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Adaptation of the educational process to the requirements of the global nuclear market according the concept of «economic cross» through its digitalization

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Abstract

The article proposes the directions of adaptation of the educational process in Russian universities to the requirements of the global educational market through the modernization of their IT-component. The results achieved in the digitalization of the educational process and ensuring its competitiveness are considered. Reserves of the use of digitalization tools have been identified as part of the adaptation of the educational process in Russia to the requirements of the global educational market. Based on the results of five-year time-lapse observations of the authors, the directions of adaptation of the digitalization tools of the educational process are proposed taking into account the current economic needs of Russian education. In this study both traditional technologies for Russian universities and technologies used mainly by foreign educational organizations were considered as tools that can be used to improve the competitiveness of domestic education in the global education market.

Keywords: Education, Digitalization, Modernization, Globalization, Competitiveness.

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1. Introduction

Relevance. The problem of ensuring the competitiveness of the educational process in the global market is central to domestic universities. This problem is caused historically, as Russian educational organizations inherited the economic model from the Soviet educational system in the 1990s, and the availability of budget funding and potential threats associated with the modernization of the educational system hindered its transformation up to the present.

In the circumstances, the economy of domestic education has acquired a pronounced national specificity, which is manifested in the following features:

- autarky of economic and educational results in most universities in Russia;
- lack of demand for scientific, educational and human potential of Russian universities by other participants in economic relations;
- isolation of the national educational system.

Another institutional feature of the educational system is its institutional conservatism, since the excessive intensity of economic and organizational transformations in this area can lead to the irretrievable loss of part of its scientific, technical and economic potential.

Objective: summarizing the experience of using digital technologies as a tool to increase the competitiveness of the domestic educational system in the global market with the subsequent development of proposals to expand the use of digital technologies in a leading Russian university (for example, NRNU MEPhI).

The tasks solved in this article are determined by the goal and the main trends in the impact of digitalization on the institutional organization of sectoral economies, in particular, the education economy. At each stage of the study, one of the following tasks was solved:

• determination of the potential of using digital technologies as a tool to increase the competitiveness of domestic education in the global market;

• Evaluation of the current year for NRNU MEPhI the economic result of using digital technologies in the educational process for 2019;

• identification of the reserve for the use of digital technologies in the educational process in order to increase its competitiveness in the global educational market ;;

• determination of the most promising areas of digitalization of the educational process in Russia for the period 2020 - 2030 in terms of addressing issues of increasing its competitiveness in the global market;

• development of copyright recommendations to maximize the economic effect of the use of digital technologies in a Russian university.

2. The statement of the problem: digitalization as an instrument of increasing of global competitiveness of education

The formation of the digital economy affects all spheres of society, including education, and digitalization is one of the most promising tools for improving the economic efficiency of the educational process while maintaining and / or increasing the quality of education.

Economic efficiency in the broad sense can be considered as the ratio of the complex result of the economic process to the costs that the beneficiary, the initiator of this economic process, recorded per unit time, voluntarily and consciously incurred. The results obtained as part of the implementation of the digitalization process of the educational process are presented in figure 1.

The most significant areas of using digital technologies in order to increase the competitiveness of Russian education in the global market are as follows:

- digitalization of communication and marketing channels of both the Russian educational system and its structural elements, as well as individual participants of the educational process from among the teaching staff in order to increase their recognition and ensure maximum commercialization of their scientific and educational potential on competitive terms;

Fig. 1 – The economic result of the process of digitalization of education [1], [2]

- increase in labor productivity and lower operating and organizational costs in the educational process due to its unification and scaling;
- Creation of a barrier-free digital environment, which will ensure increased competition between participants in the educational environment in the national market for educational services and prepare them for participation in global competition without the current protectionist support from the state.

3. Evaluation of the economic effect of the use of digital technologies in the educational process in Russia for 2019.

In the short term, the most significant result of the digitalization of the educational process is the reduction of costs associated with the organization of the educational process. The estimate of the savings due to digitalization is presented in Figure 2. The proposed estimate is based on the authors' timing over a 10-year period of work (83 courses) and surveys of colleagues using digitalization tools in their activities (8 universities, 112 courses).

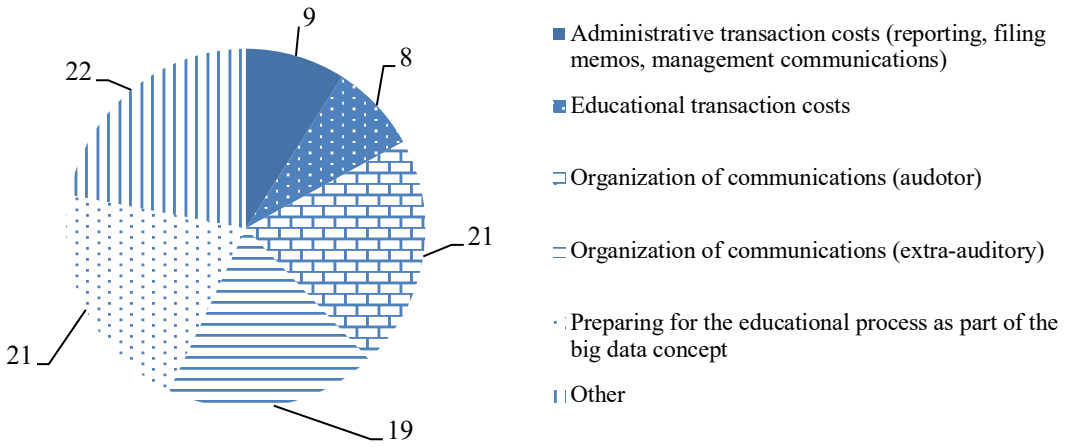

Fig 2. Evaluation of the economic result of the digitalization of the educational process, achieved by saving time, compiled on the basis of timing studies (%)

It should be noted that initially digitalization as a tool to ensure the economic efficiency of the educational process was recognized at the level of the ministry and top management of universities. The subsequent dynamics of the ratios presented in diagram 2 shows that such a setup turned out to be economically viable. The dynamics of increasing the indicators of time-saving of the temporary resource are presented in diagram 3.

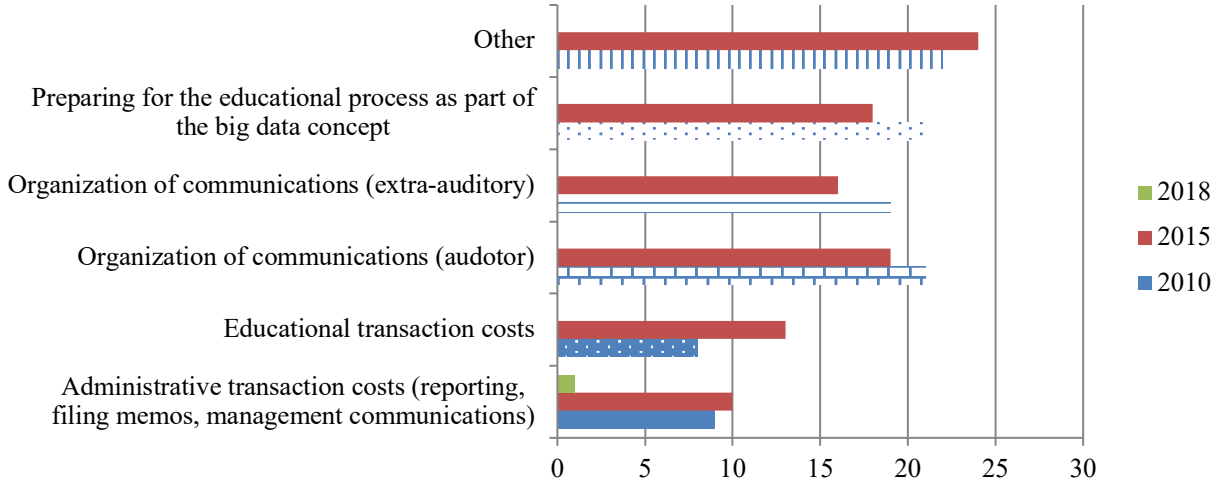

Fig. 3. Dynamics of changes in the structural economic effect of the optimization of the use of the working time fund due to digitalization (built according to the timekeeper method)

Economic assessment of the cost-effectiveness of digitalization of the educational process is provided in table 1. The calculation is carried out in relation to the most relevant digitalization tools from the point of view of the concept of the “economic cross”.

Table 1. Evaluation of the cost-effectiveness of digitalization of the educational process using various tools to develop its competitiveness.

Digitalization tool	Costs per student, per year (₽)	Empirical assessment of the economic result, per 1 student, per year (₽)	An empirical assessment of the economic effect of using a digitalization tool
Providing conditions for remote interaction with students	987	1438	46%
Building a digital integrated knowledge base	1857	2132	108,81%
Promotion of an educational organization in the global market	1012	1876	85,36%
The use of digital technology in traditional educational processes	2135	2213	3,65%
Other, average	1298	2402	85,05%

An analysis of the information presented in Table 1 proves that digitalization is a promising tool for ensuring the global competitiveness of domestic education in the educational market in terms of increasing its economic efficiency. At the same time, it should be noted that without changing the existing economic model of managing, the use of digital technologies in the educational process will provide exclusively savings on the promotion of an existing competitive educational product. With regard to an educational product that does not currently have global competitiveness, the introduction of digital technologies without changing the economic concept of this product will contribute to the formation of a financial reserve for improving such a product, but will not directly increase its competitiveness [3].

From the point of view of ensuring the economic integration of the domestic educational process within the framework of the innovative economic cross, digitalization is used by educational institutions more as a tool for releasing the resources used [4]. Along with this, to ensure the competitiveness of the educational process in the global market, the use of a digitalization reserve as a tool to improve the quality of education is also required, which will inevitably require an increase in costs per student.

4. Development of the concept of an educational product, based on the introduction of digital technologies in the educational process according to the global nuclear market requirements

Consider the concept of an educational product offered by leading Russian universities to the global market on a competitive basis in 2019 and the place of digital technologies in it. The structure of this product is shown in Figure 4.

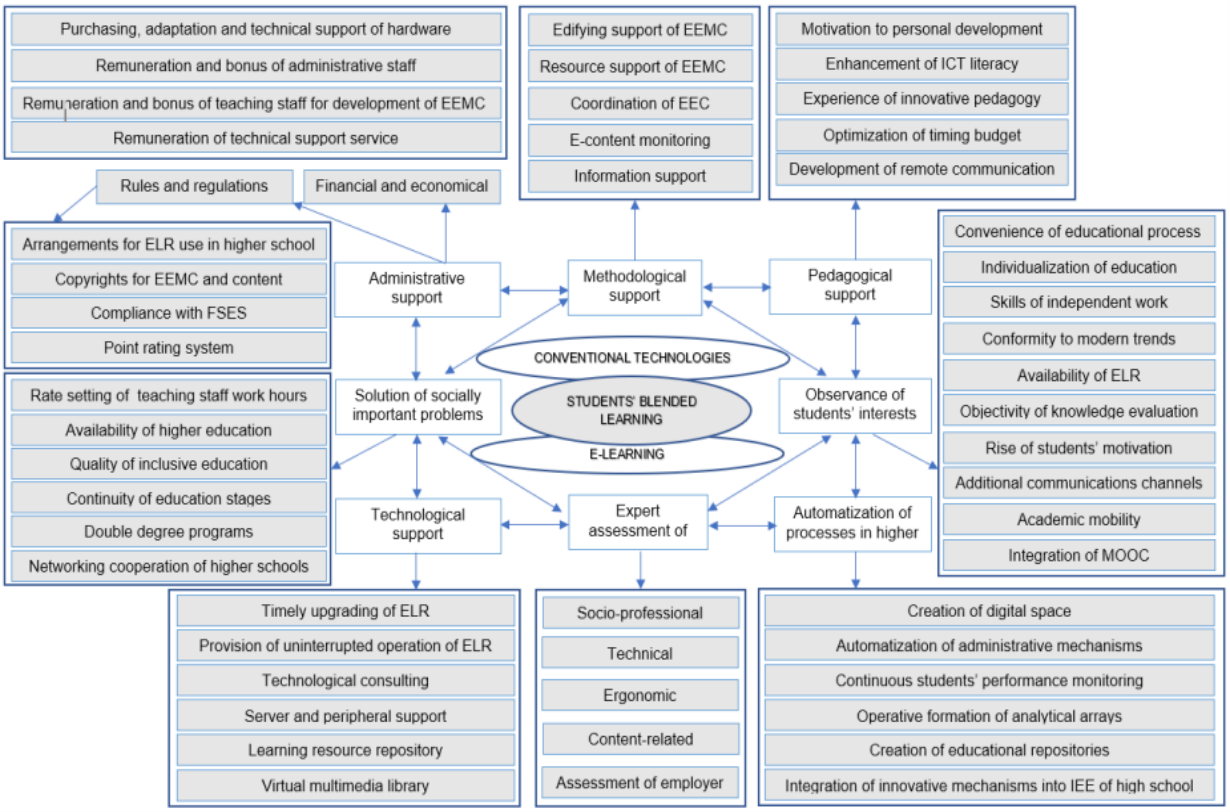

Fig.4 The structure of the educational product, developed according to the competitiveness requirements of the global educational market based on the use of digital technologies [8]

In accordance with the presented concept, the authors conducted a SWOT - analysis of the economic efficiency of using the possibilities of digitalization in an educational product in Russia using digital technologies, the results of which are presented in table 2.

An analysis of this table allows us to draw the following conclusions regarding the current state of the use of digitalization as a tool for developing the competitiveness of Russian universities in the global market:

- The current level of use of IT technologies in the educational process provides the infrastructure basis for the further development of its competitiveness in the global market [5]. To a large extent, the country's leading universities solved the problems of training personnel for working with digital technologies in the format most adapted to work in the global market.
- There is no consolidated approach and a single national educational product. This problem is a consequence of the disunity of the participants in the educational process and a large number of conflicts of interest between potential partners in the formation of an educational product for the global market.

Table 1. Swot - analysis of the economic efficiency of using digital technologies as a tool for promoting the Russian

educational process on the global nuclear market

Strengths:	Weaknesses:
- existence of national infrastructural basis for development; - the personnel core of development has been created; - the presence of internal suppliers of IT products; - significant scientific and educational potential; - Active government support for the digitalization of a commercially significant educational product.	- low motivation of the main part of employees to implement digital technologies in order to create a global product [6]; - conservatism of the educational system; - Insignificant experience in the commercialization of scientific and educational potential in the global nuclear market [7].
Opportunities	Threats
- the potential for creating a combined scientific, educational and industrial product, especially for the BRICS countries; - the presence of emerging niches in the global market, not yet occupied by leading suppliers.	- geopolitical risks; - Consolidation of leading manufacturers of educational products without the participation of Russia; - reputational risks associated with commercially inefficient digitalization of the educational product.

According to the results of the analysis, it can be argued that commercially attractive areas of digitalization of the educational product in 2020 - 2030. from the point of view of its adaptation to the requirements of the global nuclear market are:

- the most prompt translation into digital format of the most significant existing educational product;
- consolidation of efforts on digitalization of communication channels of interaction with both potential customers and partners to create a competitive product [9];
- maximizing the presence of universities in the online sphere [10];
- providing a centralized approach to the digitalization of the educational process on the basis of the leading industry university NRNU MEPhI.

5. Conclusions

Thus, digitalization as an instrument for developing the competitiveness of the national educational system in the global nuclear market has economic attractiveness both in the short and long term. In the short term, the economic result is determined by the potential for saving and creating development funds, in the long term - by the marketing component. At the same time, in order to ensure economic efficiency, it seems promising to consolidate the process of digitalization of education of students oriented to work in the global nuclear market and the development of Rosatom as a participant in the global nuclear market.

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