UNIVERZITA KONŠTANTÍNA FILOZOFA

PEDAGOGICKÁ FAKULTA

ICT USED ON SECONDARY SCHOOLS IN SLOVAKIA

BAKALÁRSKA PRÁCA

2012   **Ivana PUČÍKOVÁ**

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Študijný program:	Učiteľstvo anglického jazyka a literatúry
Pracovisko (katedra/ústav):	Katedra lingvodidaktiky a interkultúrnych štúdií
Vedúci bakalárskej práce:	Karina Turčinová, Mgr.

Nitra 2012   **Ivana PUČÍKOVÁ**

Univerzita Konštantína Filozofa v Nitre
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Abstrakt

Cieľom tejto bakalárskej práce bolo zistiť či stredné školy na Slovensku využívajú inovatívnu technológiu, ktorá sa nazýva IKT. Zisťovali sme v akom smere sa IKT využíva ak ide o vzdelávanie a vzdelávací systém na stredných školách na Slovensku. Poukázali sme na výhody ale tiež na nevýhody súvisiace s dlhodobým používaním tejto technológie. Výsledkom práce je prehľad základných informácií týkajúcich sa IKT až po vyjadrenia Európskej Únie a Ministerstva školstva SR.

The aim of this thesis was to find out whether the secondary schools in Slovakia are users of the innovative technology called ICT. We have been investigating in what ways is ICT used, in education and in education system on secondary schools in Slovakia. We pointed out the advantages but also disadvantages of associated with long-term use of this technology. Ther result is an overview of basic information relating to ICT and the Expression of the European Union and the Ministry of Education in Slovakia.

1 Table of Contents

Introduction

Education is one of main antecedency in our life. But more than personally ours, it is a main goal and antecedency of present-day society. We live in lifetime when the use of modern computer technology is a huge necessity. In our thesis we terminated a conceprion of ICT, analyzed a basic terms of Information and Communication Technologies and we zoomed in the ICT usage in secondary schools in Slovakia. We defined the basic equipments of ICT usage, we went throug the European survey which is currently in progress and we also tried to define the nowadays teacher who should be eligible for the correct teaching by ICT usage.

In this thesis you can find an explanation and description of electronical distance study, also called e-learning, which is very popular at the present asi t save our time and creates a comfort while study.

1 ICT

In 21st century the concept of ICT is used relatively in daily speech. Nowadays the term is commonly used in education sector and this work will be especially about using ICT in education. Particularly about ICT used on secondary schools in Slovakia. We will try to write down as much information as we can although it is difficult to be in accordance with the latest information owing to fast development of this technology.

In our document we will take up the questions dealing with experiences of ICT usage of young people in schools and apart from the schools, teacher´s ability to use ICT equipments and we will mention some of the advantages and also disadvantages of ICT usage. In next section we will deal with regulations of European Union and its impact on educational system in Slovakia.

1.1 What does ICT stand for?

At the beginning we would like to explain a basic and we think the most important question. What exactly ICT stand for? ICT is an abbreviation used for **Information and Communications Technology.** It a descendant of abbreviation of IT that used to be an abbreviation for Information Technologies. The term has sprawled out to ICT and word *Communication* has been used since Nowadays the term is commonly used in education sector and this work will be especially about using ICT in education. Particularly about ICT used on secondary schools in Slovakia. We will try to write down as much information as we can although it is difficult to be in accordance with the latest information owing to fast development of this technology.

ICT has an innovative tendency and significant contribute to increase teaching effectivity. The right use and teaching implementation can be beneficial to the educational process. This technology also make work on schools easier regarding to administration of school, administration work of individual teachers and of course ICT in the teaching process. American website TechTarget defines ICT as "a term that includes any communication device or application, encompassing: radio, television, cellular phones, computer and network hardware and software, satelite systems and so

on, as well as the various services and applications associated with them, such as videoconferencing and distance learning. ICT are often spoken in particular context, sucha s ICT in education, health care, or libraries. The term os somewhat more common outside of the United States" (Tech Target, 2003, n. d.).

A website dealing with computer dictionary Tech Terms define ICT as "Technologies that provide access to information through telecommunications. It is similar to Information Technology (IT), but focuses primarily on communication technologies. This includes the Internet, wireless networks, cell phones, and other communication mediums. In the past few decades, information and communication technologies have provided society with a vast array of new communication capabilities. For example, people can communicate in real/time with others in different countries using technologies such as instant messaging and videoconferencing. Social networking websites like Facebook allow users from all over the world to remain in contact and communicate on a regular basis. Modern information and communication technologies have created a global village, in which people can communicate with others across the world as if they were living next door. For this reason, ICT is often studied in the context of how modern communication technologies affect society" (Tech Terms, 4.1.2010, n.d.).

1.1.1 ICT in education

Combination of the terms ICT and education is used quite often. In our opinion it is one of the most increasing technology implemented to educational sector. We are proud to say that Slovakia is one of those countries, they do not hesitate and invest a certain amount of money to this sphere. As it is known, education is very important and necessary for everyone and ICT can only improve this process. Director of Sandlewook International English Course commented on this theme as following: "Nowadays the role of Information and Communication Technology (ICT), especcially internet in the education sector plays an important role, especially in the process of empowering the technology into the educational activities. Education sector can be the most effective sector to anticipate and eliminate the negative impact of ICT. Technology (internet) in another side can be the most effective way to increase the student´s knowledge. Being aware of the significant role of ICT (internet) in our life, especially in the educational

activities, education authorities should be wise enough in implementing the strategies to empower ICT in supporting the teaching and learning process in the classroom. ICT is not jusst the bloom of the educational activities, but also it will be the secondary option to improve the effective and meaningful educational process" (Saverinus,K. 2008, online).

As we mentioned above, it is very important to invest into the technological implementation equipment as it is an of quality education investment. Future jobs are all about computing, that´s why students should be in touch with these technoligies for improving their skills. As is said "students must master this literacy if they are to succeed within, and contribute to a *technology-savvy* future workface" (Steketee, C., 2005, online).

1.1.2 Teachers approach to ICT

In this work we would like to focus specifically on using of ICT as a teaching tool. We have to approve that ICT is a great benefit as a teaching method because of its diversity. We think, there is no subject that could not use an ICT as a useful teaching tool. Teachers of any subject will find in ICT usage what they need, this technology is mnost commonly used at subjects such as biology, mathematics, foreign languages, geography, physics, foreign languages, geography etc. Essential note to say is that teachers must be skilled in teaching via ICT. And as is already known, sometimes students are actually more skilled by using of ICT as teachers. But teachers are always those who lead the lessons so they supposed to have the latest technology information and experiences. Teachers knowledge combined with Information and Communication technology creates a great approach to students. As a result supposed to be a greater student´s motivation.

Teachers are very well aware of the benefits resulting from learning by ICT. To attaining a target it is very important to choose the adequate way of teaching. Before the teacher begins the use of ICT he or she should convince students level of computer abililies. Whether the students are able to use basic software such as Word, Excel or Internet as these are the most commonly used. As well as teachers, students should be

trained before first lesson too, whereas this leads to correct understanding and troublefree apprehension. Opportunity to choose the method of ICT teaching is a great motivation for teachers. They can synchronize tuition to their liking of course in accordance with specifications that are prescribed.

2 Types of ICT equipments

In order to understand what belongs to ICT it is important to highlight and define types of most commonly used information and communication Technologies in education sector.

2.1 The Computer

We meet with this term in daily life and communication, but do we know exactly what computer really is? The computer is basic equipment for ICT using therefore definition is essential to know. Website dealing with computer service, networing, training and repairing characterize computer as following:

"A Computer is in fact a machine that had been designed by the people to carry out some numerical and mathematical operations. Due to its numerical ability it is known as a computer and it provides the solution to the people at much greater speed. At a single time the computer can solve many problems and thus this is one of the oldest devices that had been used by the ancient people and till now many new implementations had been seen in it too. Computer in fact is the most important electronic device created for the people and at time i tis found to be quite helpful fot the people too. The computer itself is comprised of many different parts. The main important part of the computer is the central processing unit without which nothing can be done. The other item that comprises the computer are its hardware and software's. The hardware includes the items which can be touched by the person such as the mouse, keyboard and others where as software are items which are installed within the computer for many different purposes''(Freetech exams,2005).

2.2 The Internet

Now when we are familiar with the definition it is easier to work with our daily companion. By this device, an internet can be installed and applied to learning process.

According to Techtarget website, Internet is a system of computer networks spread all around the world. Sometimes is called just simply *the Net*. It was first known as ARPANet (Advanced Research Project Agency) found by U. S. Government in 1969. The original purpose was to make a network that would allow users of a research computer at one school to be capable *talk to* with research computers at other school. Nowdays the Internet is public, accesible to hundreds of millions people worldwide. For many people, electronic mail c*alled e-mail* has regenerated the Postal Services. The most widely used is a World Wide Web (abbreviated *www* or just *web*). This is the connection by which teachers are able to go trough web sites and find out information they need. "Using the web, you have access to millions of pages of information. Web browsing is done with a Web browser, the most popular of which are Microsoft Internet Explorer and Netscape Navigator. The appearance of a particular Web site may vary slightly depending on the browser you use. Also, later versions of a particular browser are able to render more *bells and whistles* such as animation, virtual reality, sound, and music files, than earlier versions'' (Searchwin Development 2000, n.d.)

Internet used in education sector is very helpful, makes easier to study, communicate between teachers and students, searching for information needed for studying. Nowadays, not many people can imagine life without this network. But let's talk about students. Internet is a great source for them, as it offers a lot of online exercises. Students studying biology, they can see many examples of their themes via internet and supply of information much more comprehensive.

2.3 Interactive whiteboard

By the introduction of computer and Internet we are getting to unthinkable ICT equipment called Interactive whiteboard. This component is designed to work with data projector which receives information from a computer, respectively from internet and is assigned for innovation of education process.

TechLearn define the Interactive whiteboard as following: "Interactive white boards are used in lecture or classroom environments and the technology allows you to write or draw on the surface, print off the image, save it to computer or distribute it over a network. You can also project a computer screen image onto the surface of the whiteboard and then either control the application by touching the board directly or by using a special pen. The computer image can be annotated or drawn over and the annotations saved to disc or sent by email to others'' (Brown, S., TechLearn, The Network Centre, 2011).

Interactive whiteboards are becoming a part of daily life and educating by using this board is more intresting for students, so they are much more motivated. Tool like this can make a lesson more cheerful and amaying. For effective teaching and presentation, with carefl use of ICT interactive whiteboard is a powerful tool. An electronic device that allows life interact with computers, notebooks, directly from the board, by clicking on the projected image with interactive pen. The board serves in addition to natural science and to teach other subjects, and executing of a variety of presentation.

Janigova and Zvedalova made a survey about students opinion and interests. ''Interest on the selected subjects bu using ICT as sucha s interactive whiteboard are also confirmed by a survey carried out on 36 students. The main objective of the survey was to determine the method of study, which students like. We found that 58% of students in the lessons enriched by the use of modern teaching equipment and 10% of respondents are interested in replacing the traditional teaching process e-learning. The survey shows high interests to students (68%) on the use of modern teaching equipment including interactive whiteboard lessons'' (Janigova, Zvedalova, 2011)

2.4 Power Point

Another popular way to teach by the information and communications technology is using the operational software called **Power Point**. This software is frequently used at school lectures. It is important to register that Power Point should be a supportive instrumental not a main teaching instrumental. The rules of communication must be

stated and adapted to the category of students. Adaptability is important for the number of slides. Creator of slides must conform a number of slides to the audience. For example Power Point lecture in primary schools contains approximately five slides unlike a business lecture where slides can accomplish more than fifty slides. The slide show should be visibly enough, adequate to class room luminance and appropriate type and color of fonts too. Arial and Calibri are two types of fonts that are most suitable for presentation whereas in combination with accurate size are very easy to read. Finally is necessary to choose worthy color of background.

Teachers often use software called **Microsoft Excel** too**.** This software is suitable for teaching mathematics, biology, history, music, geography. It is used to create a chart docments. And what is the Microsoft Excel? ''Microsoft Excel is a spread sheet application, typically used to display and manipulate numerical data. Microsoft Excel provides data organization and analysis tools that enables you to sort, extract and generate charts from spread sheet data'' (President of Harvard College, 2010).

From my point of view, teachers most commonly lie to interpret their lecture by use of Power Point software. This is really assorted programe and teachers can adapt and stylize appearance of the presentation as they looks good.

2.5 Analysis

After these information is suitable to ask a question, how ICT can influence the process of learning at our secondary schools? This information and communication technology is widespread almost in all around Slovakia too. Schools and classrooms are social places where teachers and students communicate, share information and challenge their ideas. Internet is very suitable supplement for teaching e.g. foreign languages whereby the teachers learn through various kinds of online exercises. Thus students can work out also different exercises and assignments that are not in the textbook.

Effective useage of ICT in lessons place demands on both sides of the teaching process and on material-technical resources. The students must be at least basic skilled in operating PC, appropriate incentives and have an opprortunity to present their work.

As many technological equipment, also ICT usage has some advantages and disadvantages. We will mention some of them in following section.

2.5.1 Advantages of ICT usage

By thinking of ICT usage we though of many advantages they can be associated by using this technology. And we are right. ICT used as teaching method is offering a lot of new knowledges and makes our lesson more colorful. Lesson can be explained more detailed as we use a variety of teaching software. One of the most commonly used are online exercises on which students are working right on their lesson. Advantage of this form of studying is that students can work by their own pace and right after finishing they know the result. For children that are tired oft learning, the computers could cause an increased interest in learning and education.

We consider the main advantage of ICT usage is the vision of what was invisible before. Thanks to many informations, pictures and videos available on internet students can see exactly what the teacher is talking about and therefore understanding of lesson is more effective, as visible things are easier to remember. By free internet access for students, interest of studying is increasing too. Self-activity working provides a positive impact on the development of students individuality and moreover responsibility for themselves. Another great advantage of ICT usage is that students are getting more experienced in Information Technology (mix of software) and foreign language, especially in english. And just this advantage is even supported by extensive communication, which gives a feedbacks to the teacher.

Joy of the new type of studying contributes to motivation of the students. The classes are more intresting for them. Opportunity to participate in forming of the lessons is really potentiality how to drag students into the scene.

The major benefits for teachers include following: thesis are usable many times after are prepared by teacher, sometimes only small adjustments are necessary, it join and drag the students into the action. Student receive a development of intellect-by using a information, involves thinking and creativity. Students feel like they are co-

creating the lesson, ability to separare and creating work, enhancing the technical and artistic abilities.

2.5.2 Disadvantages of ICT usage

At present time there is a lot of talking about the risk of computer usage by children. Some experts believe that early acquainting with virtual machines deliver the natural development of children and can cause addiction to games, underdeveloped creative thinking, social isolation, reducing te ability of expression, communication, and creating relationships as well as lower self-discipline and not enough incentives to real life.

Some pediatricians also point out that children at early age are still developing the physical structure of the body and senses. Sitting in front of computer can demage the muscle system of child, causing incomplete development of the spine, eye deseases as well. Due to lack of body exercises, children who are sitting in front of a computer more often that is necessary, have much to lay the foundations obesity. I tis well known that children are more prone to obesity related to computer usage.

We have to mention an inappropriate material that children are able to read or download via the internet. They can get much more than they are prepared for and many times it contibutes to a violence. This could affect the behaviour of children in teen age, they become more aggresive and more aggresive to their surroundings. Increasing of child and youth crime may also be evidence of lack of adultness and unpreparedness for adoption of information technology at an early age. Scientist who held these views argue that the teaching of informtion technology should start gently and gradually.

Parents should work together by choosing childrens programs, corresponding to their age and interests. Participation on tv watching folowing the dialogue gives the children opportunity to highlight what is beautiful and ugly, what is good and what is bad, what is true and what is a lie. Talking with children enable them to better understand the program and learn the values important to its future life. It is also necessary to agree some internal family rules for example that child can watch only

programmes selected by parents and the total time they can spend in front of the screen will be determined.

From the educational point of view there are ICT disadvantages too. One of them are untrained teachers that can form the biggest problem whereas teacher is the one who should be a leader of lesson. Teachers have to be trained regularly and be informed about latest development of information and communication technologies. Occuring obsolete ICT equipment cause that teachers even latest knowledges just can not be applied. They also requires a frequent technical maintanance which necessitate an amount of money. As we mentioned before, individual working with ICT at lessons is profitable for students because of emerging of independence but this advantage leads to interpersonal communication. And this fact we rang among the disadvantages.

As last we will mention a condition resulting from often ICT usage. It is a computer addiction that is followed by social interaction. People suffering by computer addiction has a tendency to sleep deprivation and it is followed by change in social behavior. Therefore we can say that ICT usage may not always be profitable.

2.5.3 Barriers to ICT usage

Implementation of ICT is considered to be one of the biggest educational reform. Therefore this type of reform generates some obstacles. Loading of ICT usage into the education system requires a considerable financial investment what can be considered as a barrier. In schools the financial barrier is expressing as insufficient technical equipment. It lies in the lack but also in obsolesence of computers.

According to PiL Survey (2010) "deficiency of computers for students is biggest defficiency"(Informatizacia, Prieskum o IKT na strednych skolach 2010). This is a very important infrromation because as I mentioned above, computer is the basic component for ICT useage. Other barriers are like problems with access to computers, deficiency of technical support, unvalidable or unreliable internet connection. As barriers we can mention an access, time, support, resources.

In our contry first and the biggest barrier is a finance. From our point of view this is a situation where it all starts. After finishing the PiL Survey in 2012 we will see exactly how many high schools are ICT users and how many are not. As we talk about finance, procurement of information and communications technologies depends on the budget of certain school. Thereby we are getting to the fact that education using an information and communication technology has a political undermeaning.

3 Implementation of ICT by European Union

By uniting of chosen European states in 1992, a union has arose and named as an *European Union*. First of May 2004 Slovakia has become a part of European Union as well as another nine European countries. On this day, the number of countries has increased from fifteen to twenty-five and at the present time (after last extension in 2007) twenty-seven countries are members of European Union.

The reason of EU extension lies in idea of increasing an economic and living standards. This vision is closely linked by education. To achieve the goals that EU stated, is important to make a change in educational system. "At the European Council in March 2000 in Lisbon, Europe set itself a strategic goal for the next decade *to become the most competitive and dynamic knowledge-based economy in the world capable of sustainable economic growth with more and better jobs and greater social cohesion.* To achieve this ambitious goal, Heads of States and Government asked for not only a radical transformation of the European economy, but also a challenging programme for the modernisation of social welfare and education systems. This was then translated into specific actions such as those under the Education and Training 2010 programme in order to improve the quality and effectiveness of EU education and training systems; to ensure that they are accessible to all; and to open up education and training to the wider world". This idea is also based on ICT spreading across to Europe in order to create and develop the "Knowledge-based Society KBS" (The Future of ICT and Learning in the knowledge Society).

Definitely we can say that ICT is going to participate on future employments and that is the reason why Members of European Union are interested in educating students by new technologies. Now we know that future education is unimaginable without ICT usage whereas it will become a part of our life. This technology is used in administration employment on daily base therefore students will be prepared enough for environment they will be working in.

3.1 The future in line with ICT

To maintain sufficient attention to changes, organization staff dealing with ICT should be informed about future trends touching teaching and education work out. Increased using of Internet will cause also increased students contact with course contributory. They will be able to study online as never before and working together on various of projects. At present time the e-Learning is very often used and its exploitation will be increasing.

Knowledge of differentia of a new generation is very significant. According to (Kumar S., Tammelin M. 2008) "these young people are native users of technology, fluent in digital language of computers, video games and the internet, compared to those not born into the digital world and are digital immigrants. Digital immigrants adapted to many aspect of new technology but they still retain their accent because they still stand by one foot in the past and do many things the old way. This does not mean that teachers should control all the modern technology. Instead Kumar S: and Tammelin M. emphasizes that teachers need to teach their subjects by prioritize enthusiasm before content" (Swapna K., Tammelin M., Integrovanie IKT do vyučovania cudzích jazykov, 2008).

3.2 e-Learning

The term e-Learning is related to teaching process is used quite often at present time. It is a part of Information and communication technologies and it is defined as "the use of new multimedia technologies and the Internet to improve the quality of learning by facilitating access to resources and services" (VASSILIOU, A. Key Data Learning and Innovation through ICT at School in Europe 2011, page7).

According to Wikipedia.org, there are three abbreviations used as synonyms of e-Learning.

CBT - Computer-Based Training

IBT - Internet-Based Training

WBT – Web-Based Training

e-Learning is a worldwide used technology, effective for distance learning of various courses. By e-Learning student of certain country can virtually attend the classes situated in the other town either on the other state. Offers a comfortable access to variety of courses from universities supported the e-Learning. Good example of e-Learning usage are training classes or continuing education courses which may be oriented to study business, engineering, finance, insurance, languages, healthcare, software applications or low.

Many people, especially those living in the cities are e-Learning users for various reasons. Some of them study from home via e-Learning because of criminality occurring more often in schools. This is one of the ways how to protect children and is quite numerically used in U.S.A. There are also many families where parents teach their children by themselves and as main teaching tool they use an e-Learning. Last but not least is the reason of comfort that e-Learning can offer. This includes time schedule that learner set by his self and also environment he want to study in.

Krelova and Tóblová define the e-Learning as "E-Learning can be understood as a way of teaching, obtaining of information, knowledge and abilities by using a modern information and communication technologies. We can describe it as the most advanced multimedia teaching method based on the internet. It offers wide usage and is characterized by creativity. Worldwide universities are increasingly oriented to e-learning and there are all indicators that this trend will continue with us. To say it simplified, e-learning enable to create multimedia knowledge base of organization, in electronic formed courses, which can be accessed from any computer connected to the internet" (KRELOVÁ,K., TÓBLOVÁ, E., Informačné kompetencie a e-learning).

As a main disadvantage of e-Learning usage we delimitate an *internet network* by which e-Learning is mediated. We are talking about network that can file any time, and situation like this can have destructive consequences on studying. But let´s be optimistic and hope that situation like this never happens.

3.3 Ongoing ICT survey in European secondary schools

Year 2012 is a year of extensive survey of ICT usage in secondary schools belonging to European Union and also other countries such as Croatia, Turkey, Norway and Iceland. This research is executed by *European Schoolnet* which is the association of 30 European Ministries of education. According to website essie.eun.org "the survey is funded by the European Commission Information Society and Media Directorate General. It is a partnership between European Schoolnet and the service *d´Approaches Quantitatives des faits* éducatifs in the Department of Education of the University of Liége" (European Survey of Schools: ICT in Education, 2010).

These people are aware of purpose and importance of ICT usage and therefore are trying to ingathering as much information about secondary schools using this technology as they can. They need to know how many secondary schools are ICT users and to what extend by asking the opinions of teachers and students too. Information and opinions collected from teachers and students are very important for next steps in ICT positive development.

The aim of the research is to find out which schools are ICT users, whether there has been some progress in the use of ICT or not. The questionnaire, excogitated from analytical structure, was used by organizators as a research tool via internet. There are some countries where the questionnaries are distributed on paper by post. This method is applied to schools with deficiency of equipment. After this process the data collection must take place and after that detailed data analysis must be produced. At the end they should have conception of how many schools are using the ICT, whether this technology is used only in administration department or in teaching process too. It is important to obtain as much answers as possible because only thus the answers can be summarized and considered as reliable result.

According to European Schoolnet "the analysis of answers that will be elaborated after the research, is going to be published in 2012 in announcement dealing with comparation of individual countries".

To express the meaning of the ongoing survey I used the cite from Emmanuel Zammit: "this survey will helps us better planing of the future and helps us get the most from the training and technology into which we invested in recent years".

3.3.1 Nowadays teacher in Slovakia

The way of teaching in present time lays especialy in fact that teachers let the students to express their opinion to discussed lesson or theme. But in our opinion, teacher should still retains his position of the one who teach and lead the lesson, eventually encourages and assists to students. Teacher should also use methods that promote and enable the thinking. Conversly students are still those who are knowing the unknown and discovering the undiscovered. Teacher is the one who represents authoritative dignity in pedagogical and educational process. He or she shouldn´t get divert into friend or colegue position whereas it can bring a complexification.

"In the past prominent educationists dreamed of active learning that would be provided a guidance to a large extent by their own students. There is continuing effort of man (for example a student) to must have a right to intellectual self-determination to the individual forms of cognition. Todays new medium - in very broad sense let´s say the computer – brings an unexpected alternatives, alows to realize epistemological pluralism that was dreamed of a long time ago. Finally offers a tool to make children built new knowledge and not just to use them them up. To make pedagogical ideologues dreams come true, there was *divining rod* missing, new data medium, instrument to knowledges construction. New data medium affort learning of better quality. It let children to express the responsibility for their learning – in school the culture of personal responisibility is going to be developed" (Kalaš, 1999).

Development of this new kind of learning is not only the development of new technological equipment but also of new teaching methods related to them. In the past

the prefered action of the teacher was the mandatory dignity what was very stressful and disencouraging for students. From our point of view this is another proof of difference between previous and contemporary teaching method, which was brought and deserved by ICT implementation. At the present "Pupils and students come to class with some experiences that are the base for creating their cognitive structures. These may vary and transform under the influence of new experiences. Thereby are these experiences, if you like information, incordporated and integrated into a pre-existing structures. This structural link between new and old information as well as different ways of processing the acquired information, that from thoughtwave have deduced a new know-hows and conclusions, are from the learners point of view an active constructional process that is presupposition for meaningful learning" (Veselský, Gnoth, 2001) – v praci kde Kalaš.

In conjunct with ICT implementation, important fact has been highlited by Kalaš, 1999 "Changes that should occur are not related only to individual - very carefully separated – subjects. As information and communication technologies demolish imaginery boarders and globalize the world, thus open a wide space for curricular projects and activities" (Kalaš, 1999).

Thanks to development of information and communication technologies, the individual schools are able to participate at projects organized by various other schools or even other countries. Learning by elaborating of projects is very effective whereas the students are actively participating on them. This involvement of students brings a lot of experiences and understanding for them. All of this action is going through the internet. Sometimes it is called also *teleproject* which are "an excellent instruments for developing the interrelation of subjects because their themes are practically oriented, collected directly from life. Teleproject theme could be for example tracking the species composition of animals in the local pond associated with the analysis of water purity, degree of illumination etc. In this project, students can use the knowledges from subjects sucha s biology, ecology, chemistry, physics, mathematics (statistical evaluation, discovering of relativity), geography and english language (unless we succeed in impressing and inspirating also the foreign schools). Students are acquiring not only knowledge but also ways of learning. When acquiring new knowledge, emphasis on independent work is accentuating. It means students own researching and

discovering (constructivist approach) not only passive receiving of ready-made knowledges. By implementation of teleproject, we are naturaly promoting and supporting the teamwork and studen´s partnership with the teacher. As long as students have to present their results (at the lessons, on billboard or websites) they feel the interest about their work, it is supporting their self-sufficiency and motivates them for further action" (Trnková, Mázorová, 2000).

To bring the education system at secondary schools in Slovakia up to date, and to adapt it into todays society requirements, we need to change our teaching organization and arrangement. Teachers of today should be trying to lead the lesson more practically. That means using less prescribed methods and more of researching, experimenting by which should be a result such as student´s knowledge applicable in praxis. But we have to be aware of the importance of respecting the school curriculum and standards that are prescribed. We can not ever overlook them and always have to be in line with them. For teachers expression to educational methods, improvements or requirements, educational surveys are applied as we mentioned above. Teachers should actively comment on this topics.

"Computer literacy skills and abilities are characterized as:

- To know, understand and explain the basic concepts of information technology,
- To use a personal computer (PC) and work with data sets (turn on, restart and turn off the PC), to choose and work with computer screen icons, find the demanded PC programe, delete unnecessary information, make copies, print out the required information and so on,
- Work with text editor PC,
- Create and work with tables, graphs, figures,
- Create and work with databases PC,
- Create presentations ussing a PC,
- Gather information and communicate via PC (working with Internet, creating websites, control e-mail)"

    KRELOVÁ,K., TÓBLOVÁ, E., Informačné kompetencie a e-learning,

    http://www.mtf.stuba.sk/docs//internetovy_casopis/2007/2/krelova.pdf

3.4 Ministry of Education of the Slovak Republic and its approach to ICT usage

Ministry of Education of the Slovak Republic actively supports the new digital learning content, it is first and lead project held by Ministry of Education. At present time this project is applied on 125 schools in Slovakia and it is going to be augumented to other schools in near future.

"Digital learning content is going to be ready in the official language for the subjects of the state education programme. It is going to be stored in data center, Ministry of Educationand schools will have on-line, off-line version and DVD version too. Ministry of Education supplies information technology through national projects such as modernizing the educational process in primary schools and modernization of the training process in secondary schools. Activities with trained teachers to use information and communication technologies in the teaching process are developed by this institution too. Educating of teachers in ambit of ICT is provided by various projects specialized for the professional and career development of employee. Training of nursery school teachers, foreign language teachers or teachers of computer science. Even students of firts grade of primary school have the opportunity to acquire basic competence in the field of information and communication technologies. As the Ministry of Education anchored in the state educational programme, teaching of informatics is applied from second year-class of primary school. The problem still remains unsufficient amount of computers in schools which complicates building competence in the field of ICT for students and techers. A competence in ICT field wasn´t included into the requirements of professional competence of teachers, so Ministry of Education is planning to change it in near future. There is a great potential that situation in Slovakia is going to be improved whereas implementation of information and communication technologies into the educational system is interrelated to the educational reform and the use of structural funds"

(Minedu, Oznamy a správy, 2010).

3.5 Education system in Slovakia

Information and communication technology as an innovative tool, is in Slovak educational process used on daily base. Informatic lectures applied on secondary

schools are not the only one where ICT is used. There is a lot of other ones as we mentioned before, thus views and opinions may vary. Consequently experts opinions of the use of ICT depends on angle of view.

From technical point of view the classroom with information and communication technologies should be designed for usage of more subjects. The propper ICT classroom shouldn´t be missing a basic equipments such as computer, speakers, interactive whiteboard, data projector and a propper transmission speed should be ensured too.

Healt aspects are very important for students and never should be abandoned. We will mention a few of them, which we consider to be the most uncapable. Luminosity of classroom, hygienic characteristics of technical equipment and last but not least is a time spent in the classroom. These are the most important aspects which the teacher have to supervise.

Practically information and communication technology in schools is not used for teaching purpose only. There are also other activities associated to using this technology. ICT is ensuring the administrative operations of school too. A school directorate is using it for convenient organization of school, ensuring the safety and troublefree movements in school. Another action for ICT usage is very essential and i tis a teacher´s educating and training.

According to The Association of Infovek project, 2004; and Kalaš,1999; "the head administrative operations in school are:

- school management database – includes a list of sudents, classification of individual subjects;
- production of school schedule;
- information system of school, school management, methodical centers and the Ministry of Education – directly of the computer in teachers office can he or she for example obtain an information about meetings, study materials, send classification sheets or registration list to training etc., students are free to determine for example layouts of various competition and deadlines for their submission.

- official communications between the school and school management, or with parents or students;
- information system of school library – fast and easy browsing from whichever place in school, simplyfication of the whool library service and records;
- presentation of school through the web sites – also in this way the school is constructing their image, informs abou their activities and achievement";

As the biggest advantage of ICT used for administration purposes is written communication betweet teacher and parents. They can communicate on daily base about actual problems for example advancement of student.

3.6 ICT usage in secondary schools

Considering the fact that Slovak Republic is a part of the European Union, it is important to notice that this country must be conformed to EU standard specifications. And education system is not the exeption. However Slovak educational system is very rich for its history and is divided into four categories. One of them are secondary schools which is the main topic of this thesis. Of course in conjunction with information and communication technologies. ICT used on secondary schools in Slovakia is the theme which we will be devoting to in following lines.

Curriculum is different for individual types of secondary schools and are elaborated by Ministry of Education. These curriculums should be adapted to the type of secondary school, for example whether it is a grammar-school, specialized secondary school, conservatory or vocational school. And this is associated with range of ICT usage in individual secondary schools.

Essential method intended for motivation of students to learn by using of ICT is the so-called *self-education.* This method is intended for students of secondary schools. "For teenagers, the main goal of self-education to learn independence in thinking, actions and decision, is self-education. By obtaining various knowledges students can develop their talents and be better prepared for life and future careers, to make own opinion and to be able to reasonably reflect it, to acquire ability to orientate in miscellaneous difficulties of our life and to know how to solve it" (Dado, M., Podhradský, P., Využitie IKT technologií a sieťových platforiem novej generácie vo vzdelávaní).

To create approximate idea of using of information and communication technologies in secondary schools in Slovakia we tried to create a kind of survey. We contacted eighty secondary schools (ten secondary schools from each region) and we used the following three questions:

- Do you use an Information and Communication Technologies in your school?
- If yes, on what subjects the ICT is used?
- What is the availability of information and communication equipments in your school?

The result of the survey was unsatisfied because from all eighty secondary schools, only three responded us. And therefore we can name this survey as a *mini survey* .But we are glad that the answers to aour questions were positive. All three schools are ICT users and they specified subjects were ICT is using as a teaching tool. The most commonly used are subject follows: *foreign languages, biology, mathematics, chemistry, technical subjects.*

As we didnt get the answers at least from half questioned schools, we tried to find out some more information about the topic. So we decided to go through the websites of individual, randomly selected secondary schools. By this way we moved little bit forward about the ollecting of information.

In Slovakia there is a lot of schools organizing an courses that are available online. "Courses for secondary schools are dedicated for presence, distance and also for combined study. At the level of secondary school education, it is possible to use

e-learning study materials also for uncontrolled self-study. E-learning study can be a substitute for teaching unit (lesson), but may also be a suitable addition to any other form of education. By utilization of courses as compensation per hour of the basic course, the application of basic principles of teaching is provided:

- Scientism
- Sequence
- Activities
- Schematics

- The adequacy
- Individual pace"

(Dado, M., Podhradský, P., Využitie IKT technologií a sieťových platforiem novej generácie vo vzdelávaní).

3.6.1 Internet class book

We obtained many infromation by browsing the websites of secondary schools. One and the most visible is the website design that in many cases is on high quality level. They are transparent, easy to use for student, visitor or parents. What impressed us he most at first sight was *online student class book*. To explain what exactly students class book is, we used a cite from ezacka.sk.

"Internet class book begins to expand to all around the world becoming a sort of standard for each school quality. With Internet class book sudents can actively monitor his or her achievement, right on the internet, which is currently in any other home thanks to huge price reduction. Internet class book is very helpful for parents who can follow the results of his or her study and eventually guide them in further study. Internet class book hould simplify the life of parens and teachers. A parent may send a messages to class teacher (for example an apologies for child)directly via ICB, and class teacher may send a messages to a parent (such as improvement-deteioration of the achievement). Class teacher can also write a mass message to the whole class and in this way to inform parents about a parents meeting, or other activity. Internet class book contains a huge amout of functions and continually the new are adding. Every school is trying to make their study more efective and more enhance. Parents and students certainly welcome the system of Internet class book, where they can find out up to date informations and may avoid some trubles. Right now is the roght time to try upgrading of internet usage. Internet class book is simple, intuitive and extensive solution for all schools that are intrested in moving forward and to improve the level of informedness of their students and parents" (eknizka.sk).

3.6.2 School Web sites

On the websites of individual schools we found a lot of information about them. Most of the schools has a pictures of school, classrooms placed in the galery file.

Another information publicated on websites are, list of teachers, subjects that are available for learning, maps, calendar, projects, announcements of director, information about entry exams, information about leaving exams, statistics, contacts. Some of the schools are users of *online or digital library*. This kind of library provide an informations and knowledges which are very usable and helpful nowadays.

"Through the services, the school library offers alldocuments and information resources that enable members of the school community learn to become a critical thinkers and effective users of information. The library staff supports the use of documents and other information sources. Materials are supplemented an enriched by textbooks and various methodical materials for teachers. Followed fact turned out: when librarians and teachers work together, students achieve higher leverls of literacy, reading, learning, solving of problem and ability to work with information and communication technologies. School library services have to be provided equally to all members of the school community, regardless of age, race, sex, religion, nationality, language, professional or social status. Special services and materials must be provided to those who are unable to use conventional library services and materials. Acces to servies and collectionss should be based on the Universal Declaration of Human Rights and Freedoms and the United Nations should not be subject to any ideological, political or religious consorship or commercial pressure"(Manifest školských knižníc UNESCO, 2007)

Using of ICT is changing the ordinary school into the modern school. From randomly selected secondary schools oriented to building industry, we learned that the way of teaching has changed radicaly. This change occured since information and communication technology was applied into the learning process. And this entiles a high quality and conditions of education. Schools are cooperating with special softwares assigned for draw projects, these are as follows: Alplan – Nemetschek, Autocad, Autocad Civil 3D). Omega software is used for teaching of accounting and leading accounting agenda.

School websites also provides a documents that may be necessary for students. These documents are available for downloading anytime. This is another great advantage of ICT usage because in the past students had to go through some process to

get documents, e.g. request for interruption of study, request for learning department change, request for repeating of school year. On websites, there are also documents assigned for teachers and they are – request for event approval, schedule form, request for leaving from work and many others.

At school websites the visitors can find out a lot of information that are very helpful. Teenagers deciding of what school they will be study on, use websited to heap up as much information as is possible. Providing of information in comparing with the past is a considerable change.

The goal of this thesis was to find out more information about the ICT usage in education at secondary schools in Slovakia. We discussed the definition of basic terms of ICT and we are now familiar with the concepts which are used the most often in association with information and communication technology. It is a form of teaching that is currently necessary to achieve specified goals. We are aware of requirements of future employments which will be closely relate with ICT elements. It is important that students are acquainted with this technology during their lessons and regularly acquire it in practise. The aim of teaching by ICT usage is the students information literacy development which of knowledge is going to be necessary in future employment environment. We learned information about ICT from the point of view of European Union and also Ministry of education of Slovak Republic, which clarify that ICT education will be expanding and upgrading in the future. We can clearly allege that ICT is goin to be part of our daily life in the near future.

Conclusion

Nowadays it is clear that using of information and communication technologies is great benefit for current school system. Comprehensively we could allege, this innovation of school system is necessary. In this thesis we were describing the most modern technology in education system and comprehensively we could allege, this innovation of school system is necessary.

We have to note that the use of this technology nowadays is mainly a pedagogical problem than technical. For successfull use of ICT is necessary to produce a computer-literate teaching community that will be train people for to be applicable in future employment. Teachers were added the obligation to succesfully manage, implement and transform the curent condition of education in our schools into the condition where advanced technologies will be usable in daily life.

Whereas we haven´t succeed in our survey in the way we expected, we will try to continue in researching the secondary schools in Slovakia for collecting more information. Reason of the continuing research is that we would like to pursue to this topic even in master´s thesis, in which we would like to present a specific numbers of using of ICT in secondary schools in Slovakia.

Resume

V našej práci sme sa zaoberali témou Informačných a komunikačných technológií, využívaných na stredných školách na Slovensku. V dnešnej dobe, kedy je náš každodenný život preplnený rôznymi druhmi technológií a informácií sprostredkovanými z rôznych médií je dôležité tieto aspekty poznať a hlavne vedieť ovládať.

Hneď v úvode sme vymedzili a pojem IKT. Ide o technológiu, ktorá sa možno až tak často neskloňuje v našej dennej reči, no fakt že sa s ňou denne stretávame je nezanedbateľný. Možno si to ani neuvedomujeme ale IKT, teda Informačné a komunikačné technológie sú všade okolo nás a len veľmi ťažko si dokážeme predstaviť život bez nich. Je veľmi dôležité uvedomiť si silu a vplyv tejto technológie na ľudskú myseľ. Pre to, aby človek dokázal s informačnými a komunikačnými technológiami pracovať správne bez toho aby mali na ľudskú bytosť negatívny vplyv, je veľmi dôležité porozumieť tomuto inovatívnemu médiu.

Na to, aby sme pochopili čo IKT vlastne je, v prvej kapitole sme si vymedzili základné pojmy súvisiace s využívaním IKT. Ide o základný komponent - počítač - ďalej sme spomenuli tie programy, ktoré sú najčastejšie využívané ako pomôcky pri edukačnom procese.

Z názvu našej práce je ale zrejmé, že sme sa zaoberali hlavne témou IKT v súvislosti so strednými školami. Zisťovali sme fakty, v akých školských sférach sa IKT využíva. Zistili sme že vo veľkej miere sa táto technológia využíva v administratíve a pri riadení školy. Vedú sa rôzne agendy, klasifikácie, zoznamy študentov a zamestnancov školy, projekty a to všetko pomocou IKT. Podľa zistených informácií, prístup učiteľov k vyučovaniu pomocou informačno-komunikačných technológií je veľmi pozitívny. Táto metóda vyučovania im priniesla veľký osoh a podľa zistených informácií je to obrovský prínos pre študentov a ich chápanie. Dôvodom sú programy typu Power Point, ktorá patrí medzi najčastejšie využívané programy vo výučbe. Program pracuje na spôsobe prezentácie, do ktorej je možné vkladať rôzne obrázky, videá, zvuky, hudbu a pod. Dobre prepracovaná prezentácia dokáže študentovi priniesť úplne nový pohľad na učenie sa, nakoľko je to veľmi motivujúce.

Známe sú aj hodiny v špecializovaných triedach kde študenti pracujú priamo s informačnými a komunikačnými technológiami (v minulosti nazývanými "výpočtová technika"). V takýchto triedach majú študenti k dispozícii počítače so zavedenou internetovou sieťou. Forma štúdia spočíva v tom ,že učiteľ môže zadať úlohy žiakom s tým, že odpovede na otázky a úlohy sami vyhľadávajú na internete. Týmto si výborne precvičujú činnosť s IKT, osvojujú si anglický jazyk ktorého slová sú bežne používané či už na klávesnici alebo na samotnom internete. Žiaci sa takto naučia aj samostatnosti a zodpovednosti za seba a svoje rozhodnutia.

Ďalším dôležitým aspektom ktorému sme sa venovali je dostatočná/nedostatočná vzdelanosť našich vyučujúcich, v oblasti používania informačných a komunikačných technológií. Na Slovensku ale i v ostatných štátoch Európskej Únie sa organizujú rôzne školenia z tejto oblasti. Pretože fakt, aby učiteľ používajúci IKT vo výučbe, je veľmi dôležitý a neprehliadnuteľný. Zlé zaškolenie vyučujúceho by mohli mať ešte horší dopad na výučbu študentov.

Vzdelávacie organizácie nie len zo Slovenska ale aj z iných členských štátov Európskej Únie poskytujú rôzne školenia a tréningy, ktorých sa môže zúčastniť každý. Nehľadiac na vek, rasu, pohlavie, orientáciu atd. Ide o kurzy vyučované pomocou technológie nazývanej e-Learning. Táto forma výučby je úžasnou súčasťou moderného vzdelávania. Ako sme uvádzali v našej práci, pomocou e-Learningu je možné študovať na strednej škole alebo na univerzite prostredníctvom internetu bez toho, aby ste museli navštíviť hodinu fyzicky. E-learning umožňuje študovať z pohodlia Vášho domova, dokonca z iného mesta alebo štátu.

V Spojených štátoch Amerických je táto forma štúdia využívaná často kvôli zvýšenej kriminalite na stredných školách, preto rodičia často zvolia radšej túto alternatívu pre svoje deti. E-Learning je tiež využívaný v rodinách kde rodičia učia svoje deti doma a e-learning používajú ako pomôcku alebo nápovedu pri riešení rôznych úloh.

V druhej kapitole našej práce sme spomenuli výhody a nevýhody spojené s používaním informačných a komunikačných technológií.

Počas písania práce sme sa snažili vytvoriť menší prieskum o tom koľko stredných škôl na Slovensku využíva IKT a pri akých predmetoch. Na naše poľutovanie nám odpovedalo len veľmi málo škôl, preto sme ďalšie informácie čerpali z internetu, keďže sme hľadali aktuálne informácie.

Všetci odpovedajúci odpovedali pozitívne v súvislosti s využívaním IKT a uviedli, že najčastejšie sa táto forma výučby aplikuje pri predmetoch ako sú cudzie jazyky, matematika, chémia, fyzika, biológia, ekonomika a účtovníctvo. Pevne veríme, že pri rozširovaní našej práce sa priblížime k presnejším číslam, čo sa týka počtu stredných škôl využívajúcich IKT.

Súčasťou tejto práce je aj vyjadrenie Ministerstva školstva Slovenskej Republiky k implementácii informačných a komunikačných technológií do vyučovania.

V poslednej časti tejto práce sme poukázali na konkrétnejšie využitia IKT priamo na stredných školách, ako je napríklad online žiacka knižka. Venovali sme sa webovým stránkam stredných škôl, nakoľko to sú miesta kde uchádzači o štúdium (ale nie len oni) dostanú všetky informácie týkajúce sa danej školy, ktoré boli v minulosti len veľmi ťažko dostupné.

Počas získavania podkladov a informácií pre vypracovanie tejto práce, sme došli k záveru, že digitalizácia prostredia v ktorom žijeme sa stupňuje čoraz viac a preto je nevyhnutné zaoberať sa týmito témami rovnakým tempom.

List of Resources

1. TECH TARGET, ICT, n.d. [online] Newton,2003 [cit. 20.11. 2011] Available at

   < http://searchcio-midmarket.techtarget.com/definition/ICT>

2. TECH TERMS, Ict, n.d. [online] 2010 [cit. 12.12.2011] Available at:

   < http://www.techterms.com/definition/ict>

3. SAVERINUS, K., The role of ICT in education sector, [online] 2008, [cit.12.12.2011] Available at:

   <http://verykaka.wordpress.com/2008/07/25/the-role-of-ict-in-education-sector/>

4. STEKETEE, C. (2005). Integrating ICT as an integral teaching and learning tool into pre-service teacher training courses. Issues in Educational Research 15(1), 101-113.

   < http://www.iier.org.au/iier15/steketee.html>

5. FREETECH EXAMS, Computer, 2005 [online] [cit.8.12.2012] Available at:
   <http://www.freetechexams.com/computer-networking/network/computer.html>

6. SEARCHWIN DEVELOPMENT, Internet, 2000 [online] Newton [cit.7.12.2012] Available at:

   < http://searchwindevelopment.techtarget.com/definition/Internet>

7. BROWN, S., Whiteboard, Techlearn service[online] York, n.d., Available at:
   <http://www.jisc.ac.uk/media/documents/publications/interactivewhiteboards.pdf>

8. JANIGOVA, YVEDALOVA, n.d. [online] cited 8.1.2012 Available at:
   <knod.ku.sk/dokumentz/prispevkz/janogovaZvedalova.pdf>

9. President of Harvard College, Microsoft Excel Information and Support, 2010 [online] cit. 12.1.2012 Available at:

   < http://it.med.harvard.edu/pg.asp?pn=software_excel>

10. Prieskum o IKT na strednzch skolach, Informatizacia, 2010 [online] cit. 7.12.2012, Available at:

<http://www.informatizacia.sk/sledovane-temy-prieskum-o-ikt-na-skolach-/1275c>

11. The Future of ICT and Learning in the knowledge Society, [online] cit. 20.1.2012, Available at:

<http://ftp.jrc.es/EURdoc/22218-ExeSumm.pdf>

12. SWAPNA K., TAMMELIN, M., Integrovanie IKT do vyučovania cudzích jazykov, 2008 [online] cit. 23.1.2012, Available at:

< http://webh01.ua.ac.be/odlac/guides/4g-GUIDES-INSTITUTIONS-SK.pdf>

13. VASSILIOU, A. Key Data Learning and Innovation through ICT at School in Europe 2011,[online] page7, Available at:

http://eacea.ec.europa.eu/education/eurydice/documents/key_data_series/129EN.pdf

14. KRELOVÁ,K., TÓBLOVÁ, E., Informačné kompetencie a e-learning, [online] Trnava, n.d. Available at:

<http://www.mtf.stuba.sk/docs//internetovy_casopis/2007/2/krelova.pdf>

15. European Survey of Schools: ICT in Education, 2010 [online] Available at: <http://essie.eun.org/>

16. Source available at: <http://www.eun.org/web/guest/projects/current>

17. KALAŠ, I. (1999): Integrácia informačných a komunikačných technológií do všeobecného vzdelania [online], cit. 25.2.2012, Available at:
< http://www.infovek.sk/archivwebu/konferencia/2000/prispevky/ikt.html>

18. VESELSKÝ, GNOTH, 1999, Integrácia informačných a komunikačných technológií do všeobecného vzdelania [online] cit.25.2.2012, Available at:
< http://www.infovek.sk/archivwebu/konferencia/2000/prispevky/ikt.html>

19. MAZOROVA, H., Možnosti využitia informačných a komunikačných technológií vo vyučovaní biológie, 2004, [online] cit. 3.3.2012, ISBN 80-7098-314-0,

<http://www.infovek.sk/predmety/biologia/biologia_komplet.pdf>

20. KRELOVÁ,K., TÓBLOVÁ, E., Informačné kompetencie a e-learning, http://www.mtf.stuba.sk/docs//internetovy_casopis/2007/2/krelova.pdf

21.   Minedu, Oznamy a správy, 2010, n.d. [online] cit. 20.3.2012 Available at:

<http://www.minedu.sk/index.php?lang=sk&rootId=5605

22.   DADO, M., PODHRADSKY, P., Záverečná správa, Využitie IKT technologií a sieťových platforiem novej generácie vo vzdelávaní, Žilina, 2006, [online] Available at:

<http://www.minedu.sk/index.php?lang=sk&rootId=1530>

23.   KRELOVÁ,K., TÓBLOVÁ, E., Informačné kompetencie a e-learning, http://www.mtf.stuba.sk/docs//internetovy_casopis/2007/2/krelova.pdf

24.   Manifest školských knižníc UNESCO, 2007, [online], cit 23.3.2012, Available at:

< http://www.spgk.sk/?manifest-skolskych-kniznic-unesco-ifla>

25.   E-knizka, n.d., 2010, [online] cit.16.4.2012, Available at:

< http://www.eknizky.sk/>