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DIGITALIZATION OF EDUCATION: BENEFITS AND RISKS

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Rezumat: *Articolul examinează digitalizarea educației, care permite desfășurarea procesului educațional la distanță, ceea ce este foarte important pentru societate, care se confruntă cu anumite situații de criză. Totuși, ca orice nou, netestat în practică, digitalizarea ridică o serie de întrebări, fără răspuns, care pot discredita implementarea sa. În acest sens, autorul pune accent pe problemele cheie care se referă la dezvoltarea procesului educațional în ceea ce privește digitalizarea acestuia. Iată și un exemplu de creare a instrumentelor didactice multimedia, care, potrivit autorilor citați, este importantă pentru dezvoltarea educației.*

Cuvinte-cheie: *digitalizare, învățare, eficiență, riscuri.*

Abstract: *The article deals with the digitalization of education. It reveals its positive side, which allows the educational process in a remote mode, which is very important for society, which is experiencing certain crisis situations. However, like anything new, not quite tested in practice, digitalization raises a number of questions, unanswered which can discredit its implementation. In this regard, the author focuses on the key issues that relate to the development of the educational process in terms of its digitalization. Here is also an example of creating multimedia didactic tools, which, according to the quoted authors, is important for the development of education.*

Keywords: *digitization, learning, efficiency, risks.*

Digitalization is actively entering the educational environment. However, we can already see that it opens up new opportunities, but also creates new problems. Among the main positive aspects of digital transformation are solving the problems of accessibility of education, expanding the options of learning, mainly through the introduction of new ways of transferring knowledge etc. It should also include the fact that it expands the possibilities of access to data that were previously available only to a limited group of experts and scientists. The educational and scientific environment is becoming global.

Despite the undeniable benefits of digital technology, ethical issues, personal data protection, and other important aspects are coming to the fore. At the

same time, we are already seeing other problems associated with the digital transformation of education. There is a tendency to imitate traditional (face-to-face) education with insufficient quality control of relevant multimedia didactic tools.

Commercial structures have taken up the creation of didactic tools without the involvement of qualified experts in didactics, psychology, ergonomics, and basic science. For example, the attempt to replace in physics the traditional measuring instruments - voltmeter and ammeter - with voltage and current sensors, respectively! This proposal does not correspond to the scientific and practical base, but we observe proposals for the introduction of devices with such names in the educational process in physics in general and higher educational institutions of Ukraine. Didactic means, created by private commercial structures, do not always pass scientific approbation and review. The widespread principle „everyone can teach and treat" appears.

The digitalization of education has drawn attention to important problems and obvious shortcomings. Among the most significant are the problems of socialization and knowledge transfer in a formal context. Digital transformation necessarily leads to the transformation of the market of educational services, which requires the development of new educational products and serious training of scientific and scientific-pedagogical personnel.

This calls for a serious analysis and pedagogical justification of many aspects that are present today in the information space. It is important to abandon the traditional approval of what has not yet been tested and experimented in educational institutions, because in any case there are both positive and negative aspects, as well as advantages over existing methods and possible threats to the quality of education.

In what follows, some problems associated with the digitalization of the educational process will be highlighted.

Individuals who are not particularly interested in the history of the development of science, technology, production, education and other spheres sometimes have the idea that it all appeared by itself. They may believe that immediately upon opening the doors to the twentieth or twenty-first century, mankind immediately received all the benefits they have on the day they were born. For example, when they have just learned to distinguish objects, suddenly there are images of all these objects on a computer monitor, and what is missing, they can immediately print it out on a 3D printer. Over time, however, it turns out that this is all a long way off…

The development of computational technology did not begin with digital technology. At first, simple pebbles were used for subject thinking, then came various counts, and later - the logarithmic ruler and mechanical arithmometer. In place of the latter came the electric-mechanical calculating „machine" called the „Bystrica." All this happened in accordance with the laws of evolution and thanks to the inventive activity of people.

The creation of electronic computing machines (ECMs) was facilitated by the development of science and technology. At first, their „brain" worked on electronic lamps, and the machine itself had a cumbersome design with water cooling. Such computers were installed in computing centers, at the Khimvolokno Production Association, at optomechanical plant etc. Such computer consumed more than 20 kilowatts of electricity per hour, took up a room the size of an auditorium, but had limited capacity. Only the appearance of personal computers opened up new opportunities for their use in the educational process, at first mostly for calculations, typing, and simple graphic editors.

Education could not avoid the use of such a technique. At first it was used as a tool for quick arithmetic operations, and later for more complex calculations in trigonometry, algebra, and other fields of knowledge.

Its simplicity, speed, and versatility helped to introduce digital technology into the educational process in both general and higher education institutions. Subsequently, we began to speak not only about the use of individual functions of computers in education, but also about the general digitalization of the educational process.

The need for the transition to digital transformation in the educational space is due to several factors. Firstly, modern students belonging to the generation of „digital natives" (digital natives) have a natural tendency to use new technologies in their everyday life. They actively use Internet technologies both in their professional activities and for socialization and communication.

Digitalization of the educational environment, according to M. I. Nadeyeva [11], can occur in different forms:

- Transferring existing teaching materials, such as lectures, presentations, textbooks, assignments for independent work, and knowledge control tools, into an electronic environment;
- Forming an interactive electronic environment for teacher-student interaction, such as creating electronic classrooms for teachers to conduct lectures and webinars, discussion forums, etc;
- creation of new types of educational tools: electronic textbooks, electronic problem books, video lectures, quests, computer games;
- creation of fundamentally new forms of learning through the use of electronic learning tools;

To date, the process of digital transformation in education is mainly realized through the first two forms. It facilitates students' access to learning materials, reduces the unproductive burden on teachers, and simplifies control over the content of academic subjects and the learning process. In addition, this process opens up great opportunities for the expansion of distance learning services. However, by deviating from this trend, you can sooner or later lose your place in the education system (in the market of educational services). We cannot but agree with Johan Wissem's assertion that e-education is „a destructive innovation that will inevitably lead to the expulsion of inefficient universities, after which only a few winning institutions will benefit from this new technology". [3, c.20].

We can say that digitalization of the educational process encompasses the use of digitized data and digital technologies. Digitization of data means conversion of existing „paper" textbooks, reference books, tests, visual aids (pictures, photos, films, animations etc.) into electronic format. Digitization involves converting existing material into a digital version. However, if we create drawings, photographs, animations, films, books etc. directly in digital format, how should they be treated as digitization? This question does not have an unambiguous answer. In such a case, we are not talking about digitization, but simply about the creation of a digital product from the beginning.

The development of computing technology has contributed to the creation of digital devices such as scanners, photo cameras, video cameras, and related projection equipment. Further complementing this process with the creation of powerful graphics and video editors opened up opportunities for digitizing existing visual aids such as tables, diagrams, drawings, pictures, motion picture animations etc. At the same time, new visual aids, such as photographs or dynamic visual materials (animations, videos) as well as sound recordings (phonograms) have emerged.

First of all, important for students or pupils is the way of obtaining such images. A detailed description of this process is beyond the scope of this context, so it is recommended to refer to the relevant publications by A. A. Davidenko [4, 5, 6, 8].

The creation of personal computers, which combined the functions of various visual aids, such as an epidiascope, graphoprojector, slide projector, film projector, gramophone player, tape recorder, contributed to the practical application of multimedia didactic tools (MMDT). Specialists working in specialized institutions, such as the Institute of Digitalization, have created a significant number of MMDT.

The picture (Fig. 1) shows the white dormouse flower (Siléne latifólia). Its peculiarity is that its petals open only at dusk. At dawn, the flower closes. How can it be shown to students and schoolchildren?

Figura 1. *The flower of the white drema. (Siléne latifólia)*

However, creating MMDT on one's own is an effective option because it promotes the instructor's personal development and meets their personal needs for effective learning. In addition, the instructor can involve students in the creation of the MMDT, which has several positive aspects. First, the instructor develops during the process of creating an original product. Second, this approach enables students to gain in-depth knowledge of a particular topic by actively assisting in the creation of the MMDT. Third, this approach promotes cooperation between the teacher and students, which helps to solve important problems of learning and education, and realizes the pedagogy of cooperation.The text did not consider in detail the possibilities of creating didactic materials in video format, but these possibilities can be found in the works of A. A. Davidenko, D. Pokrishen. A. et al. [7, 8, 9, 10].

Various technical means, such as smartphones, tablets or personal computers, can be used to implement the educational process that involves communication between students (pupils) and teachers (teachers). These tools allow audio and video calls using popular programs such as Skype, Viber, Telegram and others, as well as the use of well-known services such as Zoom.

Conclusion

The problem of digitalization of the educational process in professional pedagogy is urgent and requires solutions at all levels: organizational and material, scientific and pedagogical, and methodological. A return to the old approaches is no longer possible.

Educational institutions and students already have a certain material base, which allows the educational process, including distance learning, though not in full. A significant amount of didactic materials has been digitized, which makes it possible to continue learning. New multimedia didactic tools are also being developed.

The development of pedagogical software tools and learning platforms continues, as does the introduction of cloud technology. Services for online learning and other similar initiatives continue to develop.

When writing the article, it was noticed that some aspects need to be changed or completely revised. Digitalization of the educational process should be based on scientific research. This requires appropriate scientific research in the field of professional pedagogy.

The effectiveness of research on the digitalization of the educational process will be much higher if it is based on the psychology and didactics of the relevant subjects.

The research should focus not only on mastering the available pedagogical software, platforms, and services that ensure communication between students and teachers, but also on developing new multimedia didactic and other tools for implementing the educational process in the distance learning mode. It is impor-

tant to remember that in this context universities with scientific and methodological achievements in this field are able to overcome the competition.
For the successful digitalization of the educational process it is also necessary to make sure that the students have the appropriate training. They have been educated by different schools and teachers, so if necessary, they should be provided with prior training, as is done in leading universities.
The digitalization of education has also caused problems of socialization and formal transfer of knowledge. There are no concrete suggestions yet on how to avoid or overcome these problems.

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