2. Thus, the developmental interdependence results in a linguistic interdependence that is reflected in both written and spoken language. According to Hagan et al. (2007) children who have not been exposed to a literate environment before school, find difficulties when reading is introduced in L2 because they cannot relate L2 linguistic and emergent literacy knowledge to their native language. Therefore, Cummings (1979) argues that "Mother tongue promotion in the school helps develop not only the mother tongue but also children's abilities in the majority school language" (Cummins, J 1979).

Cummins, J (1979) argues that bilingual children perform better in school when the school effectively teaches the mother tongue and develops literacy in that language. By contrast, when children are encouraged to reject their mother tongue they consequently stagnate in their development and their personal and conceptual foundation for learning is undermined.

Butzkamm, W (2003) states that "the mother tongue is generally regarded as being an evasive manoeuvre which is to be only used in emergencies". At present, the guidelines in many countries recommend that lessons should be planned to be as monolingual as possible. Even many teachers from Anglophone countries, teaching their own language, have spilled into the world and making a living on teaching English. They stress the importance of using "the English-only policy". The question might arise in here, since the native teachers of English do perhaps not know the student's mother tongue. Thus, the international dominance of English teachers who can not understand the target student's mother tongue and the fact with the cheaper mass production of strictly English-speaking textbooks in the Anglo-American mother country, constitutes some of the reasons why they demand the use of

monolingualism in the classroom. (Butzkamm, W (2003).

So, the theory that we do not learn a language by using another language is contrasted by Butzkamm, W (2003), where he argues with the mother tongue we learn to think and communicate; the mother tongue opens the door to grammar as well. Butzkamm, W (2003) presents the methodological thought of 20th century which was dominated by a negative metaphor, concerning the use of the mother tongue:

"*… foreign language teachers build islands that are in a constant danger of being flooded by the see of the mother tongue. They have to fight back this sea, build dams against it, and stem its tide.*

When teaching ESP through lexical items is the students' ability to find an equivalent in L1 to match a lexical phrase in L2. As all teachers of English probably realize proficiency in L2 implies the ability to be bilingual -- using appropriately and interchangeably L2 and L1. (Januleviėienė &Kavaliauskienė, 2000).

In a research conducted by Janulevičienė, Kavaliauskienė (2000), where they asked teachers of ESP classes the following questions: "Should the native language be used in a foreign language classes at university?" 86% of teachers responded with 'Yes' as well as 83% of students responded so. "No" answer has been favoured by 14% of teachers, and 17% of students, respectively. So, from the respondents it seems that teachers and students are quite unanimous in their opinion on the importance of the L1 for teaching and learning a foreign language on a tertiary-level.

According to Lewiss (1993) language teaching is divided into grammar and vocabulary by arguing that languages consist of lexical items. Small groups of lexical items are the words and polywords which are considered as essential vocabulary for learners to memorize. A second category is collocations. Native speakers know intuitively which words frequently combine and which do not. There are specific types of collocations in ESP which cause students' errors due to a lack of translational equivalence between L1 and L2. So, teachers must help learners with ESP vocabulary.

As ESP acquisition/learning and teaching usually start with mother tongue language, it is important to find out whether the developmental sequences of ESP as a first and second language are not different. It is also of importance to establish the sequences between the mother tongue and ESP.

III. WHAT WE DO NOT KNOW

The use of the mother tongue L1 in acquiring a foreign language has been looked and treated by teachers of English as crucial and determining factor in EFL and ESL acqusition. The effect and reliability in using L1 in L2 is still an issue that needs further analysis and research. Many teachers are inclined in many cases to follow their own beliefs and intuitions when they are challenged by using L1 in L2. Teachers can banish the native language from the classroom, but you cannot banish it from students' minds. It would even be counterproductive since it would mean trying to stop them thinking altogether. (Butzkamm, W. The Bilingual Method-An overview). Teachers should be very attentive in order to allow their students' needs to determine the approach towards their mother tongue, since its use may lend itself to be essential for them to achieve their specific goals in the target language. According to N. Hitotuzi (2006), L2 learners seem to be inevitably affected by the discrepant views on whether or not their mother tongue is of any value as to somehow facilitating L2 learning /acquisition.

It is very agreed that students proficiency where acquiring an L2 language determines in many cases the frequent use of L1 in EFL and ESL acquisition. In this stage L1 can be used as a blueprint, at any text produced in the target language. In other words, L1 can be used as a starting point in the production of oral/written L2 texts in the classroom. (N. Hitotuzi, 2006).

Some people assume that learner L1 in L2 classrooms is like, as Promdromou (1992) puts it, "a skeleton in the cupboard,… a taboo subject, source of embarrassment, and on the part of teachers, a recognition of their failure to teach properly, i.e. using only English".

Teachers should be aware of the students' feelings and their expectations in a foreign language acquisition.

Many theories have dealt with L1 and L2, and their relationship, being as two underpinned things, dealing with a process of owing and borrowing one structure to another.

The study of languages for specific purposes (ESP) represents a synthesis of linguistics and methodology of teaching foreign languages (L2) and includes the aspects of lexicology,

terminology, translation and discourse analysis (D, Gálová 2007). In ESP classes, everyone agrees that learning the specialized vocabulary is a primary goal. And there is no assumption that the more words a learner know, the larger the learner's vocabulary knowledge is. One of the best methods in ESP classes in acquiring vocabulary is the lexical approach. In ESP, students have to learn high-priority lexis, which needs to be selected and included into learning materials and class activities. There is another relevant and quite important point to teaching ESP through lexical items is the students' ability to find an equivalent in L1 to match a lexical phrase in L2. As all teachers of English probably realize proficiency in L2 implies the ability to be bilingual; using appropriately and interchangeably L2 and L1 (Janulevièienë& Kavaliauskienë, 2000).

ESP is not just a matter of science words and grammar for scientists or for business students: the fact that the language is used for a specific purpose does not imply that it is a special form of the language, different in kind from other forms. ESP is not different in kind from other forms of language teaching, since it does not require a specific methodology. The principles for teaching ESP should be oriented towards effective and efficient learning. Numerous teachers are involved in discussions and in researching on how to treat bilingualism.

One of the arguments for bilingual teaching is that it prepares learners better for using the language outside the classroom. However, it is only an assumption, not a fact supported by research. Because no one can predict the future needs of the learners. It seems that dealing with the above profound question will cause the development of bilingual teaching to become more widespread.

Does the effective ESP teacher require additional skills or abilities to those required in an effective teacher of ELT? The answer we offer is both yes and no. *No* in the sense that the skills required are the same, whereas we answer *yes* when referring to the critical importance of the subject matter, mastering specialized vocabulary, problem solving methods and special communication strategies within professional groups. So far, only the teacher's beliefs and inclinations are considered in cases when to use L1 in EFL/ ESL and ESP classes, whereas students' feeling and perceptions have not been considered so much. Teachers think that by finding out from the target population their perceptions and their needs. By conducting a needs analysis, where needs and wants will help teachers decide about the teaching methodology in ESP classes to be deployed. Needs deal with students' expectations, and their perceptions about the course. Wants represent institutions' and teachers' expectations. Therefore, the importance of using the mother tongue in EFL/ESL classes needs to be reconsidered. Teaching ESP is not limited to technical concepts and highly specialized materials, however important they may be. ESP also develops both the productive skills (writing and speaking), and receptive skills,(reading and listening). Teachers almost use the same teaching methodologies and students use the same language learning strategies. Therefore, we cannot differentiate ESP classes from General English classes. What preparations are needed in General English those preparations are more likely to be used in ESP classes. Thus, students may face the same learning problems, therefore they would need the same facilitating things in order to be successful in acquiring a L2, using L1 as a means of accelerating the learning process. Therefore, a research is needed in order to find out whether students prefer using mother tongue as a facilitating tool when learning their target language. Languages are made up of difficult concepts and sometimes it is very difficult for students to grasp the real meaning when instructions are held exclusively in English. An important point to be reconsidered is also the fact that if both protagonist in the teaching/learning process, i.e. teachers and students, agree to use L1 as means of facilitating and accelerating the process of learning and teaching, then how much should L1 be used in such classes to acquire the target language. Students help you by providing information; you help them by enabling them to express it in a foreign language. This spirit of mutual assistance could create a new atmosphere in the classroom and perhaps lead to a greater sense of student autonomy as well as to more cooperation in achieving the desired goal.

IV. PURPOSE OF THE STUDY

The present study represents teachers' and students' perceptions regarding the use of L1 in ESL and ESP classes. The present research was focused on Albanian speaking language learners of EFL/ESL and ESP acquisition. According to Cardenas-Hagan et al. (2007) few studies number out many possibilities that the language instruction decisions may produce varying results for different

groups of students, and may produce different results in students varying levels of initial L1 and L2 skills. There are many professionals in the field of second language acquisition with an increasing conviction that the first language (L1) has a necessary and facilitating role in the second and foreign language (L2) classroom.

V. METHOD

The research included 200 participants in this research: second-year students and fourth year students from different faculties: Business Administration, Law, CST and PA. The employed methods included administering self-assessment questionnaires and interviewing learners and teachers at the respective faculties.

One of the aims was to check whether using students L1 in acquiring a second language has a facilitating role. Showing also if it helps students feel more relaxed and comfortable when acquiring a foreign or second language. This feeling helps students to build up their confidentiality, and making them more secure during the process of language learning/acquisition. The teachers also filled out a short questionnaire about their attitudes toward the use of Albanian in the English classroom. The same questionnaire was also distributed to students.

VI. PARTICIPANTS

Students from South East European University (SEEU) were chosen from prescribed criteria for selecting participants from a pool in order to respect the sample of population that the research is aimed at. Thus, the results can be generalized to the whole population later.

A. Classrooms

In general, from each faculty three classrooms were chosen to participate in the project randomly. All the above mentioned faculties provide English for Specific Purposes to students.

B. Students

In each classroom, 10 students were randomly selected for participation from a pool of all students who were language learners of a foreign language, indicating that their mother tongue is Albanian, and following ESP classes at any of these faculties that were above mentioned. In order to attend ESP classes, students need to finish four levels of General English; therefore the confounding variables are removed or limited to an extent not having an influence on the result.

VII. RESULTS

A high percentage of 75 of the student participants in this study felt that Albanian should be used in their English classes. Teachers in the other hand shared their views, more than half were against using L1 in their English classes. Approximately 7 percent of the students responded that they like their teachers to use only English in the classroom. Very obvious is the 82 percent of students who would like Albanian used to explain difficult concepts, but also about 65 percent of teachers considered this as a right use. Generally, students also responded notably higher than teachers on the following uses for Albanian: to help students feel more comfortable and confident, to check comprehension, and to define new vocabulary items.

A notable percentage of students would like Albanian to be used in English classes either between 10 and 30 percent of the time. A large number of students like the use of Albanian because it helps them feel more comfortable and they feel less lost. About 67 percent of students feel Albanian can be used in translating the unknown words and difficult words.

These results showed that in English classes in South East European University (SEEU) in Tetova, Albanian should be used in EFL/ESL and ESP classes to some degree. Students feel there are clear cases where Albanian will facilitate their comprehension of what is happening in class. A majority also agree that the use of Albanian helps them to learn English more easily.

A. Teacher responses

In this study, I also asked teachers to respond to the question "If you use Albanian in your classroom, why do you think this may be more effective than using English exclusively?"

Here are some of their responses:

- Some difficult concepts really need to be translated in students' mother tongue in order to help them follow up the activities.
- L1 Enables students to understand new professional concepts that are first created first in English and as such they need exclusive explanation in Albanian.
- Using of Albanian definitely helps the learner, since they become more capable of understanding the concepts and learn better all language skills.

- Sometimes it might be helpful to clarify very difficult concepts or vocabulary which is unfamiliar to students and the teachers cannot elicit their meaning from students, or when they cannot guess their meaning from the context.
- Sometimes students need translation into their native language in order to understand better concepts that seem difficult for them.
- Students might feel less nervous in learning the difficult concepts in English language.
- In some cases, L1 helps to check understanding of very complex expressions, like idioms, phrases, etc. Therefore, I use L1 to clarify or check understanding in very complex language expressions.
- I believe that using Albanian in L1 classes helps lower level student when new vocabulary is introduced or when we teach them comparative grammar.
- Students understand better L2 if they base it upon L1.

VIII. CONCLUSION

I think that teachers have to take into consideration the teaching environment and the target population they teach. Some of them would say that in such classes using L2 as much as you can is very crucial, since students are only exposed to L2 only in classes; therefore they need more exposure to L2, because they do not practice their L2 outside classrooms.

Others would also say that if you only use L2, you make your students try to communicate with you in that language, giving them the opportunity to practice the target language and drag out as much output in L2 as possible.

I, also, agree that English should be the primary means of communication in L2 classroom and that you should give students ample opportunities to process English receptively as well as to give them the opportunity to practice the target language and drag out as much output in L2 as possible even outside classrooms. Moreover, if we are interested in creating a student centered classroom seriously, then my findings have important implications on what we do in our classes. My research also proves that a second language can be learned through comparison of similarities and differences between the L1 and the L2.

Additionally, bringing Albanian into the English classes has made learning English appear to be less of tense and less lost students but students being more comfortable. This way, students will be more courageous and willing to learn English since their preferences are taken into consideration and are valued properly.

A. Suggestions for further study

Suggestions for further studies would include a further examination of the effect of mother tongue in acquiring a second or foreign language acquisition. Another possible aspect to examine would be the use of translation in ESP classes while teaching vocabulary, since students are prepared for the domestic labor market, and they need to know words in English and in Albanian in order to compete in the regional and domestic markets. It would be also necessary to examine if there is a relationship between words that have an equivalent in Albanian and English and words that do not have an equivalent, i.e. which words are learnt and memorized more easily.

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APPENDIX

The Use of Mother Tongue in EFL/ESL and ESP Classes

Faculty _ **English Level** _

1. Should Albanian be used in the classroom? **100**

Yes	75	75%
No	25	25%

2. Do you like your teacher to use Albanian in class?

95

Not at all	6	6%
A little	20	21%
Sometimes	64	67%
A lot	5	5%

3. When do you think it's appropriate to use Albanian in English classes? **164**

To explain difficult concepts	82	50%
To summarize material already covered	4	2%
To help students feel more comfortable	14	9%
To check for comprehension	6	4%
To carry out small-group work		
To explain the relationship between English and Albanian	10	6%
To define new vocabulary	34	21%
To teach them comparative grammar	14	9%

4. What percentage of time do you think Albanian should be used?

Student **87**

0%	1			1%
10%	18	60%		21%
20%	40	70%		46%
30%	28	80%		32%
40%	5	90%		6%
50%	3	100%		3%

5. If you prefer the use Albanian in your class, why?		**86**
It's more comfortable	44	51%
I am less tense	11	13%
I feel less lost	31	36%

6. Do you believe using Albanian in your English class helps you learn this language?

		95
No	11	12%
A little	45	47%
Rarely much	21	22%
A lot	18	19%

7. How often do you use/prefer translation in ESP classes?		**95**
Never	6	6%
Sometimes	64	67%
Not very often	12	13%
In many cases	13	14%

MEDIA AND CORRUPTION IN HIGHER EDUCATION IN MACEDONIA

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Abstract - Corruption in higher education is a silent but well known phenomenon in countries in transition. Recent massification and internationalisation of higher education in developed countries have contributed to a decrease of quality and increase scale of corruption. In this thesis the quantity and the content of articles about higher education in two of Macedonia's most prestigious media outlets are analyzed, demonstrating that, as agenda-setting theory would predict, there is a positive relationship between societal concern about corruption in higher education and the way the journalists discuss the issue of corruption. This thesis draws upon the importance of media in the fight against corruption. The thesis presents a method of analysis of newspaper articles and news coverage on corruption in higher education in a way that it quantifies the coverage and in this way determines the most common corruption patterns in higher education as described by the media. The study offers additional alternatives to the analysis of corruption in higher education.

I. INTRODUCTION

The media, through its various sources such as newspaper, radio, internet, and television, with the specific reference to education play a very important role in the development of higher education. Covering issues in education refers to different phenomena that concern higher education and influence the service and the quality that common citizens receive from these institutions.

The level of awareness of the existence of deviant phenomena, such as bribery, academic fraud, nepotism, misapropriation, politicization, despotism, shirking and extortion in higher education among common citizens, depends on the level to which the media cover these corruption issues in higher education. By reporting on these deviant phenomena, citizens become educated about the same and this will most probably result in a higher level of interest to fight these phenomena. Media, in this way, indirectly contribute to the level of quality of services that higher education institutions offer to citizens.

In this thesis, a relationship between higher education and media coverage has been tested and found to be positive. This has been achieved through an in-depth analysis of the content of newspaper/news coverage on issues in higher education in Macedonia. The research conducted on the relation between the content of the different coverage on corruption in higher education and the quality of such higher education, is indicated to be positive. The data produced from this research were used to draw conclusions about the extent to which the media play a key role in informing the public of the deviant phenomena in higher education in Macedonia.

The content of media newspaper/news coverage are used as a tool for the analysis of the corruption patterns in higher education, revealing the major corruption patterns to be bribery, academic fraud, nepotism, misapropriation, politicization, despotism, shirking and extortion. In this way, the media becomes a partner in the fight against corruption, revealing the past trends as well as reporting and reflecting upon the latest developments of corruption in general, as well as corruption in higher education in Macedonia.

As much as it is true about the key role of the media in revealing corruption patterns and issues in higher education, the media outlets can operate normally and still be enhanced under certain given conditions. The first and the most important condition is the freedom of press.

This condition guarantees an independent flow of information without any interference of the nature of political or social pressure on media outlets in one country. Media freedom is a core factor in the process of democratization of countries in development. The press freedom is so important that it represents a key factor by which the democracy index is measured in one country.

The second factor that influences the quality of media coverage is the level of professionalism practiced by journalists. Media coverage is expected to be objective and a non-biased source of information. If otherwise, the quality of the coverage can be seriously endangered, thus influencing and easily manipulating the journalists for the benefit of third parties.

II. RESEARCH QUESTIONS

The questions guiding my research are:

- How do the media perceive and report the major challenges and the major issues of higher education institutions?
- What role do the media play in educating the viewers about the possible corrupt practices of higher education institutions in Macedonia?
- How do the media characterize such corruption?
- How much space and attention do they give to similar topics and how seriously do the media consider the issues of corrupt practices in higher education?
- Do the media encourage the students and the wider public to report corruption in higher education in Macedonia? How so? How often and to whom? What major corruption patterns and methods are mentioned in their coverage?

In this thesis, a relationship between higher education and media coverage has been tested and found to be positive. This has been achieved through an in-depth analysis of the content of newspaper/news coverage on issues in higher education in Macedonia. The research conducted on the relation between the content of the different coverage on corruption in higher education and the quality of such higher education, is indicated to be positive. The data produced from this research were used to draw conclusions about the extent to which the media play a key role in informing the public of the deviant phenomena in higher education in Macedonia.

III. CORRUPTION

Corruption has existed even in the earliest developmental phases of society. The word corruption comes from the Latin word *corruptio*, which in Medieval Latin is defined as a moral decay, wicked behaviour, putridity or rottenness [1].

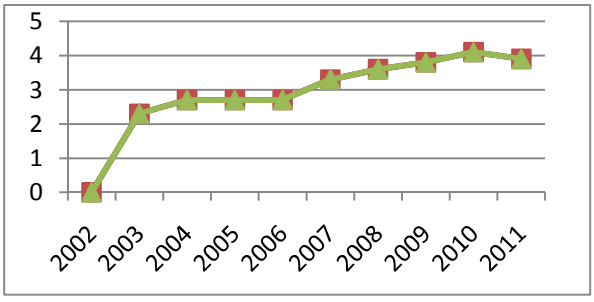
"Corruption is most commonly defined as the abuse of public office for private use". The United Nations Manual on Anti-Corruption, Transparency International, and multilateral financial institutions like the World Bank and the Asian Development Bank use the same definition when they refer to corruption [2].

The term corruption alludes to a wider range of illegal or unacceptable activities that a public official can demonstrate. Since there are many different levels to corruption, it is necessary to point out that there is a need for more definitions that will cover the different aspects of wrongful exercise of duty in the corruption hierarchy.

In the past two decades, Macedonia has left behind various social and political changes, some of which included a civil war. However, Macedonia has not succeeded in overcoming one very important aspect of its reality, which is corruption. During the post civil-war period in Macedonia, there were major international polling agencies who explored the issue of corruption. Many of the ratings from these results show the most prevalent issues in the society and how they affect the quality of life. According to the most extensive survey conducted in 2002 of public attitudes across the Western Balkans, unemployment, poverty and corruption were found to be the most pressing problems facing the country [3].

Four years later, in another survey conducted by the Institute for Social, Political and Judicial Research in 2006, corruption was found to be the third most acute issue in the country. The latest poll results, conducted by the UNDP in 2011, point out the same issue, rating corruption as the 3rd most important problem facing the country [4].

In fact, if we are to explore the corruption history in Macedonia based on yearly reports of corruption, from Transparency International's perspective the results show a gradual increase of corruption, which has almost doubled in recent years.



Source: Transparency International Country Based Reports

As seen in chart 1, the corruption index for 2002 is not available due to the civil war in the country. Transparency International reported an index of 2.3 for 2003. During 2004, 2005 and 2006 there was an equal reported index of 2.7, whereas in 2007 a more dramatic increase of 3.3 was reported. Then in 2008, the index increased again to 3.6, followed by 3.8 in 2009 and culminating with the most intensive corruption

rate index of 4.1 in 2010. The year 2011 has reported a slight decrease to 3.9. Unfortunately, the lack of gradual decrease of corruption in the years to follow is reported in polls from 2006. 62% of the respondents have answered that the corruption in their country has not decreased [5].

Despite the low estimate given in concern to corruption in the 2006 polls, there is still a negative impression by the respondents of the attention given to corruption by the government. Every second (50%) surveyed citizen's belief is that "the politicians give attention to corruption only during electoral campaigns and after the elections they do not act against it". In addition, when asked about the reasons for lack of trust in the effectiveness of reporting corruption, "the most frequently stated reason for this absence of trust is the one of laws not being implemented" [5].

IV. CORRUPTION IN MACEDONIAN HIGHER EDUCATION

Historically, many surveys have addressed and at the same time documented corruption in H.E. in Macedonia. These reports have been the only critical voice that has kept the society under alert about the deviant phenomena in H.E. institutions, and more than anything else have been concerned with the recent developments in the H.E. sector. Many institutions such as the Foundation of the Open Society Institute, Youth Educational Forum, UNDP, Transparency International - Macedonia and the Institute for Sociological Political and Legal Research--all independent non-governmental organizations-- have contributed to the development of the awareness of corruption activities. This was done by addressing corruption in H.E. in their polls at different time periods.

In a conference on corruption in Macedonia, the Youth Educational Forum reports: "Understanding the essence of corrupted behavior in higher education in our educational system is a very important thing. Namely, this form of corruption may be one of the more dangerous ones, mostly because all future individual entities of a society are developed and educated in an ethically, morally, economically, and socially spoiled system of values" [6].

According to UNDP's 2011 poll of citizens who paid at least one bribe in the last 12 months, 17% of land registry officers and teachers/lecturers received the most kickbacks in Macedonia, ranking them third amongst public officials [4]. Another portion of the same poll compared public sectors/institution's corruption levels as seen by adult citizens and found that 24.3% of public universities often or very often participate in corrupt practices, which ranks them in the fourth place amongst sectors/institutions nationally[4].

The Institute for Sociological, Political and Legal research within the public university of Saint Cyril and Methodious in Skopje reports that in 2005 the highest level of corruption is notably in the H.E. system (13,9%). More than two thirds of all surveyed citizens (69%) recognize corruption to be the presents given to professors/teachers during the education of their children. At the same level of severity are the issues of sponsorship provided to a professor and the favor given to a professor: these kinds of situations are seen as corruption by 69% of all surveyed citizens of Macedonia [5].

In what forms does corruption appear in H.E.? According to Osipian, the discussion of corruption is country based and bribes are the most explicit manifestation of corruption in education. Other forms of corruption include embezzlement, extortion, misuse of university property, ghost instructors, fraud, nepotism, cronyism, favoritism, kickbacks, unauthorized private tutoring, cheating, and research misconduct [7].

The definitions of corruption in H.E. vary in different dictionaries. The definitions used will be the ones relevant to the research in H.E. context, as described by Osipian. Osipian defines several areas of corruption, including bribery, nepotism, extortion, and misappropriation. His definitions are the followings: bribery is the use of reward to pervert the judgment of a person in a position of trust; nepotism is bestowal of patronage by reasons of ascriptive relationship rather than merit; extortion is an openly presented demand for a bribe in exchange for a certain service, such as permission, license, admission or positive grade; misappropriation is illegal appropriation of public resources for private regarding use. Hallak and Poisson,state that academic fraud is the use of public office for private gain in the academic field especially regarding accreditation of courses and institutions, examinations for access and for transfers between institutions, certificates, and diplomas, university/college research and publications [8].

Another definition used by Poisson for corruption in H.E. presents "the systematic use of public office for private benefit whose impact is significant on access, quality or equity in

education" and "corruption presents a major drain on the effective use of resources for education and should be drastically curbed" [9].

V. MEDIA IN MACEDONIA

But is there a such thing as independent media in Macedonia and worldwide that would inform the public without any biases and backgrounds and contribute to the further development of the H.E sector? Press freedom along with corruption presents the biggest challenge and threat to the development of democracy for all countries, and especially the ones in transition. Media and H.E., among other things, share the commonality of being vulnerable and easily manipulated by the governent. During the latest visit of the OSCE media freedom representative, Dunja Mijatovic, in October 2011 she/he declared: "In order to start getting out of the present serious crisis, everyone, including politicians, media owners, and journalists have to understand that mass media must serve the public and society at large, and not act in the interests of a particular party, a public figure. or business. It must be clear that it is not the role of politicians or government officials to tell journalists how to do their jobs. Media and journalists must simply be 'pro-public'."

As soon as the OSCE, the International Press Institute, and the European Commission publicized their reports\letters, the same made it in the headlines of the major international and regional newspapers recalling the conclusions of the same reports. The Guardian, The New York Times and Balkan Insight are only a few of the media houses which reported on the latest phenomenon in the Macedonian media.

On the local level, different organizations have had similar reactions to the media pressure and silencing attempts by the government. The Macedonian Institute for Media on May 3rd-- The World Press Freedom Day --came out with a joint statement titled, "The press freedom in Macedonia seriously endangered". This statement was prepared by the Association of Journalists of Macedonia, the Independent Union of Journalists and Media Workers, and the Macedonian Institute for Media, which "decisively demands from the institutions, political centers and media owners to enable unselective implementation of the media regulation, as well as free functioning of media without any pressures." Hence, the various declarations exemplify the complexity of issues which involve the media houses, journalism as a profession, politicization and government interference. Obviously, the examples elaborate a clash between the media interest and the interest of the government and the interest of the citizens for quality access to information on H.E.

The situations mentioned above exemplify quite a paradoxical situation in which Macedonia is in right now. On one side, Macedonia is an accession country, not yet a member of the EU and wanting to become a member. On the other side, Macedonian government is limiting the freedom of expression and in this way threatening the chances of becoming a full member of the EU by breaking one of the fundamental principles and requirements of the EU process of enlargement.

VI. METHODOLOGY

A content analysis of television news Kanal 5 and the daily newspaper Dnevnik's reporting on corruption in H.E. from 2010-2011 was conducted. Dnevnik is the biggest and most read daily newspaper in Macedonia [10]. This allows the author to analyze media outlets with the best regional coverage in the country, in this way estimating the media outlets with highest potential impact and coverage of information on the citizens in the country. The purpose for selecting these two media outlets are the followings: a) to quantify the coverage of the most reputable media houses on issues on corruption in H.E. in Macedonia; b) to compare and contrast results on coverage of corruption in H.E. between these two media outlets; c) to indicate the possible gaps of coverage on the topic of corruption in H.E; and d) to highlight the importance of the need for more coverage by the media on the issue of corruption in H.E. in Macedonia.

The television and newspaper coverage featured on the official web sites of the analyzed media were chosen. The criterion was based upon the content of the coverage regarding corruption in Macedonian tertiary education. The content of each report was analyzed and then put in a category based on the corruption pattern that it manifests, or more specifically the corruption patterns that the report refers to, such as abuse of official position, bribery, fraud, patronage, nepotism or shirking. This categorization is facilitated by Ghanem's subtopics dimension from the second-level agenda-setting theory, which categorizes the attributes of an issue [11]. Furthermore, table sheets were created to categorize the findings of the analysis based on the

research questions, which address space and attention for H.E. corruption, corruption patterns, and educating viewers. These tables present the final outcome of the research, which will provide basis for further interpretation of the results.

VII. RESEARCH FINDINGS

Identified corruption practices/patterns based on the content of media articles. Number of corrupt practices reported in the articles:

Dnevnik

Bribery	***6***
Extortion	***3***
Misappropriation	***2***
Abuse of position	***5***
Fraud	***7***
Patronage	***3***
Nepotism	***2***
Shirking	***7***
Politicization	***20***
Total	***55***

Kanal 5

Bribery	***2***
Extortion	***1***
Misappropriation	***0***
Abuse of position	***1***
Fraud	***5***
Patronage	***1***
Nepotism	***2***
Shirking	***0***
Politicization	***6***
Total	***18***

VIII. CONCLUSION

The media's role in the development of higher education is beyond doubt. This is because the media cover various positive and negative phenomena taking place in higher education instituitions. The media play a crucial role in setting the public agenda, in this way acting as a gatekeeper and a strong advocate for a quality higher education. The media in Macedonia cover the following corruption patterns in higher education institutions: bribery, academic fraud, nepotism, misapropriation, politicization, despotism, shirking and extortion. This specific role of the media as an educational watchdog can facilitate higher education transition. This role is of high importance as it makes the citizens more aware about the negative phenomena of corruption in higher education and improves the possibility to fight corruption in higher education

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EFFECTIVE VOCABULARY INSTRUCTION: DIRECT VS INCIDENTAL VOCABULARY INSTRUCTION

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Abstract - Teaching vocabulary to English as Foreign Language (EFL) learners is a great experience, but at the same time a daily challenge. Teaching vocabulary is vital because we need vocabulary to communicate and it enables our learners to communicate in the target language, the more words they know and understand the better they will be able to communicate. Furthermore, the challenge teachers face is because that they want to do their best and want their students to learn as much as possible. And yet not all the words require the same depth of instruction, some are easier to teach and acquire and others are more difficult.

As a result, teachers use different vocabulary teaching strategies, but the issue raised is which one of the strategies is most effective, the incidental vocabulary learning, which is learning from context, or direct vocabulary learning, which means learning and memorizing words from the dictionary, or vocabulary lists? Is one better than the other or shall they be combined in order to have both parties, teachers and students benefit as much as possible?

The objectives of this study are:

To examine the effect of the direct vocabulary teaching strategy;

- **To examine the efficiency of the incidental vocabulary teaching strategy;**
- **To identify which one of these strategies helps learners become autonomous learners;**
- **To explore whether these two strategies work better when combined.**

Data was collected from Basic English skills classes, Intermediate level, offered at the South East European University in Tetovo, Republic of Macedonia, during the academic year 2012-2013. A total number of 60 students, aged 18-25 participated in the study, and the data is analysed using quantitative and qualitative methods, such as surveys, observations, and interviews.

The primary focus of this study is to give an insight to which is the best strategy of teaching vocabulary.

I. INTRODUCTION

Our teaching focuses on the four language skills, reading, speaking, writing and listening, as well as grammar and vocabulary. Teaching vocabulary is a very important aspect of learning language because the learners need words in order to be able to communicate in the target language. Richards (1997:7) claims "Vocabulary is central to language and of critical importance to the typical language learner" (as cited in Zimmerman, 1997:5).

Coupled with this, Decarrico (2001: 285) in stressing the importance of vocabulary, he discusses about how essential vocabulary is, not only in the target language but in the mother tongue as well. He states "Vocabulary learning is central to language acquisition whether it is a second, or a foreign language. Even in a learner's mother tongue, there is an incessant learning of new words and new meanings for old words."

Teaching and learning vocabulary requires dedication and patience, because it requires a lot of work in order to achieve the goal and acquire the vocabulary presented in the classroom. This is described by Baker (2002:51) who claims "Learning vocabulary is perhaps the largest and most laborious aspect of acquiring another language." However, in this paper not only the importance of vocabulary will be discussed, and the two main strategies for teaching vocabulary will be compared.

II. LITERATURE REVIEW

Two main strategies are defined to learning vocabulary, the direct and the incidental strategy. The direct strategy is related to the grammar translation method, whereas the later is related to the communicative approach of language teaching. The incidental vocabulary learning takes place mainly by reading, whereas the direct vocabulary teaching strategy takes place by different tasks organized by the teacher.

Richards & Schmidt (2002) as cited in Ahmad (2011:67) claim that "Incidental learning is the process of learning something without the intention of doing so. It is also learning one thing while intending to learn another." The learning of the words takes place without it being the main of the task, it is mainly achieved through reading.

Coady (2001) as cited in Ahmad (2011:67) argues that "Incidental vocabulary learning motivates learners for extensive reading. It involves learners' ability to guess the meaning of new words from the contextual clues. Incidental learning occurs more particularly through extensive reading in input-rich environments, albeit at a rather slow rate." This strategy is rather time consuming compared to the direct strategy. Reading requires time and the students learn some of the new words by guessing their meaning from the context of what they are reading.

Ahmad (2011:68) is of the opinion that "Incidental Vocabulary promotes deeper mental processing and better retention. The learners get themselves fully involved in the process of deciphering the meaning through the clues available in the text. They think and rethink about the new words involving cognitive process which helps the learners retain the words for a longer period of time."

Furthermore, Ahmad (2011) argues that students remember the words learned through incidental methods for a longer period of time because it is them who guess the meaning of the word from context, they are involved in their own learning. On the other hand, he is against the intentional or direct vocabulary learning strategy since he says that the techniques that are used with that strategy are not as efficient as the incidental one. The intentional vocabulary teaching strategy involves puzzles, scrambled words, crosswords, multiple choice, students are involved and required to do the activities, yet, they are not related to context.

Ahmad (2011:68) argues that "intentional vocabulary learning based on synonyms, antonyms, word substitution, multiple choice, scrambled words and crossword puzzles, regardless of context, is not so effective, because learners are more prone to rote learning."

However, Goff (1981) opposes Ahmad's view and claims that there are studies which clearly state that the intentional or direct vocabulary teaching strategy is much more effective than incidental methods. Goff (1981:263) claims that "There have been empirical studies from the 1930's to the present whose findings indicate that the direct teaching of reading vocabulary is a superior manner in which to develop this knowledge with children."

Holmes (1934) and Gray and Holmes (1938) as cited in Goff (1981: 263) found that the direct method is significantly more effective in this respect than are incidental procedures like independent reading.

Vanderline (1964) as cited in Goff (1981:263) "discovered that children who made a direct study of mathematics vocabulary achieved significantly higher scores on a math problem solving test than did children not given such direct instruction."

III. SIGNIFICANCE OF THE STUDY

This study examines how students perceive direct and incidental vocabulary teaching strategies. It also examined both strategies, and scholarly opinions related to them. It investigated student attitudes towards these strategies and derived conclusions about how efficient they were in vocabulary acquisitions and how it affected the acquisition of the words presented in class. The study results are useful to all teachers of English, beyond this institution, because they point out which strategy is more effective in the acquisition of the target vocabulary.

IV. METHODOLOGY

This study was carried out at the South East European University in the academic year 2012/2013. Two types of data collection were used. The methods employed included administering questionnaires and quizzes for the students.

V. PARTICIPANTS

The students involved in this study, study at different departments at South - East European University. A total sample of 60 students participated in this study. The students are 18-25 years old, all non-native speakers of English, both male and female.

VI. PROCEDURE

Both the direct and incidental vocabulary teaching strategies were used with two groups of Basic English Skills, pre/intermediate level for a set time (1 month for the direct strategy, 1 month the incidental strategy, and 1 month both strategies combined. Each strategy was used separately, once the set time was up, the other strategy was used for the same amount of time. After the set time finished, the students were given a quiz that dealt with the vocabulary they had been introduced to during the semester, which means that the students were given 3 quizzes. In addition to these quizzes, students were given a questionnaire.

VII. RESULTS

As far as the first research question is concerned: how effective is the direct vocabulary teaching strategy, the results based on the analysis of the students' quizzes and questionnaires showed that this strategy is very effective in assisting the acquisition of the target vocabulary, as 82% of the students said that this strategy was more effective, and the quiz results showed that 78, 6% of the students remembered the words and used them correctly.

The second research question: How efficient is the incidental vocabulary strategy, the results showed that this strategy is not very efficient. According to the students' quizzes it showed that students did not acquire the vocabulary intended. As a result, this strategy is very time consuming and not so efficient. The questionnaire results showed that 68.9% of the students did not find this strategy as efficient as the direct strategy. The quiz results revealed that only 23, 5% of the students remembered the vocabulary taught using this strategy.

Third Research question: Which of these two strategies helps students become autonomous learners, the results showed that both strategies had an effect in making students become autonomous. They could read at home (reading part of the incidental strategy) and they could as well do vocabulary exercises, online and using the book, workbook, doing quizzes, crosswords, multiple choice (part of the direct vocabulary teaching strategy). According to the questionnaires, both strategies had almost the same percentage as far as autonomy is concerned. 52% of the students found the direct vocabulary teaching strategy is assisting them more in becoming autonomous learners, whereas 48% of the students said that the incidental vocabulary teaching strategy helps them become autonomous learners.

The fourth and last research question: Do these two strategies work better when combined, the results based on the quizzes showed that these two strategies work when combined, but the incidental vocabulary teaching strategy is very time consuming, and that is why the direct strategy works better. 49% of the students had correct answers in the quiz used with the combined strategies, whereas 51% did not do that well.

VIII. CONCLUSION

Vocabulary is a very important aspect of any language, and especially in a target language. Vocabulary is the main way by which learners can communicate in the target language.

Both vocabulary teaching strategies are widely used in teaching vocabulary to learners of English as a second or foreign language. Both techniques are good, but in this study, the direct vocabulary teaching strategy showed to be more effective, assisted students in becoming autonomous learners, and through this strategy, students learned and remembered the vocabulary more effectively. The students are involved in their own learning, and thus succeed in acquiring the target vocabulary.

IX. LIMITATIONS

The Limitations of this study are:

- There was only a small sample of students; only 60 students were involved in the study. This may not be applicable to other groups of students, as for instance ESP (English for Specific Purposes) students.
- There were time constraints: had we had more time, we would have carried out a more in-depth study of the subject matter. We would have used each strategy for a longer period of time to have more reliable results. And it would be ideal, if we had had the chance to test those students for instance 3 months later and see whether the vocabulary was retained.

X. RECOMMENDATIONS

The recommendations withdrawn from this study are as follows

A bigger sample of students should be involved in the study.

Another study should be carried out with more time at our disposal, so that the issue can be analysed more in-depth.

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KNOWLEDGE OF DANGER USING THE INTERNET BY ELEMENTARY SCHOOL STUDENTS

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Abstract – This paper presents the main ideas about how much elementary school students know about the dangers the Internet hides. A research including 150 elementary school students was conducted. The aim of the research was to find out the scope of elementary school children's knowledge of the dangers using unreliable Internet sites.

I. INTRODUCTION

A new trend has appeared on the Internet nowdays. Social networks shoot up like mushrooms every day. Social networks are on-line communities that gather people who have similar of same interests. Social networks produce networked societies. Facebook associates all of us to social networks. Beside Facebook sites as MySpace and Tweeter are able to network people. Even sending e-mails represents a kind of networking. Social networks have their good and bad aspects. Good aspects comprise making new acquaintances, exchanging experiences and connecting people having similar or same interests as it has been noted above.

If we look at hem from a scientific point of view, they can help us to examine the relationship between people. One of the bad aspects of social networks is that there are various psychological profiles on the social networks. Some of them represent a threat on the user. Due to inexperience people uncover their privacy that can be misused very easily. The Internet is one of the most powerful things today, but if it is in a wrong hand, it can produce very dangerous consequences.

The most endangered persons on the Internet are children due to their psychological features such as emotionally sensitive and thus vulnerable, trusting and believe what adults tell them, enjoy plying games, etc. It is well known that there are people of various profile types, generations, cultural belonging.

Children are those humans who are imperilled mostly among other users. Most children are networked secretly or they are members of some networks. In both cases they are inexperienced concerning the good and bad features social networks. There are different types of child abuse on the social networks such as same age, sexual, identity threft. Children even do not know who is on the other side of the network, they even do not know who they communicate with.

The paper beside global statistical data on social networks presents a tiny research among elementary school students concerning their knowledge of the dangers using the Internet. The research included 150 students of a rural elementary school. The aim of the research was to find out the scope of children knowledge about the dangers using the Internet, especially social networks.

The subject of this paper is social networks, children using social networks, and the dangers children can face using social networks. The goal of this paper is to present the state as it is, and later to develop into a more detailed research, a project. The results could be used for educating children about the Internet generally and its dangers.

II. CHILDREN USING THE INTERNET AND SOCIAL NETWORKS

It is evident that the Internet can be of great use when the development of our skills, obtaining knowledge as well as communicatind with people of same or similar interests, exhanging experiences are in question [1].

Different results are being obtained by researches done in the EU countries. Some results of the researches conducted during the period from 2006 till 2011 are as follows.

According to Lenhart et al from 2011 the following results were obtained: It is recorded in the USA that 69% twelve and thirteen year olds use sites for playing games on social networks

comparing it to older ages it is 44% from fourtheen to seventeen old children [3]. Social network usage patterns are very similar both for boys and girls. 88% girls more often upload photos or video clips comparing to boys (71%), and more often mark other persons (79% girl, 60% boys).

As far as European countries are concerned, the results do not differ to a great extent from the ones obtained in the USA [4] . According to the research conducted by teh EU kids online, the results are as follows:

9-16 year olds use the internet for school work (85%), playing games (83%), watching video clips (76%) and instant messaging (62%). Fewer post images (39%) or messages (31%), use a webcam (31%), filesharing sites (16%) or blog (11%).

59% of 9-16 year olds have a social networking profile – 26% aged 9-10, 49% aged 11-12, 73% aged 13-14 and 82% aged 15-16. Among social network users, 26% have public profiles.

According to the researches conducted in the Republic of Serbia, what stands out is the fact that sever years old children have profile on social networks mostly on the Facebook [5] .

The results of those researches show:

90% children use the Internet daily. It was recorded that one third of them know something about any type of abuse.

80% time they use their computer, children use for surfing the Internet and visiting different sites.

25% children play games, listen to music – 20 % watch video clips – 13 %, 11% use the Internet as study support.

80% high school students, and 65% elementary school students have their own account on social networks [2] .

Analysing the above noted research results we can conclude that children still want to be children for they use the Internet for playing games, as well as to broaden their knowledge.

The question is if children are sufficiently acquainted with the dangers on social networks.

We have to take into account the possibility that children have not given true answers to the questions during the researches.

III. RESEARCH

A very brief poll was conducted. The aims of the questionnaire was to find out how much emelentary school students use social networks, how many years they use social networks regularly, and what they know about the dangers using the Internet and social networks.

Older elementary school students (from 5th to 8th grades) were questioned. They are 12 to 15 years old. 150 students took part in the poll. The number of boys and girls was equal. They had to give answers to the following questions:

a) Do you use social networks?

b) Do you often upload photos either yours or your friends'?

c) Do you know anything about the dangers using the Internet and social networks?

d) Do you want to learn about the dangers on the Internet?

The results obtained from the answers in the questionnaire are as follow.

a) The aim of the first question was to get insight into how many students use social networks. The results are shown in Figure 1 as follows.

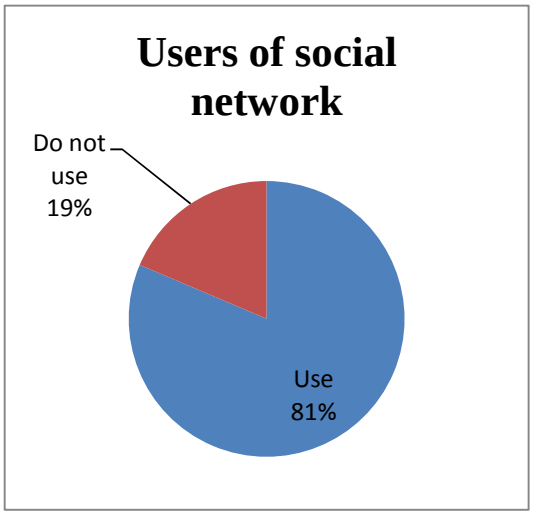

Figure 1. Users of social networks

As it can be seen in Figure 1, 81% students use social networks, while 19% of them do not use it. Girls (55%) use social network more often than boys (45).

b) Goal of the second question was to get insight into how often children upload their photos or their friends' photos. The results are shown in Figure 2 as follows.

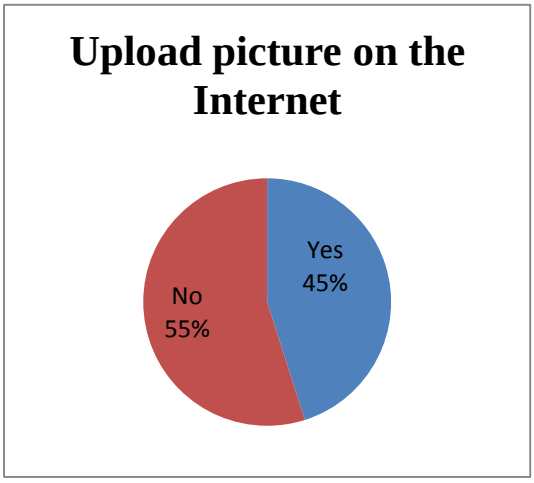

Figure 2. Photos uploading frequency

As it can be seen in Figure 2, 45% students 83% girls, 17% boys) upload any kind of photos. 55% of the social network users do not have habit to upload neither their nor their friends' photos.

c) The goal of the third question was to get answer to the subject matter of this paper, i.e. knowledge of dangers on the Internet. All students had to give answer to this question. The obtained results are presented in Figure 3 as follows.

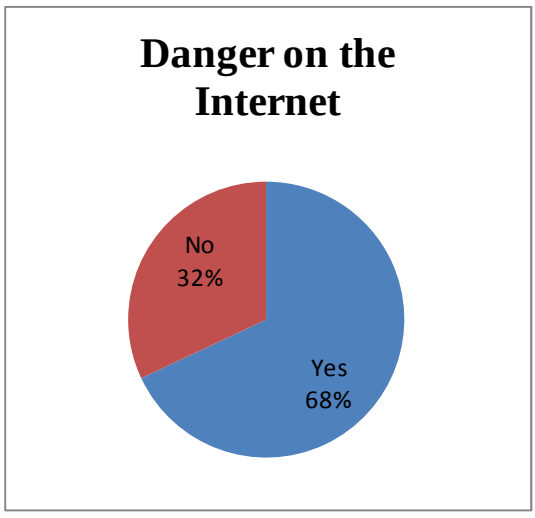

Figure 3. Knowledge of dangers using the Internet

68% students are acquainted with the dangers using the Internet and social networks, while 32% do not know anything about them.

Listing the dangers on the Internet and social networks most answers were connected to hacking Facebook profile and smuggling people. They wrote a lot about how they had to work on the Internet, i.e. about procedures and protection on the Internet. But it is not sufficient for they do know the real dangers using the Internet and social networks.

d) The aim of the fourth question was to find out if they want to get education in dangers using the Internet and social networks. The results are shown in Figure 4.

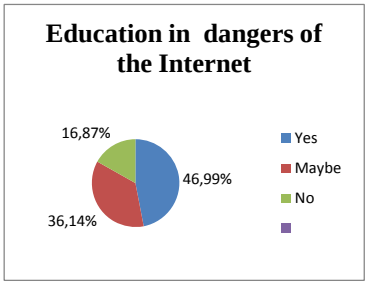

Figure 4. Willingnes for further education

As we can see 46.99% students want to learn about the dangers using the Internet and social networks. Only 16.87% of the questined students stated that they did not want any further education. 36.14% have no attitude toward further education. Besides their low level knowledge of the dangers using the Internet and social networks, students are not eager to learn more about them if we add the undecided ones to those who do not want to learn about the dangers.

Analysing the results and taking into account the Figures we can conclude that most of older elementary school students use the Internet and social networks. We can also see that they are not adequatly introduced to the dangers using the Internet, and that beside their inexperience they are not willing to learn about it. They do not know the difference between dangers and what they have to do and what they must not do using the Internet and social networks. Possible future research may encompass the problems how to protect children on the Internet, how to educate them in an interesting manner. It could include not only students but teachers as well.

IV. CONCLUSION

The above described research was conducted with the aim to get some kind of insight into the knwoledge of dangers using the Internet and social networks by elementary school students. The results show us clearly that students' knowledge of

the dangers using the Internet and social networks is not sufficient, and that the questioned students use the Internet actively. From the research results we can conclude that children do not get any education in the dangers using the Internet and social networks as far as school and family are concerned. Daily we can witness the expansion of the Internet espacially social networks where the dangers are present mostly. This research is the first one with the subject related to the dangers on the Internet, and that may bring us to some solutions.

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NEW MEDIA AND EXPERIENCE IN EDUCATIONAL SYSTEM

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Abstract - The time in which we live recommends changes in many aspects, and their rhythm is irreplaceable and constantly accelerating. Therefore, it is necessary to reorganize gradually the education system. Specifically, the information is more every day, which does not mean that the level of education and training increased, so one has to make choice of educational resources.

To help organize learning both formal and informal it is necessary to introduce new media in teaching educational process with even greater dynamics.

All you need to know concerning the teaching and the media is making sense of optimal use in teaching, and whether their function achieving the goals of teaching.

For the first time media offer us a way to increase the interest of students, and it is actually a transformation of an interesting, visual and content close of life, and well aware of that teachers should be more trained to involve the media in the educational process.

The analysis of new research projects in the field of instructional media applications come to the conclusion that the media have neither positive nor negative traits, and their effectiveness in teaching and learning can be explained as a result of many factors.

The increasing use of media in educational - educational process itself modernizes teaching, and thus actually changing roles of both teachers and students - the student.

I. MEDIA

The word media is of Latin origin (Latin medium - intermediate, middle), and pedagogical terminology is due in English Literature (Eng. medium - middle). In the colloquial language, medium term signifies means of transmitting information, or the means of communication.

"The medium is interpreted as any holder of characters, or information or system of signs or information that enables / supports communication between at least two partners." (Rodek, S. 2007th p.8.)

The function of the media is twofold: he is the holder of the information and / or an intermediary in their transmission.

Media can be understood as "the science of teaching and learning with the help of technical media, based on the findings of educational psychology." (Bognar, L., Matijević, M.: 2002., str.327.)

II. AUDIOVISUAL MEDIA IN UPBRINGING AND EDUCATION

Audiovisual media in education are:

- TV shows,
- Sound instructional films
- Multimedia software on CD - in,
- Amplified slides and video tapes that are stored in sound films or TV shows.

Efficiency in the use of audiovisual media depends on how often they are used in teaching and teacher activities that exercise with students just before, but after watching, teaching film. And we should also bear in mind that complement each other images and sound, and if that is the picture and sound facilities that do not comply may distract students. Television is an audiovisual medium that is most commonly used.

It is an extremely effective medium, because it draws the viewer into its virtual reality, so seeing and hearing is experiencing its image. If we look at the impact of television on viewers to view education in a broader sense then we can talk about the size of this impact on the intellectual, moral and physical development, the quality of the process of forming the person.

Like any media, TV has its advantages and disadvantages.

Advantages of TV are:

- All faithful to the audio - visual aids play an objective reality and gives the students a multitude of specific visual and auditory stimuli,

- Helps correct working out laws, rules and concepts in the minds of the participants,
- Draws the attention and interest in learning,
- Allow the brevity of speech, dynamism and flexibility of teaching contents
- Facilitate the realization of the principle of rationalization and efficiency,
- Allow the combination of audio - visual aids,
- Monitor events and processes at the time of the events, and so on.

Disadvantages of TV are:

- The physical limitations of a certain time,
- Unidirectional communication
- Lack of content broadcast individualization.

Unfortunately, today, we can look and shows that talk about a subject (content), and the picture shows something else. Distracting to students, but the image takes attention away from what is being said, and the image is actually a colloquialism to enrich and assist the subject matter better.

III. NEW MEDIA IN UPBRINGING AND EDUCATION

The term new media often mean new tools in the program, processing, transmission and absorption of information, resulting from the development of some basic technology and, above all, microelectronics and optical - Information Technology.

“The concept of new media we mean mainly the application of computers in teaching and learning as well as multimedia and hypertext.” (Rodek, S. 2007b.str.165)

IV. COMPUTERS

Computers actually serve to facilitate our intellectual activity, that is why we use them for and the name of an electronic brain.

The computer receives the information first then processes and finally presents the results of treatment and that this could all have:

- "Entry point" into the computer
- A place where information is stored, i.e. waiting to be processed
- "Memory" to remember information
- Arithmetic - logic unit for processing
- "Exit" through which the computer is their performance
- Control unit (place of work output pulses for all other parts)
- Electronic waves which information flows between all other parts.

It is important to mention that the computer can process all our information, no matter whether it is numeric or non-numeric, which is an important characteristic for use in the classroom.

Since the computer does not wear a didactic function it is impossible to define as a teaching tool, and it is impossible to treat it as something outside of class, because ultimately serves the educational process at school and largely contributes to changing the overall strategy of teaching.

In fact, as long as the computer is a modern and highly flexible means of communication, it can become a panacea or a solution to all our problems.

V. COMPUTER AND DISTANCE LEARNING

The need for tutoring arose from the desire of people to interact with one another even though they are separated by time and space.

For the first time this learning occurs as a newspaper ad, which offers training in shorthand - at a distance, and published by Caleb Philips from Boston (USA).

In Europe a similar correspondence courses ran during the 19th century. In England, J. Pitman sending their students homework assignments and receive them from their posts.

In Croatia during the Second World War, we find examples of correspondence education when Zagreb's high school students because of the inability to attend school receive printed learning materials.

Mailing School of Economics was founded in 1958. Distance Learning (ADL) improving the gradual development of radio and television. The radio and television educational programs are recorded, and the video - tapes for distance teaching are beginning to use the 70's and 80's.

Due to the new possibilities offered by cable television and satellite programs distance learning slowly interfere in classroom instruction.

Therefore, the development of computer technologies there is progress in distance learning. A traditional school has this kind of learning that is combined with learning in the classroom. Distance learning has its advantages and disadvantages.

VI. ADVANTAGES AND DISADVANTAGES OF DISTANCE LEARNING

The advantages of distance learning are as follows:

Provides continuous learning,

- Students of distance learning material can overcome the speed at which they want, and the learning material can be found as many times as they wish,
- Distance learning courses allow students to find and attend programs that interest them,
- Since it is an active and passive learning, the student chooses his own way of learning.
- Some trainees learn to read the materials, while others learn more easily when discussing with other students,
- Students get ready materials, but can independently look for new information that may allow them to better adoption of certain content,
- For distance learning using the different technologies (computer, CD - player, VCR, etc.), and this requires skilled use of these technologies.

The disadvantages of distance learning are as follows:

- For distance learning live contact is present (with the teacher, students, and others), and for those who have not learned to such types of work that can be a big problem,
- All students must have access to appropriate computer technology that can be very demanding, and it can prevent that course attendees which is not available,

High degree of deviation is trying to solve by introducing support for students through mentors, which tracks the progress of students and encourages it to work.

VII. HISTORICAL DEVELOPMENT OF THE COMPUTER IN TEACHING

The uses of computers in the classroom are most influenced by two factors:

- Programmed instruction - whose role was to teaching in terms of teaching and learning is more intense and individualized
- Computer technologies are rapid development and advancement.

The first machine learning mentioned S.L. Pressey machine with multiple-choice answers.

The program for this machine was a day on empty sheets of paper.

It consisted of questions and answers provided. If a student chooses an incorrect answer, the mechanism for changing the questions could not be run until the student to find the correct answer.

This machine is a multi flawed.

B. F. Skinner makes a new type of machine learning in 1956.

His learning machine has provided new things, motivated the students to provide answers, and offered them an insight into the accuracy of the answers.

Their greatest advantage and the main feature is the simultaneous use of a large number of users, called - shearing.

The first modems, which transform information from the computer into a form that could be transmitted to ordinary phone lines, appear to be 70.

VIII. APPLICATION OF COMPUTERS IN TEACHING OF E – LEARNING

The term e-learning go back to the use of computers in the teaching of, and in fact, it is learning with the help of modern technology. With the use of computers and think of DVDs, CDs, mobile phones and so on.

To the definition of e - learning is that it is actually ". the use of multimedia and the Internet in order to improve the quality of learning - allows remote access to resources and services and enables collaboration and communication at a distance". (ETF - E - Learning Strategy Task Force). E - learning is learning through the Internet where the user information is displayed in one of the web browser. Since the subject matter is on the Internet so it can even come from your own room.

The European Union has adopted an elaborate plan for the development of learning called E - Learning, education of the future (E - learning, Designing Tomorrow with Education).

The plan sets out the objectives and measures that contribute to improving EU competitiveness and economic development of the EU to the 2010th

IX. ADVANTAGES AND DISADVANTAGES OF E – LEARNING

A. *Advantages of e - learning:*

- No matter the distance, all users can participate in teaching quality,
- Because they have constant access to classes and materials they need, when users choose to access the e – learning
- All users with dynamic interactions,
- Access is granted to all sources that are relevant to teaching material.

B. *Disadvantages of e - learning:*

- This learning requires some computer skills i.e. specific knowledge and skills to be able to use it,
- E-learning only is needed related equipment,
- Since the students must motivate themselves to work individually and assess the need for learning often leads to lack of progress.
- Considering the advantages and disadvantages of e - learning cannot replace the classical approach to teaching, but it completely, and we cannot stop using it.

The Internet is a global network of the worlds calculated. This network provides equal access to information to every person in the world to have a personal computer or laptop.

The emergence of the Internet tie to America when the U.S. Department began researching how to create a network that would not have stopped working even in the case of loss of some of its parts. This network has no center, since the closing of the center stopped working and the whole network. Information travels that road which is the fastest and who is currently free, but the time is not always the same.

In order for data to reach, the destination in the correct order in which they are sent and how they interrelate and sent care of the protection system that has been introduced because of these cases. This protection is called Transmission Control Protocol / Internet Protocol, or abbreviated as TCP / IP.

In Croatia, in 1991 founded the Croatian Academic and Research Network, which is an Internet Service Provider (ISP) in Croatia. First international communication line that CARNet point in Zagreb associated with Austria was established in November 1992, and thus, Croatia became part of the global computer network Internet.

The first lecture in the distance here was achieved in January 1997 and between locations Rector of the University of Osijek, Faculty of Electrical Engineering and Computing in Zagreb (by CARNet ATM backbone).

As already mentioned it is of great importance because it provides great access to information for all people in the world that are connected to it. PC or laptops connected to the Internet are actually virtual classroom, which increases the chances for learning and education of each individual. Since each student can get important information and knowledge because it does not have to visit an educational institution. This is exactly what caused the emergence of new didactic solutions called "school at home" or "schooling from home."

Under the influence of the Internet in schools will become increasingly important to occupy the days of free and open classes, which means that more and more develop students' creativity and diversity of projects.

With the advent of the Internet in teaching the role of teacher has changed while the students were mostly passive listeners.

Now the role of the students changed. They become the ones who investigate, resolve any problems, and create various projects.

The program, which is recommended for parents to filter content, is “Control Kids”. It can determine the pages that children cannot visit, and were informed that they would like to access the site.

Hypertext is of English origin (hypertext), and is considered one of the key technologies of multimedia. The concept of hypertext usually means, "A collection of texts that are related to a

functional unit, and the connections between these texts are in fact different links." (Rodek, S. 2007a. P.166.) Hypertext so very effectively can display important aspects of a subject in their complexity and stratification.

In learning to be implemented with the help of hypertext in particular has an important motivation. In situations where there was no intrinsic motivation, academic achievement was not successful; however, if the student becomes aware of the significance and importance of the process of learning, wakes largely and its "intellectual curiosity" to elements that follow, the use of hypermedia environments can be very successful. Studies have shown that the success of hypertext often depends on the mental effort that the student is ready to invest in dealing with certain subjects. The mental effort associated with the motivation and attitudes of students toward the content being processed, i.e. the application of the medium.

Student's knowledge of the subject to be treated, as well as skills related to the use of media in teaching are also an important factor for the effectiveness of learning and teaching. In the so-called management of learning with hypertext, students who have sufficient knowledge in learning more progress than students who lack such knowledge. High knowledge allows them to actively acquire knowledge, i.e. selectively read the text and pay attention to what they might not be important.

C. Multimedia in upbringing and education

Means that multimedia integration connect multiple media together. The term multimedia means the ability of information via multiple sensory modalities, i.e. channels (auditory, visual, etc.). It is important to mention the well-known "golden rule" Jan Amos Comenius, according to which teaching should always strive to maximize student engages more senses. (Rodek, S. 2007.str. 169) He believed that all students should see what they see, hear, touch and taste.

There is an assertion (not empirically proven) that can often be found in the texts of media or in various seminars on the implementation of the media, and it reads:

"From what we read retain 10% of what we hear 20% of what we see 30% of what we hear and see 50%

From what you say, 80%, and from what we say and do 90%. "(Rodek, S. 2007a. Pp. 168.)

It is important to mention that multimedia can be applied with equal success in all situations and stages of instruction.

Can be successfully applied in setting and problem formulation, the analysis of the basis for the decision and the decision of the task or problem, and the application of acquired knowledge, and will have less sense in the application of multimedia in determining goal, agreed on the work, in comparing the results and in the conclusion.

The essential characteristics of modern teaching technology are streamlining and optimization. The teacher is the one who can provide access to multimedia content and implementation of education goals deliberate integration and correlation to their daily work, and to help teachers all over made a multimedia package, which are usually the main complex media for a thematic unit.

X. THE EMPIRICAL WORK

D. Goal research

The aim of the survey was to examine how students use computers, for what purposes, and whether their own homes and school computer.

E. Sample

The study was conducted in primary schools in Croatia. The survey was anonymous.

The above class has 240 students (140 girls and 100 boys).

F. Results and their interpretation

First question is “What do you do in your free time?”

TABLICA I. RESULT FROM THE QUESTION: WHAT DO YOU DO IN YOUR FREE TIME?

Friends	TV	sports	games	other
50 %	20 %	10 %	20 %	-

According to these result we can see that the students still are not slaves to the new media and are less dependent than their peers in the developed countries of Europe are. It is indicative that the TV is a medium that excites the attention of younger population, from which it can conclude that they did not come in to the development of

media culture through educational and training programs.

Second question is “Do you have a computer at home?”

TABLICA II. RESULT FROM THE QUESTION: “DO YOU HAVE A COMPUTER AT HOME? “

YES	NOT
85%	15%

To this question 85% of the students answered yes', and 15% negative.

If we go back to the previous question, we determined that students spend significant time with their friends than to a computer, which is very important. With this result, the first question becomes even more valuable. For students who do not own a computer is not visible to school gives them the ability to use a computer at school.

Third question is “What kind of computer you have at home?”

TABLICA III. RESULT FROM THE QUESTION: “WHAT KIND OF COMPUTER YOU HAVE AT HOME? “

PC	laptop
90 %	10%

85% of students who responded to a home computer, 90% have a PC, and 10% have a laptop.

Fourth question is “Does it have your school computer?”

TABLICA IV. RESULT FROM THE QUESTION: “DOES IT HAVE YOUR SCHOOL COMPUTER?“

Yes	Not
93%	7%

On this question, 93% of students said yes, and 7% of them negative, this can be explained by insufficient informing of students on the technical tools that owns their school. From this, we see that every classroom has at least one computer that students could serve. Therefore, it is not sufficiently developed teaching space or equipment cabinet is satisfactory.

Five Questions is “How often do you use a computer?”

TABLICA V. RESULT FROM THE QUESTION: “HOW OFTEN DO YOU USE A COMPUTER? “

Every day	several times a week	if necessary	anything else
20 %	60%	20%	-

Only a few students use a computer every day, and the reason may be overloaded with other activities, parental “ban” if the computer is not used for educational purposes.

Six Questions: “The computer you use to: a) learning, b) gaming c) something else?”

TABLICA VI. RESULT FROM THE QUESTION: “FOR WHAT DO YOU USE A COMPUTER? “

learning	gaming	something else
50%	**45%**	**5%**

These data show the unsystematic work in education because the schools are not yet equipped, and other reasons can be seen in the insufficient training of teachers for the organization of contemporary teaching. As we might expect, most of the students using the computer for learning, which actually supports the teaching of, and it's actually an indication that the computer is a useful medium in teaching and to facilitate student learning and makes it interesting. We must not neglect the percentage that indicates the use of computers for gaming (45%). All hypotheses were confirmed

XI. CONCLUSION

The world in which we live is unthinkable without the media. Their power and the meaning can be defined as "an essential part" of today's world.

This paper outlines "New Media in Education"; therefore, we have pointed out before the entire computer as a medium of mass communication.

The computer we can use for various purposes, such as: safely surf the web, playing games, learning, but also to perform various tasks.

The introduction of computers in the classroom, there was a change in training - educational process, while learning fast enough modernized.

Every now better-equipped schools has a number of computers that serve to broaden the knowledge of students, and points to the danger of disorientation uncontrolled multitude of information and misinformation. The danger in not see that selectivity does not produce applicable and useful knowledge.

With the help of computers to students is increasing interest in the material taught and the teachers are easier to work because either they would no longer should be the sole teachers.

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