Study of Innovative Technologies and Materials for Online Learning

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Abstract: The SARS-Cov-2 pandemic has fundamentally changed the way of life. On the continents, all areas were affected, from work to leisure and travel. The education sector has not been spared the consequences either. For months during isolation, schools, colleges and universities closed their doors, and online courses became the new norm. But education does not stop at the school gate, and educators everywhere have done everything in their power to ensure that pupils and students do not lag behind. The pandemic caused awareness of significant gaps and deficiencies regarding digital skills, connectivity and the use of technology in education. The paper presents issues related to the implementation of the online learning system in education, including the structure of higher education, the implications for both students, teachers and the global impact on society.

1. INTRODUCTION

March 2020, the SARS-Cov-2 pandemic led to the closure of schools and universities in more than 20 countries in Europe, Central Asia and North and South America. This affected a total of 49.8 million children, from preschoolers to students who had a very disrupted last semester (if it did exist). The pandemic has profoundly affected education and exacerbated social inequities around the world.

Universities and schools are not only a place for academic education but also for learning social and emotional skills, interaction and social support. Their closure not only disrupted the educational process of students, but also restricted access to medical services. The challenge for teachers, education officials and decision-makers at local and national level is significant. If this challenge is not met, the impact on young people, families, communities and societies on a larger scale will be felt throughout life, both socially and economically. Therefore, improving the resilience of the education system, by planning quality education, should be a top priority for the coming months and years and be the basic principle of rebuilding better education and better schools.

Distance learning in emergencies (or distance learning in emergencies) illustrates the situation where courses are offered through distance learning, in response to a crisis, rather than being planned or organized for the purpose of distance education. This type of teaching refers to a sudden transition from learning in a classroom, to distance learning and/or in a virtual classroom. It is necessary to distinguish between online learning, based on inclusive pedagogy, and distance learning, in recognition of the fact that online learning has been planned and organized, while distance learning refers mainly to the use of technology to perform tasks designed for classroom teaching.

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Distance learning (distance education) is defined as distance education, without regular face-to-face contact with a teacher in the classroom. Once implemented through correspondence, distance education includes learning with the support of printed materials that can be taken home through online programs.

Online learning is usually understood as education that takes place on the Internet. It can be part of distance learning programs, but it can also be used to complement classroom teaching (blended learning). Students can study online at home or in the classroom with their classmates. Online learning uses a variety of formats, often combining Internet-based technologies and educational technology applications that can be used offline.

Blended learning combines several ways, including face-to-face teaching and learning, the use of educational technology applications, and student interactions with online learning. In this case, applications of educational technology and online learning are some of the teaching strategies that can help students achieve their learning goals. Blended learning can also include distance learning.

2. MATERIALS AND METHODS

E-learning is the most widespread form of distance learning, with an evolution guaranteed by the progress of information technology, a field marked by rapid change. In this way, the up-to-date maintenance of knowledge is ensured, with the main concern being the creation of the necessary framework for the development of e-learning courses and teaching materials. E-learning defines Internet-based educational technologies that include distance learning programs with effective communication between the people involved and the possibility of transmitting additional study materials customized according to the needs of the learners. In a restrictive sense, e-learning is the type of distance education with the planned teaching-learning experience organized by an institution that provides online materials ordered logically, sequentially to facilitate assimilation, in their own way by each student. The distribution of materials is done on the Internet and so is the communication between the participants in the e-learning process: tutors/instructors, students, system administrators. Other possible users are: author/co-author of the course, secretary, visitor, depending on the specifics and requirements of the institution that offers the distance learning program. The courses are designed to increase the student’s autonomy in acquiring knowledge and to respond to the need to provide content and tools adaptable to different contexts and issues to support lifelong learning. The information contained in the course is delivered flexibly, is adaptable and regularly updated. The components of the traditional didactic approach – planning, content, methodology, interaction, support, evaluation – are found at the level of university education and adult courses, respectively. If traditional education is organized by age groups, online education is organized by subjects, with participants of different ages, training, experience and who come from any geographical area. Distance education, provided on the Internet, is based on synchronous technologies (chat, audio-video conferencing, whiteboard) – participant-centered (simultaneous interaction at a given time, using Internet technologies) and asynchronous technologies (www, e-mail, FTP, newsgroups) – computer-centric (interaction via a computer with an Internet connection). Today, e-learning systems combine the two technologies (Singh et al. 2005).

The e-learning models developed today, based on those in the traditional education system, are the same or even better educational solutions of the classical models. There are three of them:

- individual model (self-directed) – addressed to students with experience in continuous professional development; a web server provides hosting for web pages, multimedia pres-
entations, audio-video presentations, etc.; there is no tutor, no communication mechanisms between students; a database contains all changes made by users;

- facilitated communication model – combines the individual model with communication facilities (e-mail, discussion forum) where the transfer of documents takes place; the course administrator facilitates the access to information of the students and answers their questions;

- advanced model – uses web technology for the mechanism of the educational process, real-time audio-video transmission techniques, video telephony, video conferencing, chat, whiteboard, online file transfer, which have been added to the model with communication facilities; there is an administrator, the tutor controls the educational process.

E-learning programs have the following advantages: personalized learning system, with dynamic and interactive technologies, various pedagogical methods, synchronous – asynchronous interactions, online administration and accessibility, geographical independence, low distribution price.

The disadvantages of e-learning programs include: high dropout rate (favored by attendance, equality, teaching style), the need for knowledge in the field of computer use, high design – development – maintenance costs. An analysis of the costs by expenditure chapters (publishing, course development, course organization, elaboration of additional teaching materials, distribution by mail), made for the classical education system in comparison with the e-learning system, shows that, obviously, the second will prove more profitable; and this is because in traditional education, publishing, everything related to the organization of the course – the costs of renting rooms/buildings, travel costs, accommodation and meals, as well as the salaries of tutors, involve a great financial effort, while the other on the other hand, it is expensive to develop the course and create new teaching materials. Online learning also means easier-to-distribute course materials, reusable learning materials, and easily editable updates and revisions.

Several approaches to the use of acceptance theories in e-learning are described in the literature. Table 1 presents a number of experimental features of e-learning acceptance studies. Keller and Cernerud (2002) conducted a study on the implementation of e-learning applications in universities, with the following objectives: analysis of students’ attitudes towards e-learning (TA); analysis of the relationship between attitudes and specific variables such as age, gender, previous experience in working with the computer (EC), attitude towards new technologies, type of learning (LT); analysis of the advantages and disadvantages experienced by students from the perspective of e-learning. In the experimental model, the authors used a sample of 150 students. Based on the results obtained from the testing and experimentation of the research model, several aspects were found. First, students who had less computer knowledge had a better attitude toward e-learning than those who had more knowledge in the field. One possible explanation may be that male students and those with experience in working with a computer expected more from the use of the e-learning platform, which led to feelings of disappointment. Then, students’ perceptions were negatively correlated with attitudes toward new technologies, in the sense that students who considered themselves to be innovative or easy to adapt had less favorable attitudes than others (Iordache, 2010).

No relationship was found between students’ perceptions of e-learning and the type of learning. Overall, the students did not consider that the platform used facilitated their studies or improved their communication with other students or teachers. At the same time, they did not consider
that the pedagogical value of the courses improved in any way the possibilities of solving the problems related to the course. In subsequent studies, Keller (2005), Keller et al (2007) analyzed different ways of implementing virtual learning environments in correlation with the factors that influence the acceptance and use of e-learning.

Chesney (2006) identified the following factors that determine the use of e-learning systems: perceived utility, perceived ease of use, intent to use, and perceived enjoyment (PE). The study used an online questionnaire consisting of: 6 items that measure perceived utility, 5 items that measure perceived ease of use, and 4 items that measure perceived pleasure. This study involved 68 subjects, most of them male (92%). The study confirmed a positive relationship between perceived ease of use and perceived pleasure. Perceived pleasure and perceived utility had a positive impact on intent to use. A positive relationship was also found between perceived ease of use and perceived usefulness. No positive relationship was found between perceived utility and intended use (Iordache, 2010; Balog, 2006).

Table 1. Experimental characteristics of e-learning acceptance studies

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The e-learning platform includes procedures and tools dedicated to individual study, at your own pace, using different means of study that are easily accessible. For use, minimum requirements are established for procedures for enrollment, selection of students, registration, monitoring, archiving of information related to services provided to students, ensuring communication between participants (administrator, tutors, students). The platform includes specialized tools for conducting online educational activities: tools for accessing content, online assessment, communication and security. The creation of a platform involves steps of: analysis and definition of course objectives (conditions and terms of educational process, analysis of student profile), design of user interface (screens, menus, options, structure and organization of courses), creation (design, interactions, assembly components), evaluation (testing), launching (distribution) and requires knowledge in different fields: pedagogy, programming, information security (Iordache, 2010; Balog, 2006).

Features of e-learning platforms:
- offers a friendly, adaptable interface, customized by user types and access rights;
- easy installation, configuration, administration (transcript management, schedule/agenda, tutors, students, administrator);
• easy navigation, content management facilities;
• allows visualization and administration of educational content (interactive materials, tutorials, simulation exercises, educational games);
• allows the creation of simple content, in compliance with the standards in force;
• allows import/export of content from files, resource archives;
• allows content modification/editing, building own courses from existing components according to tutors, offers keyword search functions in the knowledge base;
• offers facilities for online evaluation of students and monitoring of their activity; offers facilities for the inclusion of specific standardized educational content (Resteanu & Mită, 2012).

The losses generated by online education are huge and difficult to recover, as the education system is not prepared to support the online school; so that students acquire the same competencies that the education process offers them with physical presence.

3. E-LEARNING SITUATION IN ROMANIA IN PANDEMIC CONTEXT

The IT sector is booming and Romania has some of the best Internet speeds in the world; Romanian schools have benefited from few technological and digital facilities, but are not ready for online schooling. Over 23% of Romanian entrepreneurs believe that this is because there is indifference and disinterest on the part of the government, 22.6% of respondents believe that teachers are not trained and are not open to learn digital skills, while 36.8% of entrepreneurs are convinced that the reason is the outdated mentality both at the level of government and at the academic level, the academic environment being sure that the classic teaching/learning methods are better than the modern ones. Instead, 17.4% of respondents believe that it is a false perception and that only the private IT sector is developing, with Romania lagging behind in terms of IT overall.

Digitization in Romanian schools is at a minimum level of 20% of the maximum potential, and teachers are beginners in computer and Internet use, compared to other European countries, according to most Romanian entrepreneurs (according to a study conducted by software manufacturer CIEL, Romania).

Young people in Romania are in the last place in the EU in this respect, only 56% of them having skills digital data above or above the basic level, according to data published by Eurostat. This reality once again confirms the need and importance of investing in the development of digital skills among students.

4. CONCLUSION

E-learning systems aim to facilitate the achievement of educational goals and can take the form of a variety of courses, textbooks, exercises, interactive options and communication methods that support individual or collaborative learning processes. The benefits of e-learning include the creation of learning networks and the ability to provide learners with a wide range of sources of information and examples.

Implementing IT technologies in education is not a new concept. The way information is defined and delivered through current technologies is innovative. All these technologies contribute to a transition in education, which puts learners in the role of self-taught people through an
interface for education, encouraging them to take a more active role in their own education. The standardization of technology is the result of the use of the Internet, which has fundamentally transformed the way we socialize, interact and present information.

The IT technologies used in the didactic and educational process in the university environments allow the teachers to realize their pedagogical ideas, to improve the quality of education. In this case, students can independently choose the sequence and pace of studying the topics, developing an individual style of activity and a culture of self-determination.

REFERENCES