E-LEARNING PLATFORM AS A TOOL FOR ACQUIRING DIGITAL COMPETENCE

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Abstract: *The field of education is struggling, more than ever, with the challenges imposed by the expansion of modern technologies. In this paper we will discuss some of the problems and their implications for teaching practice and the new role of teachers in the teaching processes. One of the themes we will deal with is the issue of the new set of skills, competences and knowledge, required for the success in life and work in the 21st century, with the focus on digital competence. The answer to the requirements for the new skills and competences has been found in the use of ICT in educational purposes. Several new problems emerging from the implementation of ICT in education will be discussed. A possible solution for overcoming the discussed problems will be presented, in the form of a new e-learning platform designed as an answer to educational needs of the 21st century.*

Keywords: *educational problems, digital competence, ICT in education, SLE platform*

1. INTRODUCTION

Digital revolution hasn't made all the aspects of human lives easier. The field of education is struggling, more than ever, with the challenges imposed by the expansion of modern technologies. The speed of technological development and the information flow, the anticipation and the impossibility to predict what the future brings, the demands for new skills and competences, the needs and interests of digital generations and the growth of the gap between the educational offer and the 21st century living demands, are just some of the problems educationalists are faced with.

In this paper we will discuss some of these problems and their implications for teaching practice and the new role of the teachers in the processes of teaching. One of the themes we will deal with is the issue of the skills and competences required for the success in life and work in the 21st century, with the focus on digital competence. The answer to the requirements for the new skills and competences has been found in the use of ICT in educational purposes. Several new problems arising from the implementation of ICT in education will be discussed further in the text. The purpose of this paper is to present a possible solution for the discussed problems, in the form of a new e-learning platform designed as an answer to educational needs of the 21st century.

2. EDUCATIONAL ISSUES OF THE 21ST CENTURY

There is a very popular quote by Eric Schmidt (2010, Chief Executive Officer of Google Inc. at a time): "There were five exabytes of information created between the dawn of civilization through 2003, but that much information is now created every two days" (an exabyte is a billion gigabytes). Even though the accuracy of this statement has been questioned, it is still a nice illustration of the information growth in today's world. There is also estimation (by IDC analysts) that by 2020, the digital universe will reach 40 zettabytes, with a zettabyte being a thousand exabytes. [1]

What does this information tell us? We now live in a world of ubiquitous data. Exponential growth of information, available through ICT, enables the generation and storage of more and more information, and their high-speed transmission. Teachers stop being the "knowledge owners", which calls for the transformation of the "traditional model of knowledge reproduction" into a model of "active knowledge building". To be able to transform individually collected information into useful knowledge, students should be taught not only to search for information themselves, but also to manage and analyze them. Teachers and students become partners in the common action towards building knowledge bases which should be assimilated. [2] The main task of education is to teach students how to learn, in other words, to provide them with the new set of, skills, competences and knowledge for living and working in the 21st century.

Skills and competences for the 21st century

P21 – Partnership for 21st century skills[1] is a national organization that advocates for 21st century readiness for every student. The P21 Framework presents a holistic view of 21st century teaching and learning that combines a discrete focus on student outcomes with innovative support systems to help students master the multi-dimensional abilities required from them in the 21st century. 21st century *student outcomes* are the skills, knowledge and expertise students should master to succeed in work and life in the 21st century, and they are: core subjects (3Rs) and 21st century themes; learning and innovation skills (4Cs – creativity and innovation, critical thinking and problem solving, communication, collaboration); information, media and technology skills (information, media and ICT literacy), life and career skills. 21st century *support systems* are the critical

[1] http://www.p21.org/

systems necessary to ensure student mastery of 21st century skills. According to P21, 21st century standards, assessments, curriculum, instruction, professional development and learning environments must be aligned to produce a support system that produces 21st century outcomes for today's students. [3]

According to European Reference Framework, competences are defined as a combination of knowledge, skills and attitudes appropriate to the context. Key competences are those which all individuals need for personal achievement and development, active citizenship, social inclusion and employment. The Reference Framework sets out eight key competences: communication in the mother tongue; communication in foreign languages; mathematical competence and basic competences in science and technology; digital competence; learning to learn; social and civic competences; sense of initiative and entrepreneurship; cultural awareness and expression. Competence in the basic skills of language, literacy, numeracy and ICT are singled out as an essential foundation for learning, and learning to learn supports all learning activities. In training these competences, the Reference Framework suggests that critical thinking, creativity, initiative, problem-solving, risk assessment, decision-taking, and constructive management of feelings should be applied. [4]

Focus on digital competence

For centuries educationalists have been dealing with the issues of acquiring basic skills of language, literacy and numeracy. Teaching methods have progressively changed alongside the social and economic changes, as well as the changes of educational goals and the availability of educational aids (e.g. the appearance of the printing press). Present-day technological development and ICT require that we once again *reboot our educational system* and *rethink the ways teachers teach and students learn* in this new era. The starting point should be a focus on digital competence.

"Digital Competence is the set of knowledge, skills, attitudes (thus including abilities, strategies, values and awareness) that are required when using ICT and digital media to perform tasks; solve problems; communicate; manage information; collaborate; create and share content; and build knowledge effectively, efficiently, appropriately, critically, creatively, autonomously, flexibly, ethically, reflectively for work, leisure, participation, learning, socializing, consuming, and empowerment." [5]

This definition highlights that Digital Competence is built on different learning domains (knowledge, attitudes and skills) and spreads across several competence areas. Digital Competence should be understood, in its wider sense, as a multi-faceted concept, consisting of several components:

- Information management – refers to the knowledge, skills and attitudes (henceforth: KAS) needed to identify, locate, access, retrieve, store and organize information;
- Collaboration – refers to the KAS for linking with other users, participate in networks and online communities, and interact with others constructively and with a sense of responsibility;
- Communication and sharing – refers to the KAS for communicating through online tools, taking into account privacy, safety and netiquette[2];
- Creation of content and knowledge – refers to the expression of creativity and the construction of new knowledge through technology and media, and also to the integration and re-elaboration of previous knowledge and content and its dissemination through online means;
- Ethics and responsibility – is understood as the knowledge, attitudes and skills needed to behave in an ethical and responsible way, aware of legal frames;
- Evaluation and problem-solving – is understood as the identification of the right technology and or media to solve the identified problem or to complete a task and also as the assessment of information retrieved or the media product consulted;
- Technical operations – is the area that refers to the KAS one needs for effective, efficient, safe and correct use of technology and media.[5]

Learning and teaching in the 21st century

Technological revolution has altered the society as well as our expectations about what students need to know in order to be able to live and work in these new times. First of all, students need to learn how to cope with the great number of information, to manage and analyze them, make decisions accordingly, and to acquire and perfect new areas of knowledge and new set of skills in the world of constant technological changes and achievements. Lifelong learning and collaboration have become necessities – people should learn during their whole lives, interacting and cooperating, and efficiently using different systems for presenting and transmitting knowledge to others.

In traditional education, teachers were knowledge transmitters and students passive knowledge receivers. In order to help new generations of students to acquire 21st century knowledge and skills, teaching should shift from a process where the teacher is the central figure, towards the process where students are put in the middle. This shift requires the change of teacher's role and responsibility. Having in mind the amount of available information, teacher cannot remain the sole "knowledge owner"; instead, he/she becomes the facilitator, mentor, instructor or trainer who helps his students to study in their own way and successfully transform information into knowledge, providing them with the new set of skills necessary for acquiring and building useful knowledge. Teachers step down from their central positions leaving them for students, promoting cooperative and active learning in a new technology learning environment where

[2] the correct or acceptable way of communicating on the Internet

ICT facilitate the processes of learning, sharing information and communication. [6]

3. ICT IN EDUCATION AND THE NEW SET OF PROBLEMS

As the technological development and the requisite for the new skills and competences have required, ICT found its usage in education. It was seen as a huge step towards the improvement of educational practice. But the truth is, we were not even close to finding a solution for previously discussed educational issues, instead we were faced with a new set of problems.

By now, digital technology has entered all the aspects of human lives. While the adults are still struggling with the new technological reality, for young generations it's the most natural environment. Today's children, *digital natives* as Prensky [7] calls them, grow up in a digital world and think and process information differently than their parents and teachers do – so-called *digital immigrants*. This gap existing between digital natives and digital immigrants is extremely present in today's educational systems. The problem lies in the fact that education's main purpose is to prepare students for living in the future – meaning that it should always be one step ahead. Never in the history of education has this gap been so profound as today. Not only that our educational system is one step behind the future, it is one or even two steps behind our present.

Having in mind the purpose of our educational system, the level and the speed of technological development, the challenges that today's educationalists and teachers (mostly digital immigrants) are faced with, it is clear why the issues of education are not so easy to be resolved. One step towards resolving this problem was the introduction of ICT in education – a logical solution which led to a series of new educational problems and issues. What are we doing wrong? Why isn't this working? We will discuss two aspects of problems with the use of ICT in education – what problems are educationalists, teachers and students faced with in schools, and what are the problems students deal with when learning at home and using ICT in that process.

Situation in schools and other educational institutions – teachers' side of the story

First of all, it is not enough just to introduce ICT in the classrooms, to make the teaching process more effective and to improve its quality. Let's start with this hypothesis: Technological development is faster than the schools and teachers' abilities to adapt. This means that educational institutions and the people working in this area are constantly struggling and trying to reach and adapt to the changes in the field of technology and its use in every aspects of our lives.

The main problem was the gap between digital learners and traditional teachers. As an illustration, we borrowed the quick summary of digital learners preferences compared with the traditional educator preferences, based on the information from 2006 Jukes & Dosaj research, and shown in the table below. [8]

DIGITAL LEARNER PREFERENCES	EDUCATOR PREFERENCES
receiving info quickly from multiple media sources	slow controlled release of info from limited sources
parallel processing and multi tasking	singular processing/single or limited tasks
processing picture/sound/colour/video before text	providing text before picture/sound/video
random access to hyperlinked multimedia information	providing info linearly, logically and sequentially
networking simultaneously with others	students working independently prior to networking and interacting
learning "just in time"	teaching "just in case"
instant gratification/immediate rewards	deferred gratification and delayed rewards
learning that's relevant/active/instantly useful/fun	feel compelled to teach to the curriculum guide and tests

Introducing new technologies in the process of teaching creates a new set of challenges for teachers. Not being familiar with the new teaching aids, teachers usually spend a lot of time for mastering the use of ICT, so when it comes to teaching, they mostly focus on technology instead on the process of teaching itself. So, ICT is not used properly in pedagogical sense. Teaching methods remain more or less the same – still frontal, but with the help of new aids (e.g. PowerPoint presentations), and students still have to learn from their textbooks and do their homework assignments traditionally.

This brings us to another problem teachers are faced with – motivation for self-improvement and for the use of ICT tools. The advancement of these tools is so rapid, that teachers just cannot keep up. A lot of their free time is required for mastering the use of ICT, especially for the digital immigrants, and as soon as they master one set of tools, the new set is being introduced. And still, no matter how fast they keep up with the advancements of ICT, they will always be at least one step behind their students. This fact, as well as the necessity for sacrificing free time for mastering the new technologies, when already faced with the challenges of the role change and new pedagogical demands of the 21st century, can be very de-motivating and time-consuming. In spite of all this, those schools turned towards modernization and wishing to keep abreast of technological development, continue to introduce more and more new tools, their teachers are not still ready to cope with. On the one hand, trying to adapt to the new role, new teaching methods, to integrate new technologies into teaching practice, to learn how to teach students new set of skills the 21st century life requires, teachers often lose motivation and continue doing they know best, which is teaching by traditional principles. On the other hand, this process can be very expensive and it takes time for the implementation of ICT, which still puts schools and educational institutions one or more steps behind the students, in term of the ICT tools they use.

Situation at home – students' side of the story

Why Don't Students like School? This question is so popular today that Daniel Willingham, a University of

Virginia cognitive psychologist, wrote a whole book about it, in which he explains how the mind works – and what it means for the classroom. But is the real reason for this the fact that "the mind is actually designed to avoid thinking," [9] and in school they make us think, or there is something else behind it. Many students ask that question, too, as they struggle to stay attentive in class, while waiting for the bell to ring so they can pay attention to the things that really interest them. We should ask ourselves if there is anything we can do to make the school a matter of interest for our students?

Traditional frontal teaching methods, outdated and not interesting content full of facts needed to be memorized, constant assessment and testing, teachers as knowledge transmitters and students as knowledge receivers and reproducers, are just some of the reasons students are not particularly crazy about school. "Students like freedom, and in school they are not free" says Peter Gray, research professor at Boston College.

In order to answer the needs of modern students, to activate and engage them, to make the teaching process more up to date and interesting, as well as to allow a certain amount of freedom for learning (in choosing time and place to do so), different types of e-courses have been introduced. Trying so desperately to overcome the limitations of frontal teaching methods, most of these solutions for e-learning have gone into another extreme, they neglected the process of teaching and turned it into a process of individual learning.

Individual learning can sometimes be very de-motivating, especially if the e-learning course is designed to manage the materials, not the process of learning. This is often the case, either because some of the e-learning courses lack pedagogical and didactical perspective, or they are not properly used by the teachers, in terms of didactical requirements. E-learning should be perceived as a *teaching and learning process as a whole, including all the factors that make these processes successful*. Why do we underline this? Simply because many of the e-learning courses today are so-called "page turners" where learners simply read through pages of bland text, listen to lectures or watch the recordings of those lectures. Viewed like this, we can relate these types of e-learning courses to modern textbooks or workbooks, with innovative design, where the content is presented in various forms (text, audio and visual materials, presentations, animations, with tasks, quizzes, tests, etc.). Modern as they are, they are still textbooks/workbooks and teaching/learning process is much more than that. It is not enough just to provide the students with good materials (books) and to expect them to acquire all the necessary knowledge and skills. We don't say that it is not possible in some cases, but still, it undermines the importance of the teaching process and the role of the teacher.

The main problem in the process of implementing ICT in teaching is that the focus is mostly on technical components, while pedagogical aspects are usually neglected. These kinds of systems cannot have educational qualities and give the expected results without adequate pedagogical and methodological approach.

What about digital competence? How is it acquired in our schools? Through ICT courses perhaps, or rather not, since the analysis of the available documents [2] have shown that in Serbia the specific characteristics of Informatics (as a school subject) didn't contribute to the essential changes concerning modernization of teaching methods (with the exception of some teachers, schools and institutions for higher education, but it is still not a common practice). These courses are still theoretical and the predominant method of teaching in Informatics is still the frontal teaching method. In addition to this, the courses of Informatics are only the small part of our school curriculums, especially in primary and secondary schools, and the use of ICT for other subjects is still in the process of implementation.

4. TEACHING WITH AND THROUGH ICT – DEVELOPING DIGITAL COMPETENCE

It is clear by now that teaching digital competence should go beyond ICT courses in schools. ICT in education, its presence and its possibility to be used for any school subject, but also for learning at home, or for leisure or work, allows the educators to use its ever-presence and turn it into a teaching tool for acquiring knowledge and skills determined by curriculum, but also for acquiring digital competency.

In the following text we will present a possible solution for an e-learning platform, consisting of all the necessary tools for building and training digital competence. The idea behind this platform was to create a contemporary ICT tool for learning, considering all pedagogical and didactical aspects of teaching and learning processes. This platform is designed as a global, flexible and adaptable teaching tool for acquiring the key competences, as well as the digital competence, and knowledge required for success in life and work in the 21st century. It is meant for primary and secondary schools, as well as for institutions for higher education. We also propose this e-learning platform as a possible solution for overcoming the new set of problems originated from the use of ICT in education.

As we have already stated, technological development requires that we *reboot our educational system, rethink the ways teachers teach and students learn* and *rebuild the means we use in these processes*. The starting and end point should be a *focus on digital competence*.

We believe that digital competence should be acquired through the whole schooling process, starting from its beginnings, since its importance is almost equal to the importance of linguistic and mathematical literacy. We consider digital competence as important as reading and writing were since the beginnings of institutionalized education. What was the importance of paper, pen and a book for those times, the same goes for ICT and Internet today. Digital competence is acquired gradually and perfected through schooling, through the use of ICT in the processes of teaching and learning and for everyday activities, leisure or work.

We have been working on developing SLE platform (Social Learning Environment) for a year now, and we will present here its basic features from the aspect of previously discussed digital competence components. SLE is at the moment being developed at the Faculty of Philosophy, Department of Pedagogy and Andragogy, and it is not meant to be an open source platform for now. But, once it's finished, our goal is to make it available for all the schools and educational institutions in our country. During the last semester, it has been used for some university courses, and we were quite satisfied with the results. Since, SLE is not finished yet, but we hope it to be ready for this school year, our focus here is not to present the platform itself, but the possibility SLE has for developing digital competence in students.

How does SLE fit into this story? Well, we like to think of it as an available, affordable, flexible, easy to use and indispensible teaching tool for the 21st century. SLE is an e-learning platform conceived on a P21 Framework. It is a system that enables tools for combining the 3Rs (core subjects and 21st century themes) and 4Cs (critical thinking and problem solving, communication, collaboration, creativity and innovation) in the processes of teaching and learning. In addition to this, SLE is considered as a tool for developing digital competence in students. It enables the teaching process to be held in a social environment, through communication, cooperation and interaction with the users (students and teachers). It is designed to be consistent with the global trends for improving the quality of teaching and learning.

The advantage of this platform in regard to other similar solutions lies in greater flexibility it offers, as well as in a possibility for implementation of different pedagogical principles of teaching and learning. SLE is based on the latest technologies, adapted to children, young people and adults as well as to demands of living in a digital age. In terms of *appearance* and *functions*, the benefits of this platform are the following: it is easy to use; it does not require a lot of time for students and teacher training; adaptable to the needs and preferences of individuals, institutions, specific subjects and areas, learning styles, types of tasks and types of instruction. SLE is a platform similar to Facebook (very popular among student population), with not too many options, and yet provides everything needed for efficient and effective teaching and learning. It also allows access from mobile devices, tablets and phones, enabling mobile learning. Based on a holistic approach, it is a system where everything is in one place.

As for the *pedagogical aspects*, SLE allows the realization of different teaching methods, through simple lines of communication with a large number of students, enabling their organization into small groups for cooperative learning. Teacher can adapt communication and teaching method for every student, and easily implement individualized, personalized or differentiated instruction. SLE allows easy implementation of the latest principles in online learning: communication takes place in two forms: asynchronous (via messages or forums) and synchronous (through chat, video or audio conferencing), which allows the interactive participation of students in discussions; and learning materials can be delivered in different formats (video, audio, image, text). As for evaluation, SLE can be adapted for a variety of evaluation methods, which comprises a portfolio of students: biography, projects, grades and achievements. The system provides several ways and levels for students' motivation to be engaged in the process of teaching and learning. Connection and integration with social networks reduces the gap between the entertainment on social networks and the process of learning. The system of advancement in learning, such as awarding and the games, allows creative and competitive spirit in the learning process. The teacher can use the system to adapt the teaching method to the needs and preferences of each individual student in order to adequately motivate him/her. SLE encourages students' self-organization in the learning process and provides various evaluative activities, such as self-assessment and peer evaluation.

How does SLE work in the case of developing digital competence? To be digitally competent, as we have previously discussed, a person should have KAS (knowledge, attitudes and skills) for information management, collaboration, communication and sharing, creation of content and knowledge, ethics and responsibility, evaluation and problem solving and technical operations for effective, efficient, safe and correct use of technology and media.

Information management. This component comprises KAS needed to identify, locate, access, retrieve, store and organize information. SLE platform is conceived as a live and growing system of information, learning materials, data bases and communication channels between users, information and data within and outside of the system. Internal wiki page, useful links, paid access to educational sites and libraries, e-libraries, personal and common pages and portfolios, and, before all, consulting and cooperation with other users, are some of the tools that should facilitate the development of KAS necessary for information management.

Collaboration. As the name of the platform states, SLE is designed on the principles of social networking. It allows users to create smaller or bigger groups of students and teachers, to interact and collaborate in active knowledge construction. Similarly to Facebook, students and teachers have their personal profiles, they are connected to other users, they can join different groups according to their personal interests or school curriculum demands, to interact and collaborate within these groups or with the whole network.

Students collaborate with other students and teachers in the process of active knowledge construction, while the teachers have the opportunity to collaborate among themselves and with students in order to improve teaching practice and share experiences. This kind of Facebook-like organization of the platform is a great motivator. It is appealing for students and engaging, since Facebook is today's most popular social network, students are familiar with how it works, and gladly spend time on it. The organization of SLE is quite similar, except for the

contents of the posts which are mainly for educational purposes.

Communication and sharing. SLE's main purpose is interaction, communication and sharing. There are tools for synchronous (live chat, video conferencing) as well as for asynchronous communication (messaging, emails, discussion boards, forums, comments, notes). Users can communicate one on one, within the groups, or with everyone in the system. As for sharing, one of the main ideas behind this concept is sharing information. We started with the hypothesis that everything we need to know can be found on the web. Students are encouraged to search the Internet for relevant information and to share them with others. Teachers have a task and a responsibility to verify all the proposed information, and to allow or deny them to be shared with the other users. Students are free and welcome to evaluate and comment all the shared information and materials, thus creating a base of the most relevant, useful and interesting information and learning materials for the given course. This feature overlaps with the Information management and collaboration as compounds of digital competence.

Creation of content and knowledge. This aspect derives from the previously discussed one. Using the information found on the Internet or other sources, as well as the information given by the teachers and other students, through tasks, assignments and projects, students are encouraged to construct and build knowledge. This individual knowledge construction is verified through different tasks and means, like forums, discussion boards, consulting, writing tasks (like essays). All the created works (essays, tasks, projects...) should be shared, and later evaluated and commented by students and teachers.

Ethics and responsibility. SLE helps students to act in an ethical and responsible way regarding other users, their individual and personal needs and interests, their differences and preferences, and regarding to the use of information and materials available online.

Evaluation and problem solving. With the help of SLE's teaching and learning principles, students acquire the KAS necessary to identify the right technology needed to solve the given problems and to evaluate retrieved information. Theirs, as well as other's shared work, is constantly being evaluated, by teachers, peers and themselves (self-evaluation, e-portfolios), since being put in the process of evaluation is the best context for acquiring evaluation skills. As for problem solving, SLE enables teachers to organize their courses in whichever method they prefer and is suitable for the subject they teach. So, learning by discovering, problem solving, project learning, collaborative learning and even frontal teaching are possible teaching methods available through this e-learning platform.

Technical operations is an aspect of digital competence that perfects itself only by the use of the ICT, which SLE platform embraces and works upon its principles.

5. CONCLUSION

ICT in education is seen as a necessity of the digital age we live in, but also as an opportunity and a means for improving the quality of the teaching process. The first is undisputable, but the second depends on the ways ICT is used in the processes of teaching and learning, in terms of pedagogical and didactical aspects.

Teachers and educationalists, mostly digital immigrants, are faced with numerous problems: on the one hand with the paradigm shift from traditional teaching towards active knowledge construction and their new role in this process; and with the challenges imposed by the new technologies they were not educated to live, work and teach with. Having no time to waste and wait for all the teachers to become digital natives, and/or to re-educate them for the use of many different ICT tools and applications, we had to think of a better and easier solution.

To answer the demands of modern teaching and learning paradigm, of educational goals for the life in the unknown future, for developing digital competence in students, to meet the needs and preferences of contemporary digital students and today's teachers, we propose a new e-learning platform – Social Learning Environment (SLE). SLE is an affordable, available and self-sustainable e-learning platform, designed to answer these requirements, flexible and adaptable to use in different educational institutions, easy for use and sharing, interaction and collaboration, allowing the individualities and personalities of the users to step up in the process of teaching and learning.

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