

Digital Transformation of Pedagogical Education at the University

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ABSTRACT

In modern education, an urgent problem is the modernization of the system, which must adapt to the requirements of the digital economy. Digital transformation of teacher education is an important part of the modernization of the education system, which creates the need to create mechanisms for its digital transformation. The research materials are based on the "Concept of development of continuous pedagogical education based on digital information technologies". Approaches to the formation of stages and tools of digital transformation of the pedagogical University are proposed. The methodological framework of the research is presented by methods of analyzing the theoretical experience of digitalization of education.

As a result of the research, three stages of implementing digital technologies in the educational process of a pedagogical University are proposed. The first stage involves the formation of digital literacy and digital competencies in the teaching staff of the University. The second stage involves the formation of digital portfolios of students and teachers, as well as rating students and teachers according to objective criteria based on the competencies of the XXI century. The third stage involves filling the electronic information environment of the University with high-quality content and opening the Lyceum together with IT partners.

Keywords: digital transformation, teacher education, competence of the XXI century, rating, digital portfolio, professional development

1. INTRODUCTION

The transition of the Russian Federation to the digital economy strongly affects the requirements for education, the construction of the educational process, its results, forms and methods of implementation. Decree No. 204 of the President of the Russian Federation V. Putin "on national goals and strategic tasks for the development of the Russian Federation for the period up to 2024" dated May 7, 2018 clearly defines the requirements for the educational process: the upbringing of a harmoniously developed and socially responsible person; introduction of new methods of teaching and upbringing, educational technologies that ensure the development of basic skills and abilities by students, increase their motivation to learn and involvement in the educational process; formation of an effective system for identifying, supporting and developing the abilities and talents of children and youth, based on the principles of justice, universality and aimed at self-determination and professional orientation of all students; creating a modern and secure digital educational environment that ensures high quality and accessibility of education of all types and levels; forming a system of continuous updating of professional knowledge and acquiring new professional skills [1].

The word "digitalisation" has long been included in the agenda of the major events that are dedicated to education. According to the program "Digital economy" adopted by the Government of the Russian Federation, by 2025 the education system in Russia should be configured to prepare for a leap into the digital future a sufficient number of literate users of information technologies who have the necessary competencies in the XXI century. Digitalization of the economy is not just the transfer of data and processes from the "analog" century to a digital form. Digitalization of the education system can not be limited to creating a digital copy of the usual textbooks, digitizing the document flow and providing all schools with access to high-speed Internet [2]. Ignatova N. [3] believes that now the educational process should be managed through an information system that allows continuous communication between the teacher, administrator and student in on-line mode. According to Bulger M. [4] the basis of digitalization of any education is a personal learning trajectory for each student, which is based primarily on the formation of high-quality electronic resources.

Let's call the basics of using technology in the era of digitalization: integration of technology is always going according to plan and is aimed at achieving some goal, technology has become an integral part of learning; technology help to engage your students need content and

involve them in his study; technology in the first place and mainly used by students; emphasis on technology, stimulating the thought process and creative development; the learning process is built around the application possibilities of a technology; technologies stimulate the desire to solve more and more complex problems; technologies teach how to work in a team, both within the study group and outside it; technologies help to solve problems that previously seemed too complex; technologies are used to form a new body of knowledge [5].

If we take into account that the development of digital technologies leaves out of work, primarily employees of "routine" work, then the pipeline of mass education, which trains specialists for a certain program, will become irrelevant. In addition, experts say that the digital economy requires a person to develop skills of self-organization, planning, and self-motivation, which is facilitated by the individual trajectory of education [6].

An important problem of the modern higher education system is the personalization of educational trajectories [7]. The main factors of personalization of educational programs are: project activities, research activities, criteria-based assessment, mixed learning and training on individual curricula [8].

Personalization of the learning process is understood as: creating an individual profile of the student; developing individual educational routes that take into account the abilities and interests of the student; consistent development of skills and competencies; evaluating the progress of the student; creating a flexible educational environment with the use of technologies [9]. Rector of Moscow Pedagogical City University (MPCU) A. Lubkov [10] believes that at the moment one of the main tasks of modernizing education is its Informatization and filling the educational environment with information that is attractive to students.

Many activities of both scientific and social nature are carried out to fulfill the tasks set. In particular, on June 2019, the Moscow Pedagogical City University hosted the international media forum "Pedagogical education in a digital society: challenges, problems, prospects". As part of the media forum, a meeting of the public Council of MPCU, as the basic organization of the CIS, on the training of teachers, was held, where the "Concept of development of continuous pedagogical education based on digital information technologies" was presented.

The goal of the concept is the digital transformation of continuous teacher education. The objectives are: to develop the content of education through the development and implementation of digital integrative and modular educational technologies; to combine programs for digitalization of different levels of education; to create a content-integrated space of pedagogical education that provides personal, professional, spiritual and moral development of the future teacher, and to significantly strengthen his motivation and cognitive activity.

The main areas of implementation of the Concept should be:

- implementation of the mixed learning model, support for the Federal project "Digital school" in order to train a teacher who can implement digital General and additional education programs;
- development of related scientific and methodological support for digitalization programs at different levels of education [1];
- international integration of Russian and foreign pedagogical universities;
- interaction with large domestic technological IT companies [6].

As part of the implementation of this concept, the formation of a strategy for digitalization of individual universities as elements of the system of teacher education in the Russian Federation is relevant [11].

2. MATERIALS AND METHODS

The purpose of our research is to build a digital transformation strategy for the State Humanitarian University of Technology.

Research objectives:

1. Form the stages of digital transformation of the University.
2. Create a meaningful part of each stage of digital transformation.
3. To determine the tools of digital transformation.

The object of research is changes in the education system under the influence of the introduction of the digital economy.

The subject of the research is the mechanism of digital transformation of a specific pedagogical University, made on the example of the State University of Humanities and Technology.

We have analyzed the elements of digital transformation of national and foreign universities. Rector of MPCU A. Lubkov believes that digitalization of education in a broad sense implies integral changes in both infrastructure, management, behavioral and cultural nature. If we focus on digital education as the basis of the learning process, it turns out that the elements of education and socialization, which, in turn, affect the formation of human values, are out of sight. The third element of the pedagogical approach – personal development – it also seems deformed, since one group of development processes is intensively activated (polysensory, multitasking, etc.), and others (memory, imagination, oral speech, etc.) are strongly suspended. Based on facts, discussing the values of education, it is necessary to form the methodology and methodology of digital pedagogy as a whole [5].

Rector of the Higher school of economy Yaroslav Kuzminov is sure that the essence of digital transformation of education is to achieve each study required educational outcomes, using a personalization of the educational process, through the use of the potential of digital technologies, including the use of artificial intelligence and virtual reality; special factor is the formation of high-quality digital educational environment of educational

institutions; the urgent need is quality access to the Internet should be used with big data [12].

Representative of Ural State Federal University Ignatova N. believes that in the field of digitalization of higher education, certain trends can be identified today: the emergence of a virtual educational space, which loses clear boundaries; the reduction of time and space connections in the interaction between participants in the educational process; clearly traced spatial shifts in the placement of educational centers, as well as everywhere there are signs of globalization of education [3].

Representative of Saint Petersburg University S. Kalmykova shows an example of effective implementation of an online course on physical culture in mixed learning, and believes that the practice of implementing online courses in the educational process allows us to assert that the format of mandatory study of online disciplines or their variable use forms approaches to the implementation of the model of mixed learning, as well as approaches to motivating factors of learning [13].

Academician A. Kondakov, representative of Russian Academy of national economy and public administration think that the basis of digitalization of education is smart integration of technologies, which implies that:

- integration of technologies always occurs according to the plan and is aimed at achieving a certain goal;
- technology is becoming an integral part of learning;
- technologies help to interest students in the necessary content and involve them in its study;
- technologies are primarily used by students;
- emphasis is placed on technologies that stimulate the thought process and creative development;
- the educational process is built around the application of the capabilities of a particular technology;
- technologies stimulate the desire to solve more and more complex tasks;
- technologies teach you to work in a team both within the study group and outside it;
- technology helps solve problems that previously seemed early too hard;
- technologies are used to form a new pool of knowledge [1].

Other experts believe that the implementation of a mixed learning format is impossible without the use of project technologies and requires the following steps: institutional changes, changes in the organization of the educational process, managerial changes, changes in pedagogical technologies, personnel changes and communication changes [12].

English colleagues believe that the most significant factor in the digitalization of the educational process is personalized learning, which is clearly controlled by a strictly regulated learning management system [4].

The Australian experience of implementation shows that the most important thing is to build an individual learning trajectory, organize the motivation of students and create a base of high-quality content [14].

In the practice of implementing digital education technologies, the following features are noted in UNESCO: technology consists in taking measures to meet

the educational needs of a person, technology includes the values of innovative "know-how" practices, and also includes organized ways to implement a system of actions that guarantee the planned result. This applies to the automatic and non-automatic set of interactions between machines, people, and systems for various processes [15].

The formation of digital literacy should be given special attention, with reading, math and science literacy. Digital literacy is the readiness and ability of an individual to apply digital technologies confidently, effectively, critically and safely in all spheres of life [1].

The network is a new reality for each person, which forms the network consciousness and network identity, is a new environment for human habitation. Accordingly, the network community is the preparation of students for a successful life and activity in the digital economy, the formation of a citizen's personality, the formation of skills and competencies of the XXI century, readiness for successful activities in conditions of complexity and uncertainty. The network generation is the first generation for which the technological environment and virtual reality are the natural environment, they are more literate and experienced in handling new technologies [16]. The characteristic features of the network generation are: a high level of social skills development, within the framework of social networks and virtual communication, they are sociable and contactable, prefer to communicate through social networks and mobile phones, tend to individualism (it is important to express your point of view and mark your place in the world), make quick decisions, and take difficult complex information in large volumes [5]. On the other hand, they are emotionally open, optimistic and contactable, have a sense of uniqueness, show selfishness and egocentrism in interaction, have difficulties in finding compromises, attach great importance to the family, are motivated to expand, but not to deepen knowledge, have a high level and rate of mental development. In the value-motivational sphere, they are characterized by freedom, creativity, entertainment, constant search for new things, frequent changes of employment and profession, they are set up for a flexible schedule and work remotely, so that there is enough time for self-development and self-realization, video games have accustomed them to instructions and control [3].

Network socialization is a leading factor in the formation of an individual's identity in the modern network culture in a global world. It is largely carried out outside the educational system. The number of young Internet users has increased approximately 2.5 times over the past 3 years. 32% of young people spend more than 8 hours a day on the Internet [1].

I would like to mention the basic values and factors that have shaped modern generations. Generation X is characterized by iconic technologies: VCR, computer, landmark events: the collapse of the USSR and the fall of the Berlin wall, their philosophy: to live to work, the best leaders are considered leaders. Generation Y is characterized by iconic technologies: the Internet, e-mail, mobile phone, Google, Iphone, landmark events: September 11, the "Arab spring", their philosophy: work-

life balance, the best leaders are considered partners. Generation Z is characterized by iconic technologies: Facebook, Twitter, Tinder, Foursquare, Google Glass, their philosophy: work to live, the best leaders are considered co-authors [17]. Generation alpha – independent and talented children [15].

Analysing the features of education in the XXI century we can name the following:

- focus on the development of the student's personality;
- remote interaction in educational networks, mobile education;
- network management culture;
- modular construction of network educational programs;
- project, educational and research, practice-oriented activities [18];
- the result of education – the level of possession of key skills and competencies of the XXI century through their application in real situations;
- flexibility and adaptability;
- continuous updating of online educational programs based on big data analysis;
- wide use of modern technologies in the educational process [13];
- early career guidance, the willingness to change the social role of the profession;
- network socialization;
- LOD-on-demand training [1].

3. RESEARCH RESULT

Various rating systems are used to assess the effectiveness of higher education institutions. The most common criteria are academic reputation, employer reputation, the ratio of teaching staff to the number of students, citation of scientific publications, the share of foreign students, and the share of foreign teachers [18]. Taking into account these criteria and the need for digital transformation of education, we have formed the stages of digital transformation of the University [19].

The first stage is the formation and improvement of digital literacy of the teaching staff. The main content of this stage should be the professional development of teachers in the program "Technologies of distance and mixed learning. Digital literacy».

The module "Legal foundations of higher education and the digital economy" contains information about the current legal regulation of the education system and innovations in this area, is a mandatory element of the formation of digital literacy. The classification of Internet risks is also considered. Content risks arise from the use of materials containing illegal, unethical and harmful information - violence, aggression, eroticism and pornography, obscene language, propaganda of suicide, drugs, etc. Communication risks are associated with interpersonal relationships of Internet users and include illegal contacts (for example, for the purpose of meeting), cyber-harassment, cyber-humiliation, grooming, etc [1]. Consumer risks are associated with abuse of consumer rights: the risk of purchasing low-quality goods, fakes,

counterfeit and falsified products, theft of funds by an attacker through online banking, etc. Technical risks: the possibility of damage to the software, information, violation of its confidentiality or account hacking, theft of passwords and personal information by hackers through malware and other threats. Internet addiction: an irresistible craving for excessive use of the Internet, in the adolescent environment manifests itself in the form of a passion for video games, an obsessive need to communicate in chats, round-the-clock viewing of movies and TV series on the Network [14].

The module "Higher school Pedagogy in the digital economy era" provides knowledge about the mechanisms of using innovative approaches in education, methods of using technologies of mixed and distance education, active and interactive technologies [17]. Teaches the use of learning management systems, digital collections of educational objects, online training courses, tools for creating and publishing content and educational objects, tools for communication and feedback, tools for collaboration, tools for creating communities, tools for planning educational activities [20].

The module "Psychology of higher education in the digital economy era" is designed to reveal the psychological characteristics of generation X, generation Y, generation Z, and generation alpha. What students share on the Internet? In descending order, consider:

- General registration data, official statuses (participation in competitions, achievements, awards);
- chronicle of personal events;
- psychological characteristics (abilities, knowledge, skills, personal traits);
- lifestyle and behavioral attitudes (worldview, values, interests and hobbies, social habits and actions, moods, tastes);
- physical characteristics (external data, biometric data, health status);
- spatial localization (location fixing and moving);
- material and economic situation (property, salary, savings);
- social connections, identification registration data.

The module "Methods of psychological and pedagogical research in the digital economy era" shows up-to-date information about changing research methodologies in pedagogy and psychology, shifting the focus to analytical data and big data. Changes in higher mental functions (memory, attention, thinking, perception, speech) are considered; changes in cultural social practices (ways of activity) — the Internet as a cultural tool for solving various tasks in new, rather than traditional ways; changes in the mechanisms of forming a child's personality (identity, status, reputation, accumulation of social capital, personal and individual characteristics); the emergence of new psychological contexts (social networks, blogosphere, virtual worlds, etc.) and new phenomena (Internet addiction, multitasking, selfism, etc.); the emergence of new forms of developing relationships with others, including negative aggressive behavior (flames, flood or spam, trolling, haterism, cyberbullying)

The module "Basics of working in LMS" involves updating the knowledge of teachers to work with the electronic information educational environment of the State University of Humanities and Technology, which is built on the basis of Moodle.

Module "Basics of working in Microsoft Office" - this module updates the competence of teachers in using the main tools: Word, Excel, PowerPoint, OneNote, Outlook, Publisher, Access, InfoPath.

The module "Working with Google tables" provides training in creating a problem map in projects, organizing deadlines for all types of work, using project solutions for placement, final presentations, opportunities for group work with documents, using a variety of formulas, a significant arsenal of applications for working with data, conducting online surveys, and opportunities to access information using a QR code.

The module "Working with podcasts" provides training in the basic principles of using podcasts: autonomy, interactivity, multi-channel perception, mobility, and problem-solving. Video podcasts, audio podcasts, and screencasts are studied.

The "Smart-learning" module involves creating an intellectual environment for the continuous development of the competence of participants in the educational process, teaching them to give the skills necessary for successful activities in a digital society, identifying various motivational models.

The module "Working with image editors" provides training in working with Adobe Photoshop and using its main functions in the educational process.

Module "Video processing and video recording" - learn the rules for recording videos, the algorithm for presenting educational material, as well as working with the simplest video editors.

The module "creating a site" involves studying the algorithm for creating a teacher's site on free and paid platforms, its content and content that should contain a site of this nature.

The "Tools for webinars" module is being studied by OpenMeetings - one of the most popular free open source web conferencing tools on the Internet today. In addition to video conferencing, it features instant messaging, document sharing and editing, whiteboards, and many other useful applications, such as Red Streaming Server, which allows you to transmit and share information remotely.

The module "Basics of working with on-line platforms" provides for studying the database of developed courses on Coursera, Open window, and Stepik. It can be used as a supplement to the main educational programs.

The module "Mathematical statistics in pedagogical activity" provides an opportunity to study modern statistical data analysis packages: parametric and nonparametric criteria.

The module "Economics of educational programs" studies the main provisions of marketing and economics in the implementation of educational programs, both basic and additional.

The "Internet of things" module provides for the study of the mechanisms of operation and use of physical objects equipped with built-in technologies for interacting with each other or with the external environment.

The module "Formation of digital modules" studies the structure of digital modules, which should contain: a system of control tasks of the training and reflexive type, consultations of leading teachers; tools for working in social and educational networks for self-learning and mutual learning; system connections of different scientific fields; pedagogical support of the learning process; digital resources; training tasks.

Module "Using social networks as a learning tool". The use of social networks in the educational process significantly changes its quality, since social networks have a number of advantages for students: a familiar and convenient application interface, which in fact creates a comfortable environment for exchanging information, since it is more familiar than the same Moodle; social accessibility of teachers in networks, a large number of tools used; full identification – in social networks, the person is predominantly himself and students, and the teacher is easier to understand what person you are communicating with and what he is; the ability to fully filter incoming information. The main possibilities of using social networks in the educational process of basic and additional education are studied [8].

The second stage of digitalization of education at the State University of Humanities and Technology is the formation of digital portfolios of students and teaching staff, which will reflect all the acquired competencies, the level of professional and other achievements. Preparation of objective criteria for rating students and teachers and conducting ratings every six months.

For teachers the main parameters of rating are: availability of victories in professional competitions, the possession of ICT technologies and their use in the classroom, training online courses, webinars and win the students for scientific competitions under the guidance of a teacher, publication activity of teachers, evaluation of teaching quality by students.

For students the rating is made up of the following parameters: academic performance, knowledge of foreign languages, knowledge of ICT technologies, passing online courses on platforms, early employment in the specialty, scientific and social activity.

The third stage of digitalization is the qualitative filling of the electronic information educational environment of State Humanitarian University of Technology with the necessary content, the launch of online courses developed by teachers, and the training of digital tutors to ensure the smooth operation of the electronic information educational environment. An important element is cooperation with IT partners, such as organizing a University-based Lyceum together with Yandex and presenting online University courses on Internet platforms. On the basis of the University, two centers for continuous improvement of the skills of teachers have been created, within the framework of the national project "Education". At the moment, professional deficits of teachers are being tested on the

basis of the EAS platform (expertise, analytics, support). The University team has developed modules to fill the gaps in professional and interdisciplinary competencies. Based on these modules, an individual learning trajectory for teachers will be formed.

Another important element of digitalization is the formation of skills and competencies of the XXI century, which can include: personal qualities, competencies, basic skills. Personal qualities: acceptance of basic values; curiosity; initiative; perseverance; leadership qualities; social and cultural involvement in public life; conscious, responsible activity. Competencies: critical thinking; creative thinking; ability to communicate; ability to work in a team; joint activities and cooperation. Basic skills: reading and writing skills, mathematical literacy, humanities, science, financial and business literacy, ICT literacy, general cultural and civic literacy.

4. DISCUSSION OF RESULTS

The transition to the digital economy has significantly changed the requirements for the implementation of educational activities, which has led to the need to personalize the educational process. The need to obtain competencies, skills and basic skills of the XXI century is becoming a necessity not only for students, but also for the teaching staff who implement educational programs. For teachers, it becomes necessary to form new competencies that will ensure high-quality activities in the new, digital educational environment. The ability to create and process video and audio content, as well as modern software, are significant tools in modern didactics.

5. CONCLUSION

As a result of the research, three stages of digitalization of the University were formed. As a result of the implementation of the first stage, the necessary competencies will be formed for the teaching staff of the University. As a result of the second stage, digital portfolios of students and teachers will be created, and ratings will be conducted. The third stage will sum up-the University's electronic information educational system will be filled with content, digital tutors will be prepared, and Yandex Lyceum will be opened on the basis of the University.

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