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Moderní technika ve výuce angličtiny na ZŠ

Diplomová práce

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Zásady pro vypracování:

Diplomová práce se bude zabývat vhodností a možnostmi aplikace moderních technologií do výuky anglického jazyka. Bude také reflektovat možnosti systematičtějšího a komplexnějšího zařazování technologií do výuky. Praktická část práce bude obsahovat drobný výzkumný prvek.

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Prohlášení

Prohlašuji, že jsem tuto diplomovou práci vypracoval pod vedením vedoucího diplomové práce samostatně a uvedl jsem všechny použité prameny a literaturu.

V Hradci Králové dne 6. dubna 2015

Poděkování

Děkuji Mgr. Pavle Machové, M.A., Ph.D. za odborné vedení práce, cenné rady a podněty při psaní diplomové práce.

Anotace

MATUŠKA, David. *Moderní technika ve výuce angličtiny na ZŠ*. Hradec Králové: Pedagogická fakulta Univerzity Hradec Králové, 2015. 87 stran. Diplomová práce.

Tato diplomová práce se zabývá implementací ICT do vzdělávání a technologiemi podporovanou výukou s důrazem na jazykovou výuku, především pak angličtinu. Zaměřuje se jak na jednotlivé inovace v této oblasti, tak i na komplexní přístupy k tomuto tématu. Práce také předkládá vývoj implementace ICT do výuky, stejně tak jako proces začleňování ICT do vzdělávacích dokumentů. Je také pokryto téma ICT gramotnosti a její důležitost jak pro učitele, tak pro studenty. Pro účely praktické části byla vybrána jedna základní škola, v rámci které byl celý výzkum vykonán. Tento výzkum se zaměřoval na postoj učitelů této školy vůči vzdělávacímu ICT, míru používání ICT a projekty zaměřenými na implementaci ICT, kterých se tato škola účastní.

Klíčová slova: vzdělávací ICT, technologiemi podporovaná výuka, informační gramotnost, komplexní implementace ICT

Annotation

MATUŠKA, David. *ICT in ELT*. Hradec Králové: Faculty of Education, University of Hradec Králové, 2015. 87 pp. Diploma Thesis.

The diploma thesis deals with the ICT implementation into education and technology-based education. The emphasis is put on the foreign language education, especially English. It focuses on the individual innovations in the field, as well as on the complex approaches. It also presents the evolution of ICT implementation into education, as well as the process of incorporation of ICT into the educational documents. The thesis also covers the issue of ICT literacy and its importance for both teachers and students. For the purposes of the practical part one elementary school was chosen within which the whole research was carried out. The research focused on teachers' attitudes towards the instructional ICT, the rate of use of ICT and projects dealing with the ICT implementation in which the school participates.

Key words: instructional ICT, ELT, technology-based education, information literacy, complex ICT implementation

CONTENT

INTRODUCTION

Information and communication technologies (ICT) are increasingly penetrating into our society and everyday life. This development got nowadays to the stage that ICT is nearly inseparable from our lives. Due to this fact, there is a great tendency in the field of education to implement ICT into the curricular documents and, more importantly, into the lessons in every school. The general aim of this thesis is to analyse the suitability of the most common pieces of ICT in education, as well as approaches to the ICT implementation. The diploma thesis will build on the basis of my bachelor thesis that dealt with the same topic. Therefore, in some parts I will refer to it. I have chosen this topic because of my rather positive relationship to technologies and I am interested in whether their presence both in the classroom and outside of it can be beneficial for education in any way. As an English teacher, it is also important for me to have general knowledge concerning modern trends and approaches in education.

Since ICT has gone through radical changes over the last seven decades, the first part of this thesis will present the most important milestones in its history with the emphasis on original and contemporary reasons for its implementing into education. The increasing influence of ICT on education unavoidably led to the changes in curricular documents. These specific changes, as well as newly emerged documents, will be the aim of the following part. ICT also requires its users to acquire new skills and abilities, and so it gave rise to a new set of competencies, collectively called the information literacy, that young generation should undoubtedly master. However, teachers cannot fall behind. This issue will be explored in the next section of the theoretical part of the thesis. In the last chapter of the theoretical part the concept of the technology-based education (TBE) will be introduced, as well as the latest innovations and approaches of its implementation. The emphasis will be put on the language education.

The research part of this diploma thesis will aim to explore the environment of one of the elementary schools in Hradec Kralove in respect to the usage of the instructional ICT and attitudes of teachers of the school towards it. The hypothesis is that elementary school teachers are sceptical about the impacts and importance of the instructional ICT and their willingness to use them is not high. It is also presupposed that the level of their ICT literacy is rather basic. For the purpose of this research I have chosen the

Elementary school Jiraskovo namesti, Hradec Kralove because of the fact that I teach there.
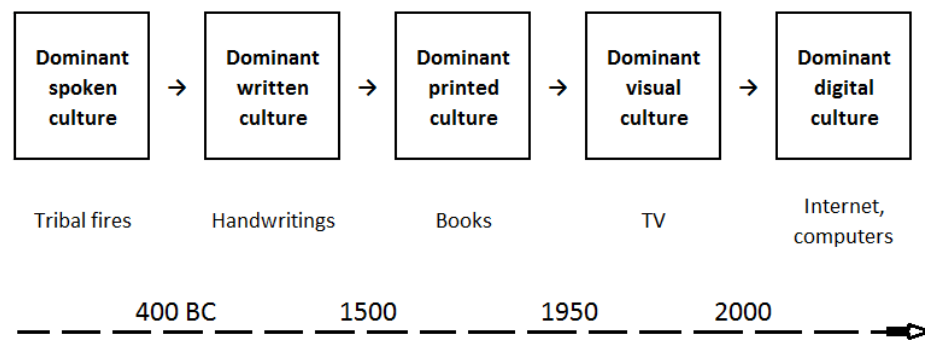
Concerning the citation of the electronic sources, I decided to label each of them with a code name that will be used in the text to refer to the detailed information about the source in the source list.

1. THE EVOLUTION OF TBE

The pace of the world in the 21st century is enormous. Literally thousands of discoveries and inventions are being introduced all over the world every year. Completely new ideas are being presented and recorded, new theories and attitudes to both old and new concepts are being promoted. And yet, all of them, brought to the world one day, are destined to be outdated, supplemented or even supplanted someday. This process of change has been here since the very beginning of human society in its broadest term; however, what is typical these days is that the interval between "one day" and "someday" is getting shorter and shorter. The chief factor causing these rapid changes is still greater possibility to spread and process information in general extremely fast. This is not, however, strictly limited to just information. Analogically, new technologies are being spread as faster than ever before. This is true for so called educational technologies as well which eventually led to the development of learning concepts such as technology-based instruction or e-learning. But first things first. This chapter will explore and present the most influential milestones in the history of (educational) technologies which had both direct and indirect impact on educational process and concepts in teaching as such. It will also give a brief insight into the gradual process of implementation of technologies (not only) into the education of pioneering countries in this field.

To explore the beginning and further development of information and communication technologies (ICT) and its implementation into education, it would be desirable to know its starting point. This might be, however, rather misleading. Brdička (2012) emphasizes that the present situation is the result of long historical development that started in its broadest meaning as early as several hundred years BC and naturally, due to the growing needs of society in both social and educational fields, resulted in "the dominant digital culture" of present day. In this development he perceives the invention of the printing press in the 15th century as one of the greatest game-changers, and goes on to claim that this revolution is of exactly the same nature as today's internet revolution (Brdička, 2012). In the case of the printing press the importance is evident; most of the people at that time had suddenly much less limited access to writings than ever before. This had a dramatic positive impact on literacy and knowledge. Analogically, the introduction of the internet and computers into civil society enormously changed the

accessing and, more importantly, sharing and publishing information and knowledge. The culture of visual dominance served as a transition step between these two diverse eras. In other words, it was the time when *technologies* as we understand them today began to appear and slowly take the place of solely mechanical or manual devices. Then, the role of film and television in instruction were being gradually discovered and appreciated. However, technological (im)possibilities were limited and it took time for their potential to be fully developed (Brdička, 2012). This viewpoint on the development of ICT is illustrated in scheme 1 (Ed-tech 21 [online])[1].

Dominant spoken culture	→	Dominant written culture	→	Dominant printed culture	→	Dominant visual culture	→	Dominant digital culture
Tribal fires		Handwritings		Books		TV		Internet, computers

400 BC   1500   1950   2000

Scheme 1: Development that led to the present state of ICT

A slightly different, or better, a little more extended and complex standpoint is held by Švejda (2001). He is an advocate of so called cumulative development which perceives every epoch in history as a set of the latest technological advancement(s) and all the preceding ones. The closer to the present point a historical milestone is, the greater influence it has on it. It is best observable from scheme 2 (Švejda, 2001). He believes that all the old paradigms live with the new ones, and therefore the old models just never disappear but, quite the contrary, are present in the new paradigm. According to this theory, once in a while some of the old paradigms seem to become fashionable again. It can be seen in technologies in general (television did not kill radio), as well as in in the educational technologies and paradigms. For this reason we should not be surprised when some people are excited about the drill and practise exercises and quizzes online, for some still believe these paradigms are right (Seatler, 2004).

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[1] The author's translation
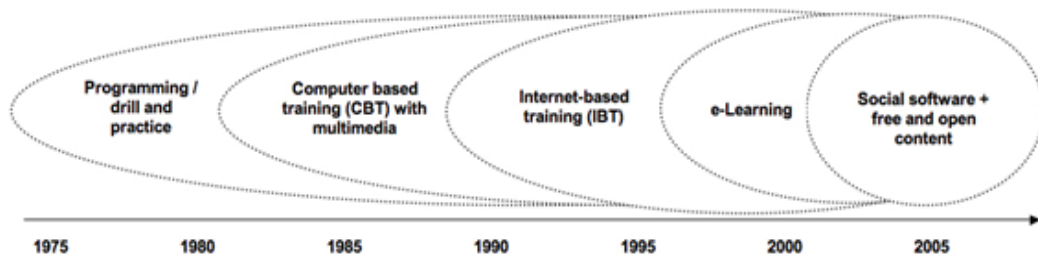
Scheme 2: Cumulative theory

1.1. Original and contemporary reasons for implementing ICT into education

No matter which of the two theories mentioned above reflects the reality more precisely, they both respect and reflect the reasons leading politicians and educators of past centuries to try to make use of ever thriving technological devices. If we take the term *technological devices* as it is understood today, its history can be traced back to the early 20th century. At that time, according to many authors past and present dealing with this topic, the rise of effectiveness in education was one of the main goals of its implementation, as Hannafin and Savenye (1993) state:

> *"Since 1920, many advances in instructional technology have been introduced in the classroom with the aim of making teaching and learning more productive."*

It did not mean, however, the productivity or effectiveness only on the level of quality and quantity of students' knowledge or a teaching unit, but also effectiveness on the administrative level of schools. But these pure reasons were, in their consequences, a trigger of lively debates questioning the appropriateness and potential of technologies in education which has endured in a way to the present. Nonetheless, today we generally do not doubt the potential of technologies since development has advanced by giant leaps and opossibilities are incomparable with those a hundred years ago. But still, there are sceptics in today's professional and non-professional layer of society who do not consider ICT to be beneficial for education in any way. For them the following reasons of advocates of educational technologies are simply not convincing enough.

In the first place, ICT in a classroom may work as a huge source of motivation for students at every stage of education and in every part of a lesson. This is the key for

today's situation because the present generation of students easily get bored by studying in the traditional conception of education. Even mere use of a computer when, for example, looking for a word in a language lesson instead of a paper dictionary raises much greater interest, not to mention the full scale use of ICT in a lesson. This has an obvious reason. When teaching in a traditional way with traditional teaching tools such as chalk and blackboard, students are confronted with what used to be common both inside and outside the school in the past. But the reality today is so much different than the environment in which these traditional lessons take place and as a result of this diversity, students do not find such lessons beneficial for their practical, as well as future life, since it does not enhance their competitiveness in the labour market (Bitterová, Mních 2011).

Secondly, and quite analogically to the reasons of the early stages of ICT implementation, Švejda (2001) describes another positive aspect of ICT in schools contributing to the rising quality of educational process. He states that technologies in education enhances teachers' ability to appropriately and according to their desires or students' needs manage the processes of acquisition of new information, as well as processes serving to fix the information.

The last but not least reason to mention is the fact that ICT in schools has highly beneficial social effects. This is a particularly important feature of educational technologies if we take in consideration that modern society is strongly social-balance oriented with significant tendencies calling for equality of human beings in getting education regardless of their social background or state of health. The positive role of ICT in this respect is clear, it allows socially and/or physically handicapped students to level up with others by means of various modern technological devices and software, and so receive a thorough adequate education (Freedman [online]).

More on pros and cons of ICT in education and reasons for its implementation can be found in my bachelor's degree thesis, specifically in the introduction of the fourth chapter called *ICT used in education* (Matuška, 2013).

1.2. The process of educational ICT implementation in Europe and Northern America

The term information and communication technologies may hide many technological tools, even those which do not necessarily contribute to the enhancement of education or are not suitable for it. Therefore, it is essential to refer to specific types of technologies which are commonly used in the educational process. Such technologies are called instructional or educational information and communication technologies. In general terms, two major sets fall into this category. Firstly, it is all instructional devices together with software improving the quality of education. Secondly, and maybe more importantly, it is the new forms and methods of education inspired by the actual devices (Průcha et al., 2003).

From the diachronic point of view, this category of ICT, similarly to other categories of technologies, has gone through massive development over the past century starting in the 1920s. Those times can be thus labelled as the advent of *modern* educational technologies. The whole process, viewing it retrospectively, has not been of a linear but rather exponential character (Brdička, 2010). This means that the development has not happened gradually but its evolution has been much faster in recent times. The first practical ideas of educational technologies appeared around the year 1920. At that time, celluloid films for taking photographs were beginning to be widely used, and as the technology of their production improved, the idea of motion picture on the basis of celluloid appeared. From that point, it was not far to the use of motion picture in education, and the first educational films were shot. Together with the first films of this type, a series of films dealing with a methodology of using films in a classroom was produced, to help and support teachers in using the newly emerged way of teaching. Soon after, also the first books dealing with this topic appeared. By the late 1920s, a definitive methodology had been developed, adapting, among others, the Herbart's *instructional steps*.

The introduction of visual instructional media, as the set of such educational tools was collectively called, worked as a stimulus for the educational community to start changes and, eventually, foundation of the visual instructional movement in American education (Seatler, 2004). By the end of the 1920s and during the 1930s educational films were slowly being implemented into public education. However, from the educators' point of

view rather sadly, on a much greater and more complex scale this technology was incorporated into the education of soldiers during World War II, which, for example, in the United States was even made a part of the official policy of the War Department, for the results of education were strongly positive. The same reason led later on to a great demand by the industrial sphere aiming to train millions of workers as rapidly and effectively as possible. Even after the war everything continued in the same manner; education suffered from insufficiency of educational films due to low budgets. Moreover, most of the films were stilted and pedantic. Almost simultaneously sound recording developed, which was first used separately; then it also began to serve as sound for not only educational films.

In the post war period, a number of game-changing inventions came into being with the greatest of them being the first vacuum tube-based computer. The development of this computer started during the war but the full working version appeared only after the war was over. It was originally meant, as most of the technologies at that time, for military purposes, however, the military technological development departments were not the only participants in this process. They worked tightly with universities. In the following decade, the invention of computer-type educational tools initiated the beginning of so called Computer-based instruction (CBI) (also referred to as Computer-assisted instruction/education), so popular and widespread in recent times. However, CBI in its beginnings was, of course, something very different from CBI of recent days, mainly due to technological and economical limits of that time. In 1960, PLATO, a great milestone of CBI was founded. The name *PLATO* is an abbreviation standing for Programmed Logic for Automatic Teaching Operations. It is considered as the first generalized system of computer-based education in history. Originating in the United States at the University of Illinois, over a short period of time it had profoundly influenced CBIs all over the world. By the late 1970s it supported thousands of graphic terminals at schools worldwide (PLATO history [online]) offering them multi-use computing coursework with features analogical to today's forums, chat rooms, message boards and remote screen sharing. However, the PLATO system was not he lonely 'pioneer' in this field. Soon after its arrival, in 1970 another system, or rather network, appeared. ARPANET is called retrospectively by many as "a forerunner of the internet" (Seatler, 2004). But ARPANET had a long way to go before it would became the

internet in the present-day sense, since at its starting point it transmitted data among only four sites. These four sites were scattered around the United States' universities, such as Stanford or Utah. In 1973, ARPANET had still as little as forty junctions; however, it was this year when these ideas literally crossed the border of North America and reached Europe. First to connect was Norway, followed by the United Kingdom and other countries (ARPANET History [online]).

The new technologies, such as computers and networks, were, however, rather expensive equipment to be purchased by schools only. Therefore, since 1965, Northern American and European lawmakers initiated political actions to support funding and equipping elementary and secondary schools. Mainframes and minicomputers were put into place as a result of it, but the majority of them served mostly for administration or school databases of information regarding students (Abbot 2001, Seatler 2004). When they were used in instruction, though, the results were not of a high quality. As the members of European network of Experts on Educational Technology (EENet) point out, this might have been, and probably was, due to the fact that there was neither any concept of CBI, nor was there any complex implementation of ICT into curricula of other subjects (EENet [online]). Abbot (2001) explains that the significant feature of the following decade in Europe in the use of computers in schools was "drill and practice programs, themselves descendants of activities previously delivered through microfiche and microfilm in teaching machines" and later goes on to state that "much of the development of the use of computers to support learning has been bedevilled by those who misunderstood their uses and have then claimed that they (computers) can in some way act as teachers." In other words, he suggests that many people in the educational field at that time misinterpreted the function of computers in education assuming that computers can in some situations replace the role of teachers. However, there were advocates of this hypothesis, among which Seymour Papert, the former professor at M.I.T., played an essential role. He prognosticated that in future there would be no schools assuming that they would become useless under the influence of modern technologies. On the contrary, the director of a research group and advisor of Apple, Jane L. David, a decade later came with the evaluation of the CBI in the 1980s where she concluded by saying that technologies in education did not fulfil their expectations. As for reasons, she named the most crucial one according to her. It was the fact that "all

the decisions concerning purchasing and using (ICT) were motivated by improving the effectiveness of what schools had already been doing, not by the aim of actually changing the schools through technologies" (Ed-tech development [online]). This was, and still is to a certain extent, a very important issue concerning technologies in education, since, even today, many teachers think of a transfer of their often several decades old teaching notes into a PowerPoint presentation as the final and highest aim of CBI.

A significant step on another level on the stairway leading towards the present state of education with use of modern technologies came in the 1990s. It was the era of the emergence of multimedia computers. They caused a great change in the perception of ICT in education and a huge advancement. Schools also began to implement object-oriented multimedia tools, as well as simulations, educational databases and other CBI programs delivered on CD.ROMs and DVDs, many with animation and sound. In many countries pilot projects, initiated and co-funded by the governments with the aim of supporting the development of the educational technologies industry, were started up. In the mid-90s the idea of one computer for instructional delivery per school was promoted and eventually funded by local governments, but not all teachers had access to a computer for instructional preparation. However, the 1990s were also the era of the internet. Many schools installed web servers and provided the teaching staff with a possibility to create instructional content and webpages. Towards the end of the millennium, countries of the EU gave priority to the connecting of school computers to the regional, national and international networks through the internet. As a part of newly emerging educational networks were considered not only schools but also libraries, research institutes and museums. Obviously, the exponential growth, mentioned above, began to be extremely apparent during this period, for this many inventions and innovations in the CBI had never occurred before, and this trend has continued even to the present day.

In the following decade the internet went on expanding even more than most predicted. It soon became the largest database of information, graphics and videos in the world. This made it an invaluable resource for teachers. The internet also became a place where everyone could publish and discuss almost all they wished for. A rather unusual thing at that time was the launch of Open Course Ware (OCW) website by The

Massachusetts Institute of Technology (M.I.T.) offering free online access to educational materials from its courses to anybody anywhere in the world connected to the internet. This database, of courses, may be perceived as a predecessor of present-day Massive Online Open Courses (MOOC) which will be dealt in more detail in one of the following chapters.

From 2005 on, an initiative of distributing laptops to poor children around the world called One Laptop per Child was being run with the aim to enhance the level of education in the countries of the third world under the lead of M.I.T. Also the Promethean University project was launched. Both these events were revolutionary and today they have their successful successors. The second half of this decade saw the advent of interactive textbooks, as well, merging paper textbooks with the modern technology of portable computers and other devices which led later on to the introduction of the first fully automated classroom supported by wireless access to the internet.

The above presented evolution of educational technologies has inspired not only inventors of new ones but it also inspired thinkers of present day to rethink the whole concept of modern education. This resulted in the emergence of a new movement labelled as Connectivism. Its core idea is that, in simple terms, "digital media have caused knowledge to be more distributed than ever, and it is now more important for students to know where to find knowledge they require, than it is for them to internalise it" (Siemens, 2004 [online]). This puts the responsibility to create their own personalised learning tools and environments on every student. There are, however, some opponents to this attitude claiming that simply knowing where to find a particular piece of information does not guarantee the ability of a student to treat it in a suitable manner, and therefore that the principle of this idea is insufficient.

Together with the rapidly evolving educational technologies, a range of research surveys on the national, European and international level have been carried out aiming to find out the current situation in TBI, possible advancements, as well as failings and improvements. One of the most significant representatives is the Information and communication literacy study (ICILS), or the Study of the Impact of Technology in Primary Schools (STEPS). Based on the results of these surveys the following steps were thought out and eventually realized.

This chapter aimed to present an overview of the evolution of educational technologies with the emphasis on the important milestones, such as the invention of educational film, computer and internet, from the very beginning in the early 1920s to the present day. But in spite of the great number of technologies that has been developed, we still need to bear in mind that it is the teacher who is the decisive element in the question whether a lesson would be beneficial to students or not.

2. ICT AND EDUCATIONAL DOCUMENTS

As the new technologies inseparably penetrated into education, not only methods and the teachers' role had to go through certain gradual changes, but also political and educational documents on the national, as well as European, level needed to be modified or extended by the aspect of ICT. This chapter will describe the introduction of the most significant documents of this kind, as well as changes in the older documents. The emphasis will be put on the language education. Due to the fact that the implementation of ICT into education is a long-lasting process, this chapter will be approached as a sequence of crucial steps leading to the full and complex integration of technology. The basis of this chapter, upon which it will be built, is the second chapter in my bachelor thesis (see Sources below) where the fundamental changes, not only, in the Framework Educational Programme (RVP)[2] are to be found.

Technological advancements of the several last decades increase the possibility to access information and knowledge in a still greater amount and quality. As a natural result of this, national and educational organizations created a coherent set of programs ensuring the most effective utilisation of educational technologies. The Czech White Paper, defining itself as "a systematic project formulating intellectual basis, general goals and development programmes of the educational system in the medium term," (Kotásek et al., 2001) serves as a main tool for this purpose setting such aims. The fulfilment of these aims is crucial for the future of society, both in the Czech Republic and the rest of the world. It is because society of the near future is to become not only the *information society* (mainly due to ICT) but also, probably thanks to ever-present information, a society where learning is a life-long process. People are increasingly being surrounded by a constantly growing amount of information that needs to be processed. This trend is perceived by all the countries of EU, which suggests the fact that since the year 2000 there have been several meetings where implementation of ICT into education as a reaction on the current situation and future predictions was discussed. The result is obvious, ICT needs to be implemented into education on all levels and incorporated into most subjects. This is not restricted to full-time study; it covers distance study as well. In the context of the European Union, the Lifelong

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[2] An abbreviation of the original Czech name for the Framework Educational Programme – Rámcový Vzdělávací Program

Learning Programme (LLP) was introduced in the European Parliament in 2006 offering the new type of technology-based education.

Similarly, also so called e-learning, defined as "educational process with the use of ICT" (Barešová 2003, p. 27), is viewed as an immensely important tool for the development of the whole society. Hence, in 2001 a strategically crucial document concerning e-learning initiated by European Commission was created. The e-learning Action Plan, as it was labelled, aimed to guarantee that every citizen, household and school would be 'online.' Main reasons for this were creating computer-literate Europe, integrating every citizen into the digital community, establishing trust in modern technologies and guaranteeing a social cohesiveness (The e-learning Action Plan [online]). Unlike older documents, an important shift from material equipping towards the support of an exchange of experience and collaboration on e-learning projects in all European countries is evident here. In the Czech environment, e-learning is being incorporated primarily into the education at Universities. However, preparations are being made for incorporation into lower levels of education as well in the near future.

The White Paper approaches the implementation of e-learning and curricular innovations under the influence of ICT as follows:

> *"...the role of schools will be to learn how to know – managing methods of learning, using information and communication technologies, avoiding a flood of trivial information but learning how to process information turn it into knowledge and apply it, being able to think and assess critically*" (Kotásek et al., 2001).

Another document, also obligatory for every educational institution, is the Long-term Aim of Education and the Development of the Czech Republic Educational System (Long-term Aim [online]). This document develops all the crucial strategies of the White Paper into individual strategic solutions leading to their gradual yet complete fulfilment.

Concerning the implementation of ICT into education in a complex way, one of the early documents in this area in the Czech Republic was the National Information Policy – a Way to the Information Society, which was followed by The Concept of National

Informational Policy in Education (SIPVZ)[3] issued in 2002 by the Ministry of Education, Youth and Sport (MSMT)[4]. These documents deal with fields of information literacy of teachers and students, software and information sources, complex ICT infrastructure (computers, peripheries, networks, the internet connection etc.) and information literacy of the public. The basis of SIPVZ was three consecutive projects (Project I-III) focused on the ICT education of teachers and ICT coordinators, mediation of supply of the essential software for schools and the internet connection in schools. However, the process of realization of the three projects was not smooth. To name some of the problems, there were some voices complaining about the fact that in SIPVZ the management of schools, i. e. those who have the decision-making powers, was not included in the process of ICT education. Another reproach towards SIPVZ was that, even though 98 % of schools in 2005 were already connected to the internet, computers were prevailingly used in the classes of ICT education (Zounek, Šeďová, 2009). To enhance the concept of SIPVZ and guarantee the fulfilment of its goals, MSMT carried out The Plan of Realization of State Information Policy in Education which aimed, among other things, to incorporate the use of ICT and aspects of information literacy into the Framework and School Educational Programmes (RVP and SVP[5]), to equip 70 % of schools with at least one ICT classroom with modern computers or to reach the rate of the use of ICT as a common tool in lessons of at least 75 %. In spite of this endeavour, in comparison with other countries of the European Union and OECD the percentage of ICT use in lessons is not sufficient.

In 2008, the Government of the Czech Republic issued a document called The Conception of the Development of Information and Communication Technologies in Education for Years 2009-2013 (hereinafter as Conception 2009).

Conception 2009 follows up on an older conception issued in 1999 developing, and in many cases also broadening, its direction and specific focuses. In general terms, Conception 2009 strives to fully incorporate technologies into education using their potential completely. In more specific terms, it means to use technologies throughout

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[3] An abbreviation of the original Czech name for the Concept of National Informational Policy in Education – Státní informační politika vzdělávání

[4] An abbreviation of the original Czech name for the Ministry of Education, Youth and Sport – Ministerstvo školství, mládeže a tělovýchovy

[5] An abbreviation of the original Czech name for the School Educational Programme – Školní vzdělávací program

the whole RVP, i.e. in teaching of other subjects besides Informatics. This implies that students will become active participants, not only mere passive receivers of information. Regarding the new dimension of the conception, it is a reaction on the present-day situation and climate primarily in Czech education. Therefore, even though one of its goals is to support equipping schools with ICT according to their individual needs or desires, its primary is to support the educational institutions that were disadvantaged in some way in the past. However, the schools which already actively used ICT during lessons demanded provision and guarantee of certain conditions necessary in order to keep developing and be able to realize their own educational projects. Hence, among the goals of Conception 2009 belonged also the further support of equipping schools with the educational tools, such as educational software or software for data collection. The conception also included The Programme of the Support of Teachers' Training in the Field of ICT in Education which was focused on the development and accessibility of the digital educational content, the software equipment and a usage of learning tools (Conception 2009 [online], MSMT [online]).

In direct relation to Conception 2009, MSMT issued an Action Plan named School for the 21st Century. This plan deals not only with technical and technological aspects of ICT, but mainly with an area of help and motivation of teachers in regional education. Its general goal is to level up with the countries of the European Union and other countries of OECD. In the document there are 8 competencies of the lifelong learning among which we can find Communication in foreign languages, The ability to study or The ability to work with digital technologies. Obviously, the realization of the Action plan School for the 21st Century does not mean mere bringing of modern technologies into schools but, more importantly, the change of processes that are not suitable any more for contemporary perception of the competences necessary for the 21st century. Nonetheless, the success or failure of the Action plan is directly dependant on the level of responsibility of all participating parties including not only teachers, headmasters but also students and the public. Of paramount importance is the goal to make students interested in discovering and learning new things and teach them to study effectively. Only these competencies have the potential to make them competitive in the job market in of Europe and the rest of the world.

All in all, the direction of Czech education in general terms seems to be set well, even though it took some time to adjust it. On the way, however, it got into several dead-ends and came across a number of hurdles in a form of lower flexibility of participants of education, or inability of the local society to fully conform to the new conceptions of implementation of educational technologies proposed by the trend-seters of today. Quite evidently, the process has not reached its final form, and most probably it never will, since technologies are being improved and new once introduced literally every day, hence educational systems need to react and adapt to it continuously.

3. ICT LITERACY

Throughout modern history, in every society there has always existed in some way the concept of a certain set of skills, abilities and knowledge necessary for a man to master in order to function in a particular society on his own. This set is usually referred to as *literacy*. In a traditional way, most of us would think of literacy as so called '*trivium*' consisting of basic abilities to read, write (text comprehension and production) and count. In the last several decades, however, the term *literacy* started to seem to be insufficient and narrow, and thus needed to be broadened and structuralized to cover the multidimensionality of the needs in our modern society. This is caused mostly by the rapid expansion of modern technologies, which entails also the tendency of growing requirements on applicants for almost every job these days, and thus a larger set of skills to be taught in schools. Moreover, Maněnová (2012) emphasises another layer of literacy today. She suggests that, besides the skill/knowledge level, literacy also expresses specific mental abilities. Therefore, we cannot simply describe it as the exact reflection of a level of education that a man reached. She then goes on to claim that the original trivium has been going through a gradual enlarging process due to these facts, and is thus enriched by abilities connected with searching, processing and transmitting information. Mikula (2002) perceives the issue in a very similar way presenting five areas of abilities that represent the basis for successful functioning in today's society: reading, writing, counting, presenting and communicating.

Such infusion of new competences required by today's society has had a direct impact not only on the definition of the term *literacy* but mainly on its further subdivision into more specific *literacies*. These new literacies need to be subsequently incorporated into the educational documents and competences that should be acquired by students on all levels. Since the society we live in is very often labelled as an 'information society', an emergence of a new term *information literacy* is only its natural result. This literacy may be, therefore, considered a key one for today's world and is directly related to the development and capability to use modern information technologies and devices. By these we mean primarily computers, networks and mobile telecommunication devices. This term was coined in the 1980s and since then it has gone through radical changes caused by ever-developing ICT (Maněnová, 2012). The opinions about the definition of *information literacy* seem not to be fully unified among the experts in the field.

However, the core meaning stays more or less the same. Chráska (2007) describes information literacy as a set of the following abilities:

➢ To find particular information for certain purpose.

➢ To recognize the relevance of a particular piece of information.

➢ To be able to be critical towards sources of the information.

➢ To use the information to solve problems.

➢ To effectively mediate information to other people in different forms.

However, information literacy is not the only term that concerns modern ICT. We can also come across a term *computer literacy*. Průcha et al. (2003) define it as a set of abilities and knowledge including the capability to manage basic computer operations, abilities to recognize a type of a task and solve it with the help of a computer and awareness of the range of its functions and limits of computers and computer programming. Obviously, computer literacy may be considered a part of information literacy, probably even the most crucial one. But it is definitely not the only one. Another literacy that emerged in connection with information literacy is *functional literacy*. This kind of literacy may be interpreted as a skill in a certain context related to the situation and conditions of a particular person (Dombrovská et al. [online]). In other words, it is a set of abilities of a man necessary for realization of activities essential for living in today's society. This type of literacy can be further divided into several sub-parts. Namely, these are literary, document, numerical and language literacy.

The above described literacies are closely interconnected and their mutual relations are best expressed in Scheme 3 (Dombrovská et al. [online]).
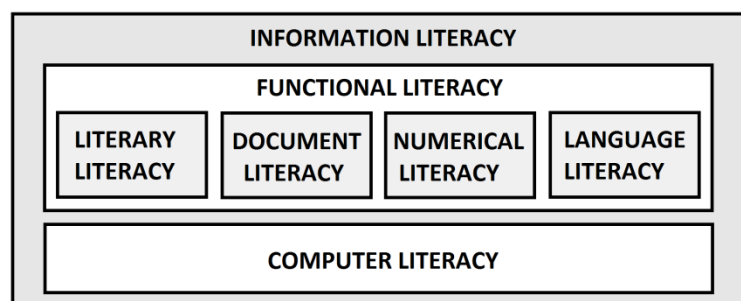
Scheme 3: Relations among literacies

However, these are not the only literacies dealing with the issue of ICT and modern society mentioned in scientific sources. Some of the authors mention, for example, network or technology literacy but they are in most cases only a part of one of the above mentioned literacies. Nevertheless, there are also other concepts that summarize necessary competencies for the 21st century, such as the one proposed by Dombrovská et al. that has three main aspects, an *information literacy*, *media creativity* and *social skills and responsibility*. Regarding the term *media creativity*, it stands for specific abilities to not only understand the specific world of media and multimedia but also be its active part. *Social skills and responsibility* then include the abilities to realize social consequences of presenting a certain piece of information and its possible impact on today's young generation. Here the internet plays the key role.

3.1. ICT literacy and education

As suggested above, information literacy is particularly essential for people to function successfully in our society. Therefore, it is crucial to incorporate its basic elements into our educational systems and curricula in order to bring up young people that are capable of living in the modern world of today. This claim supports also one of the experts in the field, David Warlick, who emphasises the importance of literacy over modern technologies as such by stating that "technologies are not what we should concentrate on, it is literacy. That is what our children should be taught in schools" (Warlick, 2004). Brdička (2011 [online]) then provides us with a real-life example situation, which stresses the importance of information literacy incorporation into educational documents by putting ourselves in the shoes of a person with only an elementary education unable to find a job due to his insufficient education. If such a person was within its elementary education taught information literacy basics, he would be able to obtain better education by himself by being aware of the possibilities of the modern world (e.g. the internet where there are many courses and study programs to be found, or the email communication through which one can communicate with education providers literary around the world). The core idea of this attitude is, therefore, building up people's self-reliance in our society in situations such as looking for a job, for it allows them not just to wait for what the state will offer or find for them, but to take control of their lives.

In case of the Czech Republic, MSMT is in concordance with this attitude and supports it by numerous revisions and additions to educational documents, as well as by creating new ones, such as SIPVZ or the Conception plans. These documents state the required minimum knowledge and skills students should master among which the most important ones are (Conception 2009 [online]):

➢ The ability to use a computer and its peripheries as a tool for writing texts, working mathematical (arithmetical) operations, solving elementary practical issues with use of common computer applications and programs and the ability to print own or gained materials.

➢ The ability to understand the structure of a text and create an elementary document with multimedia features (a document featuring texts, graphics, animations and audios).

➢ The ability to use a computer connected into a computer network (to send and receive e-mails including the multimedia documents exchange and internet searching).

➢ The ability to work with their own computing system (folder structures, work with them, saving different documents and folders, basic ability to work with an operating system).

➢ The ability to search and filter information.

➢ To have a notion about different forms of information and the ability to pick and use the information to solve specific problems.

However, these abilities are spread into the whole educational process, more specifically into the individual stages of the educational process starting at the elementary and secondary level. After completion of these stages students will have successfully gone through the process of acquisition of elementary skills of information literacy. This involves elementary ability to work with a computer operating system, its basic office software, as well as to work with the internet (browsing, using most common searching engines, downloading and uploading data). On top of this elementary information literacy, graduates at high schools also need to be able to decide on the use of modern technologies for a particular task, realize its risks and limits, recognize various basic malfunctions of their computer and its software products and know the principles of task algorithmization (not necessarily particular programming

languages). It is also required for students to be able to use the internet to obtain or provide particular data and sign in and actively participate in electronic conferences and similar communication environments (Maněnová, 2012).

3.1.1. Students' ICT literacy

Such effort of MSMT and teachers has been successful and is being paid back in a form of superb results in international comparative studies. The most significant one is the ICILS study which in 2013 surveyed 30 countries world-wide including the Czech Republic, Germany, Russian Federation but also Australia, Canada or Chile. The average age of students in this study was 14 (8th grade). Being compared with such countries with strong economics, often higher ICT Development Index Score and in some cases more sophisticated educational systems, the Czech Republic performed extremely well and surpassed all the other 29 compared countries in the overall average ranking of students' information and computer literacy level.

The support of MSMT and schools is not, however, the only influencing aspect of students' information literacy. Another game-changing factor in this issue with a direct impact is students' home background. According to Fraillon (2013), one of the head-editors of the ICILS 2013 report, there are various pieces of evidence from many countries highlighting that differences in students' access to digital resources at home affect the opportunities of students to develop the capabilities required for living in modern societies. In other words, the extent to which students are surrounded and exposed to modern technologies and digital information resources outside schools directly influences their possibilities and abilities to internalize information literacy competences.

Countries should therefore pay attention not only to incorporating information literacy competences into educational process but also to supporting the overall economic growth and ICT equipping of their citizens' homes in order to provide students' adequate home environment for their personal information literacy development.

3.1.2. Teachers and ICT literacy

Incorporation of information literacy competences into educational process together with adequate home and school information environment are undoubtedly extremely important factors in achieving sufficient students' information literacy level at any stage of education. However, without teachers fully mastering these competencies and its specific methodology the effort would be worthless.

On this basis a theory concerning teachers' competences referred to as TPCK was established. In full standing for *Technological Pedagogical Content Knowledge*, this framework describes different competences that teachers necessarily need to acquire in order for effective practice in technology-based instruction. TPCK suggests three main areas of knowledge. 'Equality' is the most spoken word here, for an unbalanced ratio of pedagogical, technological and content knowledge would lead to inefficiency of this way of teaching. In TPCK framework, emphasising the interaction of teachers' contents, pedagogy and technology knowledge, teachers are placed in the centre taking a role of designers of curriculum creatively integrating technology and pedagogical approaches into education in order to help students understand subject matter (Mishra and Koehler, 2008 [online]). This arises from multiple interactions between and among the three key knowledge areas of TPCK framework. These relations are depicted in the scheme below.

Concerning testing teachers' ICT literacy, the greatest one was carried out by a STEM/MARK agency in 2005. Its results showed that 39 % of teachers were technologically literate. In other words, each two out of three teachers in the Czech Republic did not master the ICT competences described above (STEM/MARK, 2005 [online]). Despite the fact that teachers scored above average in the context of the Czech population (the average was 23 %), this result lead MSMT to carry out a system of educating teachers in this field. This step was definitely necessary and right because an insufficient level of teachers' ICT literacy might have direct impact in a form of ineffective or lower rate of use of technologies in instruction. Hence, it is clear that without teachers' participation on the process of implementation of ICT into education the vision of technology-based education of 21st century would not be possible. Seymour Papert (1993) knew this twenty years ago and aptly noted that technologies in instruction "...does not in itself produce good learning any more than paint produces

good art." In other words, it is, and always will be, a teacher who makes a lesson good or bad, and in case we live in the century where technologies are becoming more and more an inseparable part of our lives, a technologically literate teacher becomes a must in order to perform a 'good' lesson.
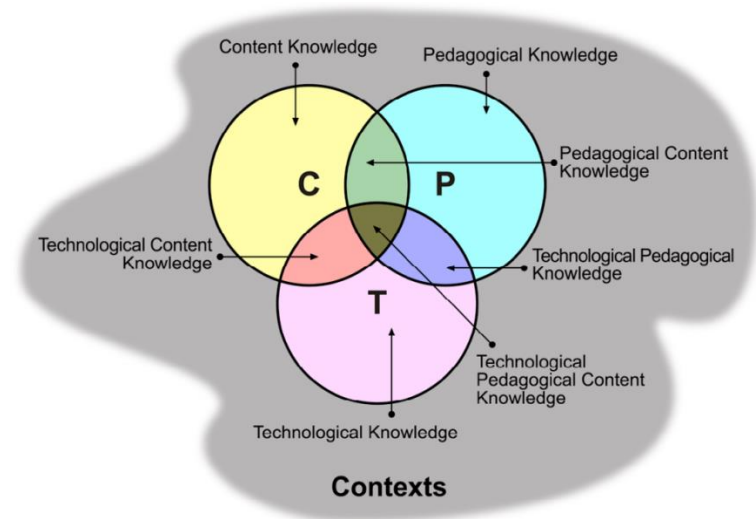
Scheme 4: Relations between and among teachers' knowledge areas

4. ICT IN EDICATIONAL PROCESS

Present education has gone through a long-lasting process of change. Norms and methods which were being applied decades ago were, among others, based on the direct frontal way of teaching putting only a little emphasis on individuals' educational needs. During the last two or three decades, however, we have witnessed a gradual shift from such an approach to a more individualized one where the student's abilities and weaknesses, as well as their educational needs arisen from them, have become a part of the attitude of a modern teacher. Such transition or optimization of the educational process has been achieved with the great help of modern information and communication technologies, and hence has become an inseparable part of technology-based education.

But not every ICT device or software is suitable for the purposes of education enhancement. We need to take into consideration not only the educationally beneficial potential of ICT tools but also their limits. Such tools that contribute to the enhancement of the educational process are then collectively called *Instructional ICT*. These include but are not limited to an interactive whiteboard (IWB), a projector, a computer (laptop, PC), a document camera or educational websites, as well as the internet itself. Each and every one of these may have a significant impact on the educational process in a both positive and negative way, depending predominantly on a method and teacher's skills to apply it (Matuška, 2013). Juříčková (2015 [online]) takes the same standpoint asserting that also the student's personal learning style, as well as the strategies and methods of a particular subject (matter) acquisition, need to be revised and adapted to modern technologies, whether it is English or mathematics. Therefore, Průcha et al. (2003) define the term 'instructional ICT¨' as a set of modern technological devices and software used for didactic purposes and new methods of education inspired by or based on them and their specific potential.

In the following lines a technology-based education (TBE), its aspects and impacts will be discussed. Farther in this chapter, specific parts and innovations in the field of TBE will be presented, as well as complex educational approaches integrating particular instructional technologies and methods that are being realized either in the Czech Republic or in other more advanced countries. The basic individual elements of

instructional ICT, though, will not be dealt in an in-depth way, since these have already been the subject of one of the chapters of my bachelor thesis (Matuška, 2013).

4.1. Complex TBE implementation

Today, many teachers claim that their way of educating or teaching is technologically based, and thus they perform what is called *technology-based education*, in short TBE, in their lessons. However, the statement might not be quite true. So what is TBE? How widespread is it in reality? And how do schools know?

Contemporary tendencies of using instructional ICT focus on combining specific tools and their integration with other technologies (particularly network and audio-visual). A group of such integrated instruction tools is then referred to as multimedia (Svatoš, In Průcha a kol., 2009). These multimedia tools are then building bricks of TBE. However, they cannot and do not guarantee that once they are used in a lesson it becomes technologically based education. An important feature of TBE is to enable students to work with multimedia interactively and in order to achieve goals adjusted to the education of 21st century including enhancement of students' ICT literacy or ability to obtain, process and work with information. Brdička (2012) has the same stance on this issue adding that activities that are not interconnected with the world outside the school seem more and more useless to the students of today who are, on the contrary, increasingly interconnected (among themselves and with the outside world).

In 2012, the Czech school inspectorate (CSI) researched this field with the aim to find out how much teachers on different levels of education use ICT and features of TBE. In case of the secondary school level, almost 27 % of researched teachers used technologies in education. This means that these teachers used it only to present information or play a video clip. However, when we look at the percentage of teachers who really integrated the technologies into their teaching, the number will not reach even 6 % (Neumajer, 2014 [online]). This implies that the Czech teachers try to use these technologies in their lesson but the concept is completely missing.

Marc Prensky, an expert in the field of ICT implementation into education, describes the technological transformation and incorporation of ICT into teachers' lessons and

divides it into four stages. The initial stage is defined as unsystematic attempts where teachers do not consider mid- and long-term goals but only getting familiarized with the technologies work and what are their limits. In the second step, teachers try to use ICT to achieve their old educational goals with old methods (instead of writing what students should write down into their notebooks, teachers project it on the wall). The impact on the students is still the same. In the following step teachers strive to achieve old goals with newly adjusted methods, which however still leads to the same results. The final step is to be able to achieve new goals with new methods in respect to technologies. (Prensky, 2005 [online]).

However, it is difficult to state at what stage a particular school and its teachers are with regard to ICT implementation from the inside. Hence, in the Czech Republic there is a tool called *Profil Škola*[21] that aims to evaluate progress in a particular school. It states to what extent a school is successful in incorporating ICT into the inner environment of the school. It does not, however, only focus on the level of technological equipment but mainly on how ICT supports the educational process. Another feature which this tool offers to its users is suggesting and planning future steps suitable for a particular school and controlling their fulfilment.

4.2. Selected building blocks of complex TBE

This part of the chapter aims to present selected innovative elements of instructional ICT tools, both hardware and software, which support different approaches of technology-based education and are, therefore, inseparable parts of these approaches in the sense that these approaches could barely work without them. On the other hand, each of these tools may be used on its own or in combination with others.

4.2.1. Portable devices in instruction

The young generation is increasingly bound with using mobile, portable devices that can be carried around at any time on any occasion outside of school. The tendency in education should, therefore, be to balance the diversity and bring the outside world back to the classrooms making learning more reasonable for modern students growing up in

the modern world full of technologies (Zounek, Šeďová, 2009). To achieve such a balance, the ICT infusion into education has incorporated also this kind of moveable tools in recent years. They can be generally referred to as mobile or portable devices.

This general term covers all types of devices that have their own battery and weigh not more than one or two kilograms. Typical representatives of this category are notebooks, netbooks and lately also tablets. Technologically speaking, the fundamental differences between notebooks/netbooks and tablets are the capacity of their battery (affecting operating time), which is significantly higher in the case of tablets, due to a presence of rotating parts (such as coolers or hard drives) and touch screen (Tablets for Learning [online]). The key aim of using ICT is to support, enhance and transform teaching and the learning process (Tablets for learning [online]). However, the concept in the Czech Republic is not unified and the way tablets are used in schools varies hugely. To clarify essential requirements of the learning process supported by portable devices and provide supportive materials for the full-scale implementation of these devices into the Czech educational conceptions, there are several pilot projects being run in selected schools. Among the most influential are projects 'The touch school'[6] or 'Tablets for schools'[7]. One of the participating schools pointed out that new findings are already publicly available and can serve as suitable material for other schools aiming to introduce portable devices into their school learning environment. More on some of these projects will be presented in the practical part of this thesis.

The process of incorporating portable devices requires to be thoroughly thought out before its realization. However, there is not only one 'right' way of doing so. The authors of the advice sheet for implementation of tablets to schools at the Promoting and Supporting the Integration of ICT into Education server, designed and suggest several most common approaches when introducing tablets to a school, not only, for British teachers and headmasters (Tablets for Learning [online]):

> ➢ Tablets are introduced initially for teachers so than they can become familiar with the tablet and develop confidence in their use.

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[6] The author's transaltion of the original Czech name Škola dotykem
[7] The author's transaltion of the original Czech name Tablety do škol – pomůcka pro pedagoga ve světě digitálního vzdělávání

- A small number of tablets are introduced per class for student use to facilitate group-work.
- A set of fifteen tablets (eg. For pair work) or up to 30 devices are introduced as a shared resource to rotate among different class groups.
- A number of tablets are provided 'permanently' to class groups.
- A 'Bring Your Own Device' (BYOD) model could be considered (will be discussed closely farther in the text).

This leads to a rather important question whether only a teacher or all the participants of the educational process should have their 'own' portable device in a lesson. Obviously, both possibilities have its own specific impact on students' learning and a particular approach a teacher chooses for the lesson. In the first case, a teacher uses the device usually as a 'remote' to an interactive whiteboard. He can manipulate objects and words on the board as if he were working with IWB directly, while moving around the classroom. To increase interactivity, he can also let a student or a group of students work with the tablet and IWB or divide the class into several groups working separately alternating with IWB and the tablet. The second option, however, opens up many more possibilities and applications to make a lesson more creative, interactive and, most importantly, individualized. It implies hence that students' personal needs can be approached directly, not just through generalizing the most common needs of all the students and adapting lesson aims according to them. This can be achieved through assigning individual students or groups exercises and other activities on tablets of different degree of difficulty, or easily provide extra work for the more competent students.

This second approach towards the implementation of portable devices into teaching offers also another possibility broadening their usability even more. It is a fact that portable devices can have so called interactive textbooks installed on them. When equipped with interactive textbooks, schools could free their students from paper textbooks by substituting them with their interactive counterparts (Tumola, 2012 [online]). This would, however, require schools to have enough devices for nearly every student in most of the lessons during the day, which might be highly financially ineffective for schools. Therefore, this could be realized with only several subjects and

it would mean that students would still need to carry some of their books to and from the school.

However, there is a way to deal with this issue. It is a so called BYOD, in full 'Bring Your Own Device' approach, allowing students to take their own notebook or tablet along to school and use it in lessons. It is based on the idea that students use this kind of technology on a daily basis, so why not to attract their attention through them (Neumajer, 2013 [online]). The BYOD approach is often being connected with Cloud computing. This is a general term covering various programs and services usable in education accessible through an internet browser of any kind without having to install them on the devices. Hence, users can log in on any device wherever they are. As a result, all educational software and data are being moved from school servers to clouds, i.e. servers of providers of the programs. Due to this, IT school administrators have less work with obligations concerning software, such as reinstallations or updating. On the other hand, it brings other new responsibilities connected with stable internet connection everywhere in the school building(s). One of the great advantages of Cloud computing is that many programs are available for free, e.g. Google Apps or Microsoft Office 365. Nevertheless, the BYOD approach also raises some questions in the areas of technical support for students and teachers with their own devices with different hardware specification running on different platforms (Android, MS, iOS). Another rather big issue is how to help students who do not own their own portable device (Edu-ICT trends [online]). These questions need to be answered in a short-term horizon if we wish to preserve the continuity in ICT implementation into schools.

All these approaches to portable devices implementation have one unifying feature. They all head towards what is called *1:1 pedagogy*, which is in other words teaching where each student has their own electronic device. In the past, this was the goal with desktop computers in specialized ICT classrooms. Nowadays, the same scheme is applied with portable devices aiming to enhance the educational process and fulfilling the information and communication competences requirements of the 21st century (1:1 pedagogy [online]). In the case of desktop computers the situation in the Czech Republic was better that the average of ICILS research at that time. However, today in an analogical situation with tablets, the Czech Republic is significantly lower in the ICILS ranking involving around thirty countries from around the world. According to

this study, only 6 % of Czech students have access to tablets at school, while the average is 19 % (Fraillon, 2013). These results imply that if we want to guarantee 1:1 pedagogy nationwide, students will either need to bring their own device (BYOD) or, in case some students do not own one, a school will have to obtain a certain number of devices that will serve this purpose, lending them to such students. Such a situation may however cause problems for the teacher, due to certain heterogeneity of the device in both software and hardware.

Despite all the questions raised and uncertainties of use of portable devices in education, there are strong arguments supporting their implementation. As it was already suggested, portable devices in classrooms support student centred learning which is in accordance with the conception of both Czech and European education of the 21st century. A typical example of such an approach is project learning. Tablets have extremely high potential in this way of learning and help students in every step of carrying out a project assignment from using a text processor to make notes, a camera in their tablet to capture pictures or videos of progress of their work, to application that allow them to present results of the project, e.g. Explain everything app. These assignments can be done either as an at-school work, homework or combination of both. When outside the school, students can work together or they can use another feature of portable devices – communication apps allowing them to message or call each other via different applications, such as Skype (Tablets for learning [online]).

Tablets have their place also in second language acquisition (SLA) where it can be used, for example, to make oral examinations more student-to-student based, less stressful and more joyful by giving a tablet to one student who is capturing a video and having others to tell him/her few sentences on certain topic or answer two or three given questions. The teacher then grades each student separately after the lesson. According to teachers practising this alternative examination it is time-saving because it allows them to examine all their students by one activity that takes no more than five to eight minutes (Tablets for learning [online]). Another use of tablets in a classroom is in the testing process (see the following subchapter).

Tablets have their place even in special education serving as a compensation tool for students with special educational needs. Thanks to tablets, many of these students are even able to participate in education in regular schools. Support, experience and ideas

are being spread on websites of specialized communities, such as i-SEN, recommending applications useful for students with special educational needs (Matějková, 2013 [online]).

However, none of these applications of portable devices would be possible to realize without teachers willing to participate in the change and, more importantly, on self-educating. It is important for teachers to be capable not only of using portable devices, but also of internalizing and applying new educational methods of the learning process that is becoming increasingly flexible. Villiers stresses that "they must be equipped to deal with the distractions presented to learners by their devices, and learn to operate under a different engagement model (Paperless Edu [online]).

To make the portable devices implementation into the life of a school complete, it is optimal to furnish it with suitable furniture supporting and facilitating portable-device-based education. One of the vital pieces of furniture is a working desk. It should be large enough to accommodate students' tablet/notebook, textbook and other study materials and some educational items given out by a teacher. Tables and chairs may be organized either in a way suitable for cooperation group-work (clusters) or whole-class work (circle, u-shape, rows). Regarding furniture in general, it should be easily moveable, flexible and adaptable to allow students to rearrange it if needed. Another key aspect necessary in a classroom of the 21st century is a number of electric sockets. These can be a part of the working desks or even a part of specially designed chairs providing easy access to the sockets. A sufficient number of electric sockets is important, primarily in the case of use of notebooks as their battery life is significantly shorter compared to tablets (ICT furniture [online]). Very helpful is also a docking station where these devices can be charged while not in use. However, if these devices are used often, electric sockets are a must in a classroom.

4.2.2. Virtual learning environments

Obviously, there are instructional ICT tools that provide compactness in the process of learning on both software and hardware levels. But are there any ICT tools that would provide connectedness of students and their teachers outside the classroom?

Of course, there are. Such tools offer teachers and students 'stay in touch' outside the classroom in an environment accessible via the internet network. The only requirement to use such a tool is to own an ICT device connected to the internet, whether it is a tablet, a laptop, a personal computer or a smartphone which should not be much of a barrier for the present-day information society. These environments are collectively referred to as *Virtual learning environments* (VLE). VLEs can be in other words defined as a school online environment supporting educational activities outside the school, e.g. homework or project assignment or teacher-student(s) or student- student communication in a form of a chat or open topic discussion conversation. But it is not the only field in which VLEs are meant to be used. These environments are also designed to manage, process and substitute the role of most of the school administration, such as class registers, student attendance, time-table processing, online report-book, parents-teachers communication or report card processing. (Neumajer, 2013 [online]).

However, in the context of the Czech Republic, a VLE featuring all the above mentioned aspects is still rather a vision than reality. If we were to characterize the situation of VLEs in our country in one word, it would be 'convergence.' There are many software programs in the Czech Republic enabling users to use some of the features of an ideal VLE but very few of them, if not any, can fully offer the complexity on the full scale. If we look at what is accessible for Czech schools, we can sort these software programs into several categories the first one being Learning management systems (LMS), then school information systems, single platforms for communication with 'outer world' of a school and lastly Educational social networks. The most complex part of these programs are so called LMSs managing the administration and organization of the educational process, as well as internal communication, to name a few features. LMSs are used not only in full-time education but, more widely, in distance e-learning education. Probably the most well-known LMS in the Czech environment is Moodle, which is an open-source software. An example of a school information system in the Czech environment is a program called Bakaláři or Škola online. (Neumajer, 2013 [online]).

Such convergence of programs used by schools may be causing both learning and teaching difficulties mainly due to a need to know and be able to work with more than

one environment, which also brings inefficiency. It is expected, though, that the number of systems of this sort will be gradually falling. The Norwegian city of Oslo is a fine example of this development of complex TBE. Here 96 % of primary, secondary and high schools use one common VLE – Fronter. This environment offers such a high complexity of tools that it gave rise to a brand new approach to teaching and learning. Schools functioning on the basis of this approach do not have traditional classrooms but large areas where walls have been removed. The timetable is also organized differently than in traditional learning. Students have lectures given by teachers until lunch time, and then they have a study time during which they study individually or in groups and are responsible for their own work. A teacher is present to give individual guidance, though. The aim of this approach is to prepare students for the reality they will meet after secondary school, when they either start working or attending higher stages of education. Nonetheless, such a system would not be working if not for a versatile virtual learning environment holding it together.

From the students' point of view Fronter may also be perceived as an assistant teacher, for it serves as a source of study materials, a storing place of their individual papers, projects and other personal materials and it provides them with their individual plans and a list of assignments they need to carry out. For submitting these papers, this VLE features an assignment submitting system allowing students to hand in assignments electronically at any time before a deadline. When students are missing form school they are allowed to view what their peers did, and so catch up more easily before they go to school again. Also teachers profit from this approach of teaching, since they can prepare learning material and lesson plans in advance and publish it when needed making it more suitable for both teachers and students. Moreover, this VLE is also set up according to the National curriculum, so it supports and helps teachers because it structures the work that needs to be done at a particular time period (Fronter [online]).

All in all, a virtual learning environment is a very useful piece of instructional ICT allowing all participants of education to manage things more interactively when outside (in some cases even inside) the classroom and in a much more individualized way. However, as any other tool of this group, if used improperly or without deeper understanding of its purpose and methodological role, it may become useless or even contra-productive. Moreover, when combined with a fresh modern approach to

education, it may create a very unique complex learning environment of the 21st century.

4.2.3. E-assessment

The process of teaching and learning can be defined as a complex procedure composed of a number of aspects. In case we decide to modify or change the nature of this process and its goals, we need to readjust also assessment as a fundamental component of educating, since it often determines the priorities of education, allows us to state the quality and efficiency of educational process and subsequently, as well as to plan and take necessary steps leading to its enhancement (Redecker and Johannessen, 2013 [online]).

Obviously, the issue of assessment by itself features considerable complexity. Its in-depth exploration is not, however, our main aim here. For the sake of this subchapter it is sufficient to determine the most spoken and widely-accepted division of assessment in education. The majority of authors distinguish different kinds of assessment by a purpose to which they serve and to whom specifying two fundamental groups, the summative and formative assessment (Marshall, 2011, Redecker and Johannessen, 2013 [online], Starý, 2006 [online]).

Regarding summative assessment, its main role is to provide information about a state of knowledge and skills of a particular student (or a group) after a specific period of time. This kind of assessment is particularly meant for a person or institution from outside the school. An example of such an outside party may be parents of students or a committee at entrance exams for high school or university. A typical piece of summative assessment is a school report at the end of a school year or a certificate of any kind. The characteristic feature of summative assessment is, therefore, its finality (Marshall, 2011). It implies, hence, that this type of assessment serves for the purpose of signifying a level or quality of knowledge and skills a particular student has acquired during a semester, school year etc.

As for formative assessment, this approach is designed to help both main participants of the educational process, i.e. students and teachers. It is carried out over the school year

and provides useful information that serves as a feedback signalling whether the effort students and teachers made was worthwhile. In case of teachers, we are talking about whether specific part(s) of the teaching and learning process should be changed in order to adjust it to students' specific educational needs or facilitate the process of education itself. In case of students, formative assessment serves as a mirror for what they have (or have not) learnt up to a present point, and therefore, what they should work on in order to achieve a better grade or higher score (Starý, 2006 [online]). It might, thus, be defined as a non-final evaluation of the current state of knowledge and abilities of a student and be motivation to increase study activity or confirmation of a good study performance. An inseparable part of formative assessment is also suggesting further steps in order to improve his knowledge and skills of a particular subject matter. In other words, teachers should advise each student what to do to achieve better results. Starý (2006 [online]), however, reminds us that the question is not whether to use summative or formative kind of assessment, for both of them have their role in the educational process and only if combined together and used in proper situations, we can achieve the highest possible effectiveness of assessment. The tendency in European countries is, however, to increase the use of formative assessment over the summative one in order to lead students to better results during the educational process and have a better control over it.

But what may be the role of ICT in the process of assessment? ICT in education generally is often perceived as a tool or a set of tools for simplifying and increasing efficiency of particular processes in teaching and learning. The essential purpose of implementation of ICT into the assessment process is, hence, of this origin. Nonetheless, the outcome of this intention is slightly different and more complicated in reality. Generally speaking, technologies have the potential to positively impact the process of assessment, stimulating students to strive for better results. Presently, this may be observed, for example, in case of computer assisted tests or electronic voting systems where students are given hand-held devices allowing them to wirelessly respond to questions raised by a teacher. This lastly mentioned system is most commonly an optional part of interactive whiteboard systems. Answers are instantly processed and displayed on the screen of IWB numerically or in a form of various graphs. Obvious advantages of such testing are swiftness of gaining answers,

interactivity and instant readiness of the system. However, there are also several significant disadvantages concerning computer-based assessment (CBA), such as time a teacher has to devote to create an assessment activity, cost effectiveness or (non)validity and (non)reliability, to name the most voiced (NCEO, 2010 [online], Redecker and Johannessen, 2013 [online]). Concerning the time consuming aspect, it is clearer in case of preparing computer-based tests, where teachers usually need to spend some time writing and programming questions (and possibly also answers, in case of multiple-choice exercises), not to mention open-answer questions which have to be processed individually one by one by the teacher. Also the aspect of human-human kind of assessment compared to the computer-human one, which do not take in consideration any other factors but (in)correctness of an answer is a rather controversial issue. Beran (2013 [online]), a realistic advocate of CBA, perceives this feature of CBA as beneficial explaining that there can be nothing like a biased assessment anymore, contrary to the traditional 'paper-pencil' assessment. Nonetheless, there is a general scepticism among instructional ICT experts and teachers about this issue arising from the approach that assessment needs to be based on an individualized approach taking in the consideration students' skills and knowledge in broader range (NCEO, 2010 [online]).

Despite the current interest of such approach to CBA, it is not the only one that has appeared in the works of authors dealing with this topic. These approaches may be put into the time frame according to their developmental stage, sophistication and the time of emergence. Such a chronological sequence was carried out by Redecker and Johannessen (2013 [online]). Yet, their division of four generations of CBA is derived from the 1980s study of Bunderson, Inouy and Olsen called 'The four generations of computerized educational measurement'. These four generations are Automated administration and/or scoring of conventional test (traditional tests processed and assessed by computers), Adaptive testing (computer-based tests adapting to the level of student's knowledge during the test), Continuous integrated assessment of the student's effort and Personalized feedback and tutoring (intelligent assessment helping teachers not only to assess tests but also giving suggestions on further direction of education to both, students and teachers. The last two generations, entitled Embedded assessment by the authors, are rather questions of the future, even though having potential of wide-

spread realization in a short-time horizon. The relationship and time sequences are best seen in the scheme below (Redecker and Johannessen, 2013 [online]).
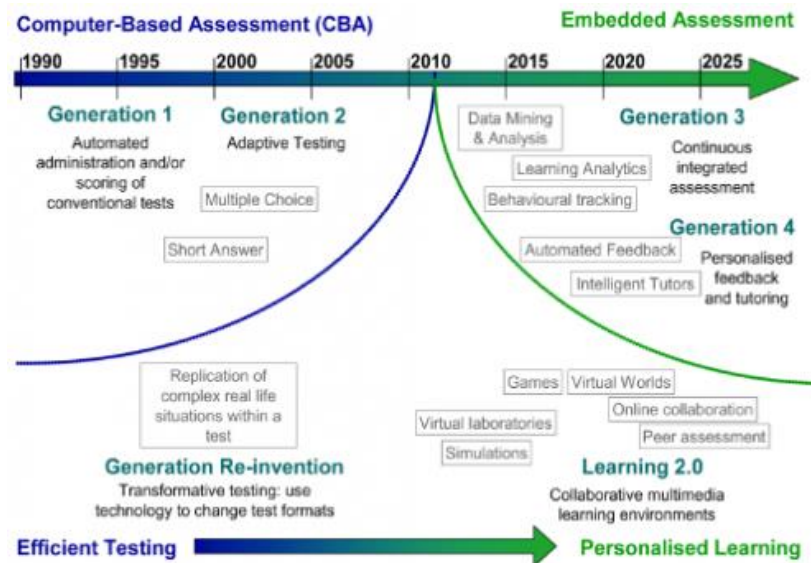
Scheme 5: The development of computer-based assessment

4.3. TBE approaches and applications

The following part of this chapter will deal with specific applications of instructional ICT tools into specific learning approaches based on their nature. These approaches are meant to be used in most cases on full scale in the educational process, and thus are in most cases alternatives to the traditional way of education.

4.3.1. Flipped classroom

Even though school might have the access to a great number of ICT instructional tools, technology-aided teaching and learning needs a certain concept or approach to impact students effectively. One of such complex approaches introduced several years ago is called *Flipped classroom* (FC). Its individual parts have been in education for some time now, however the Flipped classroom concept finally shaped them into a working system making use of the fact that students have access to technologies not only at school, but also outside of it.

The core idea of FC is to move certain parts of a lesson from schools to libraries or students' homes to provide more time for other activities. More specifically, the frontal part of a lesson involving explanation of the fundamental ideas and terminology of a topic is transferred to a learning management system (LMS) accessible via the internet. Here, students find the necessary study materials in a form of video-lectures (prepared by their teacher or experts in the field), podcasts, articles and other written materials and external links to reliable websites. Students study these materials before a particular lesson (or a set of lessons). Their task is to summarize what they have learnt and write questions concerning the part(s) of the subject matter they do not understand. These questions are forwarded to their teacher, so he can prepare activities focused specifically on the areas of the subject matter that are unclear or he may help students individually according to their needs. The advantage of such an approach is that the teacher can skip the areas of the subject matter that are clear to students and hence save time (Edu-ICT trends [online]). This time can be devoted to achieve higher forms of thinking by students, in other words higher stages of Bloom's taxonomy such as analysis, application, evaluation or creation components (Tůma, 2015 [online]). Methods of spending this 'extra time' have been specified by John Bergman and Aaron Sams. The first method is to help students with what is difficult for them and what they struggle with by individualized or small-group based learning, instead of spending time on content delivery and low-content thinking. Another method, that can be complementary with the previous one, is to intervene and prevent future problems by spotting students' misunderstanding of a concept. Last but not least, they present a method of questioning activities consisting in a teacher circulating around the classroom answering students' questions concerning the subject matter. These questions may be motivated by students not being able to understand the concept by themselves or by a desire to deepen their knowledge (Bergman, Sams, 2014 [online]).

The whole process is not, however, only a transfer of information mediation process from schools to students' computers by making it a video tutorial to gain more time during a lesson. Further changes in fundamental learning conceptions take place as well. This concept implies that we need to stop leading all of our students along the same path, but quite the contrary. The aim should be to individualize the teaching processes as much as possible and ensure that each student can learn at his own pace and into the

depth that is in concordance with his/her maximal potential, abilities and capabilities (Richardson, 2007 [online]). This, however, also puts great responsibility on the students, for the teachers' role switches rather to a facilitator.

Another important aspect of this approach vital for achieving success is to stimulate and rouse students' interest in gaining the information by themselves. Kelly Walsh summarizes methods to achieve this. They are, though, very similar in their nature and can be therefore combined and adjusted to specific situations. Most frequently used ones are research and project methods where students are assigned a complex task or are given a specific situation and to solve it they necessarily need to research certain information area and obtain particular pieces of information. Another method is problem solving where the goals are almost identical with the two previous methods (Walsh, 2013 [online]). What is different from the traditional approach of teaching is that through this approach students learn to cooperate and to be self-reliant at the same time.

As for foreign language teaching, flipped learning offers a great potential as well. Since this approach enables teachers to save time during lessons by having students prepare for a lesson in advance going through grammar presentation and exercise practise at home, there is more time to practise the language by doing one-on-one interactions or carrying out various projects. By working with the language as a means to communicate information, students perceive the language as something that must be mastered in order to finish the activity they are engaged in. Students might also like role-playing or other dynamic activities through which they learn the language in a more relaxed and unconscious way.

A model example of flipped learning today is Khan Academy, an institution founded by Salman Khan, an M.I.T. graduate, which provides students around the world with sophisticated on-line educational environment for free. Its purpose is to serve teachers as an online place where their students have the access to a variety of video tutorials made by experts in the field. The whole structure is designed to lead students from elementary knowledge in a certain subject matter, say mathematics, to more complex concepts. The pace is extremely individualized by allowing students to move to more difficult concepts only when they mastered the simpler ones. This is tested through a variety of activities and exercises that are eventually graded by an intelligent assessment

system taking into consideration a wide range of aspects, ranging from time spent studying, to the number and kind of difficulty of mistakes a student made, as well as previous results. All these data are also accessible to the student's teacher and parents. Regarding subject matters, it does not cover the full range of educational areas but its range is rather wide. It stretches from science, technology and mathematics to the humanistic field, such as art and history. Unfortunately, foreign language learning has not been covered yet, even though language teachers have already expressed their desire to extend the range.

Now and then, advocates of flipped learning and instructional ICT hear negative reactions from the public claiming that under the influence of such use of modern ICT in education teachers' job is going to disappear being substituted by ICT. Khan Academy and other flipped classroom approach applications clearly show that it is not like this. The tendency is that teachers' role is going to remain impossible to substitute, even though the teachers' role and competences are shifting from an information presenter to a facilitator highly capable of working with technologies for educational purposes.

4.3.2. E-Twinning

Another approach to using ICT in education is eTwinning. In general terms eTwinning is a program which mediates mutual learning of two or more schools from different countries with the help of information and communication technologies. It operates in thirty countries in Europe including the Czech Republic and it focuses on elementary and secondary schools (eTwinning [online]). The aim of this subchapter will not be a detailed description of the program but rather its aims, impacts and benefits for students with the emphasis on SLA.

Concerning the content of eTwinning, its main part is a project or a topic on which the two schools agree and collectively work over given time. The general goals of these projects are usually developing language skills, enriching general knowledge about the world around students and new learning habits and styles. To be more specific about the last mentioned goal, it, in other words, mean that students learn not only by getting information from teachers or searching the internet, but also by talking to their peers

from both their own and foreign country. To provide the best possible environment for achieving these goals teachers and students work mostly with an ICT tool called TwinSpace. It enables them to easily share picture, videos, writings and more with the other school(s). All the participants can log in and share and communicate at any time and any place, since the interaction is mediated via the program connected to the internet. It implies that this kind of project transcends the traditional school educational limits (Brdička, 2011 [online]).

We can say that eTwinning is very similar to travelling because it involves speaking a different language, meeting people from other countries and learning about their culture. Even though the diversity is significant due to different nationalities, students definitely have many things in common, such as similar hobbies and interests or subjects they study. Therefore, there are many topics about which students can speak even after school. This communication is most often in English. However, when students learn the language of their counterpart school as their second language both sides may benefit from it even more (e.g. English and Spanish or German and French children).

Clearly, eTwinning is a great means to develop all the four main aspects of language learning, i.e. speaking, listening, reading and writing, and also word-stock grows significantly. In order to really try these aspects of a language out, learning through eTwinning combines small-groups work and whole-class work with a teacher. By doing so, students also learn to work collaboratively on small pieces of their project and, since all the work is done with the help of ICT, students' ICT literacy increases as well. Another 21st century competence which eTwinning develops is creativity and so called 'out-of-the-box' thinking that is vital for students to be successful in the job market. What is, however, probably the most significant benefit for students, at least from the viewpoint of SLA, is that the program increases students' confidence to speak the second language which is a great issue in (not only English) language classes at elementary and secondary schools.

All in all, eTwinning may be a great help to all the second language teachers, since it enriches students complexly. Also other knowledge and skill areas are being developed when a school joins the eTwinning community, such as geography or cultural education. It also positively impacts on students' ways of learning.

4.3.3. MOOC

In today's world where spreading and obtaining information is done through the means of the internet network, internet-aided learning is just a natural outcome. However, there are some approaches that shift the learning process to windows of internet browsers in its full range. The most wide-spread representative is MOOC.

This abbreviation stands for Massive open on-line courses. These courses are studied exclusively via the internet. Thanks to this aspect of MOOC, people with the interest to study from literally any part of the world have access to such education. It is not in most cases restricted by age, nationality, gender or religion. The only requirement is to own or have access to a computer connected to the internet. Once this requirement is met, a person can be enrolled. Due to their nature, MOOCs are most commonly realized at the higher or university level of education. Even the most prestigious universities such as Stanford or Harvard are, thus, publically available.

MOOC may remind traditional distance learning but there are some significant differences one of them being that students are never in face-to-face contact with their teacher, so for the entire course the teaching process is realized through a virtual learning environment where students are provided with necessary materials, video tutorials and other sources of information. In this environment, they are also assigned a number of short- and long-term tasks, papers and other study projects. The assessment of students' effort, representing 45 % of the total amount of time teachers spend on one course on average (Mandernach, Hudson, Wise, 2013 [online]), is most commonly done by teachers themselves rather than by a computer assessment system, though when a course uses traditional testing tools, these can be assessed by a computer. Concerning final assessment and finishing of MOOC courses, unlike 'regular' university programs, when students finish a MOOC course they are given only a kind of certificate confirming their successful completion of a course. However, despite some kind of assessment that is done in MOOC courses, according to Dr. Keith Devlin, a Stanford University teacher, marks and desire to be graded well at the end of a course should not be the first-place motivation for students of a MOOC to carry out assigned tasks and projects. He goes on to claim that negative results of such a concept are obvious in primary and secondary education and MOOCs should stay as it is and resist these tendencies (Devlin, 2013 [online]).

This on-line learning approach brings a various number of positives for both universities and students. The most significant one is the fact that studying such a course is for free. That breaks all the barriers concerning the socio-financial situation of people, allowing them to educate themselves in any field they desire. It is particularly significant in countries where students pay high tuition fees every semester to study, such as the USA. It is, however, also a cost effective way of education for universities, since costs to run a MOOC are minimal compared to 'regular' programs. Another positive aspect is that students of MOOCs at prestigious universities are educated by top experts in the field, hence the quality of education is of a high quality. Last but not least, there is the aspect of easy accessibility, already suggested above, that breaks barriers in reaching education on a geographic level. There are, on the other hand, also some disadvantages and barriers of MOOCs voiced ones being an absence of real contact with teachers, insufficient importance of a certificate after finishing a course for some students or low prestige of MOOCs in general when compared to 'regular' university programs.

Concerning the amount of students in MOOCs, even though a great number of students are enrolled, those who finish such courses are just a fraction of this number. To be more specific, the fraction represents 10 % of the total amount of participants at the beginning of a MOOC course on average. The reasons are multiple, usually it is the difficulty of a course that makes students leave the course or they are just 'lurkers' who "observe or sample a few items at the most" (Hill, 2013 [online]). Another group of students are 'drop-ins' characteristic for acting as actives students at the beginning but after some time they out of the course. The reason for acting like this is that they join the course only to gain additional information either for another MOOC they are taking or for other study purposes outside MOOC. The distribution of different patterns of students at the beginning and the end of a course is best observable from the scheme below which was carried out by a provider of a number of such courses (Hill, 2013 [online]).
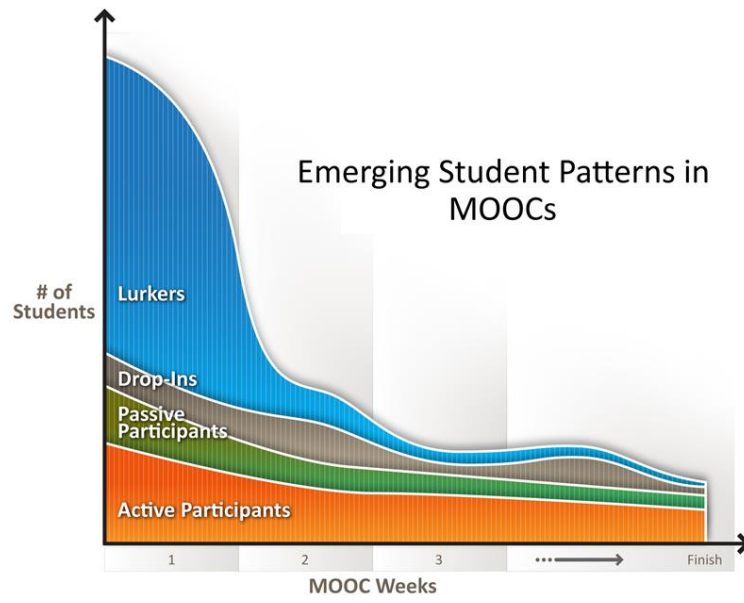
Scheme 6: The distribution of patterns of MOOCs students

5. THE RESEARCH PART

The theoretical part of this thesis implies that there is a number of instructional ICT tools that have the power to enhance the quality of the educational process. However, it was also stated that no matter how significant is the positive potential of instructional ICT tools, if not used within a suitable method and by knowledgeable teachers this potential vanishes and the tools might either not impact the process in any way or even impact students and the outcomes of a lesson negatively. Therefore, the standpoint of teachers towards TBE directly influences the rate of successfulness of the ICT implementation process to schools and makes them the key element on the way to the transformation of education into its 21st century concept.

This was the main reason to choose teachers and their attitude towards ICT in schools as the subject of this research. To eliminate environmental factors that differ school by school (ICT equipment, management, budget, colleagues, students and their parents) the research was conducted in one particular elementary school in Hradec Kralove (Elementary school Jiraskovo namesti, hereinafter referred to as ZS JN). Therefore, the results cannot and will not be generalized for any larger area neither on the level of districts (the district of Hradec Kralove), nor on the national level. The only generalization will be drawn within the scope of ZS JN. The general aim will be **to** provide an insight into this school, its environment, atmosphere, level of ICT equipment and, most importantly, teachers' attitude to ICT in their lessons and opinions about impacts of ICT on the educational process. The reason to choose this particular school was that it is a school where I teach, hence there was more time and possibilities to observe and research. Moreover, this school has participated in several projects focused on implementation of ICT into lives of both school and teachers.

5.1. Research tools and aims

For the purposes of this research two methods of obtaining necessary information and data were chosen. The results of these two methods were combined to present as objective picture of the school regarding instructional ICT as possible. Concerning the nature of the two methods, one is a typical representative of quantitative research tools

and the other is rather less frequently used one adjusted for the specific purposes of this research.

In specific terms, the traditional qualitative research tool was a questionnaire (see appendix A). It was used purposely to collect opinions and attitudes of the teaching staff in order to quantify and compare them, as well as to characterize the environment and prevailing stance on concrete issues concerning the instructional ICT. As a result of the lack of smoothness and reliability of the electronic data collection for my bachelor's degree thesis, the questionnaire was given out in a paper form and its results were processed manually. The validity and reliability of the questionnaire were piloted by students of pedagogical faculty of the University of Hradec Kralove (UHK) and a group of teachers before its final distribution. This piloting uncovered several misleadingly formulated questions, and hence prevented the results of the questionnaire from being irrelevant. The questions were either with pre-defined answers where only one of them could be chosen or there were semi-open questions with both pre-defined answers and a space where teachers' own suggestions could be filled in.

Regarding the target group of the questionnaire, these were solely teachers of ZS JN teaching at both primary and secondary level of the school. There were no restrictions concerning their age, gender, or subject they teach. The total number of teachers who participated in the research is 30, which is almost 90 % of all the teachers in the school. The rest 10 % includes the management of the school and teachers absenting due to a long-term illness. A special attention was paid to foreign language teachers, who constitute 23 % of the teaching staff. For these teachers an extra group of questions was added to the questionnaire in order to research their standpoints in a greater detail in respect to the foreign language teaching.

To enhance the accuracy and provide high authenticity of the research, the questionnaire was supplemented with the second research approach, so called Ethnography. In simple terms, in this research style the researcher spends time in the particular environment with the target group and participates in various activities. Thus, this approach provides the researcher with a real insight into a researched situation and environment, and hence "better understanding of how a particular culture works" (Bell, 2005, p. 16-17). Vital requirements necessary in order to succeed in gaining relevant research data are thus a long period of time that the researcher needs to spend in the environment and active

participation (Bell, 2005). Despite these rather demanding requirements, due to the fact that I have been a part of the ZS JN environment for almost a year, the ethnographic style of research seemed more than suitable. Nevertheless, even though the degree of my involvement is not low, I would still characterize myself as partly a foreign element in this environment, and as such, the perception of various phenomena is not unbiased.

The method was, however, adapted to specific aims of this research and enriched by diary notes. This diary, being filled exclusively with my teaching reflections and English teaching methodology notes at the very beginning, was originally meant for personal purposes only. Nevertheless, as the amount of methodology notes and advices of my colleagues grew, the purpose of the diary broadened to notes regarding teachers' personal opinions, ideas and attitudes towards the instructional ICT implementation. This subsequently led to the incorporation of another research approach into this thesis research.

The results of these two approaches will be presented simultaneously for each part of the research to create a complex insight into a particular issue. The diary notes of teachers' attitudes will be presented in the form of citations preceded by the date when the note was taken and its source. Since the language of notes in the diary is Czech, the original quote will be cited in footnotes and the citation in the text will be the author's translation. To emphasis the presence of such note in the text, it will be in italics and its width will be narrowed. See an example below.

> *(14/1/2015, from the Diary) "The interactive whiteboards are so useless because it takes so much time to prepare an activity and then you spend some two or three minutes and that's all…"[8]*

Regarding the source of graphs presented in the research part of this thesis, they all draw data from the questionnaire survey, and hence they were solely produced by the author. Their list can be seen in the Appendix B.

As already foreshadowed, the general topic of this research was an insight into the environment of ZS JN, teachers' experience and viewpoint on the ICT implementation into the school. Concerning the research questions, the main emphasis was put on

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[8] The original quote: "Ty interaktivní tabule jsou tak na nic, zabere ti to takovýho času než to připravíš a pak je za dvě tři minuty po všem" (The author's translation).

finding answers to the following ones: Are the teachers ready for ICT implementation? Do they want it? Do they perceive instructional ICT as a set of tools for the enhancement of education? What are the barriers to using such tools? Do they have (positive/negative) personal experience with some of these tools? The research also aimed to find out possible dependences of researched aspects on each other. Quantitative conclusions in a traditional way were not meant to serve as the final goals but rather as an illustration of nature of the inner atmosphere in the school and a means to find out the dependences and connections between particular aspects, such as the role of age in the rate of using ICT in lessons. The second part of the research presents projects in which ZS JN has participated and deals with their impacts on teachers.

5.2. ZS JN in detail

Regarding the researched institution, the elementary school Jiraskovo namesti, it is a regular medium-size town school in Hradec Kralove with the extended language education. ZS JN also presents itself as a school open to innovations in the field of instructional ICT and confirms it by participating in several projects developing the school's practical experience with it. Hence, teachers go through variety of training courses where they are getting familiar with new pieces of ICT and methods of teaching with them.

Concerning the teaching staff of the school, the total number is 34. However, as suggested above, the questionnaires were recollected from 30 of them. Out of these teachers, 93 % are women and only 7 %, which represents two teachers, are men (see Graph 1). As for the teaching experience length, there are rather experienced teachers at ZS JN, for more than a half of them have been teaching for twenty-six or more years (see Graph 2). The teaching experience is usually directly bound with age of the teachers which implies that there are fewer teachers who are under 45 than over. On one hand, experienced teachers may be perceived as a 'guarantee of quality' which is in most cases truth. On the other hand, though, in the case of the instructional ICT and its implementation into the educational process the situation might not be that clear anymore. Another important feature about the teaching staff is the proportion of primary and secondary level teachers, which is almost balanced.
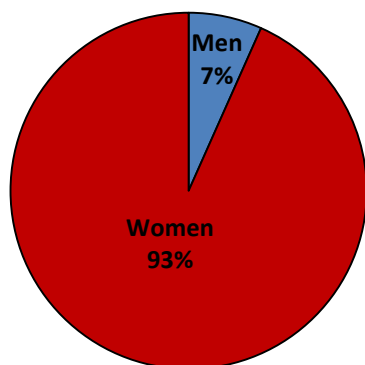
Graph 1: Gender distribution
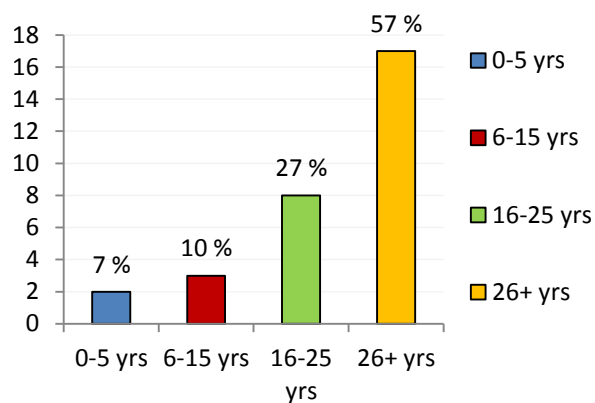
Graph 2: Teachers' experience distribution

As for the instructional ICT equipment, the school offers a satisfying number of ICT tools and provides its teachers with comfort in everyday teaching situations. Every classroom is equipped with a PC, a data projector, an audio speakers connected to the computer and in most cases also with a document camera. However, when it comes to IWB it is slightly worse. This, for the 21st century classroom vital, piece of instructional ICT is in only five classrooms in the school. Similarly, interactive textbooks are very rare especially on the secondary level.

As mentioned above, ZS JN is also active in respect to participating in projects concerning instructional ICT. Namely it is, among others, participation in 'The touch school' or 'Tablets for teachers' projects. Questions concerning these projects were included in the questionnaire as well. The results will be described in a greater detail in the second part of this research.

5.3. Teachers and ICT in general terms

A decisive aspect in the process of the instructional ICT adoption into the personal teaching style of every teacher is the perception of technologies as beneficial for the quality of the educational process and the learning environment. More than two thirds of ZS JN teachers are optimistic about the impact of the instructional ICT and believe that it has a positive influence on the learning process. However, nearly 20 % were not sure whether ICT brings enough benefits to be worth the effort of implementation. In the

case of the foreign language teachers (FLT), this attitude turned out to be stronger, for uncertainty about the instructional ICT was expressed by almost a half of them. This may be in the direct relation with the fact that the vast majority of FLT fall into the category of highly experienced teachers (26+ years), and they, therefore, may not even have had the chance to thoroughly explore the waters of the instructional ICT simply because of their commonly insufficient level of information literacy. This is not, though, applicable to all the FLT. On the other hand, positively enough, not a single ZS JN teacher regards the instructional ICT as completely useless or contra-productive for the educational process.

In correspondence with these facts, 68 % of all the teachers described themselves as pedagogues open to technologies in education. Concerning FLT, the results significantly differ, for only one of these teachers described herself[9] to be open to technologies, whereas the majority of them stays somewhere in the middle of the scale of openness. One of them even expressed a personal negative standpoint towards the instructional ICT, which only confirms the uncertainty of suitability of ICT. This limited openness may be illustrated on a statement of a FLT colleague of mine:

> *(6/11/2014, from the Diary) "I don't see a reason why I should use those modern technologies. I have no idea how to work with it and I don't have time to learn it (...) plus, it's malfunctioning all the time so you lose so much time by setting it up and eventually it's not working, so what is so good about it?"[10]*

As this quote suggests, insufficient abilities or uncertainty of working with the instructional ICT could be a severe problem for their implementation into the teachers' teaching style. Hence, another question in the questionnaire aimed to find out teachers' self-evaluation of their own ICT competences. The results clearly confirm that this is what the school management should focus on when working on the implementation of the instructional ICT into the school educational environment. Expressed in numbers, nearly half of the teachers evaluate themselves as having only the very basic or minimal knowledge of how to work with ICT in lessons. However, there is also a strong group of

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[9] All the foreign language teachers are women.
[10] Original quote: "Já nevidím žádnej důvod, proč bych tu techniku měla používat. Nemám ponětí, jak to funguje a fakt nemam čas a chuť se to učit (…) a navíc to pořád blbne, takže prostě něco nastavuješ v hodině a pak to stejně nejde, tak k čemu to je?" (The author's translation).

teachers (37 %) who evaluate their instructional ICT skills as average, which suggests that there is a general basis of knowledge on which a deeper understanding of the instructional ICT could be built. This 'building' may be very well assisted or mediated by the top 17 % of teachers, who described their ICT competences as excellent or very good (see Graph 3 below). What is positive about this aspect is that FLT had not any worse perception of their own skills which implies that the difference between the FLTs' self-evaluation and the overall self-evaluation of all the ZS JN teachers is in terms of attitude rather than competences.
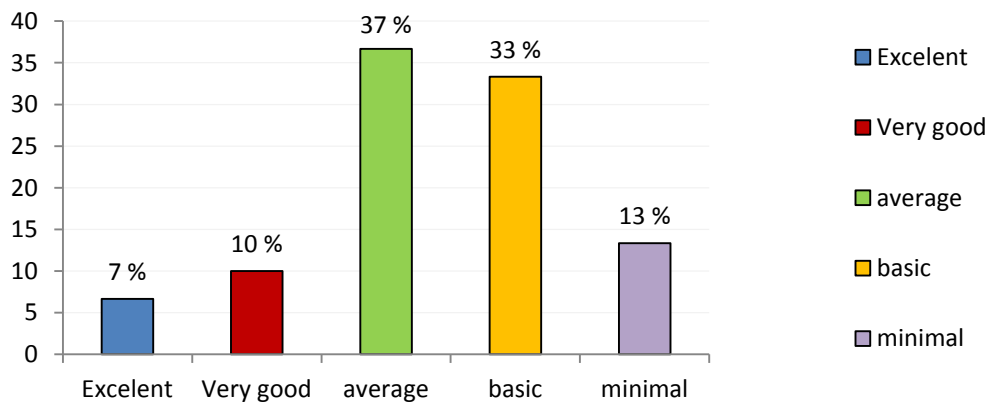
Graph 3: Teachers' self-evaluation of their ability to work with the instruct. ICT

Not only colleagues but mainly professionals in the field, though, should help in the educating of the teaching staff. Therefore, this raises a question whether (and how often) the teachers go through training courses concerning the instructional ICT. The answers to this question in the questionnaire were evenly spread among all the provided options (never, once or twice a year, three or four times, five times and more) with the only exception being 'never'. As for FLT, the prevailing frequency of the training courses attendance is once or twice a year. From this we can deduce that some of ZS JN teachers take part only in the compulsory training courses[11], while others voluntarily participate also in some other courses provided by the school to enhance their abilities even more.

As for the compulsory training courses at ZS JN, another interesting fact can be notice. Since all the teachers collectively participate in these training courses without being

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[11] By 'compulsory' we mean those training courses which are being held in the school either as a part of its participation in a project or because they were chosen and considered by the school as important for the members of the teaching staff.

divided by their skills and knowledge in particular subject matter (e.g. instructional ICT), a rather uncomfortable situation often occurs. The problem with the wide range of teachers' skills and knowledge of a subject matter of courses is when it comes to pace and the depth of exploration into which a course should go. Usually the teachers split into three groups, those who fall behind the pace, the core which more or less follows what is being presented and a small fraction of skilled teachers who already know most of information. A member of the last mentioned group after a training course focused on creating activities in an IWB software program noted that:

> *(20/2/2015, from the Diary) "it was a 'how to work with a computer' or 'a drawing editor' course rather than anything else. It was boring."[12]*

The teacher was, however, partly right. The reason why he felt like this was that during the course members of the first mentioned group above started having problems with elementary operations on a computer, such as dragging objects or creating a folder where they should save activities they had created. As a result of this, the instructor of the course slowed the pace and started helping these teachers. After the course she mentioned that she had to skip several rather advanced features of the program because of this. This, hence, implies that having all the teachers participate in a training course or splitting them randomly up into groups is unsuitable for the particular environment of ZS JN and the school management should definitely consider differentiation of participants according to their skills. Also basic training courses focused on working with a computer for the less skilful teachers should be taken into consideration.

The difference among teachers' ICT skills, though, is not caused only by their age, as may be wrongly interpreted, but also by the fact that some teachers simply do not regularly use ICT (both in their personal and professional life), which is completely independent of how old they are. Regarding professional life, beside teaching and working with a computer, it also involves using a computer (or other piece of ICT) to prepare for lessons. According to the results of the questionnaire, most of the teachers use a computer for these purposes several times a week or several times a month. The

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[12] The original quote: "to byl spíš kurz práce s počítačem nebo opakování malování než kurz na práci s programem pro iteraktivní tabulí" (The author's translation).

same is true for FLT. This suggests that the hypothesis concerning the connection between the use of computers and ICT skills is most probably right.

As for the purpose of use of ICT in the foreign language teaching, out of all the fundamental aspects of language, listening is the most mentioned one by FLT closely followed by the vocabulary building. However, these results are not that surprising, for listening is usually mediated through a CD player or alternatively IWB, and similarly it is in the case of the vocabulary building.

5.4. IWB and instructional software

It would be very difficult to find a more characteristic representative of today's instructional ICT than an interactive whiteboard. Over the time, it has become almost a symbol of the modern transformation of education into the 21st century conception. It is usually the central part of every modern classroom serving as a multifunctional tool. To what degree it has been adopted by the teachers of ZS JN, what is their attitude towards it and what factors influence its use are the main topic areas of this research part.

In order to take the advantage of IWB and use it in a meaningful way, teachers first need to have constant access to it whenever needed. The number of IWBs at ZS JN is not high; the school has only five classrooms equipped with this piece of ICT. However, the fact is that IWB may not be equally beneficial for every subject. The question, though, still stays the same: Is the number of IWBs sufficient for the needs of the teachers? The results clearly suggest that ZS JN teachers do not consider this a problem, because to 72 % of them five IWBs seem to be enough to fulfil their teaching needs concerning the use of IWB. Even though this result may seem positive, we need to realize that in the case that this little amount of IWBs is enough for three fourths of all the teachers, the use of IWB by these teachers is rather rare. It also implies that most of the time they get by with just a computer and a data projector (that are in every classroom of ZS JN). It means that they usually present either their notes as a static text with pictures or animations (e.g. PowerPoint presentations) or play audio / audio-visual recording. Either way, this teaching approach involves only little interactivity. This approach could be, therefore, very well defined as the second step out of four on the way to the real implementation of instructional ICT according to Prensky (2005

[online]), for at this stage teachers use ICT in order to achieve old goals with old methods.

However, when the research results are studied more deeply, it becomes obvious that the primary level teachers require the presence of IWB in the classroom they teach in significantly more than the teachers of the secondary level (see Graph 4). It may have basically two reasons, one being the need to use an interactive textbook and the second to present the educational content in as much visual and interactive way as possible. It should be noted, though, that the school offers the primary level teachers the possibility to use interactive textbooks for several main subjects, whereas the teachers of the secondary level do not have this opportunity for any subject.
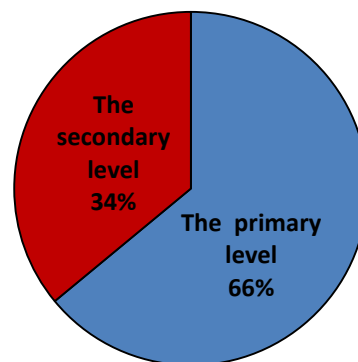
Graph 4: The comparison of teachers' desire to have IWB in their classroom

Regarding FLT and the frequency of using IWB, the results obviously show that IWB in the foreign language teaching is not a common phenomenon. The vast majority of FLT use IWB in their lessons on average as often as 'few times a month' or 'seldom' according to the results of the questionnaire. This may be caused partly by the fact that there are no interactive textbooks for foreign languages provided by the school. However, there is another software program that allows teachers to use IWB interactively. It is a software program provided by manufacturers of IWBs[13]. These programs enable teachers to create and work with interactive activities in their lessons without having to have an interactive textbook, and hence, FLT are not any significantly limited in using IWB. Despite this fact, FLT still have certain reservation about using IWB. One of my FLT colleagues gave me this explanation of her negative attitude:

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[13] Each manufacturer of IWBs provides their customers with their own software program, which is however incompatible with IWB software programs of other manufacturers.

(14/1/2015, from the Diary) "The interactive whiteboards are so useless because it takes so much time to prepare an activity and then you spend only some two or three minutes in the lesson by doing the activity and that's all..."[14]

Nonetheless, 'the other side' have rather convincing arguments to oppose such critique. Some of them were mentioned during a compulsory training course by the instructor:

(9/3/2015, from the Diary) "You may, of course, spend long time by preparing an activity, but once you have it you can use it repeatedly, modify it and once you learn the way the program works, your preparation time will get significantly shorter. (...) Moreover, you don't need to create only your own stuff, since there are tons of shared materials on the internet."[15]

Hence, also other software programs, besides interactive textbooks, may serve as a medium for the full utilization of the features and the potential of IWB. However, to be able to reach this potential, a teacher needs to master the way the program functions. How successful the ZS JN teachers are in respect to this competence, how often they use the software program and whether there is a connection between this mastery and the frequency of using IWB are questions which the following paragraphs will deal with.

Since classrooms at ZS JN are equipped with ActiveBoard IWBs by Promethean company, the software program the teachers' are provided with is Active Inspire. This is one of the two most widely used IWB software programs, hence teachers can gain and share experience and tips on using it with teachers all around the world. This opportunity, however, made only 64 % of teachers use it on the regular basis (see Graph 5).

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[14] The original quote: "Ty interaktivní tabule jsou tak na nic, zabere ti to takovýho času než to připravíš a pak je za dvě tři minuty po všem" (The author's translation).
[15] The original quote: "Samozřejmě asi strávíte hodně času při tvoření tý aktivitky zezačátku, ale vy ji pak můžete použít opakovaně nebo upravit pro jinou třídu, a jakmile se naučíte s programem pracovat, ten čas, kterej na tom strávíte se výrazně zkrátí. (…) Navíc nemusíte tvořit vlastní věci, protože na internetu máte už množství sdílených aktivitek volně ke stažení." (The author's translation)
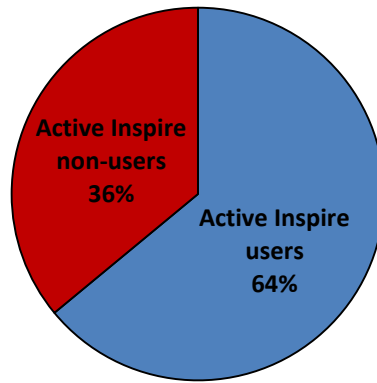
Graph 5: The rate of Active inspire use by ZS JN teachers

The results, though, did not prove the direct connection between (not) using Active Inspire and the age of teachers. Yet, there can be traced a loose connection between the Active Inspire use and a school level, for the primary level ZS JN teachers tend more to using this program when working with IWB.

Concerning teachers' self-evaluation of their competence to work with Active Inspire, even here we can spot a certain link between these skills and a school level. It is, analogously to the previous case, in favour of the primary level teachers. As for FLT, in this respect they perform only slightly worse compared to the overall teachers' results (see Graph 6). This rather insignificant difference hence implies that FLT may not have as much barriers in incorporating IWB into their lessons on the level of using competences as on the level of willingness and motivation.
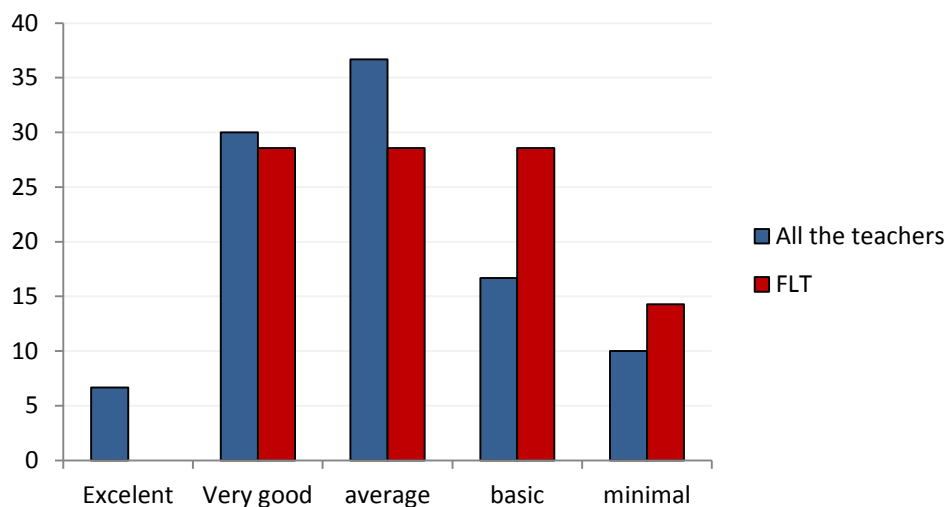
Graph 6: A comparison of teachers' Active Inspire competence

However, besides the IWB manufacturers' software programs, characteristic for the feature to create and edit activities for students and pre-prepare a lesson in advance, there are also so called instructional software programs. In their broadest meaning they can be split up into two groups. The first group covers above mentioned interactive textbooks and the second one includes supplementary instruction software programs (SISP). Compared to interactive textbooks, SISP provide slightly less broad range of facilities usually focusing on limited amount of aspects of a subject (e.g. grammar or vocabulary, in the case of SLA) and therefore cannot be used as a substitution for traditional paper textbooks, contrary to the interactive textbooks. SISP are usually used as a supplementary tool for the enhancement and enrichment of the teaching process. What is the teachers' attitude to both types of groups of instructional software, whether they have tried to use it and what is the possible frequency of using the software are the main areas of the following part of the research.

Despite the fact that the term 'interactive textbook' have been around for some time, it may not be familiar to everyone. In the case of ZS JN, though, nearly 80 % of the teachers have a general notion of what it is. However, only a half of all the teachers have actually had a chance to work with an interactive textbook in practice. In the case of FLT the rate is even lower. These facts are not provably dependent on age, as well as on whether they are primary or secondary level teachers. In spite of this, nearly 70 % of all the teachers and 60 % of FLT would like to use an interactive textbook regularly in their lessons. Regarding a particular foreign language interactive textbook, the one that FLT would like to work with most is Fraus' Way to win.

Concerning SISP at ZS JN, teachers of most of the major subject (e.g. Mathematics, Czech language or English) can work with these subject-specialized series of programs in their lessons because these programs are installed on every classroom PC[16]. However, in most cases teachers cannot use its interactive aspect due to a rather low number of IWB, and so they usually only project an activity or exercise on the projection screen. FLT, though, do not mind this that much, for the results of the research suggest that they use the programs very seldom. To be more specific, 71 % of FLT use SISP only several times a year and the rest of them do not use them at all.

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[16] These are the stationary computers that are located in classrooms and connected to speakers and data projector (and also to IWB if possible).

All in all, when the FLT's general attitude towards interactive textbooks is compared to their attitude towards SISP, we cannot but state that interactive textbooks are in greater favour of FLT and the school management should consider investing into their purchasing. Subsequently, by increasing the rather low number of interactive textbooks the schools could positively impact the attitude of FLT towards using IWB, and eventually also instructional ICT in general, and thus increase the interactivity (not only) in foreign language lessons.

5.5. Portable devices

Portable device, another essential piece of instructional ICT in the 21st century concept of education, represents an important transitional element helping to connect the real world with the inner 'world' of every school. Incorporating such devices, most commonly tablets nowadays, systematically into lesson plans can support students' perception of learning as being meaningful, for they see the connection between the two worlds and take the device as a learning tool. Portable devices are also said to develop students' creativity and increase motivation. Do ZS JN teachers share this view on portable devices? Are they willing to use portable devices in their lessons regularly? Do they believe that the 'one tablet for each student' conception (1:1) is worth implementing into the environment of ZS JN? And are there any barriers in using school portable devices in education? The following lines should reveal answers to these questions.

Concerning possible benefits of portable devices, specifically the increase of creativity and motivation by using tablets, the results show that ZS JN teachers rather do not believe that there is such an impact. As for the motivation aspect, only 37 % of the teachers believe that tablets might positively influence students' motivation to learn in lessons. Similarly, also the creativity aspect does not appear to be influenced by using tablets according to ZS JN teachers, for only 27 % of them share this view. Moreover, the teachers' opinions about these two aspects seem to be bound. We can claim so because two thirds of the teachers who do not see the direct positive influence of tablets on students' creativity also do not believe that they might have any significant impact on students' motivation (see Graph 7). Regarding the foreign language education, the

opinion of FLT on the influence of these two aspects is even more pessimistic, for not a single FLT regards tablets as significantly influential in this respect.
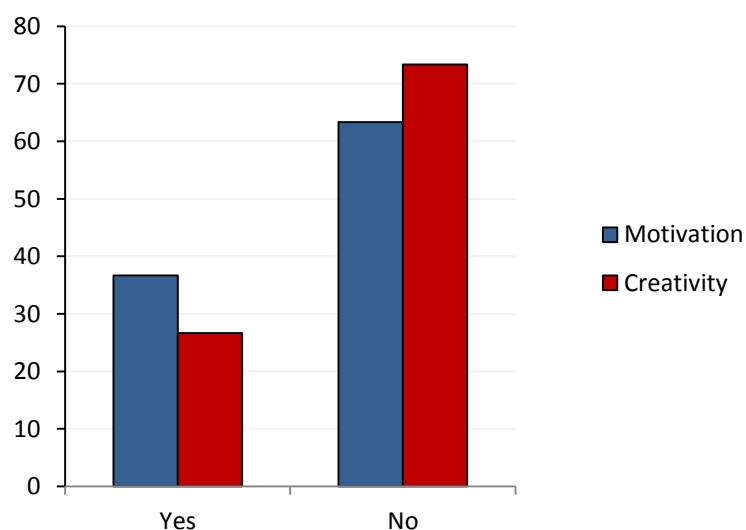
Graph 7: Teachers' opinion about impact of tablets on students' motivation and creativity

Putting together these results and the teachers' attitude towards 1:1 conception, we can say that they are, quite logically, in concordance, since 59 % of the teachers would not support their school in transition to this conception. Almost identical are the results of FLT. One of them aptly pointed this out:

> *(1/23/2015, from the Diary) "What's the point in using tablets to fill in an exercise or connecting children wirelessly in a lesson? What you need is to make them speak or use the language somehow, not make them touch the screen."[17]*

This suggests that to these teachers the feature of interactivity of such devices does not seem attractive enough to incorporate them into their teaching style. It does not mean, though, their total refusal of interactivity, but they rather create interactivity through speaking directly with students, having them speak to each other or having them work in groups.

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[17] The original quote: "K čemu mi je, že použijou tablet na to, aby vyplnili cvičení nebo byli mezi sebou propojený? Přece to, co v jazyce chceme je, aby děti mluvili nebo nějak pracovali s jazykem, ne aby ťukali něco na displeji." (The author's quote).

When the teachers speak about portable devices, it is important to note that it is not based only on their theoretical knowledge or guessing what it would be like, but also on their personal experience, since the school have its own set of portable devices (netbooks[18]) in the total number of 26 pieces. The school has had them for seven years now. We were interested in whether they use these netbooks, how often they do so and if not, what are the barriers?

Even though not a high rate of usage of the school netbooks was expected, judging by the previous results, the reality turned out to even surpass these expectations, since no more than 23 % of all the teachers use them in their lessons, out of which 16 % do so only several times a year. The rest 77 % of the teachers have never used these netbooks (see Graph 8). The purpose of use of the netbooks by the 23 % is most commonly searching the internet. The questionnaire also revealed that the 7 % of the teachers who use it several times a week are informatics teachers. As for foreign language teaching, all the FLT are involved in the category of non-users of these netbooks. The age of teachers does not play a significant role in this respect.
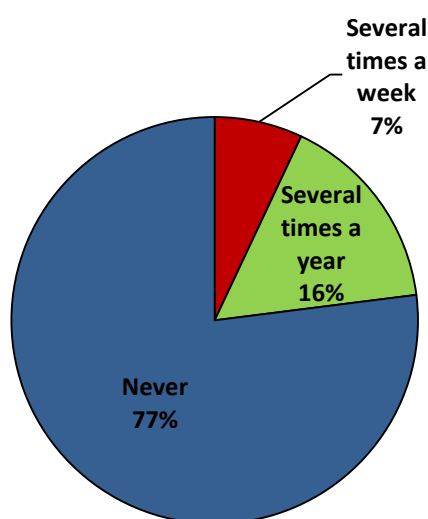
Graph 8: The frequency of use of netbooks by the teachers[19]

So what are the barriers of not using the netbooks? There are basically three main reasons why ZS JN teachers do not use them. It starts with having to pick the netbooks

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[18] A netbook could be described in simple terms as a regular laptop of smaller dimensions with extended battery runtime. Such devices are therefore lighter, easily moveable, but at the same time they feature all the fundamental aspects of laptops.

[19] There were five options to choose from in the questionnaire; the two options with zero per cent rate ('several times a day' and 'several times a month') were excluded from the graph. (see Appendix A)

up in one specific classroom, in which teachers can get only after getting a key from the deputy headmistress. After picking it up, the teacher needs to move them (with the help of students, if possible) to the classroom where he/she regularly teaches. Once in the classroom, another barrier appears. Some of the netbooks might not be charged or its battery is in bad condition so it needs to be charged during the lesson. This means for the teacher to take along a power strip with splitters and chargers. This is rather annoying and it also takes some time to prepare, not mentioning jumping over all the cables while teaching. This is also one of the main reasons why tablets are gradually substituting devices like netbooks, for their battery runtime is significantly longer.

The last barrier which teachers often mentioned may be very well illustrated on the comment of one of my colleagues when recollecting using the netbooks:

> *(12/2/2015, from the Diary: "First, I thought they work on what was assigned, which was looking for the topic-related information, but every time I went around the classroom to check what is the progress, they swiftly pressed something and I realized that I do not have control over what they are actually doing.")[20]*

It is this barrier that makes the most of FLT rather not to use the netbooks. However, there exist certain systems (software programs) that enable teachers to supervise everything what is happening on the students' computers or banning using particular applications. In order to be able to do this, though, the teacher needs to have his/her own computer.

5.6. Projects running at ZS JN

The last section of this research deals with project in which ZS JN participates. Specifically, these are two projects, focused on the instructional ICT implementation. In this section, not only teachers' attitudes are being subjected to researching, but mainly the details of particular projects and their goals and impacts.

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[20] The original quote: "Nejdříve jsem si myslela, že pracují na práci, kterou jsem zadala, což bylo hledaní informací na internetu o probíraném tématu, ale vždy, když jsem se šla podívat jak jsou na tom, rychle něco zmáčli a já si uvědomila, že nemám žádnou kontrolu nad tím, co dělají." (The author's translation)

5.6.1. Tablets for schools

This project is currently the most significant one at ZS JN concerning the ICT implementation. It has been running since October 2014 and its planned completion is in June of this year. Its main goals are to boost the implementation of ICT into the primary, secondary and high school education and improving the teachers' competence regarding using touch portable devices in the educational process. It also aims on educating the school management members and helping them with the process of ICT implementation into the unique environment of their school. An important part of this project is practical using of tablets under the guidance of a trained professional. These tables and other facilities necessary for the project are partly financed by EU and the state budged of the Czech Republic. To enable the participants of the project to feel as much comfortable with using tablets as possible, they can use the tablets not only when there is a training course but throughout the whole duration of the project (CSYSTEM-tablety [online]).

Regarding training courses within the project, there are three types of them. Naming them by their starting date, the first one is a series of individual courses, which is still being provided to teachers. Then there have been several regular collective training courses since December, and lastly, as a supplement for these courses, there have been also webinars[21] presenting additional information on practical use of ICT in education with the emphasis on portable devices.

As for the individual training course and teachers' attitude towards them, they generally were not enthusiastic about attending them, especially at the beginning. It was in most cases caused by the fact that there was no given topic to be covered, besides the cloud services[22] and their use in the school environment. Therefore, teachers, unable to come up with their own topic for discussion, have not had any motivation to attend these individual training sessions. It should be also noted that because teachers were given the tablets only in late January, until then they could not discuss this topic and related issues. On the other hand, several teachers took it as an opportunity to improve their ICT skills in general. As an example can serve the following citation of one of my colleagues when asked what the session was like:

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[21] These are seminars broadcasted online in real-time. They are usually held every fortnight.
[22] 'Cloud' is in simple terms a space on the internet where data can be stored and further processed.

(7/11/2014, from my Diar) "I had no idea what to discuss with the instructor so I asked her about something concerning Power point and so we spoke about that for the rest of the session."[23]

Concerning collective training courses, there have already been three of them since January. Their conception is to briefly explain a particular issue (e.g. sharing documents on clouds) in theory and afterwards more thoroughly in practice with the use of tablets. It also mostly includes a didactic part where participants are familiarized with practical applications of their tablets for both the in-classroom and home-preparation use. According to the results of the questionnaire, these training courses have a positive impact on teachers, for only 3 % of the responded teachers find them rather useless, whereas 63 % perceive them as beneficial.

Due to the fact that the project is running on more schools simultaneously, there appeared also another possibility for teachers to gain (or share) information and experience with tablets (and other pieces of the instructional ICT) called webinars. This implies that the presenters are not only experts in the field but also experienced teachers who share their practical reflections. After their broadcasting, these webinars can be watched on the official website of the project, so the teachers do not worry about missing a particular episode. Moreover, on this website there are also video tutorials advising teachers about broad range of issues from using various MS Windows programs[24] to classroom management programs.

Since tablets may be a helpful tool when preparing for lessons, we asked teachers about the frequency of using them for this purpose. The results showed that ZS JN teachers are only slowly getting used to using tablets in this respect, for only 7 % use it several times a week,   27 % several times a month and the rest several times a year (see Graph 9).

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[23] The original quote: "Netušila jsem, co mám s tou školitelkou řešit, tak jsem se jí zeptala na pár věcí ohledně Power pointu a nakonec jsme o tom mluvili zbytek toho školení' (The author's translation)
[24] The reason for this is that the tablets run on the Windows 8.1 platform.
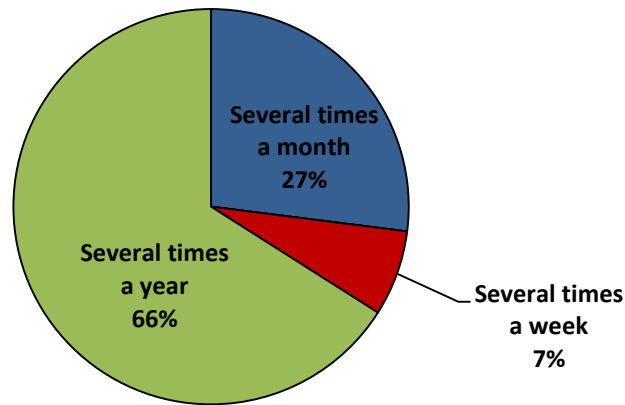
Graph 9: The frequency of use of tablets for lesson-preparation purposes

5.6.2. The touch school

Another project ZS JN is partly involved in is called 'The touch school.' As the name suggests, the aim of this project is to transform 12 chosen schools in the Czech Republic into the schools where leaning is based on using various touch devices (predominantly tablets) by both teachers and students and trace possible contributions to students' achievements, as well as impacts on the teaching and learning process. The project is funded by the EU and all the devices are provided to schools by a Korean electronics manufacturer (The touch school [online]).

The outcome of the project, though, should not be only a statement saying whether tablets have the positive or negative impact on the teaching and learning process, but also a number of materials created by both teachers and students. These are divided into four groups as follows:

➢ Educational materials – materials created by teachers for teachers including lesson plans for the tablet supported education, suitable applications recommended by the teachers involved the project and tips on how to organize different tablet-based working activities in a lesson.

➢ Teachers' videoblogs – videos shot by teachers involved in the project. They describe their experience and express their personal opinions about the project.

➢ Students' projects – projects which were carried out by students with the help of tablets.

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➢ Students' creative production – materials (videos, interactive presentations, etc.) created by students in a particular application on their tablets.

However, there is not only one group of involved schools in the project, but two, and each of them has a different role. The 12 schools mentioned above are pilot schools being equipped with all the devices[25]. They are responsible for the realization of tablet-supported education in their school, collecting data about students' progress, evaluating them and giving feedback on them. The second group, including also ZS JN, are schools functioning as an external unbiased evaluators giving comments and recommendations for enhancement of the educational process with tablets and suggesting and co-working on the implementation of reasonable improvements into the educational process of the 12 schools.

5.7. Summarization of the results

From the researched data we can draw several general conclusions about the inner atmosphere and stance of teachers on the instructional ICT at the Elementary school of Jiraskovo namesti, Hradec Kralove. Concerning the attitude of all the ZS JN teachers, they seem to have certain reservations about ICT in their lessons. In the case of FLT the reservations are slightly stronger and generally they are more pessimistic about the benefits of the instructional ICT. Their age may play its role in this respect. The difference in attitudes is also visible between the primary and secondary level teachers. Here it can be stated that the primary level teachers have more open attitude towards using ICT and use it more often than the secondary level teachers. However, the use of particular pieces of ICT in lessons is rather low in both cases. It might be caused by the slightly under-average level of their abilities to use the instructional ICT, which is especially significant in the case of FLT. Therefore, the school management should consider a series of elementary training courses to build a firm basis for the future to have something to build on.

As for specific instructional ICT tools, interactive textbooks turned out to be the most accepted one out of all the instructional software programs available. It is especially

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[25] Besides tablets there is a new type of IWB which does not use a projector to display the data on the screen. It fucntions rather as an extra-large-size tablet (the screen size is 65 inches).

truth for FLT who refused all the other options. Regarding portable devices, ZS JN teachers do not see many reasons for the implementation of tablets according to the 1:1 pedagogy concept. The reasons for this may be their uncertainty about the positive effects of tablets on students' motivation and creativity in the educational process. Even though, the school has owned a set of portable devices for seven years, teachers did not get used to it and use it rather seldom in their lessons. There are three main reasons for this, the need to bring them into the classroom, difficulties with charging and the inability to control students' devices.

All in all, it is obvious that the ZS JN management tries hard to incorporate the instructional ICT into its educational environment. However, it is also obvious that there is still a long way ahead of them but at least the direction seems to be right.

CONCLUSION

The initial aim of this diploma thesis to analyse the suitability of the most common pieces of ICT in education, as well as approaches to the complex ICT implementation, was successfully fulfilled. This thesis introduced and gave the background to the terms 'technology-based education' and 'instructional ICT' and their historical development was presented. The main reasons for implementation of ICT into education were presented, among which the most significant ones were productivity and effectiveness of the educational process and the increase of students' motivation to learn.

There were also presented the fundamental political documents that help to change education in the Czech Republic, such as the Long-term aim of Education or the Conception 2009. It turned out that all of these documents do not only focus on finding a way to equip schools with ICT but also to educate teachers and the school management in this field. The process of their education aimed on two competence areas, the usage of various pieces of the instructional ICT (tablet, IWB, etc.) and the methodology of the technology-based education.

The thesis also introduced the issue of the information literacy and some other related literacies and suggested the structure and relationships among them. The importance of this set of competences was strongly emphasised and the way to its implementation into education suggested. The results of the ICILS 2013 study were also mentioned. The study showed that the level of the information literacy of Czech students is very high compared to other researched countries.

The theoretical part also provided a thorough analysis of the educational ICT and TBE and presented opinions of an expert in the field Marc Prensky. Moreover, a series of innovative ICT tools and approaches were introduced and their positive impacts on education were explored. Among the most inspiring ones belongs a 'Bring Your Own Device' (BYOD) model, which represents a solution to the financially demanding equipping of schools with portable devices, or E-Twinning program connecting schools from all over the world in order to co-work on an educational project of their own choice.

As for the research part, the main goal was to provide an insight into the environment and teachers' attitudes towards ICT in education of one specific chosen school. For

obtaining the data, two research approaches were combined, a questionnaire for teachers and the ethnographic approach. The ethnographic approach for the purposes of this research consisted of spending some time in the school environment and participating there in various activities in order to experience the specific atmosphere of the school and talk directly with the respondents of the questionnaire. This was no problem form me, since I chose a school where I teach English as a regular teacher, and therefore I knew the environment very well. This particular combination of research approaches was purposely chosen to make the research complex allowing both traditional quantitative data and opinions and thoughts of individual teachers to be presented simultaneously. To keep record of all the relevant data I gained by the ethnographic research approach, I kept a diary.

The aim of the research was to confirm or disprove the hypothesis presented in the introduction of the thesis. The results showed that the first hypothesis that elementary school teachers are sceptical about the impacts and importance of the instructional ICT and their willingness to use them is not high was right. However, the difference was noted between the primary and secondary level teachers suggesting that the primary level teachers at ZS JN are slightly more open and optimistic about the ICT in education. Concerning foreign language teachers, they, on the other hand, turned out to be rather sceptic about the instructional ICT.

The second hypothesis presupposed that the teachers' information literacy competences will be on the basic level. The results of the research confirmed that the level of these competences was not high. However, the situation did not seem to be critical, for 54 % of the ZS JN teachers evaluated their competences to be on an average or higher level which may be seen as a firm basis to build on. The school should, however, consider organizing a series of basic level ICT courses for the under-average teachers in order to help them catch up with the rest of the teaching staff.

Talking about training courses, the research also revealed an interesting fact that whenever there was held a training course at ZS JN, teachers were randomly split up into groups and as a result of this there was always a mixture of teachers with different skills, and thus with different requirements on pace and the depth of the presented information. Therefore, the school should consider doing more in-depth research aiming to find out teachers' ICT competences and create permanent groups of teachers for ICT

training courses in order to partly individualize the teachers' possibilities for the professional development.

ZS JN has also participated in several projects focused on the ICT implementation. The most significant one is the 'Tablets to schools' in which all the ZS JN teachers have to participate. This course deals with providing teachers with tablets with the aim to help them to get used to using them for both home preparation for their lessons and teaching. According to the results, though, teachers are only very slowly getting used to using the tablets.

To summarize, individual modern pieces of the instructional ICT as well as the complex approaches of ICT implementation into education have the potential to enhance the learning process and direct it towards the concept of the education of the 21st century, yet without teachers' willingness to adopt the new approaches and acquire necessary competences, this potential cannot be fully developed. Thus, we can conclude by claiming that if there are no 21st century teachers, there is no 21st century education.

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APPENDICES

Appendix A – The questionnaire for ZS JN teachers

Appendix B – The list of graphs used in the research part

Appendix A

Dobrý den, jmenuji se David Matuška a toto je **anonymní** dotazník pro získaní dat do praktické části mojí diplomové práce, který se zabývá technologiemi ve vzdělávání a postojem učitelů k tomuto tématu. Tímto bych Vás chtěl tedy požádat o věnování několika minut Vašeho času na vyplnění tohoto dotazníku. Velmi mi to pomůže. Děkuji.

Vysvětlení základních pojmů v tomto dotazníku:

ICT = informační a komunikační technologie (rozumí se tablet, počítač (PC), interakt. tabule, vizualizér, powerpoint, výukový program (software), interakt. učebnice apod.)

Výukové ICT = ICT, které se aplikuje ve výuce za účelem naplnění cílů a rozvoje kompetencí. Obsahuje i nové metody výuky podporované ICT.

Pohlaví		MUŽ	ŽENA			
Obecné informace						
Délka praxe (vyberte 1 odpověď)		0-5 let	6-15 let	16-25 let	26 a více let	
Kolik je vám let?		23-35	36-45	46-55	55 a více	
Na kterém stupni učíte? (vyberte 1 odpověď)		1.	2.	Na obou		
Vnímáte obecně vliv technologií na vzdělávání jako pozitivní?		(spíše) ano	Něco mezi	(spíše) ne		
Charakterizoval(a) byste se jako pedagog otevřený technologiím ve vzdělávání?						
Máte chuť se v oblasti vzdělávacích ICT dále rozvíjet (získávat nové kompetence, inspiraci v této oblasti využitelnou ve výuce vašeho předmětu)?						
Kolikrát do roka absolvujete školení týkající se obecně ICT ve výuce? (vyberte 1 odpověď)		vůbec	1-2x	3-4x	5x a více	
'hledávate 'školení přínosnými?		Ano	spíše ano	částečně	spíše ne	vůbec
Na jaké úrovni jsou vaše schopnosti práce se výukovým ICT?		Výborné	Solidní	Průměrné	Základní	Minimální
Prvky ICT ve výuce						
Vnímáte vybavení vaší školy vzdělávacím ICT jako dostačující pro dosahování výukových cílů a kompetencí 21. století?		(spíše) ano	Něco mezi	(spíše) ne		
Máte ve škole možnost používat interaktivní tabuli vždy, když potřebujete?						
Využíváte při práci s interaktivní tabulí výukový software, který je dodáván k tabuli (Active Inspire)?						
Na jaké úrovni jsou vaše schopnosti práce s tímto software?		Výborné	Solidní	Průměrné	Základní	Minimální
Jak často interaktivní tabuli využíváte ve vašich hodinách?		V každé hodině	Několikrát denně	Několikrát do měsíce	Několikrát do měsíce	Skoro nikdy
Interaktivní učebnice						
Setkali jste se někdy s pojmem interaktivní učebnice?		(spíše) ano	Něco mezi	(spíše) ne		
Měli jste možnost někdy interaktivní učebnici vidět v praxi?						
Pracovali jste někdy s interaktivní učebnicí osobně ve vaší výuce?						
Chtěli byste s interaktivní učebnicí pracovat ve vaší výuce soustavně (dlouhodobě)?						
Vidíte ve využívání interaktivní učebnice pozitivní vliv na proces vzdělávání žáků na ZŠ/SŠ?						

Pokud používáte interaktivní učebnici, o jakou se jedná?

Vnímáte ICT (tablet, netbook aj.) jako nezbytný nástroj při přípravě na výuku?

Jak často používáte ICT (tablet, PC aj.) jako nástroj při přípravě na vaši výuku?

každý den	Několikrát týdně	Několikrát do měsíce	Skoro nikdy	

Jak často využíváte ICT ve ve výuce?

V každé hodině	Několikrát denně	Několikrát týdně	Několikrát do měsíce	Skoro nikdy

Jakou část výuky (v průměru) využíváte ICT v jednotlivých hodinách?

0-15%	16-35%	36-55%	56-70%	71-100%

Kdybyste mohl(a) změnit/zlepšit něco ve stavu technologického vybavení vaší školy nebo přístupu k práci s technologiemi v hodinách, co by to bylo?

Následující otázky označené 'JZK' jsou POUZE pro učitele jazyků

JZK Myslíte si, že technologie ve výuce jazyků mají potenciál zkvalitnit jejich výuku a osvojení?

(spíše) ano	Něco mezi	(spíše) ne

JZK Podpořil(a) byste výuku jazyků, kde každý žák pracuje s tabletem?

JZK Z jakého důvodu?

JZK Pro podporu jakého aspektu jazyka využíváte technologie ve výuce? (vícenásobný výběr)

Mluvený projev	Psaní	Čtení	Poslech	Slovní zás.

JZK Máte ve škole možnost využívat pro váš jazyk interaktivní učebnici?

Ano	Ne

JZK Jak často využíváte výukové programy pro cizí jazyky na PC v učebnách? (vyberte 1 odp.)

Každý den	Několikrát do týdne	Několikrát do měsíce	Několikrát do roka	Nikdy

Projekt tablety do škol

Vidíte pozitivní přínos účasti v tomto projektu pro vaši výuku?

(spíše) ano	Minimálně	(spíše) ne

Shledáváte školení v rámci projektu přínosnými pro vaši praxi?

Podpořil(a) byste na vaší škole zavedení výuky, kde každý žák pracuje s tabletem?

Myslíte si, že práce s tablety má výraznější vliv na motivaci žáků učit se (v hodinách)?

Myslíte si, že práce s tablety má výraznější vliv na kreativitu žáků?

Jak často používáte tablet v přípravě na vyučování? (vyberte 1 odpověď)

Každý den	Několikrát do týdne	několikrát do měsíce	párkrát do roka	Nikdy

Jak často využíváte školní netbooky pro žáky ve vašich hodinách? (vyberte 1 odpověď)

Každý den	Několikrát týdně	několikrát do měsíce	párkrát do roka	Nikdy

K jakým aktivitám je používáte? (vícenásobný výběr)

Práce s interaktivní učebnicí	Práce s výukovými programy	Internetová cvičení	Vyhledávání na internetu	Testování

Jiné:

Co jsou pro vás bariéry bránící větší frekvenci jejich používání? (vícenásobný výběr)

Nutnost vyzvednout si je v jiné učebně	Riziko, že žáci budou dělat s PC jiné věci	Nedostatečná znalost práce s PC	Absence metodických znalostí výuky s netbooky	Nízká výdrž baterie / složitost napájení z el. sítě

Jiné:

Appendix B