

The Digitalization of Education in Higher Education: Methodological and Practice-Oriented Aspects

Maltseva O.A.¹ Khovanskaya E.A.^{2,*} Martynova N.A.³ Karpova I. V.⁴

¹ Kikot Moscow University of the Ministry of Internal Affairs of Russia, Academica Valgina st, 12., Moscow, 117997, Russian Federation Email: O-malzeva@mail.ru

² Moscow International University, Leningradsky prospect, 17, Moscow, 125040, Russian Federation

³ Oryol Law Institute of the Ministry of Internal Affairs of Russia named after V.V. Lukyanova, Ignatova st, 2, Orel, 302027, Russian Federation

⁴ Orel State University of Economics and Trade, Oktyabrskaya st. 12, Orel, 302028, Russian Federation

*Corresponding author. Email: l.hovanskaja@yandex.ru

ABSTRACT

This article highlights the relevance of considering the issues of digitalization of the educational process in educational organizations implementing programs of higher education, advanced training and retraining. The concept of digital didactics is given, the principles of the digital educational process are considered, the tasks of implementing digital technologies and their possible implementation are analyzed. Factors influencing the construction of the digital educational process are considered. The importance of implementing distance learning is emphasized. The category of «adult» students is defined. The principles of digital didactics are outlined. Features of traditional and innovative digital educational platforms are considered. The analysis of difficulties of switching over to distance learning in higher education institutions is carried out. Recommendations for teachers in the main points of distance learning organization in higher education are formulated.

Keywords: distance learning, digitalization, digital environment, digital didactics, online learning, adult learning (adult education)

1. INTRODUCTION

Digitalization of the educational process is a mutual transformation of the educational process being formed under the influence of modern conditions and modern technical means being introduced into the educational process.

The goal of transforming the educational process is to use the capabilities of digital technologies with maximum efficiency. In turn, the goal of developing technologies in the field of education is to adapt them fully and integrate them as conveniently as possible into the learning process for the most comfortable solution of the pedagogical tasks having being set.

With the beginning of the process of introducing of modern technologies educational opportunities of institutions have significantly expanded. In particular, such training formats as corporate online training, inverted education, various mobile platforms, micro-training, and many others are developing actively. This ensures mobility and non-attachment to one place for both the student and the teacher. The introduction of electronic educational resources provides students and teachers with convenient access to a wide range of educational materials [1]. Universities, in turn, refill library collections with electronic literature,

provide access to various educational platforms, including research. Educational organizations of higher education with a similar profile focus combine their works using electronic platforms, where they can freely exchange educational content with each other.

Regarding this, there are powerful and significant changes in the educational process, designed to prepare modern students for life in a digital society, as well as the organization of professional activities are prepared for the digital economy.

2. RESEARCH METHODOLOGY

Digital didactics is a branch of pedagogics aimed at organizing of the educational process in the conditions of digitalization of society. This scientific discipline uses traditional didactic principles and basic concepts, but transforms and complements them, adapting them to modern realities. Digital didactics is the basis for building modern teaching methods and strategies.

The main principles of the digital educational process include:

1. The principle of dominance focuses on the student's independent learning activities in the digital educational environment. The teacher must organize the learning

process, support and help the student in the learning process.

2. Personalization principle involves the ability of the student to determine an objective of learning, select the strategy of the educational process, the pace and the level of mastering educational program. This approach will allow the teacher to track the indicators of the student's personal development and academic results.

3. The principle of reasonability intersects with the traditional didactic principle of purposefulness: the learning process requires the use of those digital technologies which maximize the achievement of goals in the educational process of a particular student. This principle does not imply the use of ineffective pedagogical technologies and tools without clearly defined educational goals.

4. The principle of flexibility and adaptability allows developing of an individual approach depending on the conditions of the digital educational process. The digital educational process allows automatic adjustment of the program for each student, taking into account such aspects as the order, method and pace of providing educational material. This principle also takes into account the level and nature of the teacher's support.

5. The principle of success in training intersects with the didactic principle of strength and requires the achievement of goals, as well as the full assimilation of knowledge, skills and abilities. In the digital educational process, this principle is the final element in the didactic chain «explanation – consolidation – control». Additional study hours are allocated for consolidation of the material, and a face-to-face meeting of teachers and students is often organized. The teacher monitors the optimal ratio of group and individual forms of consolidation carefully. Digital tools significantly speed up this process and make it less routine.

6. The principle of learning in cooperation and interaction (analogous to the didactic principle of interactivity) requires the construction of the educational process on the basis of active diversified communication - real and network - between the teacher and the student. This principle involves the use of group forms of network learning.

7. The principle of practical orientation, which is directly related to the traditional didactic principle of linking learning with life, requires a clear adjustment of goals and specific results. To do this, you need to organize:

- setting of learning goals, tasks, and problem situations;
- practical tasks;
- consolidation of the acquired knowledge in «field» conditions, that means using an existing project or an enterprise.

8. The principle of increasing complexity, which correlates with the didactic principle of accessibility, systematicity and consistency, assumes a consistent transition:

- from simple to complex and from complex to simple;
- from general to private and from private to general;
- from individual to group and from group to individual and other learning processes.

9. The principle of richness of the educational environment requires a surplus of information resources to construct individual learning strategies. This redundancy can be

implemented by using a network educational resource of the unified information educational environment.

10. The principle of polymodality (multimedia) is a more detailed didactic principle of visibility and involves visual, auditory and motor (kinesthetic) ways of perception in the educational process. To do this, various devices are used, such as simulators and sensors, as well as augmented reality tools.

11. The principle of included evaluation requires continuous evaluation of the success of a student throughout the learning process. Digital technologies provide instant feedback transmitting the necessary data about the results of the task to the teacher continuously. Thanks to this, the teacher makes conclusions about the strengths and weaknesses of the student, and this, in turn, allows to adjust the development scenarios and immediate learning goals right in the learning process. Thus, digital technologies ensure the objectivity and transparency of the final assessment of the performance of a particular task [2].

Digital didactics is a branch of pedagogy, a scientific discipline about the organization of the learning process in a digital society [3].

Factors that influence the construction of the digital educational process:

- new technologies and digital environment,
- new requirements of the economy for personnel,
- «digital generation» – new students.

Digitalization of the educational process is a change or reinterpretation of the existing educational process, the optimal alternation of virtual means and real production processes in professional education, the transition from inductive to deductive learning logic, the development of flexibility in relation to the educational schedule and organizational structure through the use of new teaching methods and organization of educational activities, motivation of students' academic activity and independence through rich virtual reality in order to support their readiness to solve more complex tasks (in the context of using digital technologies, work is no longer cyclical and is a continuous process; a comprehensive understanding of the entire process is required), usage of digital technologies as a means of increasing the attractiveness of professions and vacancies in the labor market.

Principles of digital didactics:

1. Personalization of the student. The student builds an individual learning path based on personal request.
2. A central role of the learning process. Training should be not only developing, but also educating.
3. Individual approach to training. The system should be flexible in relation to the student.
4. Interactivity. Learning should be realized through interaction.
5. Practical orientation. Training should be connected with real life [4].

3. THE RESULTS OF THE RESEARCH

Digital technologies in education is a way of modern educational environment organisation based on digital

technologies [4] therefore, in this research, we will focus on distance learning, in particular, on teaching adults students in educational organizations that implement programs of higher and postgraduate education.

The prototype of distance learning - learning by mail - appeared in the XIX century. Due to the active scientific and technical development, distance learning has become widespread. Distance learning is becoming more and more popular and highly-demanded in the modern world: every year more and more people choose distance learning, so the number of distance courses and programs is constantly growing, increasing by 30 - 40% annually.

Based on the data obtained by NeoAnalytics on the topic «Russian distance learning market: results of 2018, forecast to 2021», it becomes obvious that distance education in the domestic market is developing quite actively. The share of online education in the structure of education in 2021 will be about 2.6% [6].

Currently, the distance education market is highly competitive. A large number of offers, programs and tools appear in the market. Due to the increasing opportunities for choice, participants emphasize the beginning of market structuring. The most successful companies in this industry are developers of digital educational solutions based on game mechanics and simulation of real processes.

The peculiarity of distance education for adults is that adults know why they need the education they receive, that is, they have stronger motivation for learning. Many people work in their specialty, but don't have the necessary level of education (bachelor's or master's), that is, adults learn only what they really need, and the learning process itself is based on examples from their practice. Based on the essence of distance learning for adults, we can conclude that an adult student consciously chooses a specialty (training program), form of training and training organization; the possibility to obtain knowledge at a convenient time and in a convenient form, regardless of where the person is now; the possibility to repeat the course content almost without restrictions.

What can we say about adults as subjects of educational activity? The free encyclopedia «Wikipedia» defines androgogy as a section of the theory of learning that reveals the specific patterns of development of knowledge and skills by an adult subject in the educational activity, as well as the features of management of this activity by a professional teacher. Based on a large pedagogical experience, as well as certain criteria mentioned above, we can confirm the fact that adults are students who receive higher and postgraduate education, namely, we will consider students of eighteen plus age. Of course, when individualizing the educational process, these students can be divided into students (who receive higher education after graduation) and trainees (who have practical experience or higher education).

Today, every adult has an opportunity to study remotely and get the necessary education. To do this, domestic educational institutions provide the opportunity to take online courses for advanced training or retraining, or to obtain higher or secondary education. Advantages of distance learning for adults are as follows: flexibility which means the ability to study educational materials at a

convenient time for the student; accessibility which means that everyone with free access to the Internet can get an education regardless of their place of residence and location; modularity which means the construction of the educational process aimed at obtaining only the knowledge required for students; the course content is based on the modular type, which facilitates the learning process; openness which means that each student can choose the form of obtaining knowledge which is comfortable to him (listening to lectures, reading lecture notes, methodical and educational literature); availability of educational resources.

Thus, distance education opens up the potential, gives new chances and opportunities. A person can get new knowledge anywhere in the world. Distance learning methods are constantly changing and improving.

The specifics of distance education for adults are manifested in the following features: independence which means that the student must have the skills of self-organization and self-education, the organization of the educational process is based mainly on the ability to work with a PC and modern Internet technologies. When developing educational and methodological materials, teachers should take into account the age characteristics of adult students: the features of the cognitive sphere of an adult (the ability to abstracting, analyzing and synthesizing incoming information); adults are more self-organized and motivated to acquire knowledge; adults are more emotionally stable, which makes it easier for them to tolerate the lack of contact with the teacher; cognitive processes (thinking, memory, perception) of adults are less productive than in a child or teenager; an adult has social experience and their own well-established views on the model of education, which often contradict the modern education system. One of the important features of distance learning is a complex system for identifying students' work. In general, the implementation of distance learning for adults is a complex methodological process, which requires taking into account the various and many-sided specifics of an adult's personality.

In the context of digitalization of the higher education system a special role is casted in the virtual form of mobility (primarily in the mass open online courses - MOOK) – the movement of information, digital flows, the formation of communication channels in the information and educational environment with the help of the latest technologies.

Today, there are different ways of distance learning in the practical activities of teachers, which have been tested and successfully applied. For example, using the long-established method of sending completed tasks via the WhatsApp or Viber mobile apps. This method is not very convenient for the teacher and leads to a number of questions: how to prepare for classes and how to monitor the progress of the entire group, how to organize the process of interaction with students?

Other ways to conduct classes are the Internet platforms Zoom, Skype, Google Meet, Discord, Microsoft Teams, and True Conf. Innovative content allows to create homework assignments and get the result of their carrying-out into the teacher's personal account in the form of points. This option

will allow to build a lesson so that students are to be engaged systematically and controlled timely. Some students, especially audiles, are better able to understand an oral explanation than a written text, so you can prepare video lessons recorded with your own participation or with other teachers.

Distance learning can be defined as a purposeful process of interactive interaction between teachers and students with each other and with learning tools, invariant to their location in space and time, which is implemented in a specific didactic system.

Educational organizations that implement higher education programs often also implement advanced training and (or) professional retraining programs, which can also be delivered with the help of remote technologies. Distance learning programs (distance courses for advanced training or professional retraining) allow getting knowledge in a concentrated form. And using online learning methods is a great way to save time, the most valuable and at the same time irreplaceable resource, you can choose the time for classes that is more convenient when there is a mood for learning, and therefore classes will be the most effective. So, the result of such training will be higher.

Distance courses of professional development and retraining, for example, in psychology (distance learning psychology) are intended for active people who are able and aiming to their personal and professional improvement, get new tools for practical work. Distance learning programs (for psychologists, teachers, managers, and other categories of citizens) are a requirement of the modern world with its pace gaining speed and constant increase in the amount of information. Such training allows not only to keep up with the times, but also meets the professional's need for development and growth.

The motivation of people who choose distance learning courses for advanced training (or professional retraining) in adulthood is much higher, for them it is a conscious choice, so it is natural that such retraining gives significant results (the opportunity to master a new specialty (training program), promotion on the career ladder, receiving material benefits in the form of wages and additional bonuses from the employer). The advantages of distance learning are also widely known, such as significant savings in money and time, convenience and high efficiency of the educational process.

However, psychological aspects of this form of education aren't less significant, though less well-known, advantage of distance learning. Exactly, it is the fact that distance learning (distance education) is the best psychological approach for adults - their main «consumers». Let's analyze it more thoroughly.

So, in general terms, we characterize the process of such training: distance learning (distance education) takes place remotely and involves independent study of educational material by students and rather limited (in comparison with full-time training) contact with the teacher. Why is this form good for «adults»? Because an adult has a well-formed cognitive, emotional, motivational sphere, and well-developed goal-setting abilities.

Distance learning (distance education) is intended for those who really want to learn something and who know why they need it, that is, for those who have a high motivation to learn. And such motivation, consciously associated with the acquisition and development of specific knowledge and skills in the field of professional activity or self-development, is a characteristic of adult students. In addition, adult students are more purposeful and able to plan their activities, including those related to learning material.

4. DISCUSSION OF RESULTS

Thus, distance learning (distance education) is perfect for adults and is a psychologically comfortable and enjoyable process for them.

Education for adult differs from children's education. Over time, a person develops a critical perception of knowledge from the perspective of personal experience. This can be manifested in resistance to strict instructions, because «I know everything myself», «Don't teach me to live». After passing school (University), adult students usually understands what methods are working for them, what ways of learning they prefer [8].

In addition, an adult needs to combine education with work and family: in this case remote and asynchronous learning formats, short or shortened learning are helpful.

Distance learning allows you to:

- * reduce the cost of training (no need to spend on renting premises, trips to the place of study, both for students and teachers, etc.);
- * reduce training time (collection, travel time);
- the participant can independently plan the time, place and duration of classes;
- * provide training for a large number of people;
- * improve the quality of education through the use of modern tools, large electronic libraries, etc.
- * create a unified educational environment (especially relevant for corporate training).

Distance learning is playing an increasing role in modernizing education in Russia. According to the order of the Ministry of Education and Science of the Russian Federation dated 06.05.2005 No. 137 «On the Use of Remote Educational Technologies», the final control of training using remote educational technologies can be carried out both in person and remotely [9].

The didactic principles of digital vocational education are open and, due to their novelty, require additions as theoretical and practical possibilities of digital education develop.

The results of digitalization of education will be effective independent education based on individual educational processes and continuous monitoring of the student's activities. Digitalization significantly expands the possibilities of using group and individual forms of classes, provides full assimilation of professional knowledge and the formation of appropriate skills, and also significantly affects the development of inclusive learning.

In the course of studying the use of digital technologies in higher education 3 groups of difficulties were identified:

difficulties on the way to the using digital technologies in training, difficulties during their implementation and difficulties after implementation.

On the way to the using digital technologies in education, there are four factors that prevent the adaptation of educational technologies to the digital environment:

- conservatism of the part of teachers, many of them do not want to change something in their activities, consider new technologies «superfluous»;
- lack of competence in digital technologies which teachers have, lack of staff to create online courses;
- difficulty in adapting of the organizational structure of training to changes;
- lack of financial support.

The following difficulties arise when implementing digital technologies:

- * teachers' distrust to online learning;
- * lack of mechanisms that will allow the switching over to mixed learning;
- * lack of self-organization among students.

After implementation, it is difficult to support digital vocational education for the following reasons:

- * students' increasing reluctance to attend traditional lectures after learning about online courses;
- * the need for changes in teaching activities;
- * lack of a clear system of remuneration for teachers who use online courses.

In order to address one of the significant difficulties associated with the unwillingness of teachers to work in a «new» format for them, we reviewed the programs of several pedagogical universities in Russia and several foreign universities. It was found that none of them teach the basics of distance learning or methods of online learning. There is no methodology, for example, for online teaching of advanced mathematics. No teacher has a corresponding entry in the diploma. And it's necessary to take into account the fact that the average age of teachers in the country is 48+... In addition, we have analyzed the programs and plans for advanced training in the educational organizations for 2020 and Federal state educational standards. We revealed only the presence of distance education departments in the structure of institutes and universities, which are structural departments to meet the needs of the educational organization in conducting webinars.

For the purpose of a preliminary review for teachers, we have formulated some recommendations for the organization of distance learning in the educational organization.

First, the teacher's first step should be to choose a web conferencing tool, such as Zoom or Skype. Some of the platforms are free, but there are restrictions on the time and number of participants.

Secondly, if it is difficult to hold the attention of students in person, so online it is even more difficult, here you should think about reducing the lecture, switching attention to fragments of video, audio, the ability to ask a question and project the appropriate response of the audience, as well as a possible answer. In this case, you need to take into account the capabilities of modern students, who can log in via their

smartphones in accordance with the schedule, and can watch recordings later.

Third, an important point is the need to record an online session for those who can't connect in person.

Fourth, for a more productive remote session, the key moment is the illumination of the room and place of the lecturer, you need to think about virtual eye contact, if video transmission is provided. You need to make sure that there is no shadow, and in order to simulate visual contact, you need to look more into the camera.

There are many tools for remotely asking multiple-choice questions to students. Teachers can ask students to respond to the invitation in text chat, which is included in most video conferencing platforms. You must enable at least three surveys or interaction opportunities during each online session.

Finally, distance learning requires visibility, namely a presentation that is better perceived by students and synchronizes audio material with visual perception.

5. CONCLUSION

«Continuing education is a necessity. If we evaluate the results of our training in terms of the applicability of knowledge in life, it turns out that we have built a pyramid of unnecessary knowledge. And the longer we live, the fewer skills we need. Every two years, knowledge is doubled. This means that three years after studying at school or university, we have only 25% of the skills that we can use. This is a huge challenge facing the education system, employers and society as a whole» [10].

Digital transformation is the process of integrating digital technologies into all aspects of business activities, requiring fundamental changes in technology, culture, operations, and the principles of creating new educational products.

At the forum «Personnel for the digital economy (05.03.2020) Dmitry Peskov, special representative of the President of Russia for digital and technological development, said that «...to create an economy which is based on digital technologies, it is necessary to prepare the new generation better, to prepare «digitally» in schools and universities, to retrain adult specialists who are ready to master digital competencies» [11]. Digital literacy is the ability to safely and appropriately manage, understand, integrate, share, evaluate, create and access information through digital devices and network technologies to participate in economic and social life.

The need for new qualified personnel in Russian society is growing, and the task of training is to meet this need. Educational organizations should switch to the World Skills international standards and the new Federal State Educational Standards in order to meet the requirements of the digital society.

REFERENCES

- [1] O.A. Maltseva, E.A. Khovanskaya, A.I. Akhulkova, Regularities of digitalization of educational process in e

educational organizations in Russia. Proceedings of the 1st International Scientific Conference Modern Management Trends and the Digital Economy: from Regional Development to Global Economic Growth (Mtde 2019), 81, 2019, pp. 632-634.

[2] V.I. Blinov, M.V. Dulinov, E.YU. Esenina, I.S. Sergeev, Proekt didakticheskoy koncepcii cifrovogo professional'nogo obrazovaniya i obucheniya, Moskva, Izdatel'stvo «Pero», 2019, pp.18-19.

[3] V.I. Blinov, E.YU. Esenina, I.S. Sergeev, Cifrovaya didaktika professional'nogo obrazovaniya i obucheniya (klyuchevye tezisy), Srednee professional'noe obrazovanie, vol.3, 2019, pp. 3-8.

[4] Didakticheskaya koncepciya cifrovogo professional'nogo obrazovaniya i obucheniya / P. N. Bilenko, V. I. Blinov, M. V. Dulinov, E. YU. Esenina, A. M. Kondakov, I. S. Sergeev ; pod nauch. red. V. I. Blinova, Moskva: Izdatel'stvo «Pero», 2019. pp. 40-42.

[5] Cifrovye tekhnologii v obrazovanii, <https://urok.rf>

[6] Analiz rossijskogo rynka distancionnogo obucheniya: itogi 2018 g., prognoz do 2021 g. <https://marketing.rbc.ru/articles/10886/>

[7] D.M. Kovba, E.G. Gribov, International academic mobility through the prism of soft power theory, Obrazovanie i nauka-education and science, The Education and Science Journal, vol. 21(10). 2019, pp. 9-31. DOI: 10.17853/1994-5639-2019-10-9-31

[8] D. Otto Using Virtual Mobility and Digital Storytelling in Blended Learning: Analysing Students' Experiences, Turkish Journal of Distance Education, 2018, vol. 19(4). pp. 90–103. DOI: 10.17718/tojde.471657

[9] Distancionnoe obuchenie, <https://ru.wikipedia.org/wiki/>

[10] Nepreryvnoe obuchenie. Kak nuzhno izmenit' podhod k obrazovaniyu, chto nuzhno dlya adaptacii k novym usloviyam, <https://hr-media.ru>

[11] Na forumе «Kadry dlya cifrovoj ekonomiki 1.2» opredeleny zadachi podgotovki specialistov dlya tekhnologicheskikh otraslej, <https://ntinews.ru/news>