



Transforming the Criteria of Quality and Efficiency of Higher Education in the Context of Digital Modernization

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Abstract

As both a donor and a recipient of digital technologies in the context of global digital modernization of the economy, a higher educational institution falls into the difficult conditions of the need for competent broadcasting to society of the quality and effectiveness of educational services. The purpose of the work was to determine the compliance of quality criteria and the effectiveness of the activities of universities in Russia with digital modernization processes. The research method was an analysis of these criteria for the activities of Russian universities, which are part of the first and last ten rankings of TOP-100 universities in Russia for 2019 according to Forbes, contained on their official websites, and reports on the results of self-examination. As a result of the study, it was revealed that even the leading universities of the country are far from fully integrated into the implementation of breakthrough areas of digitalization of the educational environment, which, in particular, necessitates a meaningful change in the existing criteria for quality and effectiveness of activities. It is determined that in the conditions of the need to broadcast the results of activities in three key areas (the Ministry of Science and Higher Education of the Russian Federation, consumers of educational services, the business community), the university should respond flexibly to requests from the external environment in terms of the formation of a system of quantitative criteria for quality and efficiency.

Keywords

Digital modernization • Higher education • Quality • Efficiency • Rating • Internal environment • External environment

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1 Introduction

No modern area of activity today manages without the use of digital technologies. Their functions are diverse, and the number of application areas increases every day. Higher education is one of the most sensitive to digital modernization processes. There are several reasons for this:

- The higher educational institution provides training of highly qualified personnel, including the work in the field of digital technologies, which makes it necessary to bring the resource base of the educational institution to certain requirements.
- The university needs to comply with trends taking place in the external environment in the field of using digital technologies to improve the quality of educational services.
- Digital technologies give the university the opportunity to simplify the implementation of many management and educational processes, increase transparency of activities, as well as improve feedback between students and teachers.
- Digital technologies make it possible to establish new, including foreign contacts and provide educational services in the foreign market.

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The peculiarity of each of the above reasons consists of the relationship between the “necessary” requirements, which, in the opinion of the authors, should correspond to the university at the present stage, and the “capabilities” that are provided by the fulfillment of these requirements.

The concept of the Federal Target Program for the Development of Education for 2016–2020 approved in 2014 set the country's universities with tasks that influenced the need for transformation by the last strategic directions of development. Among other things, this affected the formation of an electronic educational environment, which is an important factor in improving the quality of education (Federal Target Program for the Development of Education, 2014). In the context of the formation of national educational systems, the emphasis on information technology has increased even more, since the source of significant changes is recognized not the education system itself, but its related industries (Bakhtizin et al., 2016; Burenina et al., 2018; Vanchukhina et al., 2019). New educational model in Russia—STI university 20.35 (University20.35, 2020). The positioning of the University 20.35 as the flagship in the field of personalization of education based on new digital formats has led to the need for all universities to further focus on the development of digital educational platforms. In this regard, it can be argued that in an era of radical change in education, goals, objectives, results, and, therefore, the criteria for quality and effectiveness of activities must be meaningfully transformed. Thus, the purpose of this work was to study the compliance of the criteria for the quality and effectiveness of the activities of Russian universities with the processes taking place in education in the context of determining how modern universities fit into the breakthrough concept of the University 20.35.

2 Methodology

The research method was an analysis of the criteria for the quality and effectiveness of the activities of Russian universities, which are among the first and last ten best universities in the ranking of TOP-100 universities in Russia for 2019 according to Forbes for their compliance with breakthrough educational models and concepts. Universities are selected by the value of the final score of the indicated rating (Kazmina et al., 2019).

The materials of the study were information contained on the official websites of universities and reports on the results of self-examination. The choice of universities of the first and last ten ratings out of the 100 best universities is due to the need to confirm or refute the following hypothesis: the presence of significant differences between the reflection of the digital modernization processes of high-ranking universities in these sources allows us to talk about the complete

lack of unity on this issue throughout the educational space of the country.

The authors also used the materials from report on the self-examination of the university for 2018: Moscow State Institute of International Relations (University) of the Ministry of Foreign Affairs of the Russian Federation (Moscow State Institute of International Relations (University), 2018) as a basis of this article.

3 Results

There are a huge number of attempts to form a unified system of criteria for the quality and effectiveness of higher educational institutions, which would fully reflect not only the activities of the university itself, but also take into account the realities of time. However, if the criteria of efficiency is now legislated (although efforts are being made by scientists and specialists to change them), then the criteria for the quality of educational services in the field of higher education undergo a constant transformation under the influence of numerous, diverse events, and trends. The classical scientific work to which all researchers of the quality of higher education refer is the work of L. Harvey and D. Green, according to whom quality is “different things for different subjects” (Harvey & Green, 1993). B. Testov argues that the quality of education is nothing more than a “fashionable word” (Testov, 2008) and in order to improve it, it is necessary to improve education as such (Testov, 2008). Back in 2005, Polishchuk and Livni, studying the criteria for the quality of higher education, came to the conclusion that many of the criteria used in practice (for example, the resource availability of the university, the results of testing students and graduates, etc.) “Give an idea of the possibilities of quality education, not allowing us to judge the extent to which these opportunities are realized” (Polishchuk & Livni, 2005). For this reason, the authors recommend using indirect signs of the quality of education, and its necessary condition is “the presentation of sufficiently high requirements for both students and teachers...”, as well as... “A market assessment of a university diploma” (Polishchuk & Livni, 2005). Nevertheless, most often quality refers to the level of conformity of products (services) to the expectations (needs) of the consumer (All Union State Standard, 2014).

It should be noted that for the first time the monitoring of the effectiveness of universities in the Russian Federation was carried out in 2012, and its results made it possible to assign universities the status of effective and ineffective (Yanova & Valdaitseva, 2019). Speaking about the effectiveness of higher education, we will give the opinion of O.N. Smolin that the existing indicators for assessing the effectiveness of higher education institutions do not take into

account their economic, sectoral, and other characteristics (Smolin, 2015). This opinion is not an isolated one and reflects the point of view of many modern specialists in the studied field (Rezakov, 2015), and the experts of the Higher School of Economics note that “the difficult task of assessing the effectiveness of universities partially help to solve ratings” (Krylnikov, 2013). From our point of view, the modern Russian university is in a complex system of ensuring the translation of the criteria of quality and efficiency of its activities into the external environment, the conceptual model of which can be presented as follows (Fig. 1).

In 2020, the Ministry of Science and Higher Education of the Russian Federation approved performance indicators for federal budgetary and autonomous educational institutions of higher education, combined into four groups (Order of the Ministry of Science & Higher Education of the Russian Federation, 2020). For 2012–2020, there was no significant meaningful transformation of indicators, while it should be noted that the threshold values of indicators have changed, as well as a decrease in their number. It is obvious that compact indicator systems are more understandable and easy to collect information and monitor, but their excessive simplification without meaningful change will not allow an overwhelming number of universities to be in line with modern educational trends.

Broadcasting the results of activities to the business community, the university should focus on professional ratings, taking into account industry characteristics, the specifics of educational programs of the educational institution. For example, QS World University Rankings is based on such criteria as academic reputation, employer reputation, student–teacher ratio, ratio of international faculties, ratio of foreign and local students, number of faculty citations (QS World University Rankings, 2020). Times Higher Education World University Rankings includes five groups with 13 indicators: research revenues, revenues from scientific innovation research in industry, income per employee of the

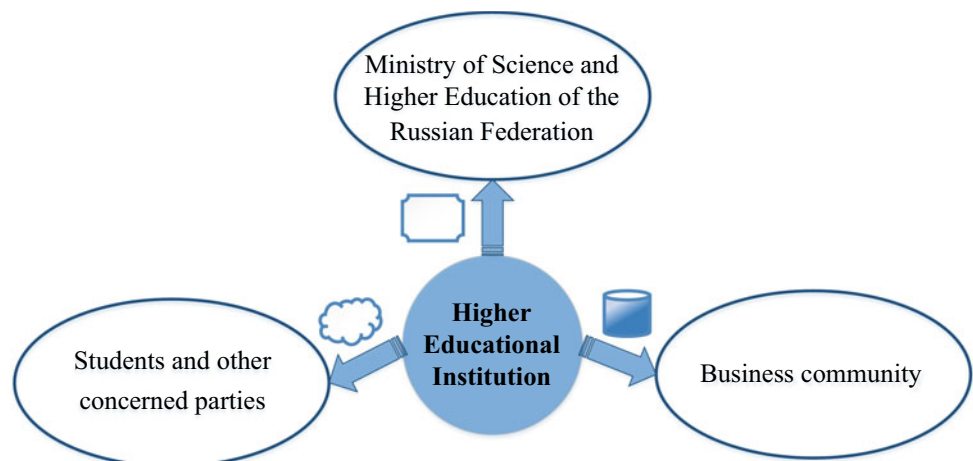
academic environment, normalized average citation per article, etc. (World University Ranking, 2020). Academic Ranking of World Universities is based on such criteria as graduates of an educational institution who have won the Nobel Prize and Fields Medals, employees of an educational institution who have won the Nobel Prize and Fields Medals, the number of highly cited researchers, etc. (Academic Ranking of World Universities, 2019).

In the process of attracting a potential consumer of educational services, the university is forced to position itself in ratings that are understood and available to the general public. Such a rating, in particular, includes the Forbes rating, which includes the following criteria: the quality of education (organization of foreign internships, the number of foreign teachers and foreign students at the university, the amount of teachers’ salaries, etc.); quality (demand) of graduates; Forbes factor (taking into account the elite of the institution); final score (Krylnikov, 2013). The group of indicators of the quality of education is based on monitoring the effectiveness of the Ministry of Science and Higher Education.

The conceptual transformation of the educational environment, the main provisions of which are enshrined in federal documents, has led to an intensification of the process of reorientation of the activities of universities to its digitalization. Moreover, this activity should be poured into the general vector of breakthrough educational areas. The study of the strategic directions of the University 20.35 made it possible to distinguish the following: the development of virtual tutors and mentoring networks; increasing the role of the gaming environment and augmented reality; improvement of online multimedia libraries, multiplayer online courses; building work based on distributed, remote and virtual laboratories and scientific teams; ubiquitous introduction of a personal virtual portfolio, etc.

The analysis of reports on the results of self-examination of leading higher educational institutions of the Russian

Fig. 1 Conceptual model of university translation of quality and efficiency criteria into the external environment. *Source* compiled by the authors



Federation revealed that universities form their own quality systems for training students, but the selection of its external and internal elements is similar. For external assessment of a university belonging to the category of “leading” it is important that educational programs be accredited by international organizations. In terms of external assessment, the experience of the Higher School of Economics seems interesting: almost 5,000 tasks in the online courses of the Higher School of Economics in 2019 passed a psychometric examination (National Research University, 2020). One of the new quality indicators used in the Higher School of Economics is the survival rate of graduates - this is the proportion of students who have completed their studies in the selected educational program within the normative period of the number of applicants to the program. The National Research Nuclear University “MEPhI” has a similar mechanism for assessing the quality of training: the key mechanism for external evaluation is vocational and public (including industry) and international accreditation of educational programs (Report of the National Research Nuclear University Moscow Engineering, 2019).

The study of self-examination reports and other documents made it possible to highlight general and some special characteristics of digital modernization of universities. The following are identified as general characteristics:

1. Availability of electronic information and educational environment.
2. Emphasis on digitalization of the library system, increasing access to foreign library information resources.
3. Introduction of new units into the electronic document management system.
4. An increase in the number of digital education programs, a variety of online courses for applicants, students and graduates, as well as faculty.
5. The focus of scientific and applied work on the study of certain aspects of digital modernization of education.
6. The opening of departments responsible for the development of digital technologies (for example, the Office for Informatization, the Center for Digital Educational Technologies, the Center for the Development of Electronic Educational Resources, etc.).

As opposed to information representation, in terms of the areas of digital modernization of the educational environment, we can talk about some commonality in the universities under consideration. In the activities of individual universities, special characteristics are distinguished that allow them to be positioned as conditional leaders in the field of digital transformations of the educational environment (Table 1).

A study of trends in the quality and efficiency of higher education institutions in the context of digital modernization revealed the following:

- Only 57% of universities provide the general public with results on self-examination for at least 3 years, and this provision does not allow making qualitative conclusions about changes in the content of indicators.
- Universities of the top ten rating, providing information on digital modernization, are guided by high-quality indicators and characteristics.
- It was revealed that the lower the rating line is the university, the more transparent the quantitative information about certain aspects of digital modernization of the educational institution.
- One of the most common criteria that appeared in the self-examination reports of individual universities in 2015–2016 is “the number of electronic courses posted on the educational portal”.
- Only 15% of the total number of studied universities included in 2018–2019 in the self-examination report sections “Online training” or “Informatization of the university”.
- A significant increase in the amount of information about digital educational technologies, distance learning technologies in all studied universities are due to the 2020 coronavirus pandemic.

Therefore, we can talk about a significant differentiation in the information representation of digital modernization processes in universities, the lack of unity on this issue throughout the educational space of the country. In addition, the study of the content of the activities of universities in the conditions of digital modernization indicates the following significant structural distortions: between universities of various categories and between the areas of digitalization within one university. This provision determines the need to supplement the existing criteria for the quality and effectiveness of universities.

4 Conclusion (Recommendations)

Therefore, even the country's leading universities are far from fully integrated into the implementation of breakthrough areas of digitalization of the educational environment. In addition to the need to provide the educational institution with mandatory performance indicators, the university should profitably present itself in the external environment to the potential consumer of educational services and the employer (Fig. 1). In this regard, the expansion of the system of performance indicators of

Table 1 Characteristics of universities—leaders in the field of digital transformations of the educational environment

HEI	Characteristics
Moscow Institute of Physics and Technology	<ul style="list-style-type: none"> – submission of documents in English via the Acceptance Campaign system; – Holding the International Olympiad “OpenDoors” on an IT platform implementing mechanisms for automatic distribution of work for verification by the commission and a model for assessing the achievements of participants (Moscow Institute of Physics & Technology, 2020)
St. Petersburg State University of Railways Emperor Alexander I	implementation of higher education programs using a network form with partner universities (Petersburg State University, 2020)
National Research Nizhny Novgorod State University named after N. I. Lobachevsky	<ul style="list-style-type: none"> – implementation of a full-fledged strategic program “Electronic University” with electronic integration of all internal and external business processes; – development and implementation of a mechanism for automatic determination of the need to introduce restrictions on access to the network on the basis of single accounts of all students (Lobachevsky, 2019)
Russian Economic School	own development—training management system myNES (Russian Economic School, 2019)
NIU “Higher School of Economics”	<ul style="list-style-type: none"> – implementation of the Portal “Remote Keeper”; – placement of courses on global online educational platforms (Coursera); – introduction of the first English-language online magistracy in Russia “Master of Data Science” on the Coursera platform (National Research University, 2020)
St. Petersburg Research Institute of Information Technologies, Mechanics and Optics	<ul style="list-style-type: none"> – ITMO.Expert—professional development program for teachers, researchers, graduate students of ITMO University; – recruitment information system (Petersburg National Research University of Information, 2018)
National Research University of Technology “Moscow Institute of Steel and Alloys”:	in the framework of cooperation with one of the leading online platforms in the world edX online courses are being created in English in specialization areas specialized for the university (National Research Technological University Moscow Institute, 2018)

Source Compiled by the Authors

higher education institutions should be carried out in the context of existing groups. Taking into account the best existing practices in the field of digitalization of the educational environment, the following may be recommended as additional indicators for inclusion in self-examination and monitoring reports:

- in the “quality of education” group:
 - The number of users trained on the educational platform to the total number of registered users, %.
 - Number of registered electronic courses per higher education teaching personnel employee, units/person.
 - Number of electronic courses with active students per one university student, units/person.
 - Provision of electronic training courses for educational programs, %;
- Ratio of the number of own and third-party electronic educational and information resources, %.
- The volume of simultaneous access of students to the electronic educational system, people.
- The presence of separate structural divisions responsible for the development of the digital educational environment, yes / no.
- In the group “international activity”:
 - Number of e-learning courses registered on global e-learning platforms in total e-learning courses, %.
 - Number of electronic training courses registered on Coursera platform, in total number of electronic courses, %.
 - The number of partners with whom digital integration is established, in the total number of university partners, %.

- In the group “scientific activity”
Number of created results of intellectual activity in the field of digital modernization per employee of higher education teaching personnel, units/person;
- In the group “financial activity”
Share of electronic document flow in the general document flow of the university, %.

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