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**THE KNOWLEDGE AND SKILLS OF THE 21st CENTURY
TEACHERS**

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Abstract

This paper examines current aspects regarding the competences of the 21st century teachers in the context of the needs for specific knowledge and skills of the 21st century students. Two internationally recognized contemporary American models for education and learning in the 21st century are presented – the P21 Framework for 21st Century Learning and the Three compasses of the 21st century education, which outline the parameters and the required knowledge and skills of the 21st century students and, correspondingly, of the 21st century teachers. In view of the fact that today's teachers have no experience of studying in the 21st century schools, the foundations of their competences have to be laid at the university – within the basic training and the upgrading qualification courses. This is a serious challenge for the pedagogical faculties, institutes, departments and specialties – they themselves must step into the 21st century in order to prepare the 21st century teachers.

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1. Introduction

The 21st century is unlike any other in terms of its problems, challenges and changes both in the material world (Nature, production, household items, etc.), and in the interpersonal relationships and opportunities for communication between people (at the workplace, among the citizens in a society, between virtual strangers on the internet, between partners etc.). There are also different kinds of communication between governments, organizations, and countries in the conditions of a common market, competition, and rivalry.

2. Problem Statement

This is a dynamic, interdependent, globalized and technological world and in order to feel good in it, as early as during the school period, **students should acquire:** competences for decision-making and problem-solving; communication skills; culture as citizens of their own country, of Europe and of the world; entrepreneurial competencies, innovative, critical and creative thinking; culture as citizens of the information society.

The latter seems the easiest to achieve as 21st century students are “born digital” – they “speak from birth” the digital language of computers, video and electronic games and the Internet, and they can handle new information technologies (after *Alvermann, 2007, p. 15*). They love to play electronic games (using also their phones), they grow at their “game speed”, they prefer to communicate through technical devices and through electronically written messages (“text messaging” / “texting”), and some even develop dependence on ICT. They prefer electronic resources over traditional textbooks. Sometimes they study while listening to music or watching TV.

At first glance, the answer is simple – more technical education, with a pragmatic focus, action-oriented rather than speech-oriented.

3. Research Questions

3.1 Educational Reforms Movement

Over the past decade, there has been a rise in the popularity of educational models and concepts which focus on the development of learning skills. The authors of some of them are American teachers, educational experts, and business leaders. Their ideas quickly become widespread and launch international movements for reform in education and in schools. Such is the model of the P2 organization (Partnership for 21st century learning) (P21 (Partnership for 21st century learning) is an American organization or network which currently has over 5 million members from the USA and abroad – business, government and educational leaders united by the idea that “all learners need educational experiences in school and beyond, from cradle to career, to build knowledge and skills for success in a globally and digitally interconnected world” (What is 21st century learning and citizenship all about (2015) - <http://www.P21.org/our-work/citizenship/a-parents-guide> - 20.07.2016)

4. Purpose of the Study

4.1. P21 Framework for 21st Century Learning

According to Chris Dede, who examined the frameworks concerning “21st Century Skills“ which had arisen by 2009, this framework, although established in 2006, is one of the most detailed, the most widely accepted and approved of in comparison with those before and after it. (Dede, C., 2009).

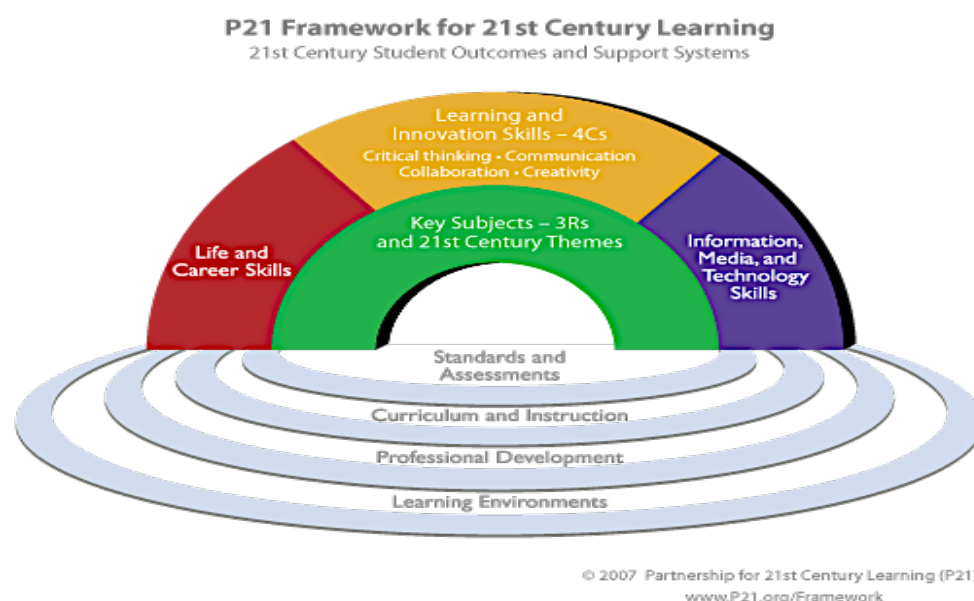


Figure 01. P21 Framework for 21st Century Learning

According to its creators, the Framework is “a vision for student success in the new global economy“(Framework for 21st century, 2006). As a result of their education and learning, students must master “a blend” of skills, knowledge and expertise in order to succeed in their professional and personal life in the 21st century.

The framework reflects the new paradigm of the 21st century education, according to which education should combine the 3 Rs (reading, ‘riting and ‘rithmetic), which are “more important than ever, but are no longer sufficient” and the new “Multiple Literacies”. Further down there is a discussion on the eight major literacies suggested by the organization, including two sub-literacies (visual and aural), which “need to be taught specifically” (Shaw, 2015 c).

In order to develop the skills set out in the Framework, every student should master educational content which is focused on: 1) **core subjects**, which are the foundation of basic (“key”) academic knowledge – English (which is the national language in the USA), reading or language arts, world languages, arts, mathematics, economics, science (physics, chemistry, biology), geography, history, government and civics; 2) **five interdisciplinary themes**, including content which complements the core subjects and contributes to a better understanding of the 21st century world. The themes are: “*Global Awareness*“, “*Financial, Economic, Business and Entrepreneurial Literacy*“, “*Civic Literacy*“, “*Health Literacy*“, “*Environmental Literacy*“.

Studying these subjects and interdisciplinary topics, students should develop essential life skills for the 21st century: learning and innovation skills; information, media and technology skills; life and career skills.

Learning and innovation skills are recognized as the skills that separate students who are prepared for the increasingly complex life and work environments in the 21st century, and those who are not. These skills are grouped into several subsets focused around “*the 4 Cs*”: *creativity, critical thinking, collaboration and communication*.

Information, media and technology skills are part of the specific literacies learners need to acquire: *information literacy, media literacy and ICT literacy*.

Life and career skills are skills involving: flexibility and adaptability, initiative and self-direction, social and cross-cultural skills, productivity and accountability, leadership and responsibility. (Cross-cultural skills – skills for communicating with people from different cultures at the same time).

The formation of these skills as a result of implementing the Framework is possible by building a **support system that produces the expected outcomes for the 21st century students** (and learners overall). This system includes the following elements:

- *21st century standards* – with a focus on 21st century skills, content knowledge and expertise, acquired through education and learning; the core subjects and interdisciplinary themes; deep understanding of the educational content; handling information and data for career and life goals, problem-solving (“students learn best when actively engaged in solving meaningful problems”) (P21 Framework definition, Appendix C, 2015).

- *Assessment of 21st Century Skills* – by using appropriate assessment tools and methods.

- *21st Century Curriculum and Instruction* – considering the 21st century skills which students need to acquire through the basic “key” subjects and the interdisciplinary themes, mastered by application of modern innovative methods, ICT and contemporary approaches in education (e.g., competency-based approach, problem-based approach, project-based approach, personalized approach, etc.).

- *21st Century Professional Development* – particularly important for teachers as they enable them to develop 21st century skills in students, to integrate new methods, approaches and technologies in the educational process, to identify their students’ educational needs and to evaluate their accomplishments and development.

- *21st Century Learning Environments* (school, out-of-school, virtual), supporting students’ mastering the 21st century skills, allowing access to quality learning tools, technologies and resources, and providing opportunities for group, team and individual learning. These environments facilitate the establishment of professional learning communities which enable educators to share their best practices, to cooperate and collaborate. They also support expanded community and international involvement in learning, both face-to-face and online.

4.2. The three compasses of the 21st century education

A similar, yet not identical, picture of education is presented in the model of the American organization “21st Century Schools”, known as: ***The three compasses of the 21st century education***

The model is associated with the name and the organization of Shaw – a teacher who established an independent educational consulting firm, “21st Century Schools”, in 1995, in Texas. The goal of the firm is to help schools transition into the new century, to transform from traditional to contemporary, modern, relevant to the time and the world (Shaw, 2015b).

Gradually, the organization grew into a movement and an international “global network of educators and schools” (International Coalition of the 21st Century Schools) from the USA, Canada, Mexico, Turkey, India, Malaysia, Vietnam and others. Its Advisory Board includes academics from the USA, the UK, Finland (Shaw, 2015).

According to Shaw, a 21st century school is much more than offering access to technology and providing better equipment and new facilities for the educational process. The school may have all the latest technical equipment and a high quality new building and still operate as a traditional school of the “factory model” (Shaw, 2015b) – where teachers continue to follow their old ways, only do it digitally (Shaw, 2015a).

In the new 21st century school, students are not perceived as “a mass”, but as individuals who can learn in different places, at different times, using a variety of sources. They acquire educational experience not only through participating in planned lessons and meeting the standards. The purpose of their education is not to improve their grades on standardized tests, but to prepare them to succeed in life in the 21st century. According to Shaw, this means making fundamental changes at all levels – from the policies implemented at national to local level, to the way curriculum is organized and learned, to the organization of students and space in the school and in the classroom (Shaw, 2015a). The directions of these changes are determined by three new compasses of 21st century education (Shaw started developing her model for the 21st century education (and school), known as “The three compasses of the 21st century education” at the end of the 20th century. The process took over 10 years. The first two compasses were developed in 1998 for the purposes of the author’s PhD thesis and for the purposes of the PBL21 model – a model of project-based curriculum in the 21st century school (PBL21..., 2015) (Figure 2). They determine the curriculum, the approaches and methods of educating students as well as the outcomes students and teachers are expected to reach. These three compasses are: *Critical Attributes (basic characteristics) of education, Multiple Literacies, and 21st Century Skills which learners need to master.*

The first two compasses – the Critical Attributes of the 21st Century Education and the Multiple Literacies for the 21st Century are defined as “essential characteristics of 21st century education”. The first compass – **the Critical Attributes of 21st century education** – lays the foundations of the 21st century education, and also determines the curriculum, the methods of pedagogical instruction and the outcomes of students’ education and learning. In particular, the new education differs from the 20th century education as it is: integrated and interdisciplinary; realized in global classrooms in the conditions of globalization; directed to developing 21st century skills; rigorous to students and teachers, relevant (action-oriented), and real-world – considering the development of the 21st century world; adapting to and creating continuous personal and social change which is achieved through life-long learning; project-based and research-driven; student-centered; utilizing technologies and multimedia for its realization.

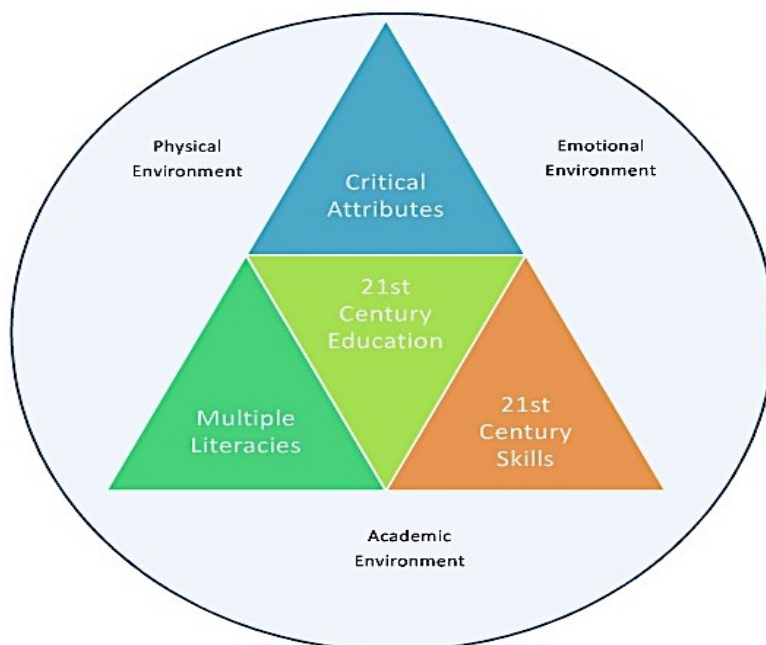


Figure 02. The 3 compasses of the 21st century education

The second compass guides the outcomes of education. Besides “the 3 Rs” (reading, ‘riting and ‘rithmetic), the 21st century students should master *multiple literacies* (3 Compasses, 2016):

- Ecoliteracy;
- Information and Cyberliteracy;
- Physical Fitness & Health;
- Global Competencies (knowledge, skills and attitude relevant to the modern world) and Multicultural Literacy;
- Social/Emotional Literacies;
- Media Literacy;
- Financial Literacy;
- Creativity and the Arts

All these literacies and competencies lead to the formation of a set of skills which make human personality resistant to the dynamic changes in all areas of life.

The third compass to the 21st century was added to the model by Anne Shaw after she read Tony Wagner’s book, “The Global Achievement Gap”. She adopted the author’s concept that education should help young people develop **7 Survival Skills for the 21st Century**, namely: critical thinking and problem-solving; collaboration across networks and leading by influence; agility and adaptability; initiative and entrepreneurship; effective oral and written communication; accessing and analyzing information; curiosity and imagination.

These skills are all related to the changes in the 21st century world and mankind. Their acquisition cannot be fulfilling in the traditional classroom (of the “factory model”) with its organization where education is teacher-centred. (Anne Shaw defines the organization of the traditional classroom as the “cemetery method”, and the followers of the Freinet pedagogy in France define it as a “class-bus”). As

Figure 2 shows, the 21st century education needs a new, purposefully organized learning environment which is a complex of three types of environments: physical, social/emotional, and academic.

The physical environment consists of “facilities” for students and “living schoolyards”. The members of the 21st Century Schools Organization are convinced that there is “a relationship between the physical environment and the achievement of students (*21st century education, 2016*). The organization is a partner with distinguished architects who have created beautiful school buildings (“the schools of your dreams”) in 46 countries on 6 continents. They transform the organization of the classrooms so that it maximally supports curriculum acquisition, instruction and learning – learning which can be defined as “self-directed, independent, interdependent, authentically personalized and differentiated, learning that is active rather than passive, and student-driven”. And all this is “for about half the price of a traditional school facility” (ibid).

The “Living Schoolyards” are green areas around the school, with vegetation and places which support students' work on projects concerning social issues and environmental issues. They enable students to experiment and acquire different skills related to environmental protection, health, nutrition, creativity, cooperation, and communication skills. The new environment also helps them to better understand the educational content of traditional subjects like math, history, geography, language arts, media production, etc.

The social/emotional environment provides for students' emotional comfort. Anne Shaw cites William Glasser, according to whom, before students can begin learning, *four needs* of theirs must be met (after *21st century education, 2016*): *the need to Belong and to Love*; *the need for Power*, which is determined by the achievements, which in turn come as a result of high expectations, support, recognition and respect); *the need for Freedom* – realized through choice opportunities, individual research, self-control, performance-based assessment, personalization and differentiation of tasks and activities); and *the need to have Fun*.

The emotional environment in the classroom should support the fulfilment of these needs. Since it has been proved that teamwork provokes positive emotions, organizing the class as a team and developing a team-like relationship between students are “critical to children’s emotional health as well as to their learning” (ibid). In the 21st century schools, emotional environment is characterized by respect, caring, acceptance, trust, high expectations, and faith in each other, joy and fun – characteristics of positive microclimate. In such an environment, students form qualities like self-confidence, emotional literacy (intelligence), cooperation and teamwork skills, by learning and applying specific strategies.

Positive emotional environment is the context where curriculum acquisition takes place. The program is organized around the new 3 Rs, distinguishing the 21st century education, which is: *with high expectations (Rigorous)*, *action-oriented (Relevant)* and *corresponding to the world (Real world)*.

The 21st century project-based learning is based on this positive emotional environment (PBL 21), which in turn is based on the three compasses presented above (*PBL 21- the next step in the evolution of project-based learning, 2015*; *P21 Framework definition, 2015*).

The academic environment is directly related to the learning process and the acquisition of the curriculum. In 21st century schools, this environment is characterized by high expectations from students. Taking into account that students learn in different ways and assimilate the curriculum to varying degrees,

the focus in learning is on individual achievements – learning should be personalized - based not on school time but on the expected learning outcomes of individual students.

Personalized learning means that teachers set high requirements (standards of performance) for each student regarding his own studies (research), teach students to set high goals and standards for themselves, and help students to achieve them. They encourage students to track their progress periodically and replicate it in learning, to use a portfolio to gather laudable works, plan their development and improvement, and share it with their parents. This learning which is student-centred leads to increased motivation for learning and high academic results.

Project-based teaching and learning in the 21st century requires a fourth variation of the environment – ***the virtual environment***, which expands learning opportunities beyond the classroom, by using the Internet, electronic learning platforms and e-learning (educational) resources. They, in turn, require digital, virtual and visual literacy, as part of the multiple literacies which the 21st century students should master.

These two models set a high benchmark for the 21st century teacher, who has to be able to develop specified students' literacies and skills in the conditions of a learning environment unlimited by time and space, using new technologies. To meet these expectations, the 21st century teacher has to receive adequate training.

6. Findings

What competencies does the 21st century teacher need? The answer to this question is difficult and ambiguous. There are many different ideas and studies on this topic. According to a report by experts from the Central University of Michigan about the necessary transformation of teacher training by 2023 (*Transforming to a 21st Century Educator Preparation Program, 2014*), teachers should be prepared in three main areas:

- *globalization, local responsiveness, diversity and inclusive education* – this area of training will give them the much needed “global culture” which they have to pass on to their students and will prepare them to work with students coming to school from different cultural backgrounds or living in different environments (something 20th century teachers were unprepared for);
- *assessing learning and teaching* – using databases and different approaches and methods for assessing and making appropriate decisions (including using technology for the purposes of assessment);
- *understanding and integrating technologies in their work* – to implement virtual communication, to develop technological (digital) literacy and skills for teaching based on digital technologies, to conduct virtual and “mixed” (attendance and digitally-based) instruction.

According to the Philippine teacher Avila, the 21st century teacher must be a well-prepared classroom manager who can create an educational environment where it is possible to carry out personalized and directed (considering students' individual needs) teaching and learning (Avila, 2015). What is new here? As Avila states, “traditional classroom management is focused on creating and implementing classroom rules and procedures to control students' behaviour”. The new perspective of classroom management puts an emphasis on students' engagement in learning through their active

participation and teamwork in learning tasks and activities – known as collaborative learning and active learning (Avila, 2015).

According to another educator, Palmer (2015), it is ICT, in particular, that define the profile of the 21st century teacher, and his responsibilities, respectively (Palmer, 2015):

- to carry out education which is learner-centred (Learner-Centred Classroom) and personalized (Personalized Instruction);
- to teach students to create digital educational resources – to accept them as “producers”;
- to learn and use the new technologies;
- to go global – to teach students how to use ICT (and do so as well) so that they can communicate and become acquainted with other cultures, people and events;
- to be smart, to use and to encourage students to use smartphones for educational purposes;
- to utilize blogs – their own as well as their students’ blogs, which helps them develop skills for written communication and presentation;
- to go digital – to have one’s own website, where one can upload educational resources, to initiate discussions, and to share opinions;
- to collaborate with teachers and students – by creating and sharing digital resources, presentations, and projects, with them;
- to use virtual space to meet with like-minded individuals and create contacts (networks), to share research and ideas, and to keep pace with innovations and changes;
- to connect with other people – anyone, anywhere, anytime – through social media;
- to use the advantages of project-based learning;
- to leave one’s own positive digital footprint – to be a model for using the Internet and social media to create valuable products and resources which can be shared; to teach one’s students how to behave appropriately online;
- to code – to be able to write with HTML;
- to innovate – to implement new ways of teaching which have not been used before – e.g. the social media, or to replace textbooks with web resources – “for the sake of students”;
- to keep learning – because new technologies keep emerging and “learning and adapting is essential!”

7. Conclusion

There are also other ideas and opinions on the essential skills of the 21st century teacher. The list could be longer or shorter than the presented ideas. But there is no doubt that in order to develop new skills for the 21st century in students, to prepare them to live in a highly technological information society and in the conditions of an economy of knowledge, the teacher alone has to learn and develop these skills. However, because today's teachers did not study in 21st century schools, the foundations of the needed diverse skills, literacies and competences have to be laid at the university – within the basic training and the upgrading qualification courses. This, therefore, is a serious and responsible challenge the pedagogical faculties, institutes, departments and specialties – they themselves must step into the 21st century in order to prepare 21st century teachers.

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