

Russian Universities in Digital Economy: Current State and Trends

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Abstract

Global world economy influences the development of the national economic systems. Under these conditions it is necessary to follow the world tendencies of development connected with economy digitalization. The digital economy proposes new requirements to the skilled personnel eager to work under the digitalization conditions. That means the new demands to the university graduates and to the universities. The article considers the current state of applying information-communication technologies used in Russian universities, and it also highlights the trends of their development in the area of higher education digitalization.

Keywords: digital economy, higher education, information – communication technology, digital education, digital expertise

Introduction

Globalization processes require Russian economy to increase competitiveness in the world market, thereby numerous world rating systems (The IMD World Digital Competitiveness Ranking, Digital evolution index, ICT Development Index) diagnose Russia evident underachievement in the issues of economy digitalization. To improve the disproportions, in 2018 there were developed and adopted the national projects in three directions: “Human capital asset”, “Comfort zone for life”, and “Economical growth”. On the 7th of May 2018 President of Russian Federation V.V. Putin signed an executive order “On National Goals and Strategic Objectives of the Russian Federation through to 2024” determining and approving the national projects of Russia (Putin V.V., 2018). They officially continue national priority projects adopted in 2005 (Putin V.V., 2005)., although some economists and political analysts believe the goals in the projects have not been achieved (Nemtsov B.E., Milov V.S., 2010).

A sphere of education has got a special meaning in the issues of digitalizing Russian economy as it is its foundation, its function is to train staff for all spheres involved in realizing the national projects. Reforming the sphere of education is demonstrated in the direction “Human capital asset” in the federal project “Education”, and the direction “Economical growth” is in the project “Staff for the digital economy”. Every project specifies certain problems; their solutions will allow training skilled personnel under the conditions of the economy digitalization.

Therefore, a list of tasks in project “Education” indicates: developing a contemporary and safe digital educational milieu providing high quality and education accessibility at all types and levels; developing a system of continuous retraining for employees to update their knowledge including training expertise in the field of digital economy.

One of the issues in project “Staff for the digital economy” is to develop the personnel training system designed to train the basics to improve labour efficiency with digital technologies and platform solutions.

The project developers expect that by 2024 there will have been developed a system to support citizens to train the key competences of digital economy and built a successive system of education at all levels including training the skilled personnel meeting the new requirements to the key expertise of digital economy, realizing retraining programmes for professions in-demand under the conditions of digital economy, as well as challenging educational projects.

Under these conditions the universities in Russia have to solve a problem to train personnel able not only to perform certain jobs, but also to adapt themselves to continuously changing conditions of functioning digital economy.

Issues of Digitalizing Higher Education

Despite the gradual transition of education process to the digital format, appearance of new interactive educational technologies, necessity to form new expertise, the contemporary system of higher education cannot substitute the classical fundamental education. However, the list of competences for a graduate is changing by the impact of the environment, appearing digital technologies, changing the value orientation. The challenging demands to the employees’ skills will result in decreasing the share of semiskilled employees, who can replace automation means, software and developing digital technologies. The majority of appearing jobs, despite their applicable nature, are becoming outdated, the development of professional educational programmes to such professions are late, and the training quality does not meet the employers’ expectations concerning the university graduates’ skills.

The specialists working under digital economy conditions should correspond to the following overprofessional demands:

- Digital literacy implies availability of digital competences necessary for efficient using information-communication technologies in the professional activity;
- Motivation to the life-long education should exhibit a desire to get both formal and informal education to improve the qualification in the chosen sphere. The changing conditions to perform jobs require a specialist to master new skills;
- Labor mobility means an ability of employees to master new jobs, a need in such mobility can be caused not by disappearing such jobs only, but an employee’s desire to develop and broaden the sphere of their competences;
- Language fluency determines a professional social circuit necessary to exchange job experience.

For the nearest future the main task of education will be not only to transfer students’ system knowledge in a certain sphere of activity, but they need to train how to use the tools to search necessary information, essential mechanisms to solve the suggested problems independent in their knowledge sphere.

While modernizing education to train skilled personnel under the conditions of digitalizing economy, we can emphasize several issues:

- Organization of project-based training, where the goal of training is to realize a project by the group of students; every participant contributes to the achieved result;
- Necessity to organize a learning process taking into account individual interests of students and to form an individual learning trajectory by them;
- Possibility to study some disciplines or modules in online mode using secure digital educational milieu;
- Participation of employers to determine competences necessary to the graduates to realize professional activities.

To solve the specified problems, the most significant direction becomes IT penetration to the university functioning and the teaching staff needs to learn to use it.

Evaluation of information-communication technologies usage in the sphere of higher education in Russia

To evaluate the readiness of Russian universities and the teaching staff to teach students new professions, we would like to analyze the main indicators characterizing the state and the tendencies of development of the information society in the sphere of higher education. For the last 4 years, there has been an increase in the share of higher education institutions using information-communication technologies in their activity (Fig. 1.).

There could be noticed a double share reduction of universities not using information-communication technologies. There is also an increase in share of universities obtaining their web-site from 78,7% up to 88,6%. However, the situation could not be considered as satisfactory, since the availability of a web-site for the educational establishments is an obligation by legislation in power. Developing digital literacy is impossible without applying computer equipment. According to the statistical data, the authors calculated the students' provision with personal computers (PC) used in the teaching process (Fig. 2).

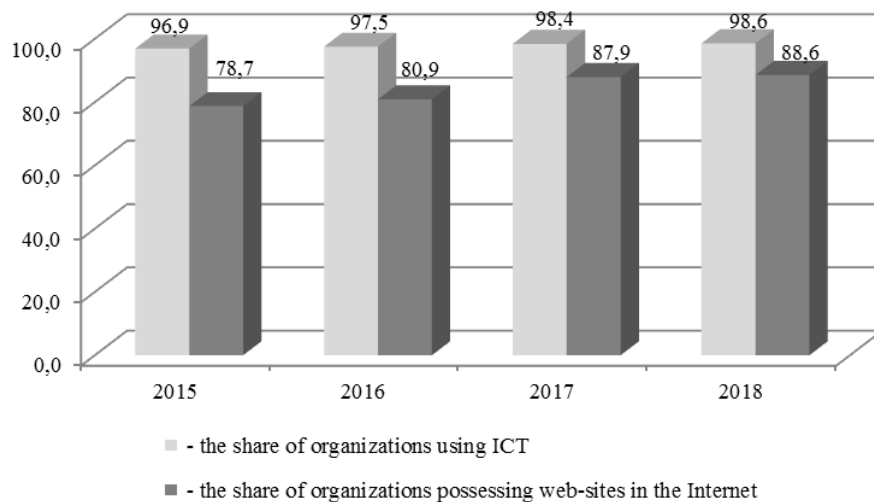


Fig. 1: Dynamics of share of institutions of higher education using information-communication technologies in their activity and possessing web-sites in the Internet, %

Resource: calculated by the authors based on The Results of federal statistical monitoring in No. 3-inform form

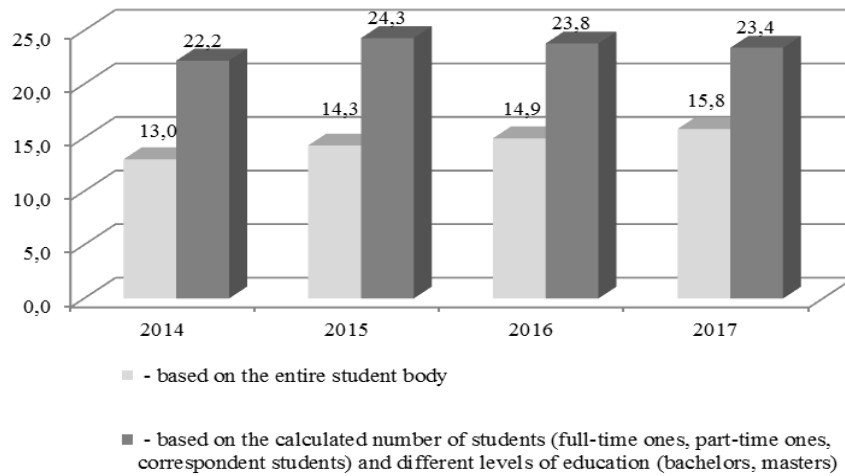


Fig.2: Dynamics of providing students of higher education institutions with personal computers used in the education process, units per 100 students

Resource: calculated by the authors based on the data Education in figures: 2016; Education in figures: 2017; Education in figures: 2018; Education in figures: 2019; Indicators of education: 2018

At first, the dynamics of an indicator calculated for the entire student body demonstrates the increase in providing students with personal computers. However, the detailed analysis of the original statistical data demonstrates the decrease in number of students with simultaneous decrease in PC number used in the educational process. Moreover, PC number decreases for 5,2%, a number of students decreases for 22,1%. The indicator meaning for the calculated number of students considering full-time, part-time and correspondent students fairly presents the provision of the educational process with computing tools. Therefore, the dynamics of this indicator needs to consider as an increase in university readiness to training specialists possessing digital expertise.

Mastering digital expertise is closely connected with developing skills to work with special software. Having studied the data about educational institutions of higher education using specialize software (Fig. 3), we can make several conclusions. The share of such educational establishments changed inconsistently, we should state negative dynamics of the indicator in 2018 comparing with 2017. Consideration of organizations possessing software produced in Russia has occurred since 2017, and this indicator demonstrates negative dynamics.

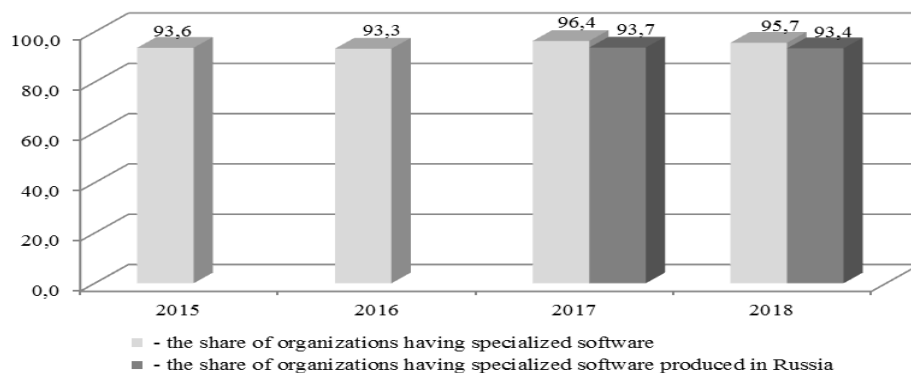


Fig. 3: Dynamics of share of institutions of higher education having specialized software including the ones produced in Russia, %

Resource: calculated by the authors based on the Results of federal statistical monitoring in no. 3-inform form

The necessity to purchase domestic software for universities was required by Russian Legislation obliging state organizations covering the majority of universities to use software produced in Russia. These requirements do not meet the previous successful developing digital expertise, since, to perform labour functions efficiently under the conditions of digital economy, the skilled employees have to use different software allowing them to solve professional problems effectively.

The teaching university staff, realizing professional education programmes of training personnel for the digital economy, should be able to use information-communication technology.

The universities are grouped according to the share of employees using Internet not less than once a week based on the federal statistical monitoring (Fig. 4).

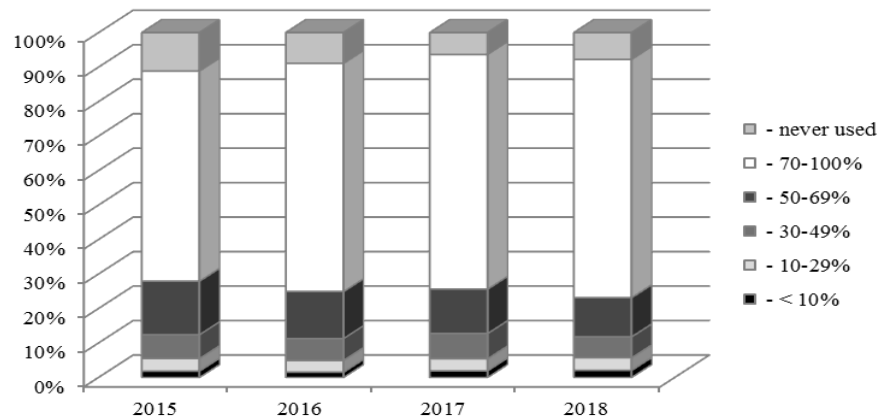


Fig. 4: Dynamics of distributing the institutions of higher education based on the percentage of employees using Internet not less than once a week, %

Resource: calculated by the authors based on the Results of federal statistical monitoring in no. 3-inform form

In the majority of universities the proportion of employees, using the Internet not less than once a week, is not 70%. For 4 years the proportion of such educational institutions has increased from 61% in 2015 up to 69% in 2018. In addition, in 2018 a minute increase (1%) happened in this group of universities. Simultaneously, lately a share of the educational institutions has increased for 1,5%, where the employees do not use the Internet, and also there is a minute increase in the share of universities, where less than 30% of employees uses Internet not less than once a week.

To characterize the level of information support to the universities, there is one more indicator connected with universities' expenses on the information-communication technologies (Table 1).

The sums of money, spent by universities on information-communication technologies for 4 years, were considerably changing. The most expenses in the sphere were in 2017, further it has increased for more than 1,5 times comparing to the previous years. However, in 2018 the expenses for ICT decreased by one third. Typical is the most shares of expenses to purchase computer and office technologies. In 2017 the increase in total expenses associates with high expenses to the services of external organizations and specialists. In addition, this increase is partially explained by relatively low US dollar to rouble in comparison to the previous and next year.

Table 1: Expenses of institutions of higher education to the information and communication technologies, million US dollars

Years	Expenses on information-communication technologies - sum total	including:						
		purchasing office equipment	purchasing telecommunication equipment	purchasing software	service fee for telecommunications	training personnel, connected with developing and using ICT	service fee to external organizations and specialists, connected with ICT (except communication services and training)	other expenses to ICT
2015	220,93	78,98	22,85	36,08	36,00	1,01	34,14	11,86
2016	196,17	69,21	20,81	32,92	30,50	0,71	32,83	9,18
2017	303,64	115,11	22,07	50,79	31,61	0,89	73,97	9,20
2018	206,84	82,96	19,15	34,22	27,80	0,54	32,36	9,82

Resource: calculated by the authors based on the Results of federal statistical monitoring in no. 3-inform form

The Tendencies in Development of Higher Education in Russia under the Conditions of Digital Economy

Realizing federal programmes “Education” and “Staff for the digital economy” will allow the universities to increase the level of information support in training personnel for the digital economy. Implementing the project-based learning will contribute to training graduates an ability to use interdisciplinary relationships allowing knowledge in one sphere to be used in different spheres of activity. Moreover, the key element to develop professional expertise is the availability of the developed metasubject competence implying the capability of team working and mastering new knowledge and skills independently.

Considering students’ individual interests and providing them with an ability to form an individual education trajectory will allow the availability of a wide list of disciplines or modules in the educational programmes. While forming the list, the universities need to follow the competences necessary to be trained as a result of learning disciplines or modules. Applying the competence approach to the results of mastering the professional education programme under the approved federal education standards of the 3-d generation affords to develop any competence with the various sets of disciplines.

The secure digital educational milieu can be formed with using public online courses for the students; the results of the taken courses by the students are accepted by the universities, as the results of the mastered disciplines or modules within their regular education programmes. This will contribute to solving the problem of developing an individual learning trajectory of students.

The problem of non-compliance with employers’ requirements to the skilled employees can be solved for the university graduates based on cooperation of enterprises – employers and universities, in case their common development of the professional education programmes. Currently, this process is regulated at the state level via approval of professional standards developed together by universities and enterprise representatives – employers. Cooperation of enterprises with institutions of higher education directly will reduce the terms for education programme development; the programmes will meet the up-to-date requirements, as well as the cooperation will contribute to adjusting the education programme immediately under the conditions of digital economy.

Conclusion

The impact of digital economy on the system of higher education is undeniable. The government participation in reforming education should be not only in forming and updating regulatory documents in the sphere of digitalization, approving targets, but also in providing conditions allowing institutions of higher education to take immediate and efficient measures aimed at developing students' digital expertise, developing education programmes meeting the up-to-date requirements to the skilled employees under the conditions of digital economy. In addition, the universities have to expand the use of information-communication technologies in the education process, while the universities compete for entrance students and for the allocation financially supported at the expense of federal budget.

References

1. The IMD World Digital Competitiveness Ranking 2018 results [Online]: Retrieved from <https://www.imd.org/wcc/world-competitiveness-center-rankings/world-digital-competitiveness-rankings-2018/>
2. Digital evolution index [Online]: Retrieved from <https://sites.tufts.edu/digitalplanet/tag/digital-evolution-index/>
3. ICT Development Index (IDI) [Online]: Retrieved from <https://www.itu.int/net4/ITU-D/idi/2017/index.html>
4. Putin V.V. Executive Order On National Goals and Strategic Objectives of the Russian Federation through to 2024 [Online]: Retrieved from <http://kremlin.ru/events/president/news/57425>
5. Putin V.V. The list of orders following the session of the Council for the Implementation of Priority National Projects held on 29 November 2005[Online]: Retrieved from <http://www.kremlin.ru/supplement/2561>
6. Nemtsov B.E., Milov V.S. Putin. The results. 10 years: independent expert report [Online]: Retrieved from <https://www.putin-itogi.ru/doklad/#14>
7. The Results of Federal Statistical Monitoring in No. 3-inform form "Data on the use of information and communication technologies and the production of computer technology, software and the provision of services in these areas"
8. Education in figures: 2019: a pocket data book / N.V. Bondarenko, L.M. Gokhberg, N.V. Kovaleva and others; National Research University Higher School of Economics. - M.: Higher School of Economics Publishing House, 2019. – 96 p.
9. Education in figures: 2018: a pocket data book / L.M. Gokhberg, G.G. Kovaleva, N.V. Kovaleva and others; National Research University Higher School of Economics. - M.: Higher School of Economics Publishing House, 2018. – 80p.
10. Education in figures: 2017: a pocket data book / L.M. Gokhberg, G.G. Kovaleva, N.V. Kovaleva and others; National Research University Higher School of Economics. - M.: Higher School of Economics Publishing House, 2017. – 80p.
11. Education in figures: 2016: a pocket data book / L.M. Gokhberg, I.Yu. Zabaturina, G.G. Kovaleva, and others; National Research University Higher School of Economics. - M.: Higher School of Economics Publishing House, 2016. – 80p.
12. Indicators of education: 2018 : a data book / N.V. Bondarenko, L.M. Gokhberg, N.V. Kovaleva and others; National Research University Higher School of Economics. - M.: Higher School of Economics Publishing House, 2018. – 400 p.