

# Modern Digital Educational Environment as a Tool for the Education Development in Russia

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**Abstract**—The digital technologies development contributes to changing the requirements for the formed competence of university graduates. In turn, the increasing spread of online learning contributes to open education in the country. One of the main tasks in the education development is to find ways to capitalize it and increase the demand for graduates. This article reveals the current trends in Russian education in the sphere of innovative technologies application, the use of online educational platforms, as well as the national projects development in this area. In addition, the dynamics of the number of students enrolled in higher education programs, including using distance learning technologies, and the size of the online education market in the Russian Federation were investigated; and the questions of funding lack in this area were raised. The article reveals the significant role of educational startups in China, aimed at the online education development and capable to attract quite a large amount of investment; it also highlights the achievements of the United States and China in this area. A number of perspective changes peculiar to the educational sphere development process during the period of the economy digitalization, including those associated with changes in the content model of the teacher’s work, a dramatic expansion of the university and some others are formulated in the conclusion.

**Keywords**—digital educational environment, education capitalization, online learning

## I. INTRODUCTION

784.5 billion rubles will be spent on the education modernization in the next five years as part of the “Education” national project development in the Russian Federation. One of the national project goals is to enter the top 10 countries in the world in terms of the general education quality. The project implementation period is from January 2019 to the end of 2024. The project includes ten federal projects such as: “Modern School”, “Every Child’s Success”, “Support for Families with Children”, “Digital Educational Environment”, “Teacher of the Future”, “Young Professionals”, “New Opportunities for Everyone”, “Social Activity”, “Education Export”, and “Social Lifts for Everyone”. It determines the main direction of the relevance of the study of education system modernization.

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In general, education is an inertial system, and any changes are very slow and have a delayed effect. In the period of the digital educational environment active development the approach and possibilities of education are changing in general. And along with this, the requirements for the human capital formation are changing. There are many studies in the literature that describe the basic skills needed for employees in modern conditions [1,2].

Thus, the role of routine labor in the labor market is reducing, and the need for personnel with high communication abilities and expert thinking is increasing. To form such a category of personnel, it is necessary to change the approach to educational technologies.

The experience and skills of educational institutions, the professional level of practitioners and graduates, which are unique to non-competitors and cannot be obtained in a short time, form the basis of competitive advantages. In general, a chain of interrelation between competitiveness and competencies can be formed. This chain will have the following form: competences – competitive advantages – competitiveness – competitive potential [3].

## II. METHODS

This article is based on the statistical and comparative methods application. In particular, a detailed analysis of the data characterizing the educational environment of the Russian Federation is presented, including from the perspective of the number of students, the amount of funding, and the online education market size. A comparison of the educational environment and innovations in this area current state in a number of countries is also made.

As part of the study of the main trends in the field of education in the Russian Federation, we analyzed the main directions of the “Education” national project implementation. We are primarily interested in trends of higher education. Today students have the opportunity to master individual courses, disciplines (modules), including online courses, using the resources of other organizations engaged in educational activities, including universities that ensure the students training quality compliance with the world level. But this trend is limited by the fact that it is not common in all universities of Russia. Within the framework of the project it is planned to bring this level to 20% by the

end of 2024.

The next problem of higher education is the human potential weak capitalization that is primarily related to the education underfunding relative to the level of other countries that ultimately leads to the lag of domestic education from rapidly changing demands from the economy.

Today, despite the leading position in the world in terms of professional education, Russia is funding 3.5% of GDP for education that is one and a half times less than the share of funds allocated for these purposes in developed countries – 5.2% of GDP.

Digital technologies have led to the formation of a new information ecosystem with completely new parameters. Information shortage was replaced by its accessibility for everyone; information control functions were redistributed, machines began to provide more and more opportunities, and the ways people interact with these machines, information, and with each other have undergone significant changes [4].

As a rule, employees of higher educational institutions concentrate only on what is called “teaching universities”, in other words, exclusively on teaching. The vast majority of lecturers are not engaged in research or development of any projects. This acts as a fundamental reason that educational organizations of higher education have very little influence on the innovative development of industries and regions.

In the Russian Federation there is a tendency to reduce the number of higher educational institutions; thus, according to the State Statistics Federal Service, in 2017 the number of educational institutions of higher education and scientific organizations engaged in educational activities was 766, and in 2018 – only 742 that is 3.1% less. In 2017, in relation to the previous 2016, this indicator also decreased. The tendency to reduce the number of organizations carrying out educational activities due to the consolidation (incorporation) is associated with the process of improving the educational system and increasing the efficiency and performance of such organizations in order to optimize the budget expenditures for education.

On the contrary, the number of applicants is growing; thus in 2018 0.5% more students entered the higher education programs, namely 1,147,900 students in 2018 against 1,142,000 students in 2017. In addition, there is an increase in the number of students receiving education using distance learning technologies based on the use of computers and a telecommunications network (from 10.2% in 2017 to 11.3% in 2018).

In addition to the lag in the educational sphere financing, as it was noted above, the lag in innovation and development is extremely important. Financing in this area per student shows a lag of about 10 times, compared with educational institutions in the countries that are part of the Organization for Economic Co-operation and Development (OECD).

The educational system is a link that is capable of ensuring a gradual and confident transition of society into the digital age. The digitalization process is associated with an information boom, since the amount of available (and potentially useful) information will increase many times over. This growth determines the appearance of a cognitive challenge, since it requires a constant search and selection of relevant and interesting content, high processing speeds. Currently, there are few studies on the impact of this civilization trend on a person, but it is obvious that the ways of interacting with the information on which the current educational system is based will undergo serious changes. These changes will affect both cognitive skills and culture in general.

In 2012 Coursera, Udacity and EdX platforms were formed on the basis of American universities that became the first commercial platforms for Massive open online courses (MOOC).

The practice of online courses and blended learning (when online courses are accompanied by seminars and consultations on the ground, and control is carried out in full-time format) creates an almost unlimited field of opportunities in the educational sphere. It forms the prerequisites for the growth of the education quality literally for every person, regardless of where exactly he/she lives and learns, and also what his/her interests and opportunities are. These changes will require qualitatively new qualifications from teachers and managers. But they will create unprecedented incentives and opportunities for young teachers or specialists from other fields who choose the teaching professions for themselves. In this situation the field of education is likely to become one of the most prestigious and attractive areas of work and career.

In higher education the main type of digital technology is mass online courses (including blended learning based on them, combining online and offline formats). Another important tool is digital educational-methodical complexes that simulate complex processes and teach behavior in the framework of these processes, including those based on strategic games. The costs of their development and updating amount to 20-30 billion rubles per year, and the effect is many times higher.

Today in Russia the commercial educational market is practically not formed. There are only several large private providers specializing in this sector. Large corporations sometimes show an interest in the education development and even invest in it, but these projects are not commercial, but charitable or marketing, and do not claim to be sustainable. There is a number of interesting initiatives (for example, the projects of “Netology-group” or SkyEng that are included in the top 20 most expensive RuNet companies according to Forbes), but the market space and its volumes are very small compared to the competing countries. Most market participants do not have their own resources to invest in promising technologies and even in promising resources and services based on existing technologies. However in other countries, and not only in the rich ones,

this market is actively developing. For example, in India the EdTech market volume was 247 million dollars and covered 1.6 million users back in 2016. According to forecasts, by 2021 this market will amount to 1,960 million dollars with coverage of 9.6 million people. Globally, the online education market plays a special role. Its volume in 2015 was estimated at 165 billion dollars that is 3% of the education market total volume. According to Global Market Insights forecasts, the growth of this segment will be extremely dynamic and by 2023 will overcome the mark of 240 billion dollars, adding more than 5% annually. According to more optimistic forecasts, this figure will be reached by 2020 with an average annual increase of 17% (EdTechXGlobal, IBIS Capital). Half of the global online education market belongs to companies from the United States; Asia is in the second place (mainly represented by China and Korea). Consumption and production of services in the online education field in Asia is three times faster than the average in the world [5].

According to the “Research of the Russian Market of Online Education and Educational Technologies” [6], the volume of the educational services market in Russia was 1.8 trillion rubles (about 27.5 billion dollars) in 2016, and by 2021 it should reach 2 trillion rubles (about 31 billion dollars). In 2016 only 1.1% (20.7 billion rubles) of the educational services market was accounted for by online education; and in 2021 this indicator is expected to increase by almost 2.5 times. At the same time, the largest share (10.9%) of the online education market total volume is occupied by additional professional education, 10.7% is formed by language education, 6.8% is provided by additional school education, and only 4.4% of the online education market volume is accounted for by higher education.

Educational startups created in China have already made 270 transactions for the first half of 2018. The total investment volume that they received reaches 2.22 billion dollars. For comparison, last year investments in Chinese EdTech startups totaled 2.28 billion dollars with 251 transactions.

School education and English set financial records – these are the areas that attract the main attention of investors. Startups for schools collected a total of 838 million dollars. Projects for learning English received 482 million dollars. On the 17zuoye Chinese platform schoolchildren, their parents and teachers jointly do their homework in English and Math online. The platform is used by seven million schoolchildren and 146 thousand teachers. The 17zuoye company has existed since 2011; during its existence it attracted investments in the amount of 200 million dollars [7].

### III. RESULTS

Coursera compared the results of training on the platform of 80 thousand Russian and 3 million students from around the world. For the analysis they took the three most popular areas: business, information technology and

data science. It turned out that students from Russia know the statistics best, have a good knowledge of data analysis and are traditionally strong in technical fundamental disciplines. But business skills are far from great.

The analysis results are presented in percentiles. The higher the percentile index, the higher the skill level of the Russian student. For example, Russian students have one of the highest levels of operating skills with the databases – 97 percentiles. It means that students from Russia study more successfully than 97% of all students analyzed on the platform. The zone of low values is located up to the 25<sup>th</sup> percentile. The zone of average values is between the 25<sup>th</sup> to the 50<sup>th</sup> percentile. The zone of high values is up to the 75<sup>th</sup>, and the zone of the highest values is up to the hundredth percentile.

The level of operating with databases was the highest among Russian students (97 percentiles). Also in the zone of the highest values are skills in managing operating systems (91 percentiles), designing IT security solutions (86 percentiles), developing software (85 percentiles), and human-machine interface (58 percentiles). The skill of working with computer networks (39 percentiles) is less developed than that of users from other countries and lies in the zone of average values.

Russian online students are at the highest level in statistics and mathematics: 100 percentiles (for statistics) and 85 (for mathematics). But machine learning, one of the most popular subjects among Russian students, falls into the zone of average values – 32 percentiles. Skills in such application areas as statistical programming (32 percentiles) and data visualization (27 percentiles) are on the border of medium and low values. And data management (6 percentiles) is generally in the zone of low values.

Business skills of Russian students are lower than in the world. Communications (24 percentiles), management (24 percentiles), finance (35 percentiles) and marketing are in the zone of low and average values. Accounting (21 percentiles) and sales (13 percentiles) also indicate a zone of low values [8].

Summing up, it should be noted that a number of promising changes can be traced in the educational sphere development, namely:

- The introduction of online courses in basic disciplines and the replacement of one-third to one-half courses. The purpose of this direction is not to replace the lecturer, but to increase the level of mastering the material. After working online, offline learning will be more lively and interesting for both parties.

- The dramatic expansion of the university. Now there are about 40,000 offline students and 1 million online ones. Income from online students now is about tens of millions of rubles, there will be hundreds of them. However it will not be the second budget, this is an addition to the existing economic model.

- Changes in the content model of the teacher’s work. If

a teacher has 20,000 students and 200 teachers-assistants, it changes the very behavior of the teacher. The author of the online course is overgrown with assistants, teachers and students as well as it happens with the university and the departments now.

- Savings on the generation of tasks and their check using new technologies.

#### IV. CONCLUSION

A new information ecosystem formation requires a rethinking of our approach to higher education. The high level skills necessary for society cannot be effectively developed within the framework of traditional teaching models that are based on the material reproduction from teacher to student. So far massive open online courses have been focused on business models that provide partner universities with tools for “disruption” in the lower price segment and in the new market; however, MOOCs have a “disruptive” potential that is capable of creating new approaches to learning and teaching, designed to develop the skills needed by students around the world. Instead of focusing on “disruption” only the business models of the educational sector, we should use the “disruptive” potential of the MOOC to truly transform the learning system. They should be forerunners of a new educational ecosystem. If we do not take advantage of this opportunity, then we and subsequent generations will be doomed to exist in a steadily aging educational environment.

The e-learning implementation in the digital educational environment as a kind of distance learning allowed for a flexible system of training organization, interaction and cooperation of participants in the educational process, the use of the whole variety of electronic resources, products and didactic electronic means, in rethinking the content, technology and general organization of the educational process using digital electronic educational resources and learning tools. Information technology training at the university on the basis of e-learning using the digital

educational environment will contribute to the active introduction of innovative educational technologies, the mastery of scientific and technological knowledge and the basics of creating an information educational environment.

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