Methods of digital transformation of the educational environment of agricultural universities

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Abstract. Currently, the issue of introducing the means and capabilities of digitalization or a digital system in modern society is becoming relevant, while the term “digitalization” is becoming quite popular. It is assumed that the introduction of new digital tools or platforms will help the organization to gain a leading position in agricultural industry. Digital transformation is primarily associated with a change in the stereotypes of thinking, working methods and company management. However, digital transformation is not just the introduction of digital technologies, it is rather the reengineering of various, including educational, processes based on them. Today, agricultural universities are more than ever interested in uniform rules that allow for the digital transformation of each university individually and accelerate the digital transformation of the university system as a whole. In the process of digital changes in the education system, fundamental changes are supposed in the structure of training and the organization of the educational process, as a result of which the issue of the need to form our own information and educational environment, which will become the basis of the modern digital base of the educational process.

1 Introduction

The digital economy is an economic activity in the field of digital and electronic technologies, including the electronic business and commerce and the goods and services they produce. At its core, the digitalization of the economy encompasses all business, cultural, economic and social operations carried out on the Internet and using digital communication technologies. The term “digital economy” first appeared in 1995, and since the mid-2000s there has been a significant increase in the Internet economy and digital platforms. The consumer is embraced by the information that he receives from Facebook, Twitter, Instagram or YouTube, and the Internet itself has long become a part of everyday life. Currently, digital changes in the education system suggest a fundamental transformation of the structure of training and the organization of the educational process.

The use of new information and communication technologies is only the first starting condition for the further development of the digital educational environment. Methodologically, the environment itself, the principles of its formation and functioning

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should be based on new educational standards that use a modern competency-based approach; therefore, it is necessary to develop and introduce tools for creating modern teaching materials, tools for effective delivery of developed content to students, which will significantly increase the effectiveness of the teaching system, including in universities.

Many Russian universities use the so-called two-component information and educational environment, combining the educational resources of educational platforms with the content of their own university developments. In many universities, the question arose of the need to form their own information and educational environment, which will become the basis of the modern digital base of the educational process.

2 Experimental

In their activities in the field of digitalization of the university, educational organizations should rely on the basic documents shown in Figure 1.

Actions within the framework of the implementation of measures in accordance with the Decree of the President of the Russian Federation “On National Goals and Strategic Tasks of the Development of the Russian Federation for the Period Until 2024” (May 7, 2018 No. 204) [1] are aimed at ensuring the accelerated implementation of digital technologies in the economy and social sphere and include:

- acceleration of technological development of the Russian Federation,
- increase in the number of organizations implementing technological innovations, up to 50 percent of their total number;
- ensuring the accelerated implementation of digital technologies in the economy and social sphere.

The key objectives of the national project “Digital Economy of the Russian Federation” (Figure 2) [2] include:

- increase in domestic costs for the development of the digital economy,
- the creation of a stable and secure information and telecommunication infrastructure of high-speed transmission,
- the use of predominantly domestic software by state bodies, local authorities and organization

Digital transformations in the educational sphere are based on indicators specified in the national project “Education” (Figure 3) [3]. The key objectives of this national project are
Fig. 1. Normative documents in the field of digital transformation of universities.

Fig. 2. The national program "Digital Economy of the Russian Federation.
Fig. 3. National program "Education".

- ensuring the global competitiveness of Russian education,
- the entry of the Russian Federation among the 10 leading countries of the world in the quality of general education,
- education of a harmoniously developed and socially responsible person on the basis of spiritual and moral values of the peoples of the Russian Federation, historical and national-cultural traditions.

As part of the national project "Education", the federal project "Digital educational environment" is being implemented, the tasks of which are:

- the creation of a modern and secure digital educational environment, providing high quality and accessibility of education of all types and levels,
- to introduce the target model of a digital educational environment throughout the country,
- the introduction of modern digital technologies in educational programs of 25% of general educational organizations of 75 subjects of the Russian Federation for at least 500
thousand children,
- providing 100% of educational organizations in the cities with the Internet with a connection speed of at least 100 Mb / s, in rural areas - 50 Mb / s,
- Creation of a network of digital education centers covering at least 136 thousand children per year.

This project was approved by decree No. R-24 of March 1, 2019 “On approval of guidelines for the creation and operation of digital education centers “IT-cube” [4].

Fig. 4. The program of digital transformation of the university.

Also, as part of the national education project, the federal project "Young Professionals" is being implemented, the tasks of which are:
- modernization of vocational education, including through the introduction of adaptive, practice-oriented and flexible educational programs,
- Creation of a network of 100 centers of advanced vocational training and 5000 workshops with modern equipment,
- participation of 70% of people enrolled in secondary vocational education programs in various forms of mentoring,
- continuing education of 35,000 teachers in programs based on the experience of the Young Professionals Union (World skills Russia).

The program of digital transformation of universities (Figure 4) should be developed and implemented in the period up to 2024. in accordance with the deadlines established for the implementation of national federal projects and carried out in stages [5].

Digital transformation programs should include the development and implementation of a number of technological and social innovative projects for the regional environment, taking into account the deepening of digitalization, scaling the university experience to other educational organizations in the region [6]

3 Evaluation

The introduction of the university’s digital transformation program can be described as a typical roadmap for the digital transformation of the educational environment (table 1). The column “Activities” shows the activities that are planned to be carried out in the framework of these areas at the Voronezh State Technical University. For other educational organizations, these activities are advisory in nature and should be adjusted in accordance with the goals and objectives of the digital transformation of a particular educational institution.

| №  | Directions                                                                 | Events                                                                                                                                                                                                 |
|----|-----------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1  | interaction with government agencies involved in digital-vision issues in general and education in particular | - with the Federal State Budgetary Institution “Coordination Center of the Intergovernmental Commission for Cooperation in the Field of Computer Engineering” under the Ministry of Digital Development, Telecommunications and Mass Media of the Russian Federation: implementation of a program for interaction in the field of information technologies and innovations, promotion of university developments in Russia and international market, the introduction of acceleration programs and initiatives, including in the field of digital entrepreneurship;  
- with the Department of Education and Youth Policy: joint planning and participation in contests, programs, grants and other university, inter-university and regional events in the field of introducing digital technologies into the national and regional economy;  
- with the Department of Digital Development of the Voronezh Region within the framework of the program in the field of information technologies and information security, as well as assistance in the training of specialists in the framework of the projects “Information Security” and “Personnel for the Digital Economy” [7]. |
| 2  | Interaction with the University of NTI "20.35"                             | - participation in the events of the University of NTI "20.35",  
- the use of the services of the STI University "20.35", including the collection and analysis of the digital footprint based on the results of work on student projects focused on the STI markets,  
- Conducting educational events in conjunction with the STI "20.35" University on the basis of VSTU. |
| 3  | Carrying out activities aimed at popularizing research in the field of digitalization, | - the introduction, within the framework of the approved curriculums of MPEP, into the structure of module disciplines aimed at increasing the level of knowledge in the field of digitalization and digital technologies,  
- participation in grant competitions in the field of digitalization, digital transformation and digital technologies in accordance with the grant |
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| 1 | 1. The formation of the DPO system at the university in the field of digitalization and digital transformation:  
   - development and implementation of additional educational programs in the field of digitalization and digital transformation,  
   - the formation of a list of courses available for mastering online in order to improve skills and retraining as part of the mastery of digital technologies by teachers and university staff [8],  
   - Preparation of a continuing education plan in the field of digitalization and digital transformation by university teachers and staff. |
| 2 | 2. The introduction of online learning in the educational process:  
   - the formation of the Regulation on the use of online courses and the offset of the results of their development,  
   - forming a list of courses available for mastering online and conducting testing for implementation in basic and additional educational programs,  
   - conducting an intra-university competition for the development of online courses,  
   - Creation of the “Laboratory of pedagogical design and continuing education” |
| 3 | 3. University hardware and software upgrade:  
   - monitoring the status of the technical and software of the university,  
   - Modernization of technical equipment and software of the university. |
| 4 | 4. Implementation of an integrated educational process management system based on 1C: University software:  
   - development and implementation of a mobile application, a student’s personal account and faculty, a student’s digital portfolio with 1C: University integration,  
   - updating the electronic information and educational environment of the university and integration with 1C: University,  
   - revision, integration, adaptation 1C: University with other information systems of the university,  
   - training university staff and teachers to work in the 1C: University system and in the university’s electronic educational information environment. |
4 Conclusions

The need for digital transformation of the educational environment of universities in modern conditions is not in doubt [9]. The roadmap of the digital transformation of the educational environment of the university includes the main directions of development and is focused on the implementation of educational, scientific, entrepreneurial tasks, as well as the mission of the driver of the socio-cultural and economic development of the region [10]. Provided that the supporting university implements all the main areas, it becomes a catalyst for the transformation of the economy of the region as a whole. Thus, a digital university is defined as the main link in a fundamentally new sector of the economy - the innovation generation industry.

References

1. Decree of the President of the Russian Federation "On national goals and strategic objectives of the development of the Russian Federation for the period until 2024" No. 204 (2018)

2. Ministry of Communications of Russia pursuant to Decree of the President of the Russian Federation of May 7, 2018 No. 204 “On national goals and strategic objectives of the development of the Russian Federation for the period until 2024”

3. Ministry of Education of Russia pursuant to Decree of the President of the Russian Federation of May 7, 2018 No. 204 “On National Goals and strategic objectives of the development of the Russian Federation for the period until 2024 “

4. The federal project “Digital educational environment” was approved by decree No. R-24 of March 1, 2019 “On approval of methodological recommendations for the creation and operation of digital education centers “IT-cube”

5. N. Sirotkina, M. Meshcheryakova, E. Syshchikova, M. Filatova, A. Greshonkov, Proceedings of the 33rd International Business Information Management Association Conference, IBIMA 2019: Education Excellence and Innovation Management through Vision 2020, 8970-8975 (2019)

6. O.N. Belenov, S.S. Kiselev, N.V. Sirotkina, M.V. Titova, Lecture Notes in Networks and Systems 87, 482-488 (2020)

7. O. Klopova, L. Komyshova, M. Simonova, Problems and Perspectives in Management 16(1), 214-223 (2018)

8. O.E. Zolotukhina, L.N. Komysheva, Materials of the interuniversity scientific-practical conference, FSBEI of HE "Russian Academy of National Economy and Public Administration under the President of the Russian Federation", 24-28 (2016)

9. D.A. Antonova, E.V. Ospennikova, E.V. Spirin, Bulletin of the Perm State Humanitarian and Pedagogical University. Series: Information Computer Technologies in Education 14, 5–37 (2018)

10. S.V. Butsyk, Open Education 1, 27–33 (2019)