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MODEL OF CONTINUING EDUCATION IN CONTEXT OF DIGITAL TRANSFORMATION OF UNIVERSITY

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Abstract

The set of measures to transfer the educational organization of higher education to the digital university model during the three-year period is described in this article. Guidelines for the development of planned activities are given in order to digitally transform the educational organization of higher education. The need to build a continuing education system at the digital university model has also been identified. This includes the following subsystems: digital competencies of students, digital educational technologies, development, and implementation of online courses. Among its principal findings, the evaluation concluded that the feasibility of developing and implementing of continuing education model is a really important action. This model combines informative and logical blocks: a digital portfolio of the student and teacher, a digital student footprint, a digital teacher footprint, personal development paths of students in higher education programs, an increase in the number of educational activities in the formation of an individual educational path, the introduction of an artificial intelligence system. The proposals were made regarding the performance of the analysis and diagnosis of digitalization tools in universities, including educational, scientific activities, university management, and administrative activities. The recommendations are given regarding a sociological study of the university's readiness for digitalization, the availability and use of individual components of the digital university model in educational and scientific activities, and the assessment of the existing level of development of digital competencies by students, teachers, and employees of the educational institution of higher education.

Keywords: Continuing education, digital transformation, digitalization of education, digital university, model of continuing education

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1. Introduction

In the context of the implementation of the national program “Digital Economy of the Russian Federation”, the national projects “Education” and “Science”, the involvement of educational organizations in digitalization processes, the formation of a model of digital competencies, the transformation of the educational process and the development of lifelong education is becoming increasingly important. This implies using the entirely new technical concepts and innovative university management processes for the implementation of the digitalization program, as well as the creation of the model of continuing education in the context of digital transformation (Gerasenko, 2011; Suharev, 2017).

“The concept of digital economy development” has been developed and implemented in the Voronezh region. This concept is aimed at the dissemination of digitalization processes in all spheres of society, especially regarding the development of personnel innovative potential of the region. The Flagship University of Voronezh can become the basis for the formation of a system of continuing education. The University could involve new students, pupils, population within the framework of the concept of the digital transformation of the university, intensifying the development of online and distance learning courses.

The following priorities are the strategic priorities for the transition to the digital university:

Priority 1. The measure aimed at the establishment of a system of the university’s digital competency. It is demanded during the transition process of the region to the digital economy.

Priority 2. The transition of the university to digital educational technologies under the programs of basic and additional professional education.

Priority 3. Development of individual educational trajectories of students and their exploitation of digital competencies applicable in different areas of the economy, taking into account market needs (Dusekeyev & Shikulskaya, 2016).

Priority 4. Development of information and communication infrastructure for processing large volumes of data and creating a unified information system for digital university management.

Priority 5. Development of the digital footprint of students, teachers, and employees for the organization of the network interaction of the university with various groups of regional development stakeholders.

Priority 6. The implementation of the concept of continuing education at a reference university for adaptation of the population of the region to the conditions of the digital economy through the development of new competencies.

Priority 7. Development of an open information and educational space of the digital university to increase the number of students and improve the quality of education and self-education.

Priority 8. Provision of help and support in increasing the digital and computer security and digital literacy of the population through the introduction of educational programs and online courses for the mass education of children, working citizens, pensioners (Prohorov & Konik, 2019).

Priority 9. Assistance in the development and effective use of the personnel reserve of the region based on the digital database.

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Priority 10. The integration of the university in the economic environment of the region through the development and implementation of research projects of students and teachers using digital technology.

Priority 11. Improving the socio-cultural infrastructure of the university in the digital space of the region for the implementation of international cooperation projects and the development of intercultural communications.

Taking into account the identified strategic priorities, the digital university development program is being formed. As well as the digital transformation card takes the lead in the process of development. (Popova, 2018).

2. Problem Statement

Within the frameworks of the digitalization process, it is necessary to develop the card with the contribution to the organization of higher education. In addition, the measures aimed at solving the key tasks of digitalization should be provided. The implementation of program activities is comprehensive, and therefore covers all the main activities at the university – educational, scientific, organizational and managerial (Sviridova et al., 2019).

The card must be developed for the medium term (from 2 to 4 years), as part of the improvement of educational activities. This c should provide for the gradual transition of the university to digitalization, by introducing personal development paths of students in higher education programs; making changes to the organization of scientific and research activities of scientific and pedagogical workers in order to educate students and the public in competencies in the field of the digital economy; development of their own online courses covering the main educational process and programs of continuing professional education; training and accreditation of project activity mentors; introduction of key digital competencies into the main educational programs.

At this stage, the main technologies will be the introduction of an artificial intelligence system; development of online communication in the educational process; the implementation of the Smart Campus Card (Concept of the Digital University model …; Myshovskay & Kolosov, 2019).

At the same time, the development of digital competencies is supposed for the administrative and managerial staff of the university in order to increase the efficiency of the organization and management of the university's educational process.

Thus, for example, the introduction of 1C “University PROF” software product has significant advantages, including for certain categories of stakeholders. In particular, the program allows students to receive, accumulate and use personalized performance information; provides access to curricula, a personalized schedule, a list of orders; educational complexes; allows recording disciplines of your choice; makes it possible to fill out a portfolio; provides a communications system through a forum. The program gives the opportunity to remotely submit applications and track information about the submitted applications, as well as moderate the submitted applications (verification of the questionnaire, individual achievements, list of entrance achievements, etc.). The program also has significant advantages for the scientific and pedagogical workers of the university. This program provides access to a personalized

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training schedule; filling out the teacher's portfolio; allows viewing the portfolio of students, educational complexes, curriculum (Shotylo et al., 2018; Salikov et al., 2019).

The leading direction of the transition of the university digitalization will be the introduction of personal development paths for students in higher education programs, including through the organization of the Young Professionals Union and the creation of the pedagogical design laboratory. The introduction of changes in the organization of educational and research activities of scientific and pedagogical workers will continue with the aim of mastering the field of the digital economy.

Technological implementation of measures will be ensured by the development of modern high-speed infrastructure for storing, processing and transmitting data and introducing mobile applications as part of the unified university information system.

At this stage, digitalization will be expressed through the digital footprint of the student and teacher. For a student, the introduction of a digital track will mean that the information on the online course platform can be analyzed by watching videos, completing test tasks (time, number of attempts, correlation of correct/incorrect answers), by evaluating the work of other students, etc.

The electronic information and educational environment of the university will be modernized at the next stage of the implementation of the card. This stage is aimed at increasing the level of information support for the educational process, the formation of the student's personal information space, individualization of instruction by expanding students' access to the educational information environment using digital technologies to create opportunities for a more flexible educational path.

As the key technologies at this stage, it is planned to scaling use the MOOCs on global and national educational platforms, as well as equipping university audiences with multimedia hardware and software modules.

Thus, the digital transformation of the university should be carried out within 7–10 years (according to the long-term development strategy of the university), gradually adjusted every 2–3 years (according to the university development card) and have strategic digital development guidelines for the period until 2035.

At the first stage (the first 1.5–2 years of the transformation process), the main attention should be paid to the development and justification of the digital university model (digital university management system, digitalization of the educational process of basic and additional professional education, digitalization of student learning paths and development in the new educational environment, the structuring of digital competencies), the diagnosis of the existing digital footprint of students and teachers, the implementation of the services of the National University the main technological initiative 2035 (UNTI 2035) in the activities of the university (Mavlutova, 2018).

At the second stage (2–3 years of the transformation process), further digitalization of educational, research, administrative and management activities should be carried out. It is necessary to plan the development and implementation of several technological and social innovation projects for the regional environment, taking into account the deepening the level of digitalization.

At the third stage (4–5 year of the transformation process), it is necessary to scale the university's experience with other educational organizations of the city and the region, stimulate the development of online forms of interaction, including with educational organizations for the development of online

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courses, distance learning, organize the exchange of best practices, attract experts; with the people of the region to develop digital literacy, increase digital competence, and improve digital security; with the business community of the region for the implementation of joint projects with companies in the digital economy, with regional and municipal authorities for the integration of digital educational organizations in the economy of the region, for educational activities, and for the implementation of continuing education programs.

The digitalization of the university would involve the undertaking of the following organizational, managerial, infrastructural, and informational measures.

Mesure 1. Implementation of 1C "University of PROF." This measure involves:

- integrated solution for automation of university management of 1C: “University of PROF”;
- automation system for the process of compiling and optimizing curriculum at the 1C university: “Automated managing schedules”;
- distance learning system 1C: “E-learning. Corporate University”;
- system of multi-user web access for teachers and students to configurations “1C: E-learning”: Corporate University or Examiner;
- development of the digital educational environment for the automation of routine operations and support for participants in academic work based on the software of 1C: “PROF University” (Myshovskay & Kolosov, 2019; Sviridova et al., 2019).

Measure 2. Implementation of the “Smart campus card”. The introduction of the universal multifunctional personalized card at the faculties of the university. This card combines financial technologies and ways to manage the educational process, allows the student to use not only the internal functionality of the university but also the services of the digital partners of university.

Measure 3. Creation of a modern high-speed infrastructure for data storage, processing, and transmission. The introduction of the unified data storage system that provides high performance for existing and implemented university applications. Updating the network and switching equipment and integrated control systems.

Measure 4. The introduction of mobile applications as part of the unified university information system. Implementation of the mobile application – “Mobile University”, integrated with the software product “1C: University of PROF”. Mobile application "Mobile University" is intended for students and teachers. This application allows using mobile devices to receive information on the schedule of training sessions, curricula and performance, dates of the session, practices, as well as extracurricular activities.

3. Research Questions

Thus, the digital transformation of the university should be carried out within 7–10 years (according to the long-term development strategy of the university), gradually adjusted every 2–3 years (according to the university development card) and have strategic digital development guidelines for the period until 2035.

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digitalization of student learning paths and development in the new educational environment, the structuring of digital competencies), the diagnosis of the existing digital footprint of students and teachers, the implementation of the services of the National University the main technological initiative 2035 (UNTI 2035) in the activities of the university (Mavlutova, 2018).

At the second stage (2–3 years of the transformation process), further digitalization of educational, research, administrative and management activities should be carried out. It is necessary to plan the development and implementation of several technological and social innovation projects for the regional environment, taking into account the deepening the level of digitalization.

At the third stage (4–5 year of the transformation process), it is necessary to scale the university's experience with other educational organizations of the city and the region, stimulate the development of online forms of interaction, including with educational organizations for the development of online courses, distance learning, organize the exchange of best practices, attract experts; with the people of the region to develop digital literacy, increase digital competence, and improve digital security; with the business community of the region for the implementation of joint projects with companies in the digital economy, with regional and municipal authorities for the integration of digital educational organizations in the economy of the region, for educational activities, and for the implementation of continuing education programs.

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teachers. This application allows using mobile devices to receive information on the schedule of training sessions, curricula and performance, dates of the session, practices, as well as extracurricular activities

4. Purpose of the Study

The digitalization of the university would involve the undertaking of the following organizational, managerial, infrastructural, and informational measures.

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5. Research Methods

Continuing education at the university involves the construction of educational paths for students, undergraduates, graduate students to motivate them to continue and complete their studies, for teachers – the possibility of taking advanced training courses and professional retraining at the university, for the population – the possibility of additional professional education at the university at based on full-time, distance and online courses. It is necessary to create a working and flexible management system based on the principles of digitalization to enable the development of counting education at the digital university (Liu, 2012; Svensson & Baelo, 2015).

The continuing education system includes the following subsystems at the digital university.

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Subsystem "Digital competencies of students" – includes the following elements.

Element 1. Implementation of key digital competencies in educational programs. This element involves updating the main educational programs of VSTU in order to develop the digital competencies among all students in the field of information literacy, communication, and cooperation, the use of digital content, as well as personal security and the search for self-development opportunities in the digital environment. The implementation of the event includes the development of optional or compulsory modules in the framework of training programs aimed at improving digital literacy among students; conducting educational activities on digital literacy for students and the population of the region.

Element 2. Making changes to the organization of educational and research activities of scientific and pedagogical workers to develop competencies in the field of the digital economy and educate the population in digital competencies. It is suggested that the use of the service of the University of the National Technological Initiative 2035 "Methodology for training personnel in the digital economy" is for university staff, teachers, and the population of the region The development of key competencies includes: the ability to manage data, information and digital content; cooperation using digital technologies for joint local production of resources and knowledge; adaptation of communication strategies to a specific audience in a digital environment; creation and editing of digital content; the ability to provide information security in a digital environment; ability to identify gaps in digital competency; identify needs and select the necessary digital tools to solve it (Salikov et al., 2019).

Element 3. Development of digital competencies of the administrative and managerial staff of the university to improve the organization and management of the university's educational process. Further training of university staff is expected to develop the following key competencies: the ability to manage data in a digital environment; information exchange in a digital environment; creation and editing of digital content in various formats; the ability to protect personal data and user privacy in a digital environment; identify and solve technical problems that arise when working with digital devices.

The subsystem "Digital Educational Technologies" includes the following elements.

Element 1. Modernization of the electronic information and educational environment (EIEE) of the university. The structure of EIEE includes e-learning courses in the disciplines of the main educational programs; methodological support of disciplines; elements of distance learning and intellectual testing of students' knowledge; electronic interactive teaching materials; other methods and information and pedagogical technologies.

Element 2. Equipping university audiences with multimedia hardware and software modules. Purchase and implementation of virtual laboratories and simulators for conducting the educational process of students, as well as the use of augmented and virtual reality simulators for various kinds of educational activities.

Subsystem "Development and implementation of online courses" – includes the following content elements.

Element 3. Development of online courses of VSTU covering the main educational process and supplementary vocational education programs. This involves implementation of the service of the National Technological Initiative "Access to Digital Content". Acquisition of the UNTI 20.35 service "Access to Digital Content". Within the framework of this measure, it is planned to include online

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courses, blended learning modules, and micro-degree programs in the main educational programs and supplementary vocational education programs.

Element 4. Increasing the scope of massive open online courses (MOOCs) on global and national educational platforms. It involves widespread use of the platforms "Open Education", "Stepik", "Universarium", "Lectorium" (Concept of the Digital University model…; Sirotkina, 2019).

Element 5. The development of online communication in the educational process. It involves the implementation of educational programs of primary and secondary education in the format of video conferencing and webinars (Shotylo et al., 2018).

6. Findings

Taking into account the system of the counting education functioning at a digital university, it is necessary to develop a model that includes the following informative and logical blocks:

Block 1. Digital portfolio of student and teacher. The purpose of creating and maintaining the electronic portfolio of students is to assess the formation of general and professional competencies, the dynamics of individual development and personal growth by the administration of the faculty (university) and employers. The introduction of a digital portfolio will allow:

- assessing the effectiveness of self-development according to the results and evidence of educational and professional, project activities;
- encouraging activity and independence, expand opportunities for self-realization of students;
- tracking individual student achievements, the dynamics of the development of professionally significant qualities, the success of general and professional competencies based on the accumulation and systematization of documents, reviews, works, and others;
- forming and improving educational and professional motivation;
- providing the employer with information about the potential employee;
- improving the skills of goal-setting, planning and organizing your activities, designing professional and personal self-development (Sviridova et al., 2019).

Block 2. The introduction of the digital student track. The implementation of this measure involves the use of the UNTI 2035 service “Service for the collection and analysis of the digital footprint”. The service includes methods and tools for collecting and analyzing the digital trace of educational activities and experience. The service involves additional training for specialists in the collection and analysis of the digital footprint.

Block 3. The introduction of the digital track of teacher. The implementation of this direction involves the account of the results of research and project activities, monitoring of quantitative indicators in the use of digital educational technologies for developing digital educational paths, as well as in the development of various groups of digital competencies.

Block 4. The introduction of personal trajectories of students' development in higher education programs. The implementation of this measure involves the use of UNTI 2035 services “Implementation of personal development paths of students in higher education programs”, “Service of pedagogical design and activity practices”, “Training and accreditation of mentors of project activities”, “Work of the University Union called “Young Professionals”.

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The service “Implementing of personal development paths of students in higher education programs” allows upgrading existing and creating new adaptive practice-oriented educational programs using the proposed model of individualization of instruction, a set of successful practices, digital tools, and digital content.

The service of pedagogical design and activity practices will be used to create a laboratory of pedagogical design (Salikov et al., 2019; Torosov, n. d.).

The use of the service “Training and accreditation of mentors of project activities” will allow forming and replenishing a team of mentors that implement individual educational paths and form digital educational competencies.

Block 5. Increasing the number of educational activities in the formation of the individual educational path. The implementation of this direction involves the introduction of the service "University Union called " Young Professionals ", the organization of project activities of students, as well as the conduct of community events" Boiling Points " at the University base. The work of scientific, intellectual, social, entrepreneurial communities, as well as the activities of innovators are planned.

Block 6. The implementation of the artificial intelligence system. The implementation of this direction through the introduction of the UNTI 2035 “Artificial Intelligence” service will allow:

- developing the competence in the field of artificial intelligence among university employees (teachers, researchers, managers) and students;
- creating and use artificial intelligence technologies in education to increase the availability and effectiveness of education;
- making the digital content and carry out the educational activities that ensure the development of competencies in the field of artificial intelligence (Popova, 2018; Prohorov & Konik, 2019).

7. Conclusion

It is necessary to analyze and diagnose the tools for translating a university into digitalization to carry out a successful digital transformation at each stage. Diagnostics can be carried out in the following directions (Liu, 2012; Svensson & Baelo, 2015):

- in educational activities – for basic educational programs based on the existing electronic information educational environment, for continuing education programs based on the number of distance learning courses for students and the public, distance learning advanced training programs for the academic staff, for building individual educational paths through the bank of projects of employees and students, through student participation in contests and Olympiads of various levels
- in scientific activity – through checking the availability of basic departments, student design bureaus, and professional aids, victories in competitions of scientific and diploma works, the number of existing and new agreements concluded with industrial partners; the number of the international investment positions; university participation in network research, etc.;
- in university management and administrative activities – based on the implemented 1C information modules, library system management, electronic document management system.

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Based on the diagnostic results, a sociological study will be conducted on the university's readiness for digitalization, the presence of individual components of the digital university model, the existing level of development of digital competencies by students, teachers, and employees (New reality of education…; Prohorov & Konik, 2019).

Taking into account the results of the study, the organization of higher education should develop and implement methods of transition to digital university, implement a set of measures within the framework of the continuing education model, determine the criteria and indicators of the effectiveness of the digital development of the university.

References

Concept of the Digital University model will be presented in June. (n. d.). Retrieved on 11 September, 2019, from https://digital.ac.gov.ru/news/851

Dusekeyev, K. A., & Shikulskaya, O. M. (2016). Models for assessing the performance of university employees. *Bull. of the Voronezh State Univer. of Engineer. Technol., 4*(70), 446–452.

Gerasenko, V. P. (2011). The concept of structural transformation of the organizational and economic mechanism for managing the region. *Econ. and banks, 2*, 23–24.

Liu, X. (2012). Continuous Education and Training Based on Virtual Learning Communities. *Energy Proc., 17, part A*, 733–736.

Mavlutova, G. A. (2018). *Digitalization in a modern educational institution, Economic security and quality*. https://cyberleninka.ru/article/n/tsifrovizatsiya-v-sovremennom-vysshem-uchebnom-zavedenii (accessed date: 16.09.2019).

Myshovskay, L. P., & Kolosov, A. I. (2019). On the issue of digitalization of education in higher education. *Perspect. of Sci., 7*(118), 159–161.

New reality of education: what is a digital university today. (n. d.). Retrieved on 11 September, 2019, from https://na.ria.ru/20190722/1556704299.html

Popova, O. I. (2018). *Transformation of Higher Education in the Digital Economy, Management Issues*. https://cyberleninka.ru/article/n/transformatsiya-vysshego-obrazovaniya-v-usloviyah-tsifrovoy-ekonomiki (accessed date: 19.09.2019).

Prohorov, A., & Konik, L. (2019). *Digital Transformation. Analysis, trends, world experience.* Moscow.

Salikov, U. A., Logunov, I. V., & Kablashova, И. V. (2019). Trends in the Human Resource Management of an Enterprise in a Digital Economy. *Bull. of the Voronezh State Univer. of Engineer. Technol., 81*(2(80)), 393–399.

Shotylo, D. M., Krainova, V. E., & Skurydin, A. V. (2018). Trends in the development of artificial neural networks in the digital economy. *Econominfo, 15*(4), 65–69.

Sirotkina, N. V. (2019). *Digital Economy*. Monograph.

Suharev, O. S. (2017). *Modern problems of industrialization of the economy*. Kostroma. http://www.osukharev.com/ lectures.html (accessed date: 16.11.2019).

Svensson, M., & Baelo, R. (2015). Teacher Students' Perceptions of their Digital Competence. *Proc. – Soc. and Behavioral Sci., 1805*, 1527–1534.

Sviridova, S. V., Pastushkova, O. V., & Krasnikova, A. V. (2019). Key competencies of a digital university in educational and outreach activities. *FES: Finance, Econ. Strategy, 16*(10), 5–15.

Torosov, I. (n. d.). Retrieved on 10 September, 2019, from *Ministry of Economic Development: a digital university will appear in Russia by 2022, Russia's Future.* National projects. https://futurerussia.gov.ru/nacionalnye-proekty/588753