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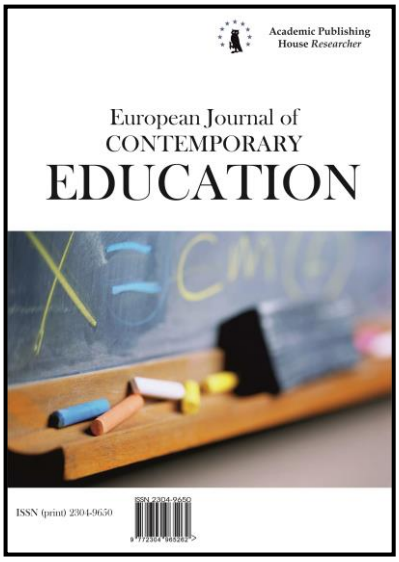

Present-Day Challenges to an Education System

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Abstract

The development of the information society is giving rise to new challenges to and new requirements for education. The challenges, most importantly, include various structural and institutional changes, which are setting new goals and objectives before the Russian education system, the most significant of these being the creation of a single, all-Russian, educational space, improvement of the quality of education, development of the nurturing component of the educational process, and coordination of the content-related foundations.

The current process of innovative modernization is helping ensure competitive advantage for the Russian school system amid the challenges of the 21st century information era, where education, as an open system, develops the student not as someone who is a passive learner but as an individual with a proactive stance toward the development of their competencies. Just about any educational organization is making today a wide use of various innovative resources in the educational process, including a school website, an electronic grade book, and others. The development of the Moscow Electronic School project is helping ensure today the high-quality conduct of classes in just about any school.

This paper examines some of the key trends in the development of Moscow's education system in the mid-term horizon, analyzes some of the key methods for implementing in Moscow a set of laws and regulations adopted at the federal level in the early 2010s, and describes some of the key mechanisms underlying and outcomes of the changes in Moscow's education system which have taken place over the last few decades, based on which the authors identified a set of universal approaches that could be implemented in the education systems of major Russian cities. The authors also identified a set of possible challenges of the modern period based on an analysis of existing trends in the development of technology and changes in the educational needs of society and formulated a set of key considerations regarding the development of Moscow's education system in the mid-term horizon. The paper describes several digital technologies and platforms

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currently employed in the sphere of education that are cutting-edge information systems designed for the development of digital educational processes.

Keywords: education system, education in Moscow, strategy for education.

1. Introduction

The key strategic areas for the development of education in Russia for the period through to 2025 have been formulated based on the key professional areas for the development of its labor market. There are a whole set of statutory documents that chart the course for the country's future development, including Federal Law No. 273-FZ 'On Education in the Russian Federation' of December 29, 2012 (Ob obrazovanii…), Decree of the President of the Russian Federation No. 642 'On the Strategy for the Scientific-Technological Development of the Russian Federation' of December 1, 2016 (O strategii…), Decree of the President of the Russian Federation No. 208 'On the Strategy for Economic Security in the Russian Federation for the Period through to 2030' of May 13, 2017 (O Strategii ekonomicheskoi bezopasnosti…), Resolution of the Government of the Russian Federation No. 2039-r 'On Adopting the Strategy for Enhancing Financial Literacy in the Russian Federation for the Period 2017–2023' of September 25, 2017 (Ob utverzhdenii Strategii…), and 'A Concept on the Spiritual-Moral Development and Nurturing of the Personality of Russian Citizens' (Kontseptsiya dukhovno-nravstvennogo…).

Issues related to the development of education have been the subject of wide discussion in the scholarly community since the early 1990s. Researchers have explored various aspects of past and current transformations in the area. Attempts have been made to determine the orientation of the reform vector and forecast its effects. Transformations undertaken across the education system have been explored by E.D. Dneprov (Dneprov, 2012). Scholar V.P. Chudnov examines the condition of Russia's education system and discusses the progress of the transformations in his work 'Russian Education: Its History and Current State' (Chudnov, 2013).

Attempts to analyze the first few years' outcomes of Russia's education reform have been made in a monograph by V.M. Brainin (Brainin, 2015). V.A. Kapranova has made a number of attempts to make the case for the need to orient the Russian education system to the standards practiced in Europe and the US (Kapranova, 2016). V.M. Mel'nichuk has given an expert assessment to the education system in her article 'The Traditional Imperative and the Innovation Paradigm in the Context of Higher Education' (Mel'nichuk, 2016). The Higher School of Economics and the Center for Strategic Research have published a report featuring 12 strategic solutions for novel education (Dvenadtsat' reshenii…, 2018). A work by I.M. Remorenko (Remorenko, 2017) discusses several tools for regulating education. Yu.M. Gruzina and I.A. Firsova note in their work that stimulating youth engagement in science is a priority amid the development of the digital society (Gruzina, Firsova, 2018).

Any reform undertaken to help develop the education system is expected to optimize it by reference to the concrete-historical and social-situational priorities set at each stage in the development of society.

The scholarly community is divided as to the number of reforms undertaken in the area of education in Russia and the time periods in which they were undertaken. For instance, A.M. Novikov believes that there have been no more than six educational reforms in Russia – between 1957 and 1992, while the figure suggested by E.D. Dneprov and V.I. Strazhev is five. Of definite interest is the take on reforms in the area of education offered by B.L. Wolfson, who drew the attention of the scholarly community to the fact that the last few decades have been characterized by education reforms being undertaken all over the world: "The whole world has been "hit" with a "reform epidemic". Reforms to education never start with a clean slate – each nation has its own history of undertaking education reforms. Failure to learn the lessons of the past is fraught with serious consequences" (Kapranova, 2016). The interplay between the secondary, vocational, or higher education systems and society appears to be a dual process that is accompanied by greater acquisition and assimilation of knowledge, has at its heart a need to upgrade knowledge, results in significant changes in the structure of employment, and leads to a need for new qualifications and competencies. These processes will only gain traction, resulting in the need to overhaul and regularly upgrade the disciplines taught and the actual curricula. As a consequence, institutions that will be at advantage are educational organizations that will be

capable of anticipating coming socio-economic changes in society, conducting internal audits, reacting in a timely manner to those changes, and offering highly innovative educational services.

"In today's world, education is being developed in a climate of intense confrontation between traditions and innovations. Education reforms are multi-aspect (structural rebuilding of the links within the education system, modernization of the content of education, and modernization of the education subsystems).

Although the orientation of education reforms, priorities in them, and ways to carry them out are determined by the specific conditions in each country, there are invariant aspects of education reforms that reflect a set of common objectives set before the national education systems.

The success of any education reform is ultimately determined by the involvement and coordinated efforts of all the interested parties (developers of the reform, departmental managers, researchers, the pedagogical community, parents, students, and the general public)" (Kapranova, 2016).

In the context of what was said above, it may be worth drawing upon some statistical data attesting to the influence of global trends on the state of present-day education in order to identify and assess some of the key challenges that the Russian education system may face in the future.

One such trend is the digitalization of society all over the world, which is going to have an effect on the structure of the present-day labor market and may result in the elimination of as many as 25 % of all jobs after 2020 (BAIN & Company, 2020). This, in turn, may have an effect on the content of educational competencies. Among the skills expected to be sought after the most by employers in the future are the following supra-vocational skills:

– multilingualism and multiculturalism;
– skills of interdisciplinary communication, founded on an understanding of technologies and processes in various sectors;
– consumer-based marketing skills;
– project and process management skills;
– multitasking and time management skills;
– command of information technology;
– teambuilding;
– systems thinking;
– ability to optimize the business processes of each staff member;
– being client-oriented;
– environmental thinking (Skolkovo, 2020).

School education is the primary stage of a person's socialization process. This is where they can master a set of skills that, having undergone further development as part of higher education, will turn into competencies sought after by prospective employers.

Digitalization is actively making its way into school, vocational, and higher education, with the use of virtual and cloud technology in education, online courses, and electronic textbooks becoming increasingly common nowadays. The trend toward greater use of digital technology is reflected in the significant increase in its volume and the increased focus on streamlining the spectrum of educational services offered by institutions of learning (U rossiyan obnaruzhili…).

However, it appears to be logical to consider the trend toward the digitalization of school education in company with trends associated with the development of social relations, the latter tending to be of a negative nature.

Today, one is witnessing growing social tensions and inequality in society amid a redistribution of income in favor of highly skilled, sought-after talent. There is stiffening competition among cities for human capital. The above trends are affecting the level of graduates of institutions of vocational and higher learning who, on account of their financial circumstances, end up being educated in educational institutions with subpar academics.

A 2017 study by The Boston Consulting Group (BCG) helped identify the following trend: over 80 % of Russia's employable population do not have today the skills and competencies required for work in today's marketplace (the study engaged 22 companies with a combined workforce of over 3.5 million) (Strategiya razvitiya…). What follows from this is that there is a need to foster cutting-edge digital competencies in the workforce. This involves certain difficulties, as mastering a profession is viewed from a standpoint of fostering a set of competencies that are elastic and creative, which is a key condition for being vocationally mobile and being able to

continually enhance one's vocational skills in a climate of digitalization and continued social changes. The above may lead one to suggest that the issue of achieving effective mastery of key competencies in the systems of vocational and higher education could be resolved via network interaction among educational organizations, as this approach can help ensure the further development of the intellectual potential of learners with a wide range of sought-after competencies and enable the use of those competencies in practice in the future. So what needs to be done to enable network interaction among different-level educational institutions?

In the authors' view, strategic areas for the development of education should be founded on the following suggestions:

– each learner's educational path should be built and assessed based on their "digital traces" and competencies gained;

– information should be obtained primarily through an online format;

– methodological support for the learning process should be built based on the use of practice-oriented technology, including exercisers and simulators, with a focus on less classroom work;

– there is a need for the global certification of educational programs by employers;

– the system of assessing learner achievements should be based on the blockchain principle*;

– network interaction should be built on a vertical basis (school – community college – institution of higher learning) and a horizontal basis (network interaction among same-level educational institutions).

As noted by a number of officials in charge of educational clusters, educational organizations in Moscow have developed a number of both horizontal and vertical mechanisms aimed at achieving real and practical results and built based on the three 'I's': integration, intensity, and innovation. However, under conditions of the new multitier, differentiated economic paradigm that is being put in place across Russia's constituent regions, there is a need to make as much use as possible of synergy effects in order to modify existing educational models and technologies.

2. Materials and methods

High-quality education is a key to success in competition among metropolises. The government's projected image of the future education system is that of one having the conditions necessary to ensure the future competitiveness of graduates in the labor market, and its current strategy sets the objective of harmonious and integral development of the education system in the Russian capital over the next 10 years, as part of fulfilling a social mandate. Seen as central to resolving the objectives for the development of the capital's education system are the following principles: promoting lifelong education; promoting practice-oriented learning; integrating formal and non-formal education to help develop talents through the creation of the best conditions and opportunities for each learner; promoting the development of one's cultural identity as part of the urban community; promoting a more open socio-cultural environment for the preparation of graduates who will be sought-after by employers; promoting the consolidation of urban communities (Strategiya razvitiya…). Among the key organizational mechanisms underpinning the implementation of the Strategy today are the following:

1) There is the Moscow Electronic School (MESh) project, which provides a platform that offers electronic learning materials and an information system that accumulates learners' "digital traces", which makes it possible to create unique mechanisms for building the learning process (e.g., the use of new pedagogical thinking for the administration of decision-making processes based on analysis of learners' "digital traces").

2) There is the system of personalized learning paths in open teams (POTOK), proposed by A.B. Molotkov, whereby a tailored learning process will be developed for each individual learner based on their choice of disciplines to study. The learner will be able to build an individual learning path of their own, which will be multi-vector and will consist of a core part and an optional part (subjects that are not part of the core curriculum). It will also provide a vector for the development of soft skills, with a focus on developing, fostering, and enhancing personal skills and social

* Blockchain technology involves the use of a decentralized and distributed digital ledger consisting of records called blocks that is used to record transactions across many computers so that any involved block cannot be altered retroactively, without the alteration of all subsequent blocks.

attitudes. Thus, supplementary education will cease to be "additional" and will become an indispensable practice-oriented part of core education. This mechanism will help expand basic education by enriching it with what is academically best for the learner.

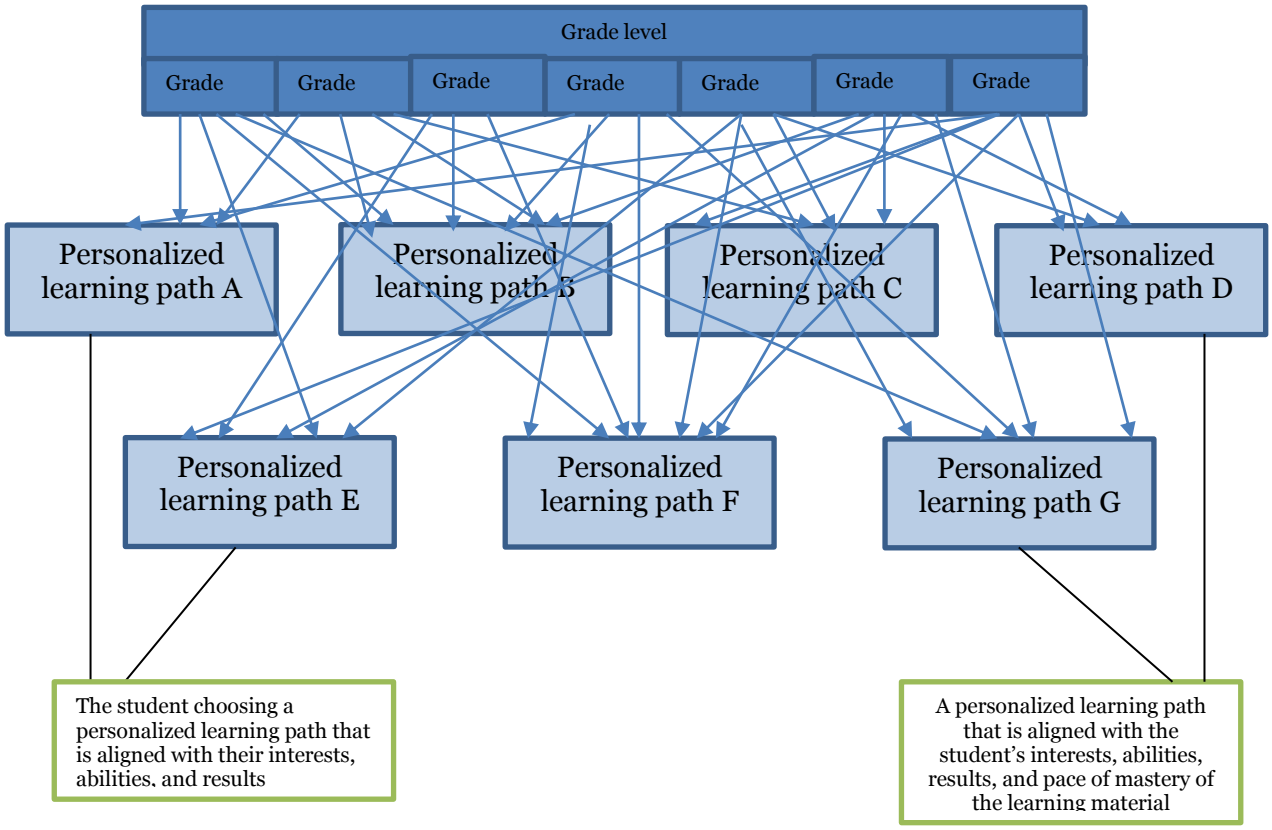

Fig. 1. Diagram illustrating the Personalized Learning Path in Open Teams (POTOK) mechanism (Molotkov, Chernobai, 2015).

The POTOK mechanism will make it possible to take account of learner results and form POTOK groups for each class for large numbers of students. POTOK group classes of this kind can be conducted both at educational institutions and at any culture and science organizations. POTOK is designed to help foster in students the skills of self-learning, self-development, and self-advancement along a learning path of their own design.

3) The Moscow Electronic School mechanism may be considered in the context of the Regional Educational Testing System (ROST). A negative consideration is that currently learners' extracurricular achievements are not recorded in their diploma. However, there are quite many examples reflecting the successful development of prevocational skills and harmonious personal development via non-formal education. There appears to be a need to develop a uniform system for assessing the achievements of learners pursuing non-formal education for all organizations to follow.

In terms of technology for this process, it may be possible to implement special Ministry of Education-certified educational programs by way of a global ROST system. The scheme of operation of the ROST mechanism, which is based on deductive logic, will make it possible to obtain and summarize information on the development and achievements of learners. This system will help ensure the priority-based development of learners, with a focus on taking into account their individuality and helping them make the right decisions about which path may be best for them.

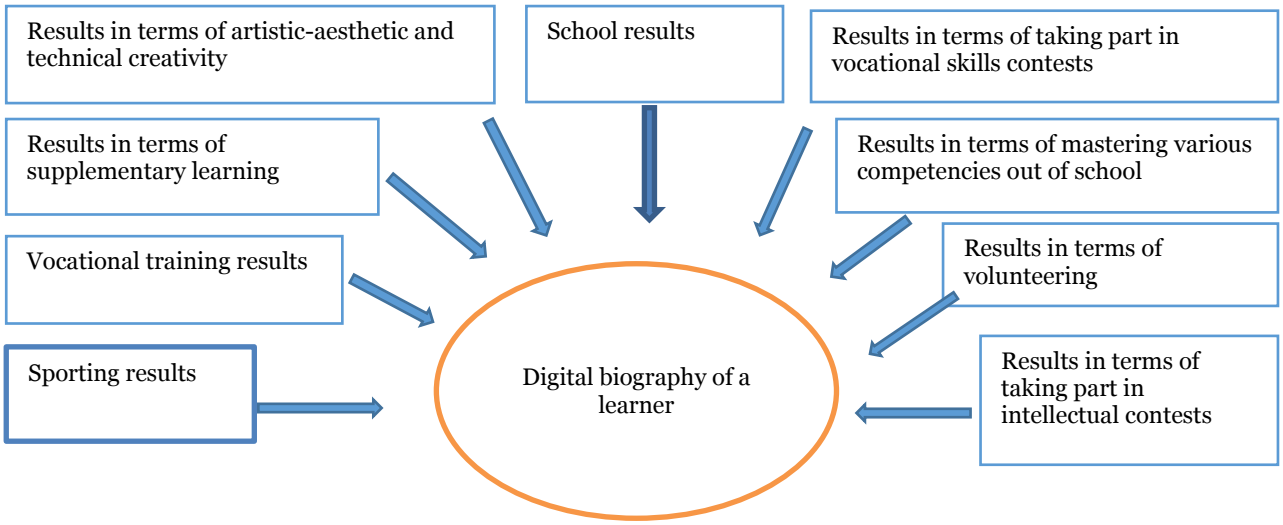

Fig. 2. Diagram illustrating the Regional Educational Testing System (ROST).
Produced by the authors.

In this context, there is a need to reconsider the system of prevocational education and understand that academic disciplines can no longer remain the same – they ought to increasingly become practice-oriented, with a focus on anticipating the direction of the development of the capital's economy in the 21st century and its demand for various types of workforce. This will require major upgrades to key subject disciplines, with a focus on laying the groundwork for independent practical activity with a view to helping achieve real objectives in a digital economy. Given the logic underlying the new concept on organizing the learning process, there will be major transformations to the schools' educational environment, with these changes expected to have a particular effect on the education of senior high school students (grades 8 to 11). It will provide a benchmark for the development of all levels of school education and will help students make a more informed choice of occupation.

The current ranking system appears to be motivating the capital's general education institutions to respond to the new needs of society as promptly as possible. Quite possibly, certain educational establishments have sought to anticipate the needs of society, bearing in mind the absolute priority of the needs and interests of a developing individual and the need to create all appropriate conditions for the abilities and potential of talented learners to be developed to the fullest extent possible (Strategiya razvitiya...). One of the new motivating criteria in the ranking system is the coefficient described below. This coefficient reflects the change in score from last year.

For each school, a separate school coefficient is computed:

$C_s = (S_c / S_l) * k_r$, where

Cs is the coefficient computed for each school under a particular Interdistrict Council of Principals (MRSD);

S_c is a school's total ranking points for the current year;

S_l is a school's total ranking points for the last year;

c_r is the correcting coefficient which factors in the place in last year's rankings (employed if the S_c/S_l ratio is greater than or equal to one):

$c_r = 1$ – for schools placed first to 50th;

$c_r = 1.1$ – for schools placed 51st to 100th;

$c_r = 1.2$ – for schools placed 101st to 200th;

$c_r = 1.3$ – for schools placed 201st to 300th;

$c_r = 1.4$ – for schools placed 301st to 450th;

$c_r = 1.5$ – for schools placed 451st and below.

For an MRSD consisting of n schools, the MRSD coefficient is computed:

$C_{MRSD} = c_{s1}*c_{s2}*c_{s3}*...*c_{sn-1}*c_{sn}$.

Each school's score is multiplied by the MRSD coefficient.

This system encourages less successful schools to perform better, helping make their contribution to the overall success of the MRSD more significant. On the other hand, it motivates

successful schools to provide some support to their less successful counterparts under the MRSD, as greater figures for each individual school mean a greater total coefficient for the entire MRSD. Figure 3 displays the planned measurable indicators.

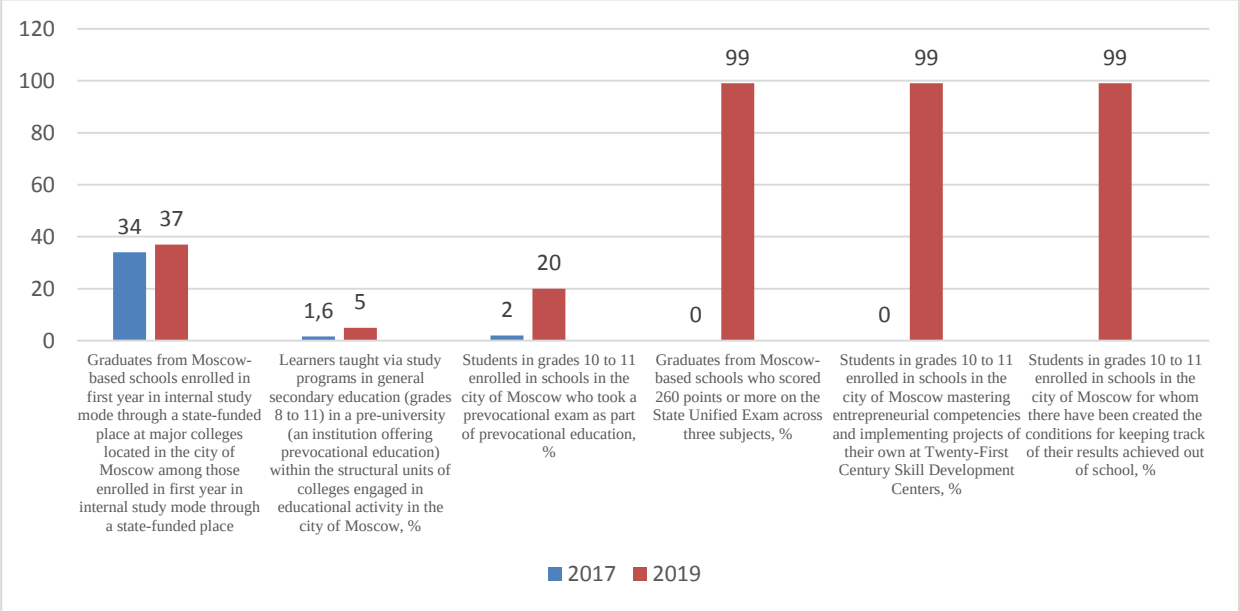

Fig. 3. Performance in terms of implementing the Strategy for the Development of Education in the City of Moscow for the Period through to 2025. Produced by the authors based on data from a source (Strategiya razvitiya…)

In today's climate of digitalization transforming the economy and society, the role of the teacher is becoming increasingly important in the educational process. The teacher is performing a variety of functions nowadays: a motivator, a guide, an integrator, a nurturer, etc. In this context, the question arises as to how to build a teaching workforce with new competencies. Here are a few suggestions on how this can be done: 1) attract professionals from other sectors into the education sector; 2) identify leaders through specialized contests and Olympiads for teachers; 3) provide retraining and advanced training as a way to remediate the deficiencies in teaching that the instructor is aware of. A key objective in this respect is to form in each educational organization a 20–25-percent pool of transformation leaders, who will be setting an example for their fellow teachers and helping foster an atmosphere of healthy competition.

3. Results

The changes in the education system of the city of Moscow that have taken place since 2010 may be nominally divided into statistical, socio-pedagogical, and economic changes. The statistical changes are illustrated by the following figures. In the 2017–2018 school year, preschool, secondary, and vocational education was provided in Moscow to over 1,420,000 children, with 420,900 of these provided with preschool education. To compare, in 2010 the city's kindergartens, schools, and community colleges were attended by 1,120,000 children, with 288,600 of these provided with preschool education.

The capital is currently home to 587 large multi-specialty schools, which offer both general and supplementary education, with 90.5 % of these providing preschool education. In 2010, Moscow had in operation 1,599 schools and 2,045 preschool educational organizations.

The average number of students per school was 437 in 2010 and 1,583 in 2017 (exclusive of preschoolers). Currently, Moscow's education system employs 166,200 people, including 92,700 pedagogical personnel concerned with the core educational process, with 54,000 of these being teachers. In 2010, Moscow's education system employed 237,600 people, with the number of pedagogical personnel being about the same. The amount of state funding Moscow's education system received, through the city's Department of Education, increased over the seven-year period

from 2010 to 2017 151.2 % – from 165.7 billion to 250.4 billion rubles. This, in company with the authorities' effective financial-economic activity, helped increase pay for the pedagogical workforce involved in all stages of the educational process and improve significantly the material-technical base of the educational organizations.

In the view of a number of experts, in 2010 Moscow exemplified a city with a polarized education system. While being pretty much homogeneous, it also featured educational institutions that were inherently innovative – these institutions were building the School of the Future.

Among Moscow's 1,599 educational organizations in operation at the time, there were 78 gymnasiums, 35 lyceums, 177 schools offering programs of advanced study of certain subjects, and over 100 centers for education and schools of health. Prior to the introduction of per capita financing, the size of funding committed to educational organizations depended on factors like status, staffing plan, and size of the school's grounds. Following the shift to the above standard, Moscow adopted 15 different standards for different types of general-education institution. Specifically, in 2010 standard expenditure per student attending a regular school was 63,100 rubles per year, a gymnasium or a lyceum – 120,000 rubles per year, an advanced study school – 74,300 rubles per year, a center for education – 102,300 rubles per year, and a school of health – 112,200 rubles per year (Molotkov, Chernobai, 2015).

Since 2011, the authorities have implemented a variety of measures and launched a set of mechanisms aimed at improving the quality of education in Moscow. These initiatives, based on the insights provided by the professional community between the 1990s and 2000s and the experience accumulated in Moscow's education system, helped get it back to leading positions in the education sector not only domestically but internationally as well. A glowing testimony to the adequacy, reasonableness, and optimality of the objectives set and mechanisms adopted to achieve them is the results achieved in 2018 by pedagogues in Moscow-based schools and community colleges and across the capital's education system as a whole, as well as the successes of Moscow-based schoolchildren. These results, which provide a foundation for further development, are best described by the following characteristics:

– democraticity of education;

– high quality of education, which matches the international level;

– maximum fulfillment of students' aspirations through the provision of appropriate conditions for their abilities and potential to be developed to the fullest extent, so that they could apply them for the benefit of the city's economy in the future;

– constructiveness and efficiency.

When it comes to the democraticity or accessibility of education, of importance is the fact that the number of children provided with preschool education has risen since 2010 from 288,600 to 420,900. Plus, there is 100-percent accessibility of places in preschool clubs for children aged 8 months to 2 years residing in the city of Moscow. A crucial indicator is the number of first-graders attending a public primary school in the same district they live in. In the 2017–2018 school year, this group accounted for 89 %, compared with 32 % in the 2010-2011 school year. In the 2017–2018 school year, public schools under Moscow's Department of Education welcomed 106,000 new first-graders (2010 – less than 80,000). Over 60 % of all first-graders entered a school by transfer from a preschool club at the same school (2010 – less than 1 %) (BAIN & Company, 2020).

The authorities' efforts to build a system of supplementary education within the capital's education system have paid off. Specifically, the total number of preschoolers and schoolchildren aged 5 to 18 attending a supplementary-education study club is, according to data from the Single Records Service, currently over 990,000. In 2010, supplementary education in Moscow was concentrated in 158 centers for children's creative work, which were scattered unevenly around Moscow. The total number of learners pursuing supplementary education was around 360,000. To help make education more accessible, the authorities have built since 2017 a whole host of educational facilities in Moscow: 14 buildings for schoolchildren that can accommodate a combined 9,678 students (57.1 % of these were built with funds from the city's own budget, 42.9 % – with funding from investors) and 18 buildings for preschoolers that can accommodate a combined 2,560 students (22.2 % of these were built with funds from the city's own budget, 77.8 % – with funding from investors) (BAIN & Company, 2020).

A major indicator of the quality of education in Moscow is the increase in the number of graduates from Moscow-based schools with high scores on the State Unified Exam. Specifically, the number of students who scored over 260 points across three subjects rose 272.5 % from 6,900 (2010) to 18,800 in 2019, with 9,800 of these scoring from 220 to 260 points (2010 – 5,300) and 7,600 scoring 270 points or more (2010 – 1,500). The number of students who scored 100 points in one subject on the State Unified Exam rose more than 3.5 times – from 11,300 to 40,200. Ninth-graders who scored a '4' or '5' across four exams accounted in 2019 for 57 % of all students who passed the exams (2010 – 24 %) (BAIN & Company, 2020).

In terms of the content-based orientation of education in Moscow, between 2010 and 2019 there was a significant rise in the number of school graduates with very high scores (91 to 100 points) in natural sciences and technical disciplines: Mathematics (the core level) – from 207 to 809 students, Informatics and Information and Communications Technology – from 280 to 553 students, and Physics – from 454 to 761 students. In 2019, 715 students from 227 Moscow-based schools became runners-up and final stage winners at the All-Russian Olympiad for Schoolchildren (VSOSh), i.e. 37 % of all of the tournament's runners-up and final stage winners that year. Overall, in the period 2015–2019 VSOSh winners and runners-up represented 321 Moscow-based schools, i.e. over half of all schools in Moscow. In 2010, there were 278 VSOSh winners and runners-up from 74 Moscow-based schools.

Table 1 and Figure 4 illustrate the dynamics of the performance of Moscow-based schoolchildren in the All-Russian Olympiad for Schoolchildren.

Table 1. Performance of Moscow-Based Schoolchildren in the All-Russian Olympiad for Schoolchildren

Year	Number of Moscow-based winners	Number of Moscow-based runners-up	Number of Moscow-based schools with final stage winners	Total participants in the Olympiad
2010	76	202	74	40,500
2016	124	459	181	367,000
2019	191	715	227	393,366

There has been a boost in the competitiveness of graduates from Moscow-based schools in terms of entering Moscow's top colleges. In the current climate of having to take the State Unified Exam, the average graduate of a Moscow-based school gets to compete with 5–7 % of the best graduates from other constituent regions of Russia who come to Moscow to pursue higher education.

Using Pearson's chi-squared test, the authors assessed the statistical significance of differences between the following two relative indicators: (1) number of Moscow-based winners and runners-up and (2) number of Moscow-based schools with final stage winners. The figure is 0.973307, which suggests a strong link between the indicators' values.

The significance level for the data in Figure 4 (the period 2010–2019) is 0. 1602 ($p < 0.1$; differences found at trend level).

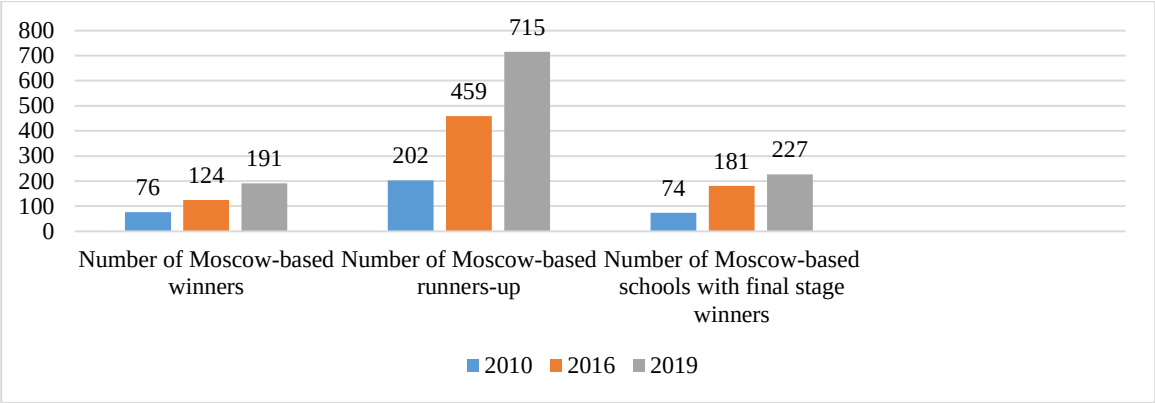

Fig. 4. Performance of Moscow-based schoolchildren in the All-Russian Olympiad for Schoolchildren Produced by the authors

The fact that the quality of education provided by schools in the city of Moscow matches the international level is attested by the findings from a 2019 PISA (Programme for International Student Assessment) study. On two of the metrics measuring the quality of education, reading literacy and mathematics literacy, Moscow's education system made it in 2019 into the world's top six best education systems. Moscow's secondary schools exhibited a high correlation with the results of the first five leaders, which is testimony to the accessibility of quality education to all schoolchildren in the city, regardless of area of residence and financial circumstances. This fact was captured in the report of the study's organizers. Figure 5 illustrates the distribution of the first 10 positions in the PISA rankings.

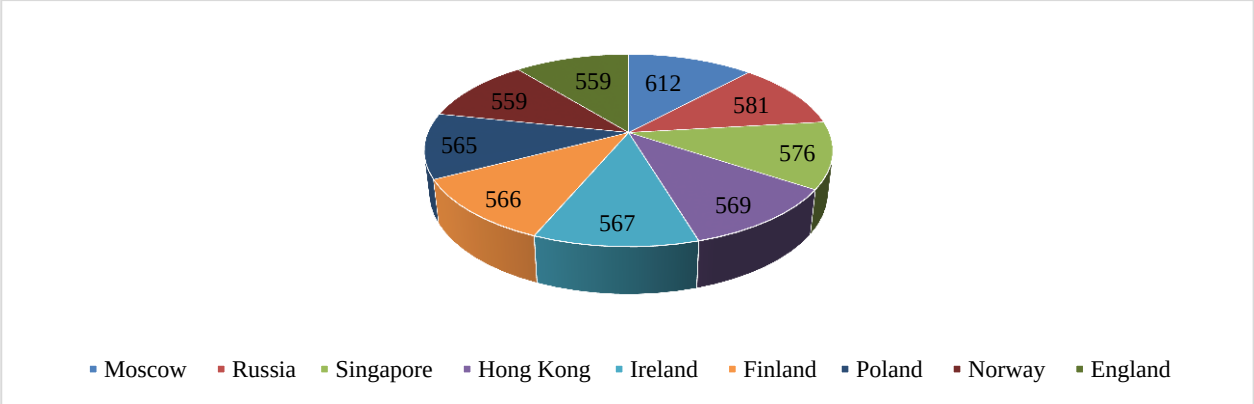

Fig. 5. Results from a 2019 PISA study. Produced by the authors based on data from a source (BAIN & Company, 2020)

Since 2016, Moscow has staged an event known as the Olympiad of Metropolises, an international competition for students aged 14–18 residing in the world's largest cities. Students work together in teams of eight competing in four subjects – Physics and Chemistry (this includes doing theoretical and experimental assignments) and Mathematics and Informatics (solving problems). Moscow has finished first in the medal count three times in a row. In 2019, the tournament featured 36 teams (288 students) from metropolises around the world. In 2016, there were 22 teams (176 students).

The focus on the development of each child's talents is being implemented not only at schools but numerous museums, theaters, colleges, centers for technological support for education, and technology parks as well. The city has become a key provider of both core and supplementary education. At year-end 2019, Moscow had in operation 1,927,641 supplementary-education study clubs for children aged 5 to 18, with 78 % of those providing their services free of charge. The number of unique learners pursuing supplementary general-development programs of study at

educational organizations under Moscow's Department of Education is currently over 840,000 children aged 5 to 18, while the number of children attending supplementary-education study clubs in the city is, according to data from the Single Records Service, currently over 990,000 (BAIN & Company, 2020).

The Moscow Electronic School project, launched on September 1, 2016, is aimed at making as much use as possible of information technologies and services to enhance the quality of education. The project envisages major technical upgrades at educational organizations and the creation of a platform for electronic learning materials. As part of the project, since 2016 the schools have so far received 21,900 interactive panels and 44,000 notebooks for the teachers.

As of May 1, 2018, the platform provided the following electronic educational materials:

– 17,000 approved and published lesson scenarios developed by teachers;
– 205 electronic study guides from publishing houses;
– 289 electronic study guides developed by teachers in Moscow-based schools;
– 181 literary works included in the school curriculum;
– 1,803 integrated interactive applications from leading Russian developers.

4. Discussion

Russia's education reform has been aimed at remediating the imbalance between what the education system has to offer and what society actually needs. Its focus tends to be characterized primarily by a processual orientation (organizational activity by the administration and joint activity by teachers and students) and a content-based orientation (study programs, curricula, and cultural-educational activity). The focus on organizational and financial mechanisms that induce adjustments to both the content of education and the structure of the school system, as the central unit within the education system, has been smaller. That being said, in Moscow extensive transformations have been carried out in the area of development of new organizational and financial mechanisms specifically. The most crucial of the new organizational mechanisms is the Moscow Electronic School digital platform, which, basically, is a universal "digital databank" of assignments and algorithms for the conduct of classes that is designed to help develop the primary competencies (knowledge, abilities, and skills) central to mastering vocational competencies at institutions of vocational learning and those of higher learning. The common accessibility of the MESh platform makes it possible to minimize the social distance between the various categories of learners at educational institutions.

Thanks to the resources offered by the MESh platform, it is possible today to conduct classes in a high-quality manner at each school.

The Government of Moscow has introduced a number of incentives for the development of the MESh project, which include the following:

– in 2017, the pedagogical community was provided with a batch of grants for its contribution to the development of the MESh project, with grant size ranging from 5,000 to 150,000 rubles;

– a raise in the amount of 10,000 rubles per month for taking an active part in the development of the project. Currently, this benefit is enjoyed by teachers at six pilot schools in Moscow and 5,000 teachers who are the most active users of lesson scenarios from the MESh platform.

As of May 1, 2018, 212 teachers from 119 schools in Moscow received 236 grants for their contribution to the implementation of the MESh project.

Between October of 2017 and March of 2018, the 10,000-ruble raise was provided to 8,998 teachers actively using the MESh platform. On September 1, 2018, the city's authorities made entitled to the raise all teachers in Moscow-based schools who will be using lesson scenarios available on the unique platform.

5. Conclusion

The strategy for the development of education is indissolubly linked with the development of society as a whole. The development of the future generation ought to be in sync with the development of the digital society. Accordingly, the development of educational organizations, most importantly schools, should also be founded on some of the key principles examined in this work.

A significant achievement in terms of digitalization of the educational process is the development of the Moscow Electronic School digital platform, which contains databanks of assignments and algorithms for the conduct of classes on all school subjects and is a commonly accessible digital resource for all learners regardless of their social and financial circumstances.

A definite benefit of the MESh platform is that it makes it possible to capture the "digital traces" of each learner across the courses taken by them by way of analysis of their performance on assignments of varying level of complexity. Such "digital traces" can be combined into a "digital track", a sort of a learner's digital portfolio that reflects their priorities in terms of mastering particular vocational competencies.

The objective for secondary and higher educational institutions is to ensure that a learner's digital track is maintained, with a focus on the further development of top-priority knowledge, abilities, and skills gained at school.

Consequently, there is logic in the position that there is a need to put in place a Vocational Digital School platform and a Higher Digital School one in order to accumulate the "digital traces" of learners pursuing tertiary education and build an objective "digital portfolio" for each learner, with a special focus on their top-priority skills, which should provide the basis for the development of supra-vocational skills that are sought after the most by employers today.

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References

BAIN & Company, 2020 – Moskovskoe obrazovanie: povyshenie effektivnosti na fone global'nykh peremen [Moscow education: Boosting its efficiency amid global changes]. Doklad BAIN & Company. [Electronic resource]. URL: http://bain.com/offices/moscow/ru/publications/index.aspx [in Russian]

Brainin, 2015 – *Brainin, V.M.* (2015). Reformy obrazovaniya: plyusy i minusy [Reforms to education: Pluses and minuses]. SPb. [in Russian]

Chudnov, 2013 – *Chudnov, V.P.* (2013). Rossiiskoe obrazovanie: istoriya i sovremennoe sostoyanie [Russian education: its history and current state]. M. [in Russian]

Dneprov, 2012 – *Dneprov, E.D.* (2012). Noveishaya politicheskaya istoriya rossiiskogo obrazovaniya: opyt i uroki [The modern political history of Russian education: Experience and lessons]. M.: Marios. [in Russian]

Dvenadtsat' reshenii..., 2018 – Dvenadtsat' reshenii dlya novogo obrazovaniya [Twelve solutions for novel education. A report from the Center for Strategic Research and the Higher School of Economics]. Doklad Tsentra strategicheskikh razrabotok i Vysshei shkoly ekonomiki. M.: Izdatel'stvo Vysshei shkoly ekonomiki. [in Russian]

Gruzina, Firsova, 2018 – *Gruzina, Yu.M., Firsova, I.A.* (2018). Analiz stimulirovaniya molodezhi v sfere nauki, tekhniki i innovatsii (rezul'taty provedennogo issledovaniya po goszadaniyu «Razrabotka mekhanizmov gosudarstvennogo stimulirovaniya po aktual'nym i prioritetnym napravleniyam molodezhnoi politiki v sfere nauki, tekhniki i innovatsii v RF [An analysis of incentives for youth in the area of science, technology, and innovation: The findings from a study conducted as part of the State Assignment 'Development of Government Incentive Mechanisms on Topical and Priority Areas in Youth Policy in the Areas of Science, Technology, and Innovation in the Russian Federation]. *RISK*. 2: 36-41. [in Russian]

Kapranova, 2016 – *Kapranova, V.A.* (2016). Obrazovatel'nye reformy: otechestvennyi i zarubezhnyi opyt [Education reforms: national and foreign experience]. Minsk: BGPU. [in Russian]

Kontseptsiya dukhovno-nravstvennogo... – Kontseptsiya dukhovno-nravstvennogo razvitiya i vospitaniya lichnosti grazhdanina Rossii [A Concept on the spiritual-moral development and nurturing of the personality of russian citizens]. [Electronic resource]. URL: http://minobrnauki.rf [in Russian]

Mel'nichuk, 2016 – *Mel'nichuk, M.V.* (2016). Traditsionnyi imperativ i innovatsionnaya paradigma v kontekste vysshego obrazovaniya [The traditional imperative and the innovation paradigm in the context of higher education]. *Mezhdunarodnyi zhurnal ekonomiki i obrazovaniya*. 2(4). [in Russian]

Molotkov, Chernobai, 2015 – *Molotkov, A.B., Chernobai, E.V.* (2015). Logika izmenenii v sisteme obrazovaniya goroda Moskvy [The logic behind changes in the education system of the Moscow city]. M.: Prosveshchenie, 112 p. [in Russian]

O Strategii ekonomicheskoi bezopasnosti… – O Strategii ekonomicheskoi bezopasnosti Rossiiskoi Federatsii na period do 2030 goda: ukaz Prezidenta RF ot 13 maya 2017 g. № 208 [Decree of the President of the Russian Federation No. 208 'On the Strategy for Economic Security in the Russian Federation for the Period through to 2030' of May 13, 2017]. [Electronic resource]. URL: http://www.garant.ru [in Russian]

O strategii… – O Strategii nauchno-tekhnologicheskogo razvitiya Rossiiskoi Federatsii: ukaz Prezidenta RF ot 1 dekabrya 2016 g. № 642 [Decree of the President of the Russian Federation No. 642 'On the Strategy for the Scientific-Technological Development of the Russian Federation' of December 1, 2016]. [Electronic resource]. URL: http://www.garant.ru [in Russian]

Ob obrazovanii… – Ob obrazovanii v Rossiiskoi Federatsii: Federal'nyi zakon ot 29 dekabrya 2012 g. № 273-FZ [Federal Law No. 273-FZ 'On Education in the Russian Federation' of December 29, 2012]. [Electronic resource]. URL: http://www.garant.ru [in Russian]

Ob utverzhdenii normativov… – Ob utverzhdenii normativov finansovykh zatrat na soderzhanie odnogo obuchayushchegosya, vospitannika v gosudarstvennykh obrazovatel'nykh uchrezhdeniyakh sistemy Departamenta obrazovaniya goroda Moskvy: Postanovlenie Pravitel'stva Moskvy № 789-PP ot 14 sentyabrya 2010 goda [Resolution of the Government of Moscow No. 789-PP 'On Adopting the Standards for the Funding of the Education of a Single Student in Public Educational Institutions under the Department of Education of the City of Moscow' of September 14, 2010]. [Electronic resource]. URL: http://www.garant.ru [in Russian]

Ob utverzhdenii Strategii… – Ob utverzhdenii Strategii povysheniya finansovoi gramotnosti v Rossiiskoi Federatsii na 2017–2023 gg.: rasporyazhenie Pravitel'stva RF ot 25 sentyabrya 2017 g. № 2039-r. [Resolution of the Government of the Russian Federation No. 2039-r 'On Adopting the Strategy for Enhancing Financial Literacy in the Russian Federation for the Period 2017–2023' of September 25, 2017]. [Electronic resource]. URL: http://www.garant.ru [in Russian]

Remorenko, 2017 – *Remorenko, I.M.* (2017). Gosudarstvenno-obshchestvennye mekhanizmy regulirovaniya obrazovaniya [Public-private mechanisms for regulating education]. M.: Izdatel'stvo «Pero». [in Russian]

Skolkovo, 2020 – Atlas novykh professii [Atlas of new professions]. Skolkovo. [Electronic resource]. URL: http://atlas100.ru/ [in Russian]

Strategiya razvitiya… – Strategiya razvitiya obrazovaniya goroda Moskvy na period do 2025 goda [The Strategy for the development of education in the city of Moscow for the period through to 2025]. [Electronic resource]. URL: https://dpgaidar.mskobr.ru/files/attach… https://dpgaidar.mskobr.ru [in Russian]

U rossiyan obnaruzhili… – U rossiyan obnaruzhili massovuyu nekompetentnost' [A study reveals a high level of incompetence among Russians]. [Electronic resource]. URL: https://www.finanz.ru/novosti/aktsii/u-rossiyan-obnaruzhili-massovuyu-nekompetentnost-1006177474 [in Russian]