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THE MAIN CHALLENGES IN EDUCATION IN THE CONTEXT OF THE DIGITAL TRANSFORMATION OF LEARNING

Ionela Simona SIPICĂ (ALDEA)[1, 2], Elena TOMA[1, 2]

[1]University of Agricultural Sciences and Veterinary Medicine Bucharest, 59 Marasti, District 1, 11464, Bucharest, Romania, Phone: +40213182564, Fax: +40213182888, E-mails: simona.sipica@yahoo.com, elenatoma2001@yahoo.com
[2]Academy of Romanian Scientists, 54, Splaiul Independentei, 050094, Bucharest, Romania; Emails: simona.sipica@yahoo.com, elenatoma2001@yahoo.com

Corresponding author: elenatoma2001@yahoo.com

Abstract

In a society dominated by technology and undergoing a profound digital transformation in all sectors, we cannot deny the influence of ICT in education in all its forms. Educational models based on technology will dominate society in one form or another, and the Internet, along with traditional methods, can make education more effective, but what remains for us to know is "how". The paper studied the main characteristics of different types of learning systems (e-learning, online learning, blended learning, etc) in order to make a critical review on the connection between ICT-based tools and education. The main purpose was to point out the emerging learning models specific to the new architecture of educational paradigms and to identify the factors influencing their implementation.

***Key words*:** *education, ICT-based tools, digital generation*

INTRODUCTION

Transformations within education systems have occurred along with the emergence of computers and the Internet. Due to this fact, the promotion of new forms of computer-assisted learning has gained momentum in recent decades. Thanks to the emergence of ICT that can be successfully used in the educational space, the status of the traditional system and the architecture of educational paradigms take on a completely different shape, giving a new form to actual learning systems: distance learning, online learning, hybrid learning (blended learning), e-learning, etc [15].

Keith Tyler-Smith stated in 2010 [24] that online learning "can more easily address individual learning styles, needs & expertise and perhaps it's greatest strength its convenience of time & place access... can involve technical and digital literacy issues that can act as significant barrier to learning... is more isolating and requires more self-reliance, independence and self-direction on the part of the learner".

However, the integration of ICT in the classroom and learning environment has increased year by year. In the pre-pandemic period, however, the distinction between traditional learning (face-to-face or FTF) and distance or online learning was quite blurred. We had forms where FTF learning was supplemented with online learning to provide flexibility in the teaching and learning process and forms where online distance learning was supplemented with FTF or synchronous learning to omit the downside of the online learning environment. Blended or hybrid learning has been introduced in several educational institutions to improve the quality and flexibility of learning and to increase cost efficiency. The pilot projects demonstrated the effectiveness of these forms of learning both in the context of the change of generations, and especially of promoting the idea of flexible learning and work [25][12].

However, the extent of the impact of these learning systems on pupils and students could only be observed during the pandemic period when various forms of online learning were implemented quickly and under precarious conditions. Until then the impact was

analyzed from the perspective of necessity and utility by different individual projects.

Since 2020, for the first time, the online learning wad raised at institutional level. Everyone became aware that we need to define not only online education systems, but also their specific tools. Thus, decision-makers and society were "forced" by the current conditions to express their opinion on different forms of learning, which almost led to the division of society through arguments for and against.

After two years of the pandemic many questions still remain unanswered: What type of materials should be used according to each type of learning? What is the content and what does tech support do? What is the role and degree of involvement of the teaching staff? How important is it for the teacher to interact with students face-to-face and for students to interact with each other and at what level of learning? How well can a discipline be transposed and transmitted digitally? What are the digital tools to support communication, interaction, active learning? ... and the questions can go on.

MATERIALS AND METHODS

In this paper, we analyzed the relation between the technologies provided for education and the present educational systems. We emphasize the main challenges from the field by looking on the subject from multiple points of view: the evolution during Covid period, the needs of teachers, pupils and students and the links between technology and education.

RESULTS AND DISCUSSIONS

Education in the context of COVID-19

COVID-19 has forced schools around the world to invest in various forms of digital learning so that they can continue to educate their students without a physical presence. Schools have had to think about how to incorporate different forms of digital learning into a curriculum which was specific to traditional (FTF) learning. They appealed to teaching methods specific to different educational models such as "online learning", "blended learning" or "e-learning". Although these approaches sound the same, they use different teaching strategies and techniques [11]. However, we must understand that the selection between the methods of "e-learning", "online learning", "blended learning" or "face-to-face learning" are real challenges for a society with many professor which don’t know what student-centered or competence-centered means.

Before the pandemic, we could encounter teachers that used in the classroom different types of technologies (like interactive presentations, software, virtual travels, etc) or universities/schools which offered 100% online classes, while models such as flipped learning or hybrid (blended learning) were rarer and generally in lower classes or during extracurricular activities.

Online education, as we have become accustomed to it during the pandemic, has been a mixture of models based on the use of the Internet. Lectures, assignments, tests were activated on virtual platforms and classes were held synchronously. Although this model is usually assimilated with the idea of distance education (asynchronous), it has been promoted in the pandemic through synchronous education at all levels of education.

Actually, during the pandemic we can say that we had several forms: 100% online with materials transmitted with the help of the media; the second stage, in which flipped learning tools were applied, through which the lessons were done online but additional digital materials were transmitted to the students; the third stage in which specific blended learning or hybrid methods were applied whereby part of the lessons were done physically and others online.

As seen from the state of knowledge in the field, technology is critical to student learning, especially in today's times and post-pandemic world. The whole society has undergone accelerated digital transformations at a very high level compared to a few years ago. The importance of the Internet, digital

devices and WiFi in education and every aspect of academic life has proven profound [19]. However, the infrastructural problems were obvious: limited access to digital tools; low bandwidth speed; lack of digital courses; and so on.

On the other hand, there are studies that indicate that hybrid or blended learning improves the learning outcome for theoretical knowledge more than face-to-face learning or e-learning alone [3][1][2]. In 2021, Şentürk [18] recommended that blended learning (FTF plus online learning) be included in schools and to be complemented with project-based learning, collaborative learning, differentiated teaching and reverse learning.

Given that many politicians, teachers, pupils and students claim that we cannot completely return to "life before the pandemic", a multitude of questions remain: Are these models the new post-pandemic educational paradigms?; What is the user's perception of the educational model on its effectiveness?; Which educational model is better and for which age groups? and last but not least Should we consider changing traditional models when many decision-makers and parents consider online learning a failure?.

Education and digital generation

The XX-XXI centuries capture profound changes in human society, from industrialization processes to the penetration of digitization in all socio-economic sectors. Today's information society or knowledge-based society is in continuous transformation thanks to emerging technologies and tools that change relationships and ways of working and living together. Given that, thanks to current digital technologies, any educational activity and many work activities can take place from any place and more and more emphasis is placed on how these technologies can influence learning models.

In the present we have access to new levels of connectivity through mobile networks and smartphones. “Devices like the iPhone and iPad (and their equivalents) provide a "full office" in one's pocket, with email, camera, GPS, books, news networks, and almost any "cloud" (Internet-based) service wanted” [16].

Actually, today if a device does not contain internet access it is not considered modern or innovative. People of all ages and organizations access and depend for their work on mobile applications such as Facebook, LinkedIn, YouTube, WhatsApp, Instagram, etc., which are integrating us all into a true digital media culture. In many cases, the consequences of all these societal changes are directly visible: the sales of printed books, newspapers, CDs and DVDs has decreased; the postal, banking, financial and administrative services have more and more digital products; the required number of employees in some areas was reduced, etc.

In these conditions, both students and teachers have to face the challenges of digital and mobile technologies. If at the level of the teaching profession this means attracting youth to the field and redefining the necessary basic skills, at the level of students it means lifelong learning to be able to use the new applications and devices that appear at a remarkable speed.

We may say that is almost certain that in the future the jobs and services will depend on the developments of digital technology. But how much should we know? What digital skills are needed in today's society? The pandemic has shown us that it is not enough to know how to work on a computer in Word or talk to friends on WhatsApp, we need to know more, better, more completely. But what are the ICT tools that will help us in the future to work, to learn, to relax or, simply, to participate in society?

Taylor and Ferrari (2012) [22] specified, for example, that nowadays it is necessary to have digital skills, informational skills and media skills to be able to create and live in a digital society. In other words, digital skills transcend IT skills. Another approach indicate that digital literacy has a functional dimension (skills and competencies that enable individuals to read, write and interact across a wide range of platforms, tools and media) and a critical dimension (digital resources often function as a means of social control and social exclusion) [13] [21]”.

In order to understand how to adapt in the future, we must first of all understand the current changes, especially in the conditions where there has been talk for some time of a new generation of students (Generation Z, 1995-present) which is and will be social-digital. According to Hietajärvi et. al (2015)[9], this difference between generations creates a gap between the expectations of this socio-digital generation and the educational offer in the educational system. Also, there are studies which indicates that this new generation will present changes in the structure of mnemonic processes due to the new phenomenon of "clip thinking" (the child is processing fragments of visual images not logical associations of text) [20]. So the problem of the last decade is not only the fact that the specialized literature points to changes in the way of understanding information at the student level, but especially the fact that their IT and media skills are overestimated [10], which was actually also seen in the pandemic. For example, Erstad [7] stated as early as 2015 that among high school students: only about 50% are able to perform complex searches on the Internet and structure information to reach a goal, and they are generally at high school level; about 32% are only able to generate search queries and to select the required source (this level was reached also by around 40% of secondary school students).

Pupils and students need to integrate into the collaborative vision of this digital age and to do so they require the following basic skills:

-the ability to create content complementary to the ideas of others;

-the ability to collaborate (adaptation and flexibility);

-critical thinking;

-communication at team level;

-creativity.

They must be able to use the various web tools for their own learning purposes. We refer here to: social networks (Facebook, Myspace, Linkedin, etc.); blogs, wikis; resource lists (social bookmarking); media services (Youtube, Itunes, Slideshare, Scribd, etc.), podcasts, vodcasts; virtual realities and communities (Second life etc); applications such as Office and Google docs; Web 2.0 tools (Moodle, LMS, open sources).

Rudd et al. [17] drew attention as early as 2006, however, to some problems raised by this digital evolution. This said that the role of teachers and students has changed, putting the one who has the information in the center, with many students not wanting to know the answer to the questions Why? and How?. Thus, the boundaries between "teachers" and "pupils" became blurred, as pupils/students also became creators, editors, tutors - roles that must belong to the teacher. To these are added other problems such as: the tendency to take unverified information, adolescent self-destructive behavior, cyberbullying, etc.

In other words, educating this digital generation does not mean teaching them to use media tools because they already know, but giving them skills in understanding and using them correctly and training them in the use of digital culture tools needed in the labor market and in life every day, that is, to offer them concrete elements of digital literacy.

Education and ICT-based tools

During the pandemic, many teachers pointed to the lack of technology in schools as a problem, but at the same time, 20% of them consider it important to use digital technology in teaching [14] In these conditions, we initially considered that, in order to achieve to effectively link education and technology, it is necessary to understand how it can contribute to the creation of learning experiences. The opportunities created by technology are multiple: access to the Internet allows pupils/students to attend online courses that they would otherwise not be able to afford; there are a multitude of high-quality online mentoring or counseling offers that are not geographically limited; online collaboration platforms and mobile networks allow pupils/students to work on joint projects from anywhere in the world; virtual laboratories (chemistry, biology, etc.) offer unique learning experiences. and so on.

The US Department of Education (2016) [4] developed a series of principles for the use of technology in educating children. These

principles are supplemented with recommendations regarding the use of technology as a tool for learning and child development, by highlighting the pros and cons.

The literature also specifies several ways in which technology contributes to the educational process, such as [23]: collaborative educational experiences (essays, media products, etc.); project-based learning or collaborative media research allow for real-time feedback from anyone on the network; the information presented in class can be expanded, with access to museums, libraries, etc.; there is access to a multitude of other courses that are not in the educational programs but are of interest to the pupil/student (learning a foreign language, etc.); obtaining online professional certificates by participating in courses offered by various providers, etc.

The examples of the use of technology in education are actually multiple:

-teaching classes by using films accessible online (for example in geography) or 3D museums;

-the use of virtual laboratories in different disciplines to deepen certain notions through experimentation;

-the use of games and simulations to deepen knowledge and stimulate cooperation;

-3D interactive representation programs (virtual medical laboratories);

-using artificial intelligence for complex teaching etc.

In fact, these tools offer more flexibility than traditional teaching materials. Whether we are talking about phones, laptops or cloud systems, it is certain that the learning experience can be customized so that any digital material (website, e-book, game, etc.) can be accessed by people with different levels of education. There are many studies that do not support the optimistic views regarding the positive impact of educational technologies on learning [8]. However, taking into account the educational remodeling due to the epidemic of COVID-19, as a result of which countries tried to transform their educational systems in such a way as to offer online education, it is possible that in the future the inclination towards digitalization will continue [6].

We must thus emphasize that it is not yet known which theories will dominate future educational systems. It is certain that the pandemic has led to education models based on a forced digitization of education at the level of course content and lectures. Erdogan Coşkun specified as early as 2021 the fact that digitization actually led to a standardization of knowledge at the pupil/student level. He thus draws attention to the fact that "Digitalization does not offer diversification as it is claimed; rather, it provides uniformity" [5].

What exactly are we sure to encounter in the future? Having the experience of the last years at our disposal, we can confidently state the following:

- education will no longer be limited in space and time - e-learning opportunities are increasing; schools have started to use resources outside the school, etc. – this creates a learning-oriented environment outside the school;
- personalized learning adapted to the student's needs will be promoted, based on different IT tools;
- free choice in learning will be promoted - through which individuals have control over what, when, where, with whom and with what learning takes place - thanks to the multitude of online course offers;
- the translation of the curriculum into digital format will allow the integration in education of other modern innovative teaching models such as learning through projects, learning through experimentation, critical thinking; it is expected that together with this way of learning, the assessment methods etc. will also change.

CONCLUSIONS

Research needs to be continued so we can understand the connection between digitization and education. However, we may conclude that the future educational reforms must focus on the following ideas:

- pupils/students must acquire basic values such as critical thinking because the labor market is constantly changing (the ability to know how to think and solve problems) - the promotion of a learning model based on processes that increase planning skills and capacity and elimination of those oriented to the subject or product;
- lifelong education must be promoted – information technology literacy must be promoted from primary and secondary education to the workplace;
- promoting creativity to ensure sustainable learning;
- the implementation of methods that lead to the acquisition of the motivation to learn, i.e. to learn to learn;
- ensuring the availability of educational resources anywhere and anytime.

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