The Early 21st Century

Russian Schools

Russian Education: Achievements, Challenges and Prospects

Editors
Sergey Kosaretsky
Isak Froumin

HSE UNIVERSITY

RUSSIAN SCHOOLS: THE EARLY 21ST CENTURY

HSE UNIVERSITY
Institute of Education

RUSSIAN EDUCATION: ACHIEVEMENTS, CHALLENGES AND PROSPECTS

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Yaroslav Kuzminov and Isak Froumin

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SERIES EDITORS' PREFACE

We are pleased to offer readers this unique series of books, which combines analytical work across all levels of education with discussions of potential strategies for future development. These books reflect over two years of work by scholars from the Higher School of Economics (HSE) as well as the Center for Strategic Research (CSR).

In 2016, when the President of Russia tasked the CSR with drafting recommendations for accelerating the growth of living standards for Russian citizens, it became clear that human capital must be the core of any strategy for boosting economic growth. As the sphere in which this capital is formed, education becomes supremely important. A key question emerges here, posing a serious challenge to education researchers: "How can we take education from being just a government obligation to fueling the social and economic development of the country?" For Russia, with one of the world's best education systems, this question is especially relevant today.

In making such demands on education, a theoretical framework is not enough. We must also carefully study the applied field of education, its achievements and shortcomings. No strategy can exist without a vision for the future and a vision of education's role in the fabric of social development. Nor can there be a strategy without data, without an empirical view of education. That is why the HSE-CSR working group discussed not only principles, approaches, and best practices from around the world, but also organized numerous studies of education systems and conducted hundreds of discussions and interviews with practitioners and experts in the field. The series of books that resulted from this work begins with a volume that offers a new approach to human capital and a new role for education. It also discusses the fundamental mechanisms of education's development. The volumes that follow are geared towards analysis and reporting, breaking down the field of education into segments: preschool, primary and secondary, vocational, higher education, as well as children's after-school programs and continuing education. A special report is devoted to our analysis of the digital transformation of education, since we see this process as playing a key role in a fast-approaching civilizational shift.

We see each of the books in the series as being valuable in itself, and as being useful and interesting not only to education professionals but also to other interested readers. The books will be valuable to all those who don't want to limit themselves to their personal experience of education, but choose to go deeper into empirical data and theoretical arguments. These arguments and data come from researchers' work with publicly available resources, as well as from our own empirical studies. These studies include: Monitoring of Education Markets and Organizations (MEMO), the Longitudinal Panel Study of Educational and Occupational Trajectories, Household Socioeconomic Behavior Monitoring, and numerous other sociological, economic, pedagogical, and psychological studies.

However, we must acknowledge that the data presented and analyzed in this series contains a variety of flaws that certainly must be addressed in future work. First and foremost, most of our data points are averages and generalizations from the country as a whole, while regional differences are significant. A close study of differences among regions, as well as smaller areas, is needed to analyze data and study the interplay of economies and institutions more precisely in terms of regional typology. We were able to do this in numerous instances, but not nearly everywhere. The reason is simply a lack of available data that can be broken down regionally. The second flaw is a lack of data on the quality of education. The need here is even more urgent: such data is simply nonexistent for all levels of education except primary and secondary. We lack objective assessment tools, and the data we have from primary and secondary school assessment is closed off to study at the needed level of depth.

An important feature of this series is its immersion in the global context, driven by the task of making Russian education globally competitive. The reader will find here not only comparative statistics, but also analysis of global best practices in education development at all levels.

We are truly thankful for the work done by Alexei Kudrin, who led the drafting of recommendations for Russia-2024: The Strategy of Social and Economic Development; by Andrei Fursenko, assistant to the President of the Russian Federation; by all our partners in the federal and regional governments; and by all the various scholars and experts who worked with us. Thanks to all of them for the support, discussions, and suggestions.

In this volume of the series, we offer the reader a description of the most fundamental level of education, primary and secondary schools, and their development in the early 21st century. We also offer an analysis of education policy in that period. Using statistics and data from specialized studies, with an emphasis on international comparison, the authors show which efforts have been successful, which problems remain unsolved, and what new challenges face Russian schools.

Yaroslav Kuzminov
Isak Froumin

EDITORS' PREFACE

This monograph was assembled by the Center for Strategic Research education analytics group in the framework of Russia-2024: The Strategy of Social and Economic Development, with an outlook to 2035. It also responds to challenges in education for 2024 set by Executive Order No. 204 of the President of the Russian Federation, Vladimir Putin, on May 7, 2018 (May Executive Order of 2018).

In putting together recommendations for developing the education system, we sought to ground them in a deep analysis of the current condition of Russian schooling. The responsibility of formulating a national strategy demands a multifaceted approach, including retrospective analysis of vectors of development and assessment of key trends. It also demands comparative analysis of data from other countries to find points of contact between the structure and evolution of the Russian education system and global trends.

Given Russia's great demographic, geographic, social, and cultural diversity, it is also critical that our analysis works effectively with data from the various regions of the Russian Federation. A major part of our mission is analyzing government policy from recent years, including reviewing and assessing the impact of key reforms. The goals of this process are to find what lessons can be learned, provide continuity, and see what capacities and opportunities are available for which initiatives, as well as what limitations stand in the way.

We see this monograph as something akin to a white paper. This genre emerged in Europe in the 19th century as an official report elucidating matters of government policy. White papers became one of a variety of "color papers" published by European governments on internationally important topics. White papers then came to be published as expert reports on key questions of strategic development in the economic and social spheres.

In this sense, our white paper continues this tradition. However, it differs significantly from its European counterparts in ways that bring it closer to the tradition of white papers related specifically to education policy in Russia.

The first and only example of a white paper written on Russian education policy in the 21st century came out at the turn of the millennium under the title "Russian Education White Paper" [Adrian et al., 2000]. It contained an overview of all levels of Russian education during the last twenty years of the 20th century, including student demographics, numbers of teachers, and financial reports. It discussed mechanisms of transformation of the education system in the transition from a planned economy to the market. The study analyzed a variety of reforms, including curriculum content, the quality control system, and reforms of the financial and administrative mechanisms.

In the years that followed, no single format emerged within the education system as a consensus method for presenting analysis of the conditions and trends of the nation's school system.

In 2006, under the auspices of the "Education System Reform" project of the National Training Foundation, a report titled "Conditions and Development of the School System in the Russian Federation" [Agranovich, Kozhevnikova, 2006] was published. This report was the first to use inter-regional and international comparisons to analyze problems and tendencies in Russian education in light of socioeconomic and demographic data.

Another interesting analysis of the evolution of Russian education, also based on statistics and international comparisons, was the 2012 World Bank report [Nikolaev, Chugunov, 2012].

It's worth noting that none of the studies mentioned were initiated by the Ministry of Education or any other government entity. Analytical texts produced by the government emerged only later in the first decades of the 21st century. At first, they took the form of reports on the execution of education programs and projects, such as targeted federal initiatives for education development, including the "Our New School" project.

Since 2013, in accordance with the law on education, there has been a report presented annually by the Russian Government to the Federal Assembly of the Russian Federation on the implementation of national education policy. The report contains goals, milestones, and initiatives of national education policy as a whole, as well as for each level of education. It also includes a forecast for the education system's development and goals, taking into account medium-term trends and challenges.

While the annual report to the Federal Assembly is intended to inform Russia's lawmakers on the activities of government agencies in executing national education policies, the annual Education System Monitoring report is intended to inform civil society on the conditions, trends, and outcomes of the education system.

The Education System Monitoring report (MSO) has been prepared by the Ministry of Education and Science and presented to the Russian Government annually since 2013, also in accordance with the law "On Education." The MSO is a formal report based on federal statistical data, sociological studies, and other data from government agencies. The education system monitoring report does not contain expert analysis that would reconcile federal education policy initiatives with the trends in monitoring data.

The Russian Government's report to the Federal Assembly on the implementation of national education policy and the education system monitoring report are separate documents which lack coordination. They are essentially reports on the executive functions of government agencies. So while on one hand the culture of analytical publications is growing, on the other hand there is a lack of problematized, comparative studies directed towards the future.

Among the greater education community, as well as among interested parties in civil society, there remains a great demand for quality interpretation and assessment of the situation.

At the same time, in Russia there continues to be a need for an empirical basis for education development strategies, for creating data-driven education policies, and for regularly analyzing them in a multifaceted and independent way, outside of government entities. Moreover, there has been a troubling rise in the number of statements being made, even at high levels, that make claims about the situation in education and propose reforms based on nothing more than subjective opinions or personal interest. Discussions of the paths forward for education are often based on ideological interpretations of the Soviet or Post-Soviet past, or on predictions of the future that have no basis in reality.

In this context, we hope that our book will promote further growth in the culture of debate in the field of education, as well as answer the public demand for good data and rich analysis of the condition and evolution of our education systems. In terms of the scope of questions addressed and the volume of data gathered, this report is unique in the 21st-century Russia.

Sergey Kosaretsky
and Isak Froumin

INTRODUCTION

For the first time in 20 years, we have conducted a retrospective analysis of national education policy for schools, and on this basis have formulated the core challenges and vectors of action in the medium and long-term perspectives. Our report is independent of state education agencies, and offers a non-governmental assessment of both existing reforms from the past 20 years as well as new education policies being implemented today. We seek to problematize the issue and emphasize the challenges ahead. Overcoming these challenges will be the key to sustained improvement of the education system in the medium and long terms. The material in this report also encompasses a wide spectrum of international and Russian comparisons, which demonstrate the importance of maintaining a diversity of approaches to school development.

The report is made up of seven chapters on the condition and evolution of Russian schools. The issues are formulated in a way that is common to many strategic and analytical documents: 1) access to schools and the state of infrastructure and technology; 2) the quality of education outcomes; 3) the school system workforce; 4) the content of school curricula; 5) school funding; 6) systems of quality assessment and oversight; 7) working with talented students. These questions can be explored through a significant volume of data from statistics and monitoring and through a refined system of analytical indicators, which can form the basis for comparison. The issues of the digitization of education and the education of special-needs students are very important, but are not treated in-depth in this volume because they are addressed in separate analytical reports.

We see the following issues as being critical today, and address them deeply in our report, using the newest data from Russian and international studies: the large share of students who fail to reach a basic level of functional literacy; the disparity in education outcomes among schools and groups of students with varying socioeconomic status; low levels of academic resilience; decreasing motivation among schoolchildren; segregation in schools; the untapped potential of highly motivated students.

In our conclusion, we present findings regarding the major challenges facing the Russian school system and co-curricular education in Russia. We also propose initiatives and vectors for action that can help us meet these challenges.

For most of the public, and even for some education researchers, some of these issues are new and have only recently become part of the dialog. For this reason, we've provided detailed and in-depth discussions backed by the latest data from Russian and international studies.

The content of school curricula is one of the topics we discuss at length. This issue is extremely relevant today in the context of the new skills required to succeed in the workplace and society in the era of the fourth industrial revolution and increased indeterminacy.

Our report incorporates the experiences and best practices accumulated in studies of the Russian education system and education policy in the 21st century. However, we've been able to eclipse previous efforts in terms of our breadth of sources. In addition to data from statistical observations, which are usually done using indicators from education system monitoring, our book makes full use of the following information resources:

- comparative data on OECD indicators of education development [OECD, 2018], which make it possible to do well-founded comparative analysis internationally;
- data from international comparative studies as an integral part of national economic systems (indicators of human capital growth, national economies, and global competitive ability from international organizations such as the UN, World Bank, UNESCO and others), which make it possible to see the

Russian education system in a wide international context, taking into account global trends;

- data from the Monitoring of Education Markets and Organizations (MEMO) project: recurring surveys of administrators and teachers at schools and afterschool programs, as well as parents, which supplement our knowledge of the education system's development in areas where statistical data is lacking, and allow us to identify changes in conditions, motivation, and strategies of participants in the education system;
- data from secondary analysis of the results of international studies of education quality (TIMSS, PIRLS, PISA, etc.), which allows us to go beyond identifying Russia's position in relation to other countries and to look into important internal questions for which Russian data is lacking;
- data from National Studies of Education Quality (NIKO) which are important for analyzing issues of education quality, given the closed nature of EGE standardized test data; and
- the results of sociological surveys carried out by leading centers such as FOM, VCIOM, and Levada Center, as well as the social monitoring fund "National Education Resources," which reveal important details of attitudes and expectations of the population in the sphere of education and their opinions on ongoing processes.

This book also includes the results of research and analysis on aspects of the development of schooling and extracurricular education carried out by the HSE's Institute of Education in recent years, including analysis of trends and reforms, the implementation of national projects (MRSO, projects for modernizing teacher education, etc.), international case studies of school education, and best practices in regions.

The team of authors includes experts from the Center for the Socio-Economic Development of Schools, the International Laboratory for Evaluation of Practices and Innovations in Education, and the

Center for the Study of School Practices and Educational Programs in the 21st Century at the HSE's Institute of Education, as well as experts from Moscow City University.

The authors would like to thank the series editors Yaroslav Kuzminov and Isak Froumin for their initiative and constant support. We thank our colleagues at the CSR L.N. Ovcharova, M.Yu. Alashkevich, Yu.N. Koreshnikova, and P.S. Sorokin for stimulating discussions and logistical help.

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Chapter 1

Primary and Secondary Education in Russia: Access and Infrastructure

The Constitution of the Russian Federation guaranteed all Russian citizens access to free primary and intermediate education. At the start of the 21st century (2007), the next step was taken when a law was passed making secondary education mandatory. This policy was also established by the Federal Law "On Education in the Russian Federation" of 2012.

Today, the idea of access to education implies not only one's ability to get an education, but also the quality of the services rendered. This includes geographic accessibility, safety, adequate facilities, and availability of modern classroom technologies such as internet access.

Given Russia's geographic and demographic diversity, as well as notable economic differences among regions, universal access turns out to be a monumental task. In this chapter, we provide a wide variety of data that characterizes the country's progress in providing access to primary and secondary education across all territories, showing both clear successes and lingering problems.

1.1. Access to primary and secondary education

School enrollment rates

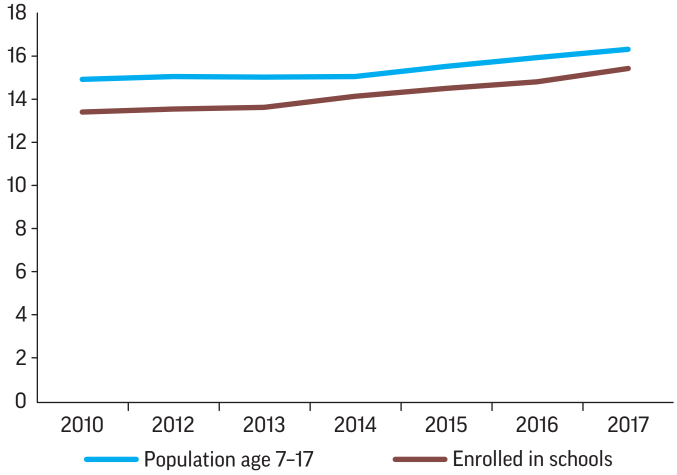
According to Federal Law No. 273-FZ "On Education in the Russian Federation" of December 29, 2012 (Item 66), "Primary education, intermediate education, and secondary education are mandatory education levels." These levels apply to nearly all children and teenagers from 6.5 to 17.5 years old. Students who move to professional training after completing intermediate education (after 9th grade), also receive the required general secondary education from their vocational schools, albeit in a rather truncated way.

According to World Bank data, Russia was the 24th out of 124 countries in terms of net enrollment rate, ahead of countries such as Italy, Germany, Israel, China, and others. In the UN's 2016 Human Development Report, Russia is among the group of countries with a very high level of human development. In terms of "net primary education enrollment rate," only four of the 51 countries are ranked above Russia, with three other countries' data unavailable. Russia's rate in 2015 was 99% [UN Report…, 2016]. However, in the UNESCO report [Education for All…, 2006], that figure for Russia was 96.2%, putting it in just 70th place globally. The likely reason for this is the difference in the age of cohorts for primary education; in the UNESCO report, the data point is defined "in relation to the corresponding age group."

The total school enrollment number in Russia has increased each year since 2012, as compared to the baseline figure measured during the 2010/2011 academic year. This is a result of demographic processes that took place in the first decade of the 21st century. Over the past seven years, this number has gone up 14.9%, or by two million people. The latest figures from the 2017/2018 school year show that the population of those enrolled in primary and secondary schools in the Russian Federation is 15.6 million (Fig. 1.1).

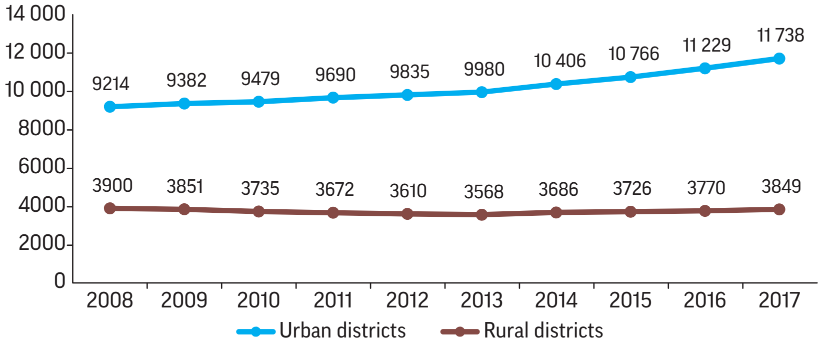
Both rural and urban districts are showing growth in school enrollment numbers (Fig. 1.2).

Fig. 1.1. School enrollment age 7–17 (millions)



Sources: Federal State Statistic Service (Rosstat), Ministry of Education and Science.

Fig. 1.2. Numbers of school students enrolled in urban districts vs. rural district (thousands)



Sources: Rosstat, Ministry of Education and Science.

The vast majority of students are enrolled in public (municipal) schools. Less than 1% of Russian school students are educated in private schools.

Barriers to accessibility

There is a variety of challenges to the goal of providing universal access to schooling, both objective and subjective:

- de-facto selectivity of students accepted into the most successful schools, especially in large cities, which is counter to the Law on Education;
- the financial burden on households to secure schooling for their children, despite the legally established norm of universally free schooling; and
- the gap between the actual structure and evolution of the education system and the stated goals of universal education, including the requirements of the Federal Education Standards (FGOS).

School selectivity

Parent surveys show that selectivity procedures exist among schools which offer advanced curricula, as well as schools in Russia's major cities. Two thirds (66%) of respondents in surveys conducted by the HSE's Monitoring of Education Markets and Organizations (MEMO) project stated that upon enrolling their child into a specialized school (lyceum) for first grade, they were required to go through a selection process. Less than one third of respondents who sent their children to regular schools noted the presence of a selectivity process. In large cities of over one million in population, 39% of families who sent their kids to schools in 2016 stated that they were faced with some form of selectivity. In cities under 100,000, less than 20% encountered selectivity.

In the transition to middle school (entering 5th grade), selectivity is less widespread, with only 6% of respondents reporting their child having been tested at this stage.

In entering high school, the testing barrier again becomes significant. 20% of respondents sending their children to 10th grade saw testing, while one fourth of parents whose child was entering 11th grade reported testing.

Household spending

One of the most discussed questions regarding access to schools is whether or not public education in Russia is truly free of cost.

In the 2017 MEMO surveys, the majority of respondents said that they did not pay for schooling. 92% confirmed that their school was completely free of cost. However, 4% stated that they pay extra for classes within the basic program, and the same amount said they paid for classes outside of the basic curriculum.

29% of parents in the survey say they pay for extracurricular education programs (lessons, clubs) within the school, though 53% of respondents skipped this question.

Overall, families spend 1850 rubles a month, including on "education-related products" (1414 rub) and "school needs" (436 rub).

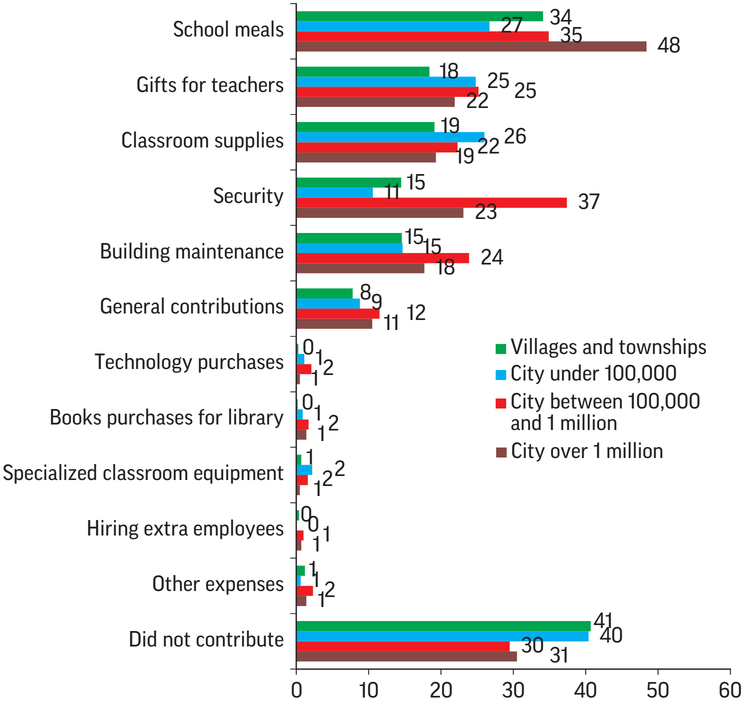
A majority of parents participating in the survey said that their schools make use of parents' assistance. Among the most common budget items in which they are involved are school meals (33%), gifts for teachers (23%), classroom supplies (22%), security (21%), and building maintenance (17%).

Parents in large cities of 100,000 to over 1 million are most likely to spend on "school needs," at a rate of 70% of respondents (Fig. 1.3).

Trends in the MEMO surveys show that the percentage of parents who don't contribute financially to "school needs" is growing. In 2016, 37% of parents said they had no such expenses, while the figure in 2013 was 32% (Fig. 1.4).

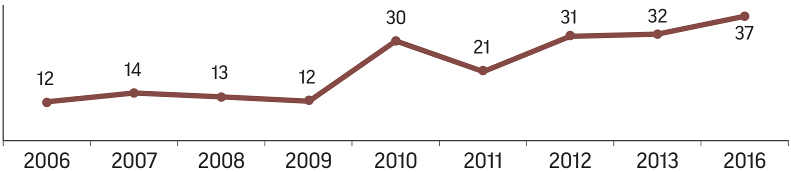
The trend of lesser numbers of parents contributing to school expenses is true for all budget items (Fig. 1.5).

Fig. 1.3. Distribution of answers to the question: "Did you or your family give financial or in-kind contributions last school year for any of the following needs of the school your child attends?" by size of city or town



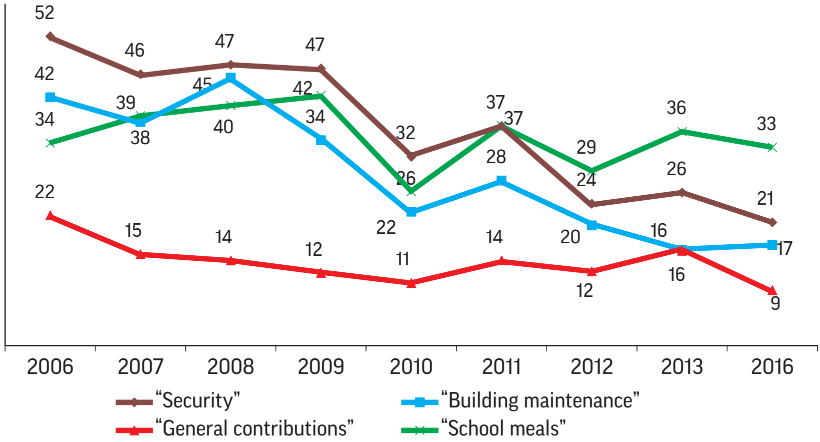
Source: Monitoring of education markets and organizations (MEMO).

Fig. 1.4. Percentage of parents who responded "Did not contribute" (until 2013, parents were asked about the past three months; in 2016, about the past year)



Source: MEMO.

Fig. 1.5. Percentage of parents who responded that they had expenses in the following areas of school need (until 2013, parents were asked about the past three months; in 2016, about the past year)



Source: MEMO.

Russian school systems: general characteristics and trends.

In 2017, 45,377 schools in Russia were licensed to provide general education, with more than half that number (28,127) being rural schools.

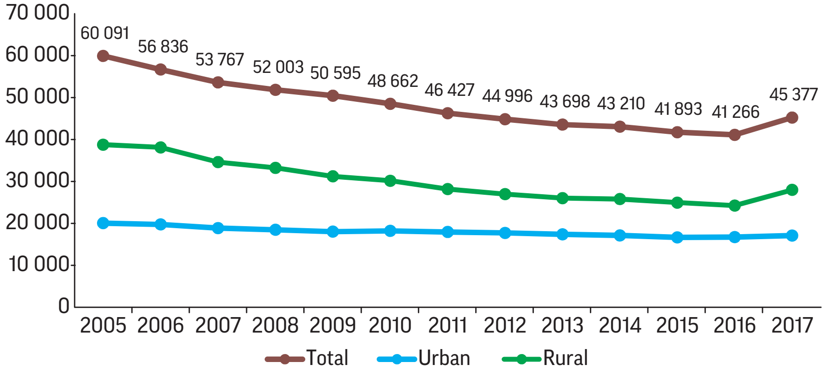
Beginning in the late 90's, Russia saw a decrease in the school-age population. This prompted a reorganization, with many schools being closed, especially in rural areas. However, while demographic trends have shifted, and the school-age population has risen over the past 5–7 years, the closing of schools has continued (Fig. 1.6).

School system shrinkage is felt most acutely in rural districts, and is present in all regions (Fig. 1.7).

The biggest drops in the number of rural schools occurred in the Republic of Bashkortostan (–1708), the Republic of Tatarstan (–985), Tambov Oblast (–631), and Orenburg Oblast (–612).

As school systems have been reorganized, the enrollment rate has not declined, but the average size of Russian schools has increased in both urban and rural districts.

Fig. 1.6. Change in the number of schools (excluding evening shifts)



Sources: Rosstat, Ministry of Education and Science.

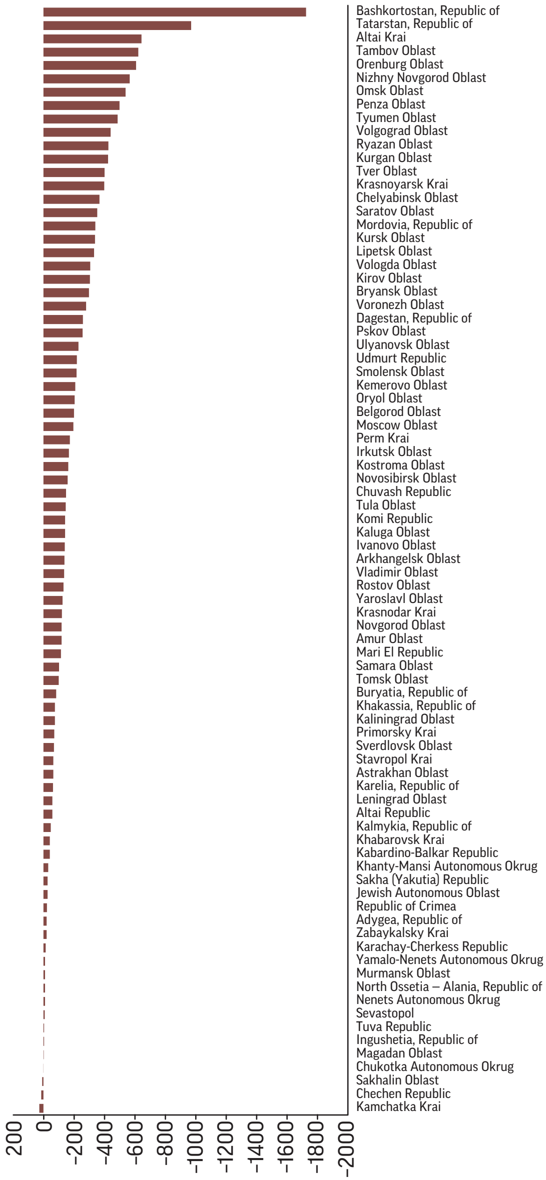
The average size of an urban school has gone up by 39.2% since 2007, adding an average of 192 students per school. In rural districts, the average school has grown by 17.9%, or 21 students. By 2017, the average urban school was nearly five times bigger than the average rural one (Fig. 1.8), and the past ten years have seen a major decrease in the numbers of small schools in Russia.

The increase in school size does not correlate with an increase of class size (Fig. 1.9). From 2009 to 2015, class sizes in both urban and rural schools hardly changed, with averages of 24 and 12 respectively.

Average class size in Russia is significantly smaller than the OECD average (Fig. 1.10).

An increase in the number of students per school creates the risk of a larger share of students having to attend classes during second or third shifts, which contravenes the principle of equal education conditions for all. However, federal policy of recent years has aimed to reduce and eventually phase out shifts altogether. Russia has succeeded in lowering the number of students attending second or third shifts despite the growth in numbers of students (Fig. 1.11).

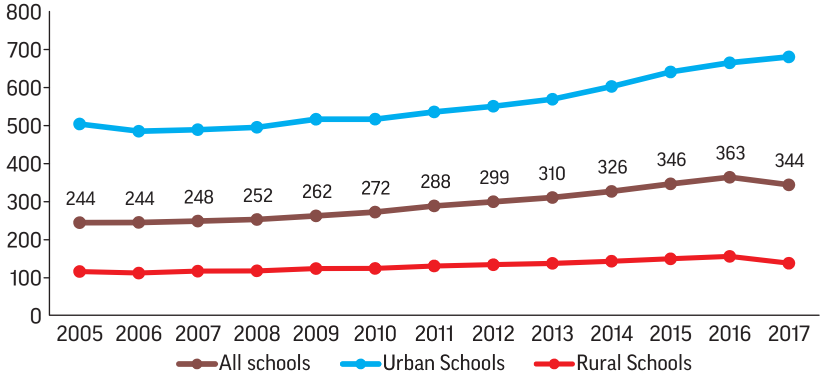
Fig. 1.7. Change in number of rural schools by region from 2004 to 2017



Note: Figures given for Saratov Oblast, Republic of Crimea, Sevastopol start at first available data.

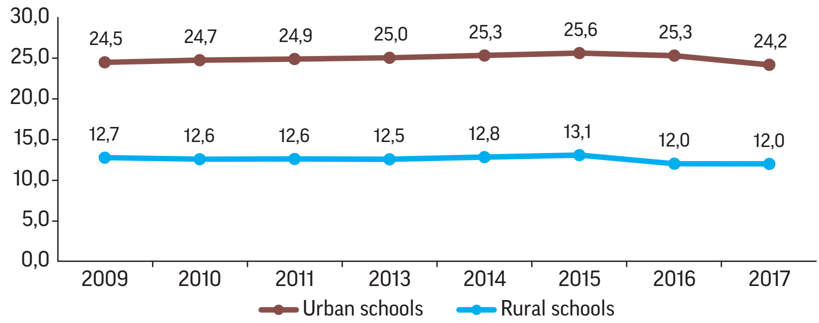
Sources: Rosstat, Ministry of Education and Science.

Fig. 1.8. Average number of students per school



Sources: Rosstat, Ministry of Education and Science.

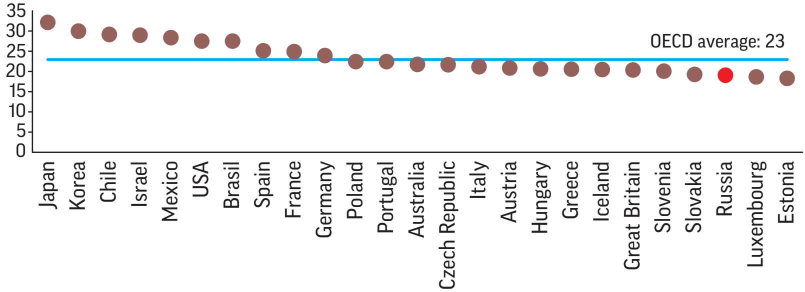
Fig. 1.9. Average number of students per class in urban and rural schools



Sources: Rosstat, Ministry of Education and Science.

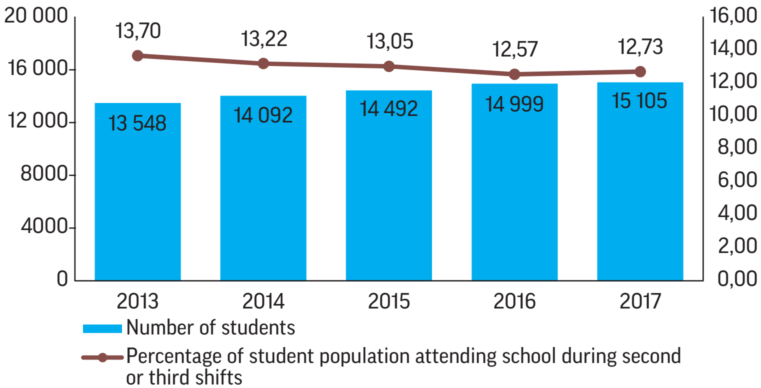
However, the presence of two and three-shift education at schools remains problematic. After decreasing steadily, the past year saw the share of those attending second or third shifts at schools increase, from 12.6% in 2016/2017 to 12.7% in 2017/2018. In total, two and three-shift schooling affects around 1.9 million Russian pupils.

Fig. 1.10. Average number of students per class in primary and secondary schools in OECD countries, 2015



Source: OECD.

Fig. 1.11. Decrease in the percentage of school students attending second and third shifts (%, right axis), in context of increasing student numbers (thousands, left axis)

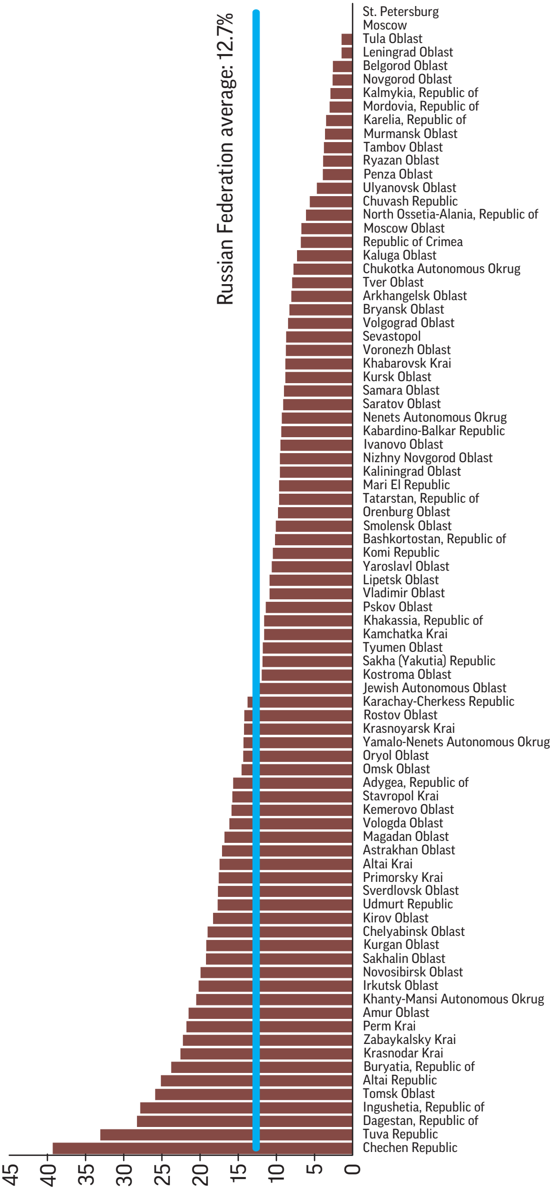


Sources: Rosstat, Ministry of Education and Science.

The problem of multiple shifts is felt more acutely in urban districts, where 13.7% are affected. In rural areas, the figure is significantly lower (8.2%).

Regions vary widely in terms of their ability to provide single-shift education (Fig. 1.12). In 2017, the regional figures for students

Fig. 1.12. Relative shares of students attending second or third shifts as a percentage of all public school students, 2017



Source: Ministry of Education and Science.

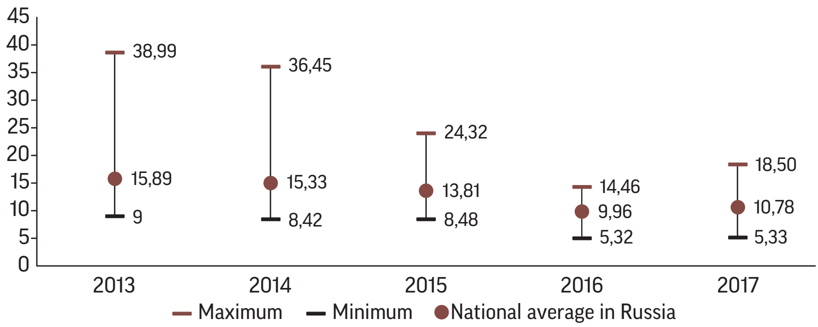
attending second or third shifts range from 0% in St. Petersburg (the only region with this number) and 0.05% in Moscow to 39.5% in the Chechen Republic.

Up to 2017, the decrease in shift schooling coincided with a reduction in square footage of classroom space per student. Until 2017, this statistic was calculated for purposes of education quality oversight as a ratio of the total floorspace of all school buildings to the number of students. Recent years have seen a decrease in this number, a 32.2% fall from 15.9 m^2 in 2013 to 10.8 m^2 in 2017.

The floorspace of school buildings has been taken advantage of to compensate for the increase in numbers of students. However, a more accurate reflection of school conditions would be produced by measuring classroom space only. This figure for 2017 shows a mere 4.4 m^2 per student, which shows the limited capacity of excess classroom space as a resource for helping reduce the prevalence of multiple-shift schooling.

The process of making more efficient use of school building space has resulted in a narrowing of regional difference in terms of space per student (Fig. 1.13).

Fig. 1.13. Range of regional figures for school building space per student in public schools (m^2)



Source: Education System Monitoring (MSO).

In 2017, the range of school building space per student between the highest and lowest regional figures was 13.17 m^2, which is significantly less than the 29.86 m^2 range in 2013.

The problem of proximity remains the most pressing barrier to access, but it is not significant for the majority of Russian families. Surveys in the 2016 Monitoring of Education Markets and Organizations show that proximity to the home was the decisive factor in school choice for 56% of parents. More than half (57%) of parents said they made their choice in advance, and had other options within their city or town. In 2013, 43% of parents had such a choice.

School system restructuring policies

School system restructuring is one of the most widespread types of education reform. It has been used to address a variety of challenges, such as optimizing public budget expenditures. This has been done especially in situations of demographic decline in school-age children, both countrywide and in specific regions. Other challenges addressed through restructuring have included initiatives to equalize access to quality education, combat segregation, and lowering region-to-region inequality. Consolidation, which is the most common form of restructuring, has been implemented at various times in the USA, Europe (Spain, France), Canada, and Singapore. This has been done largely in urban districts; Latvia, where rural consolidation was conducted, now completely lacks rural schools. In general, consolidation is used to increase levels of funding and education quality. The education reforms in Great Britain conducted under Tony Blair's cabinet were aimed at reducing the number of low-performing schools. Some of the lagging schools were closed, while others were merged with stronger schools.

However, there have also been moments where school system restructuring went in the opposite direction. In the USA, for example, a period of school consolidation was followed by a period for support for increased school variety. Charter school networks were created as alternatives to the existing system, and in some cases there was even a process of breaking up large schools into smaller ones. In recent years, there has been a trend towards softer forms of restructuring, or "network organization," which involves creating local networks or specialized clusters, as well as "school federations." By concentrating funding and expertise, these schools seek to improve resources for students and boost outcomes.

The same principal set of approaches to school system restructuring seen in other countries also applies to Russia, perhaps the one standout being the practice of merging underperforming schools together to improve outcomes. However, the school system restructuring initiatives in Russia have been complex. The primary goals of increasing access and quality went alongside (and in competition with) the goals of budget efficiency.

The history of school restructuring in Russia can be broken down into discrete stages.

A slow reduction in the number of schools began in 1991. According to the Federal State Statistics Service (Rosstat), in 1991 there were 69,700 schools in Russia, and by 2000, that number fell to 68,100. The relatively insignificant drop in school numbers is notable given the fact that school funding fell substantially:

- In 1992, federal spending on education was 4% of GDP, which in constant prices is 62% of the figure for 1991[1]. In 2000, federal spending was 3% of GDP, which in constant prices was just 40% of the education budget in 1991.
- Employees in the education system saw their compensation drop significantly. In 1992, average wages in the education sector were 62% of the average for the whole economy, equal to 176% of the minimum cost of living. In 2000, average wages in education were just 54% of the average for the economy, equal to 85% of the minimum cost of living[2].

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[1] Calculations based on statistics for the Russian Federation.

[2] Data from Rosstat and the Federal Treasury (Roskazna), see: <http://www.roskazna.ru/>.

It's clear that the idea of cuts in school spending being directly linked to a reduction in the number of schools is an erroneous one. The more large-scale reductions in the number of schools began only after 2001, when the education budget began to increase. The network of 68,100 schools that existed in 2000 was reduced to about 50,100 by 2010. A large share of the reduction came from rural schools, of which about 17,200 were closed between 1995 and 2010. The number of urban schools fell by just 1,900 in this period. Thus, the first high-intensity stage of school system restructuring began in the 2000s, starting with the optimization of rural schools.

The school system restructuring that went on between 2000 and 2007 is best explained in the context of the serious drop in the numbers of school-age kids that came out of the demographic crisis of the 90s and early 2000s. This demographic gap was felt across the entire country, aside from several localized growth spurts in the school-age demographic, mostly in large cities. Rural areas felt the brunt of this crisis, where dwindling populations of school-age children led not just to empty schools, but also to empty towns and villages. Under these conditions, school system restructuring became inevitable, especially in cases where rural schools had more teachers than students, or a roughly equal number. In the fall of 2003, the Government of the Russian Federation passed legislation to streamline federally funded organizations.

The following measures were taken:

1) consolidating the network of active recipients of federal funding

2) reviews of legal status and reorganization of publicly funded organizations

3) transition to new forms of financing for providers of government services

4) implementation of results-oriented budgeting

After the 2003 law No. 131-FZ (edited 05.12.2017) "Concerning the General Principles of the Organization of Local Government in the Russian Federation" was passed, there was a mandate to transfer preschool and K-11 general education, as well as extracurricular programs, to local governance.

The process of optimizing the nation's network of schools developed along multiple vectors, responding to the following factors:

- The demographic situation, which led to a decreased student load on schools, with many rural schools emptying entirely.
- A reallocation of budget functions and responsibilities, in context of a nationwide policy of budget modernization and efficiency. This included a ban on dual funding for public institutions.
- Increasing access to quality education due to a concentration of resources in larger schools and improved bussing.

The reforms in Samara Oblast became one of the most popular examples of K-11 school system restructuring of that period. The decrease in school numbers coincided with a redistribution of districting authority, whereby several municipalities could be unified into districts. This allowed for resources to be concentrated in larger schools, creating the conditions for quality education.

A number of school systems in the central part of European Russia, as well as Siberia and the Far East were significantly consolidated. This went along with a new bussing program called "School Bus."

This period of restructuring was marked by several distinctive models. In the majority of cases, school buildings were preserved, while organizations were merged or smaller schools incorporated into larger ones as branches (usually with a decrease in the number of grade levels). If a school closed, bussing was offered to another town or village. Alongside the successful Samara districting model, which was implemented under a dual municipal-regional governance, one may also look at the Sakha (Yakutia) Republic model of sociocultural networks, which brought together resources for extracurricular education. Also in this period, nomadic education centers were tested in northern regions, while in mountainous areas of the

North Caucasus a school-network model alleviated the lack of teachers by offering instruction via satellite link.

However, the most practical model remained the combination of bussing and branch networks, which was applied first and foremost to rural schools.

The next phase of school system restructuring and budget streamlining began in 2005, and took on a greater magnitude with the national priority project "Education." This involved a multi-vector approach to modernizing education. This phase was linked to new, per-student budgeting principles (normative per-capita financing, or NPF). NPF was designed to calculate funding for organizations that provided government services under a unified methodology, multiplying the standard cost of a given service by the quantity of that service rendered. As NPF came into effect, it became clear that bigger schools were in an advantageous position. De facto, the NPF rules acted as a powerful restructuring force across the whole country. It drove a continuing fall in the number of schools, especially rural ones, and continued the upward trajectory of school size. In general, this initiative also helped solve another, related challenge, which was tied to the NPF issue: the transition to the New System of Labor Compensation (NSOT) for teachers. The dawn of NPF and NSOT was also accompanied by new support for developing school autonomy. The law #174-FZ of November 3, 2006 (edited 27.11.2017), "On Autonomous Institutions," became the template for future legislation on state-financed institutions in general. The law supported a shift towards independent budget planning and greater spending freedom. While this specific law was not widely applied (with the exception of large, financially independent urban schools that could become autonomous without fear of budget cuts), it did serve to intensify the process of school system restructuring.

The third stage of restructuring began in 2010. A new law on public (municipal) institutions aimed to change the legal status of existing organizations that were capable of functioning on a free market basis without being reorganized, as well as to create conditions and stimuli for them to cut expenses and increase efficiency. The initiatives included:

- changing the funding mechanism for public institutions with expanded rights, and from January 1, 2011 moving them from budgeted financing to a subsidy system for providers of government services;
- allowing state-financed institutions to engage in profit-generating activities, with profits flowing to the institution's independent budget;
- removing the state's subsidy obligation for institutions with expanded rights; and
- increase the rights of public institutions vis-a-vis the portable property at their disposal (excluding a list of highly valuable items established by the local government).

In essence, this law created a normative base for intensifying the restructuring of individual schools. Meanwhile, the extensive restructuring of school systems carried on. This was related to the uneven tempo of school system consolidation among the various regions. The consolidation went most quickly in regions with a large share of rural schools, followed by regions that participated in the Integrated Project for Education Modernization (KPMO). Finally, in 2009, when the economic crisis hit, regions that were previously reluctant to consolidate school systems were forced to do so in order to keep their salary obligations and maintain per-capita funding levels. As a result, the decrease in the number of schools continued at almost the same level as during the early 2000s. Existing legislature stimulated this process by giving governments the ability to simplify procedures for closing, merging, or absorbing schools. Administrators were able to establish precedent for maintaining control over per capita budget allocations while redistributing resources during school closing or reorganization, as long as they maintained the total amount and quality of services rendered.

The period when these laws came into effect also coincided with another important process that also catalyzed school system restructuring. The MRSO Project (Modernizing Regional Education Networks) aimed to level teacher salaries with the average overall income in each region. With limited funds and a formula-based budget system, it became obvious in many regions that school consolidation was the best way to fulfill this social obligation. However, the process of school system restructuring in the interest of budget efficiency was not just a simple calculation. It was not merely a matter of school consolidation, budget conservation, and boosting salaries through increased teacher workload and more students. In Moscow, which carried out a major school system consolidation from 2010 to 2015, we see that consolidation enabled administrators to meet several important challenges, including:

- creating a system of horizontal school system management, thus maintaining school autonomy;
- increasing access to high-quality education for all; and
- as a result, improving education outcomes.

From 2010 to 2017, the total number of schools decreased from 48,700 to 40,600.

As before, the main type of reform was creating networks of branches, such as in Tambov Oblast, where rural schools became branches of urban ones, as well as bussing. However, the restructuring model used widely in Moscow, where schools were merged into large educational complexes, was also used in other regions with urban systems. A small number of regions made use of the “teacher’s house” and “mobile teacher” formats.

After the conclusion of the MRSO project in 2013, the following emerged as new factors in the restructuring and budget cutting process:

- goals announced by the President of the Russian Federation in his May executive orders, and

- the economic crisis of 2014–2016, which shrank the pool of education funding in the country while new orders and established norms had to be adhered to.

As a result of these stages of school system restructuring in the 21st century, Russia was able to increase the efficiency of education spending and bring its per-capita spending in line with other countries of similar economic profiles. A majority of rural children were able to gain access to higher quality education. On the other hand, the reduction in the number of schools in some cases had negative effects on students, such as when the costs of transport to a faraway school outweighed the benefits of the education provided there. School closings also hurt the social well-being of small towns and villages in many areas: when a school acted as a social and cultural center, its closing pushed young people to move away.

1.2. Infrastructure and conditions of Russian schools

Condition of school facilities

In 2017, the share of school buildings across Russia needing major repair was 14.7%. This figure has moved little in recent years, plus or minus two percentage points. The group of regions in which this percentage is significantly higher than average is of interest, as is the group of regions in which there are almost no such buildings, or an insignificant number (Fig. 1.14).

The first group of regions includes the North Caucasus republics, the Sakha (Yakutia) Republic, as well as Crimea and Sevastopol.

The figures on school building in states of critical disrepair are more encouraging. The share of schools with critically compromised buildings is only 0.8%. More than half of Russian regions have no such buildings.

In the aim of providing all students with basic facilities for schooling, the trends are relatively positive (Fig. 1.15). However, it's unacceptable for a country that seeks positions of global leadership

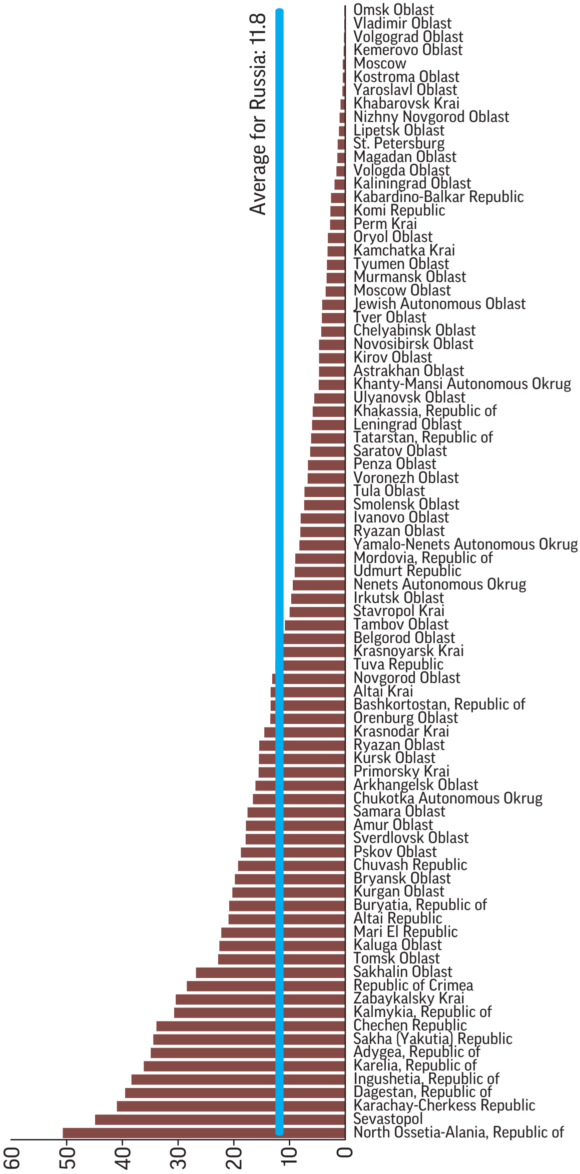
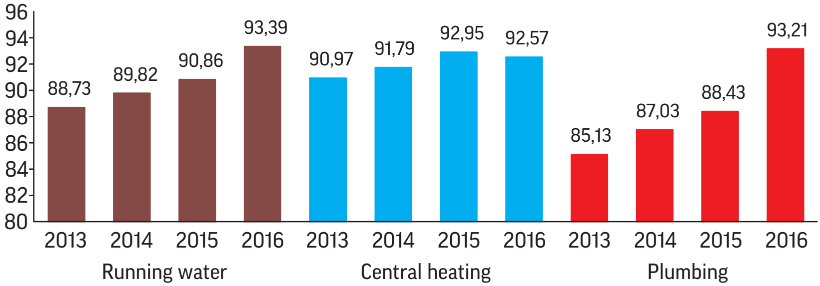


Fig. 1.14. Percentage of school buildings in need of major repair

Source: Ministry of Education and Science.

Fig. 1.15. Percentage of schools with running water, central heating, and plumbing



Source: MSO.

in the 21st century to have 6.6% of its schools (2,723) without running water. 7.4% (more than 3,000) of Russian schools are without central heating, and 6.8% (more than 2,800 schools) lack plumbing. In 2017, about 11.5% of school buildings (7788) were without running water, 12.5% (8521) were without plumbing, and 9.5% (6371) lacked central heating.

It's interesting to note that in 2015, when the data made it possible to see the share of schools that offered all facilities, there was a quite significant inverse relation between this figure and the number of schools that required major repair or were in critical disrepair. The more buildings in a given region that needed major or critical repair, the fewer schools there were in that region that offered all facility types. This may serve as evidence of widespread deterioration of school facilities in a number of Russian regions.

Conditions for meeting the Federal Education Standards

The new Federal Education Standards (FGOS) were the first to include minimums for facilities and technology for providing basic education. However, there were no mechanisms developed to guarantee the fulfillment of the new standards. In fact, there is not even a real system of monitoring their fulfillment. In 2017, the HSE's Institute of Education created an index of education infrastructure for

Russian regions, which became the first attempt in Russia to assess the conditions needed to receive a quality education by FGOS standards. This index shows the specificities of each region as an aggregate of measures of education infrastructure. These measures characterize different aspects of education infrastructure, including the school systems: personnel, condition of buildings, school equipment, informational and curricular materials, and providing conditions for students with special needs. In addition, the statistical and monitoring data allows one to look at individual aspects, like conditions for physical education and sport.

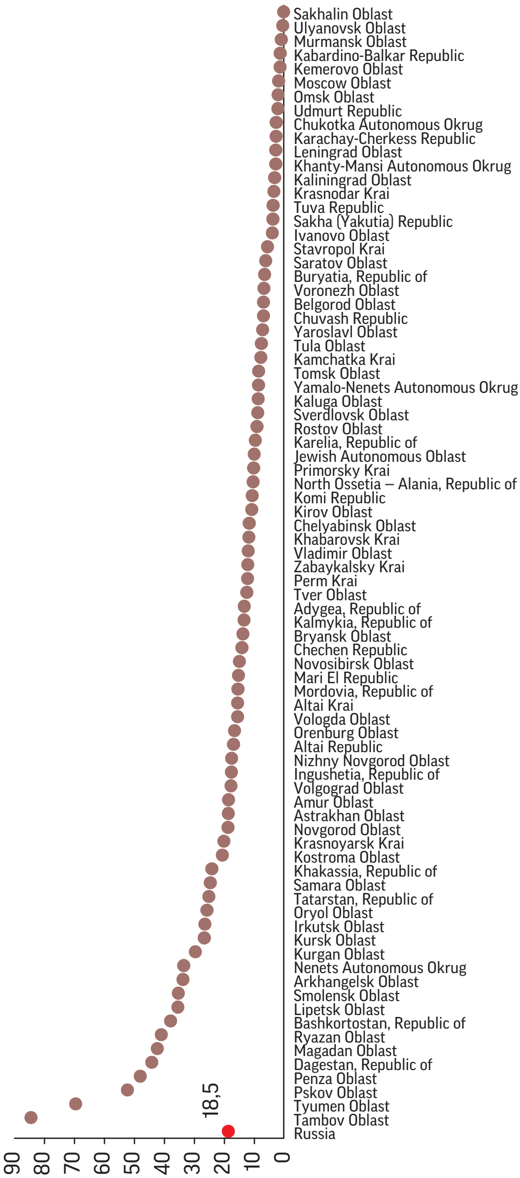
According to Federal statistics, more than one in ten Russian schools (11%) don't have a gymnasium. Some large schools only have one gym space, which seems to make it impossible to fulfill the FGOS requirement of three phys ed classes per week for each grade. The practice of two classes sharing a gymnasium during phys ed sessions is commonplace.

Insufficient facilities led to a rule change in 2016 that allowed schools to swap one of the three phys ed sessions for a sports or fitness activity. This change reduced the load on gym facilities, but did not solve the infrastructure gap. A significant number of schools are located in difficult climates that don't always allow for outdoor activities.

Many small rural schools teach phys ed classes in special rooms which have the necessary equipment, and sometimes even exercise machines. But the size of these rooms does not match the standard of a gym space, and they are not counted in the education statistics. Indirect confirmation of this comes from the large gap in many regions' data between urban and rural districts in the share of schools that have a gymnasium (Fig. 1.16). In Sakhalin Oblast this gap does not exist, but in Tambov Oblast it's 83 points. In all cases, the gap is in favor of urban schools.

Only 4.17% of Russian schools today have swimming pools. More than half (52.1%) of schools lack a facility for the track and field por-

Fig. 1.16. Differences between urban and rural in the share of schools that have a gymnasium, 2017 (%)

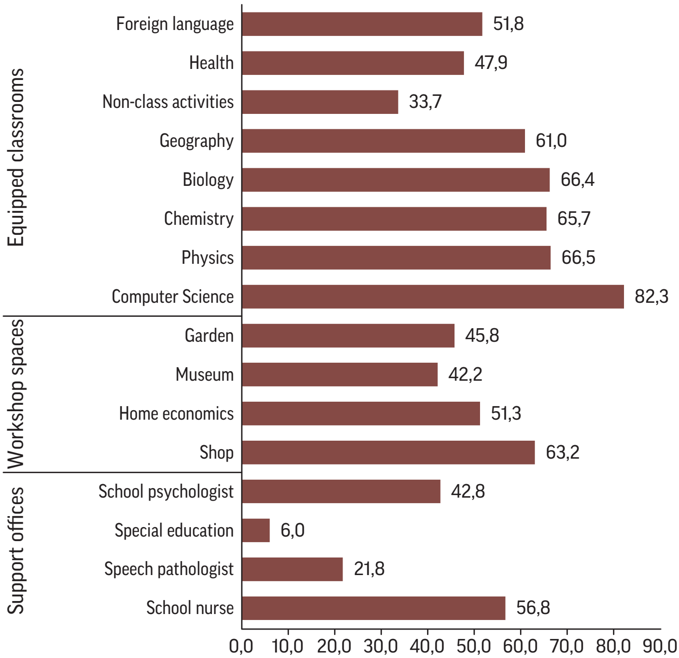


Source: Ministry of Education and Science.

tion of the phys ed curriculum, which is a serious problem for schools. This challenge can be addressed with a much smaller investment than the issue of swimming pools.

The situation with facilities for programs other than physical education, including those for different categories of students, looks even worse (Fig. 1.17).

Fig. 1.17. Percentage of schools with specially equipped spaces, 2017



Source: Ministry of Education and Science.

Computer science classrooms are the only specialized facilities present in more than 82% of schools. Of course, this is a result of school computerization initiatives, which were implemented in several stages.

A deficit of equipped facilities makes it impossible to successfully implement programs of specialized curriculum, to teach all students modern literacy and key skills, to support highly motivated and advanced students, etc. This increases the importance of developing online schools, distance learning, and electronic educational resources.

48.7% of schools lack facilities for home economics, almost 37% don't have a shop facility, and more than half lack a school garden. Only 58% of rural schools and 26% of urban ones have gardens. All this places limits on effectively teaching technologies and conducting pre-professional training.

Support offices (nurse, psychologist, social counselor) are lacking in the majority of schools. Only 43% of schools have a psychologist's office. As in many other areas, rural schools lag far behind urban ones in having facilities for support services. In some cases, a school may have all the necessary offices, as well as an auditorium and gymnasium, but these cannot be used for their intended purposes because of the large number of students and a two or three shift schedule. In a number of regions, we find instances where schools have offices for speech pathologists and psychologists, but no staff to fill those positions, full time or part time.

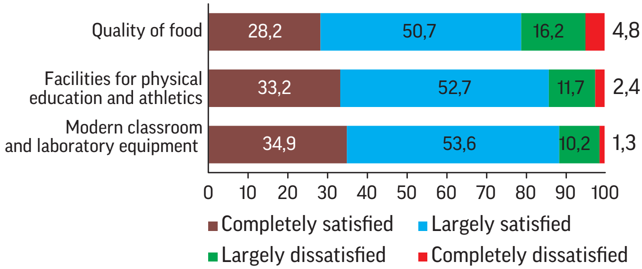
Having the proper facilities is only the tip of the iceberg of educational infrastructure.

It's impossible to determine whether these facilities have the necessary lab equipment, instruments, teaching guides, chemicals, specimens, samples, models, etc. The only way to learn about this is through population surveys.

According to teacher surveys conducted in 2016 by the HSE's Monitoring of Educational Markets and Organizations, 15.6% of respondents said they were unhappy with the "low level of resources and technologies (library, computers, laboratories, shop equipment, etc.)" at their school.

In the same monitoring study, 14.1% of parents surveyed about their level of satisfaction with the conditions in which their child was being educated expressed some level of dissatisfaction with classroom facilities, and 11.5% were dissatisfied with physical education facilities. The greatest level of dissatisfaction was with school cafeteria food, at 21.0% (Fig. 1.18).

Fig. 1.18. Parents' responses to a question on their level of satisfaction with different conditions of schooling, 2016 (%)



Source: MEMO.

According to monitoring done by the RANEPA Center for Lifelong Learning Economics in three Russian regions (2017), only 58.7% of parents are satisfied with the condition of their child's school buildings, and 55.8% indicate a good level of safety at school.

The challenge of creating modern learning conditions in Russian schools has been at the center of national education policy in the 21st century. A significant portion of the funds from the national project "Education," which was aimed at modernizing regional school systems, went to building repairs and purchases of computers and laboratory equipment. A program called "Reconstructing school gymnasiums in rural schools" was implemented. However, despite evident progress, the problem of school infrastructure failing to meet FGOS guidelines remains one of the key challenges, and demands long-term system-wide solutions.

The individualized approach and specialization in secondary schools

The individualized approach and specialization are internationally widespread practices with many years of tradition. In practice, specialization is a concentrated form of the individualized approach, which allows schools to take into account each student's strong suits as students choose an academic trajectory and a professional future for themselves. In France, for example, specialization has more than 100 years of tradition, organized through levels of education in which the highest level becomes specialized. Differentiation begins already at the elementary school level, and increases incrementally through choice of subjects. These choices act as a testing period for orienting students in their eventual choice of specialization. At the lyceum stage, which is the highest level of the French "college" system, students choose a path according to their chosen profession. Either a general education or technical track may be chosen, within which sections are chosen (humanities, natural sciences, social and economic sciences, industrial technology, computer science, etc., with 21 sections in all).

Such deep specialization is not the norm in American schools, where differentiation occurs on the college and university level. American schools offer individualized schedules, where students can choose classes in a large range of disciplines that are grouped in subject areas. These have an active orientation towards professions, and disciplines may be studied in school at a college level, with college credits being recorded on high school transcripts. For American high school students, there is no such thing as a single, mandatory schedule or a uniform class group. Everything is regulated only by class periods and individual class schedules.

Chinese schools also feature a system of specialization at the high school level. Since Chinese high schools are not mandatory and require tuition, the choice of track is a high-stakes moment in life.

Global trends in specialization and individualization in education are related to the following phenomena:

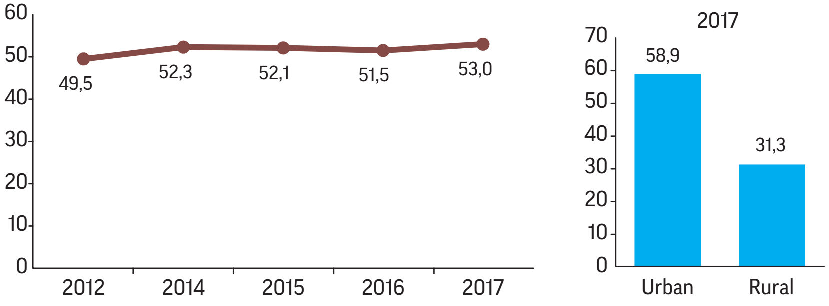
- The rise of distance learning programs and participation of school-age students in global education programs run by universities for their potential applicants;
- Active erasure of the boundary between education in school and outside the school;
- The rise of project-based and research-based approaches that individualize educational trajectories through activities based around laboratories, museums, theaters, companies, or manufacturers. STEM programs in the USA are often based on such approaches.

Overall, Russia has taken the "tracking" approach, differentiating educational paths into academic and vocational tracks after 8th grade. However, the attempt to create a true specialization system has not come to full fruition even within the academic track, which continues through high school.

The primary model of individualization of education in Russia has become "profilization," or specialization in the higher grades. The choice of "profiles" gives upperclassmen the opportunity to go deeper in subjects of their interest with a view to prepare for and apply to universities. This idea emerged in the period preceding 2010, and was formalized in the 2002 document "Conception for Profile-based Education at the Highest Level of General Education." After several years of pilot programs, the model was included in the FGOS for high schools, which is only now beginning to be implemented.

The percentage of students in specialized tracks over the past few years has remained at about the same level as before the new FGOS came into wide effect (Fig. 1.19). The limited resources at rural schools, especially in terms of teaching staff, means they are lagging far behind in this process. In urban areas, 58.9% of upperclassmen are on specialized tracks, while in rural schools the figure is only 31.3%.

Fig. 1.19. Share of 10th–11th graders participating in specialized tracks (%)



Sources: Rosstat, Ministry of Education and Science.

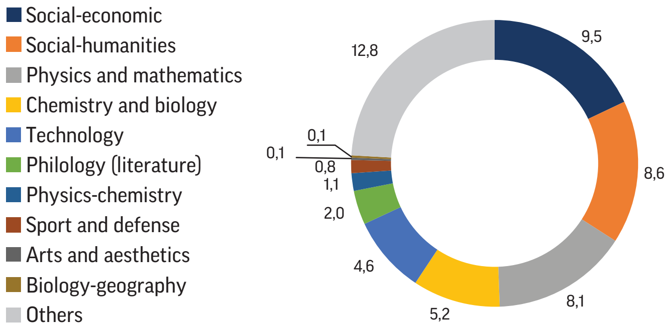
The new federal school standards for 10th and 11th grade students set out five profiles: natural sciences, humanities, social and economic sciences, technology, and universal. Engineering and medical profiles are currently being developed, but only a few individual schools offer them at this point.

In 2017, many Russian schools offered upperclassmen tracks that were combinations of the options listed in the FGOS. According to federal education statistics, there were 45,958 classes (groups or cohorts) in specialized profiles. This comprised 743,018 upperclassmen, which makes up more than half (53.0%) of the overall number of students enrolled in 10th and 11th (or 12th) grades. The distribution of upperclassmen in the various profiles is shown in Fig. 1.20.

The most popular profiles are social-economic (9.5%), social-humanities (8.6%), and physics-mathematics (8.1%). The leading specialization within the technology profile is information technology. The least popular are arts-aesthetics and biology-geography, which correlates with the low results shown by Russian students in natural sciences in the internationally comparative PISA studies.

It must be admitted that students attending regular high schools still have a limited ability to get a specialized education based on their individual interests and strengths.

Рис. 1.20. Distribution of upperclassmen (10th & 11th grade) participating in specialized tracks, 2017 (%)



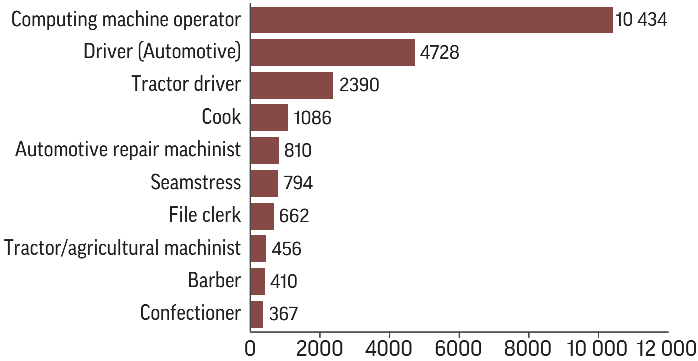
Sources: Rosstat, Ministry of Education and Science.

A very small number of upperclassmen have the chance to complete professional training programs. The total number of participants in these school-based professional programs (including graduates and those that withdrew for various reasons) is only 30,045, which is 2.1% of the total number of students enrolled in 10th–12th grades. Here Russia lags significantly behind the average for developed countries. However, this gap is compensated by the system of vocational training. If one counts the first two years of vocational school in this figure, Russia rises above the OECD average.

The most widespread of the school-based professional training programs remain driver, tractor driver, computing machine operator, cook, and metalworker (Fig. 1.21).

Russian schools today don't fully meet the needs of teenagers for choosing their educational path before graduation and finding their chosen career. According to a 2017 survey by the All-Russian People's Front (ONF), almost 32% of school-aged teenagers felt that they lacked deep subject knowledge. Half of them indicated that their schools conducted profession-oriented tests intended to identify interests, abilities, or character traits to help with career choice. However, one in five said that their school does nothing to help them

Fig. 1.21. Top 10 most popular school-based professional training programs, 2017 (number of people)



Sources: Rosstat, Ministry of Education and Science.

choose a profession, even if the school has specialized cohorts. Almost 29% said they didn't have a good enough understanding of what they wanted to do in the future. 28% indicated a lack of classes offered in their chosen field, and 26% said their school did not invite speakers or organize meetings with interesting, successful people. A majority of school-age teenagers expressed a desire to work or intern before the age of 18[3].

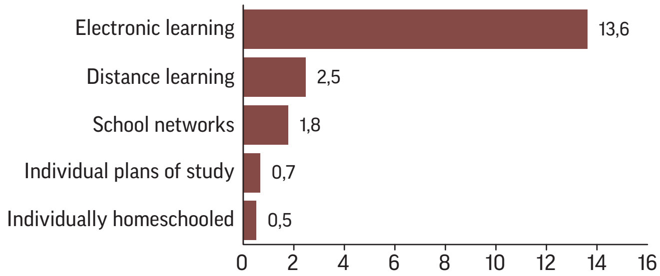
One of the key tasks for schools today is to pay more attention to supporting the professional self-actualization of their students and to modernize the forms and methods of doing so. In February of 2018, Russian president Vladimir Putin gave a directive to the Government and the Agency for Strategic Initiatives (ASI) to implement a project for professional orientation for 6–11th graders called "Ticket to the Future," starting in 2018.

The federal law "On Education in the Russian Federation" established the principle of variation of forms of education, leaving a fair-

[3] See: <https://onf.ru/2017/12/15/opros-onf-pokazal-chto-shkolniki-ne-udovletvoreny-kachestvom-svoih-znaniy-i/>.

ly wide spectrum of opportunities for families, school students, and schools. However, today these opportunities are made use of on a rather limited scale (Fig. 1.22). Less than 1% of students have an individualized schedule or curriculum, and only 2.5% make use of distance learning technologies, despite the fact that the MRSO Project of 2011–2013 actively supported and directed federal funds to distance learning.

Fig. 1.22 Percentage of school students being educated through school networks, electronic and distance learning, individual plans of study, and homeschool, 2017 (%)



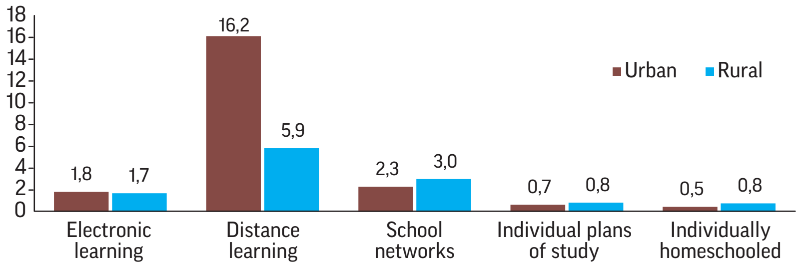
Sources: Rosstat, Ministry of Education and Science.

The prevalence of these forms, programs, and technologies in schooling differs significantly between urban and rural schools only in the case of electronic education (Fig. 1.23). A large gap is evident in providing electronic tools for education: 16.2% in cities vs. 5.9% in rural areas. However, in distance learning it is the rural schools that take the lead, 3% vs. 2.3%.

Conditions for educating special-needs and disabled students

In recent years, special attention has been paid to schooling for differently abled students. In 2017, 4.0% of school-age children and teens had health-related limitations, including disabled students. According to Russian law, they have the right to education in differ-

Рис. 1.23. Percentage of school students being educated through school networks, electronic and distance learning, individual plans of study, and homeschool, in urban and rural areas, 2017 (%)

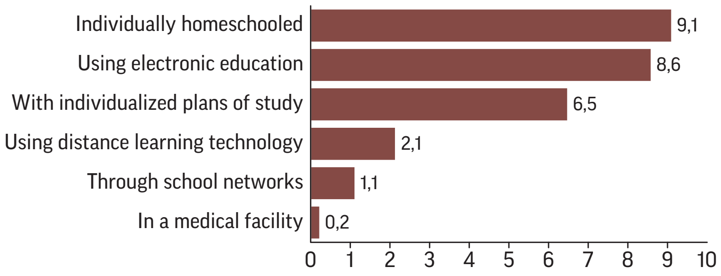


Sources: Rosstat, Ministry of Education and Science.

ent forms: in a special-needs class; with a specially adapted curriculum (programs adapted to health limitations); with individual plans of study in special-needs classes, as well as through homeschooling.

The most popular option are the adapted programs (Fig. 1.24). Individual homeschooling retains its significance. Programs using electronic education are increasing in importance. However, networked schools and distance learning technologies are still not implemented and do not see high demand.

Fig. 1.24. The percentage of special-needs and disabled students getting schooling via different formats and technologies, out of the total number of special-needs and disabled students enrolled in schools, 2017



Sources: Rosstat, Ministry of Education and Science.

These numbers do differ significantly region to region (Fig. 1.25). These differences are partially due to socio-cultural and ethnic traditions, some of which don't allow for students to be placed in group homes. The more significant differences, however, stem from the fact that a number of regions, largely in the North Caucasus, lack specialized education facilities for special-needs students.

Federal education statistics don't provide many options for assessing the infrastructure for educating special-needs and disabled students. Practically, it's only possible to check the presence of listed facilities, and even that is quite relative. In the past, a school with multiple buildings might only have one of them equipped for disabilities and special needs, and still be considered to meet the conditions as a school.

Today, the assessment is applied to each building, rather than to the school as a whole (Fig. 1.26), which makes it more reliable and informative.

At the moment, the very concept of "access for people with disabilities" remains relatively ill-defined.

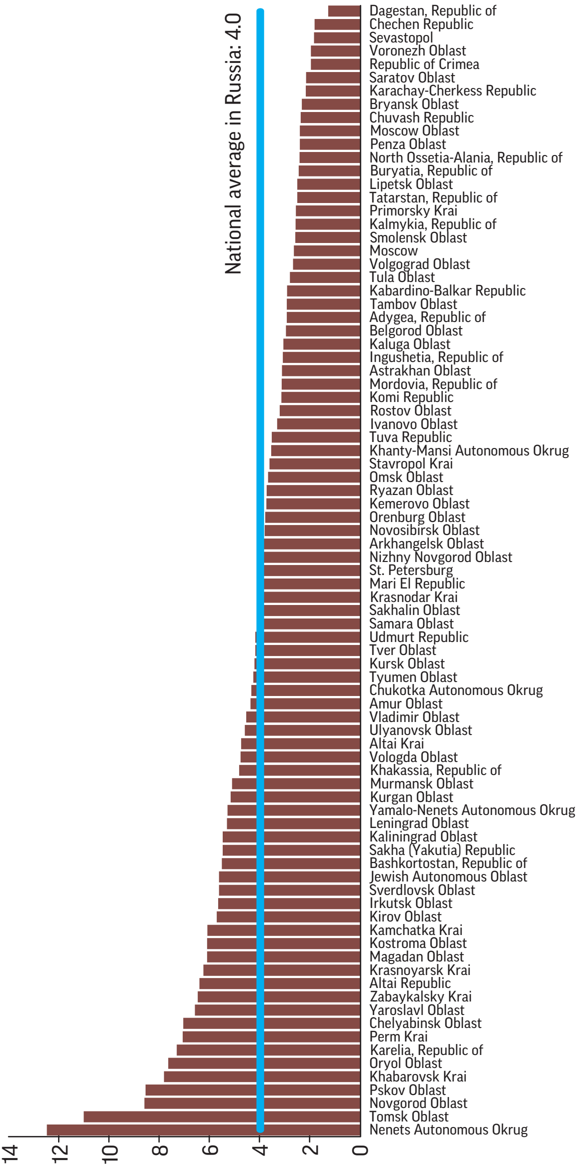
On a regional basis, there is a clear link between schools providing access to disabled students and the renovation of buildings. This leads one to assume that orders for school renovation in recent years come with mandatory inclusion of access for the disabled.

Federal policy on providing quality conditions for education

In the first decade after the collapse of the USSR, there was a systemic economic crisis that shook all sectors of the economy, as well as the social sphere. In this context of huge budget deficits, the government was unable to keep up with the decay of the material and technical infrastructure for schooling. In the middle of the first decade of the 21st century, as the economy began to grow, the question of modernizing the conditions for education became part of policy debates.

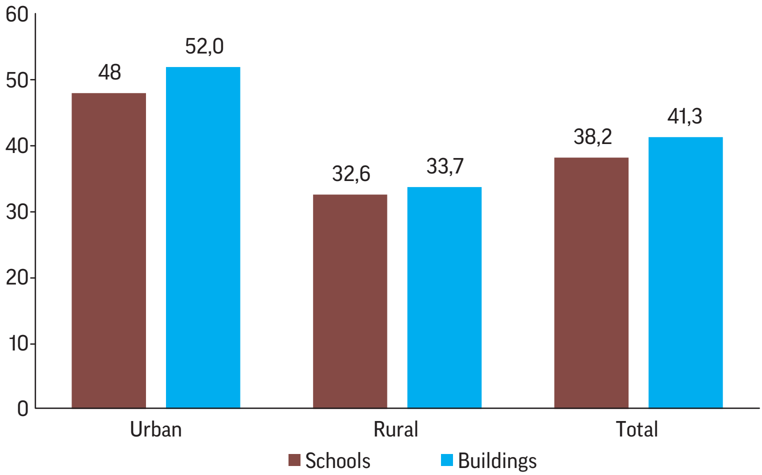
In 2005, Russian president Vladimir Putin announced a series of national priority projects, one of which was the project called "Edu-

Fig. 1.25. The share of special-needs school students across all grade levels, out of the total school-age population, 2017 (%)



Source: Ministry of Education and Science.

Fig. 1.26. Percentage of buildings (2017) and schools (2015) that are equipped for access to people with disabilities (%)



Sources: Rosstat, Ministry of Education and Science.

cation," or PNPO. One of the main goals of PNPO was to "create a new environment for schooling for the whole country," and it included such sub-projects as "connecting schools to the internet" and "bringing school buses to rural areas." For most schools, the modernization of infrastructure was carried out via grant support, with schools that were carrying out innovative education programs being awarded grants of one million rubles.

In 2007–2009, the PNPO oversaw multifaceted projects for modernizing education. 31 constituent entities of the Russian Federation took part in these projects. The key aim was to create modern conditions for providing universal access to quality education. More than 15 billion rubles were allocated from the federal budget, of which more than 80% were spent on equipping rural schools with basic needs like furniture, classroom equipment, and school buses.

A key component of the PNPO was providing information and communication technologies. A pilot program called "computerization of the education system," carried out with support from the World Bank, was used as the basis for effective solutions which created a rate of school computerization that led all European countries. In just several years, the penetration of computers into schools became several times more widespread than before. In three years, hundreds of thousands of teachers received additional training and began to use information and communication technologies.

The PNPO led to a significant increase in the share of students being educated under modern conditions. Schools with modern technologies and classroom equipment, as well as sports facilities and internet connections were built in rural areas.

The outcomes of these multifaceted projects came to define the direction of Russian national policy for improving schools. This was formalized in the national education initiative "Our New School," launched in January 2010. The initiative described Russian schools as "run-down," and set a goal to create modern infrastructure as a condition for providing access to quality education.

The project of modernizing regional education systems resulted in unprecedented levels of funding, from both federal and regional budgets, being directed towards compensating for the obvious deficits in school infrastructure. In total, 120 billion rubles were allocated from the federal budget, and 80 billion from regional budgets. Between 2011 and 2013, subsidies from the federal budget to constituent entities of the Russian Federation, within the framework of the project to modernize regional school systems, were provided for co-financing activities developed by each region, with infrastructure and professional development taking the lead.

The measures taken by regions to modernize their school systems included continuation of work that began under the National Priority Project "Education," aimed at improving the quality of education at schools and giving them more resources. More than 20,000 schools underwent needed repairs, and almost 10,000 were fully renovated or rebuilt.

School buses were purchased, including those with GLONASS navigation systems, as well as computer equipment. Internet connectivity was modernized. It must be said that the purchasing policies were not always efficient and well thought out. This, plus the fact that training for staff to use the new equipment was not always sufficient in quantity and quality, led to some of the equipment not being used to full effect in schooling.

The project was the first successful attempt to standardize school infrastructure. The majority of regions achieved an established minimum level of school facilities. A significant portion of the rural population saw their schools equipped with transport, plumbing, and internet. In this sense, the project was also a tool for modernizing the social infrastructure of rural areas, and increasing quality of life.

At the same time, the period of 2006–2013 often saw the priorities of universal access and quality take a back seat to priorities of increased fiscal efficiency and attempts to save money.

In recent years, the federal government's attention has been directed towards the problem of second and third shifts. Schools operating in two and even three shifts create a barrier to achieving the quality of education described by policy, and represent a barrier to accessibility. Such schools are limited in providing after-school activities and in offering additional education services to their students.

Students that study at one-shift schools, on the other hand, have increased opportunities to visit children's libraries, museums, cultural centers, theaters, and engage in tourism. In addition, school buildings can be used in the second half of the day to meet other, socially significant needs of the population.

Because of this, in 2015 a program was launched to create new space at schools in Russian regions, based on estimates of future need. The program is aimed at creating new spaces at schools based on need and on the demands of modern learning conditions, so that grades 1–11 (12) in the Russian Federation can be offered on a one-shift basis. In 2016, 50 regions had already taken part in the program.

As of January 2017, federal funds from the 2016 budget have paid for 61 new school buildings in 48 regions. The federal subsidies have created 57,600 new spaces.

From 2017, these challenges have been addressed in the framework of the priority project “Modern Learning Environment in Schools.” In 2017, a total of 25 billion rubles in federal subsidies were given to 57 constituent subjects of the Russian Federation.

One of the main vectors of federal education policy in recent years has been creating conditions for the disabled and those with health-related limitations to have the right to education in general, and inclusive education specifically. Within the federal program “Accessible Environment,” conditions for inclusive education of special-needs students were created in 6000 schools.

In a significant number of regions, disabled children and teens who got their education at home and had no health restrictions on using a computer were included in the program “Distance Learning for Disabled Children.”

The Ministry of Education and Science’s order of December 19, 2014, No. 1598 established the FGOS for schooling for special-needs students, which came into effect on September 1, 2016. The standard laid out mandatory conditions for elementary schools in carrying out adapted curricula, with varying demands based on the specific needs of special-needs students. This was the first such detailed regulatory document in Russian educational practice. Next up will be the establishment of special mandatory conditions for special needs students in middle and high schools.

The learning environment

Our concept of the learning environment has been changing in recent years, and these changes are linked to the realization of key changes in the environment’s role in education. Contemporary education is first and foremost an environment that has been formed by cultural education traditions. At the same time, the education environment itself forms culture and expands the borders of these traditions.

The reality is that the learning environment today is as important a source of learning and personal development as the teacher. According to students, it sometimes even plays a bigger role than the teacher. The environment shapes the motivation for learning, creates the conditions for reaching educational goals, and provides the resources needed to support the learning process. Today, expectations for the learning environment are growing, both on the part of governments and on the part of the public. The learning environment includes good books, well-designed teaching aids, games, and the teachers themselves. It includes all the spaces in which learning takes place: the school, the home, as well as the virtual realm, which plays an ever-bigger role.

The contemporary learning environment changes in response to demands that are formulated through two opposing processes.

The first process is the massification of education. Education is truly becoming accessible to all. It is no longer bound by borders, whether those are class borders, the walls of a school, or even national borders.

Massification of education is not only a process of increasing accessibility, but also a growing demand for education quality. Since the end of the 20th century, the concept of exclusive education implied a set of specialized, selective institutions which offered a wide range of additional services. This segment was separate from the mass education offered to everyone else. Today, more and more parents, as well as children themselves, are interested in getting access to this exclusive education.

The second process that accompanies the massification of education is individualization. In essence this means that in addition to social standards, there are now individual standards emerging. They are based on the experiences of individual families and micro-communities, as well as on individual aspirations to be better and more successful than others. This does not mean that the process of education necessarily gets more and more complex. There are many kinds of ambitions that may play into one's choice of educational trajectory, including the desire to be part of an ethnic or religious group, or of a community of physical health and fitness.

Improving the learning environment today means more than just bringing in electronic devices, connecting high speed internet, and setting up distance learning tools. Around the world, schools are being renovated to create new learning environments that, on one hand, answer the needs of the modern workforce and information economy, and on the other hand make schools comfortable and attractive places. This includes individual areas in school buildings, multi-purpose areas capable of being transformed by the students themselves based on their needs at a given moment, and spaces for experimentation where students create their own research projects, form groups, and self-organize for active learning. The classroom has ceased to be a simple room where knowledge is absorbed and reproduced.

In Russia, unfortunately, the commonly held notion of what it means to have a modern learning environment is still incongruent with the real needs of today and tomorrow. Conventional buildings are still erected, which are unpleasant for both children and adults. Even buildings that are attractive on the outside don't have the right functionality within. This is happening in large part due to strict regulations, including sanitary and fire codes, which often don't improve safety but rather just limit the potential for carrying out contemporary educational processes.

Internationally, the creation of a new school environment is a collaboration between architects, designers, landscape architects, and education specialists. Some projects of this kind are already famous around the world, such as the Vagen school in Norway; the international Lycee Nelson Mandela and the Olivier de Serres elementary school in France; the Gammel Hellerup Gymnasium in Denmark, and others. These are ecologically sound schools, built with contemporary materials, in which all the details are thought through. Often the lighting and communications are self-sufficient. The virtual realm is organically integrated with physical and intellectual space. For a long time, there were only a handful of such schools in Russia. Today, the number of schools of this new type is on the rise (the Engineering School within complex No. 548, the Letovo school, and the HoroSchool in Moscow; Smart School in Irkutsk).

The digitization of schooling

The digitization of schooling can be approached in two ways:

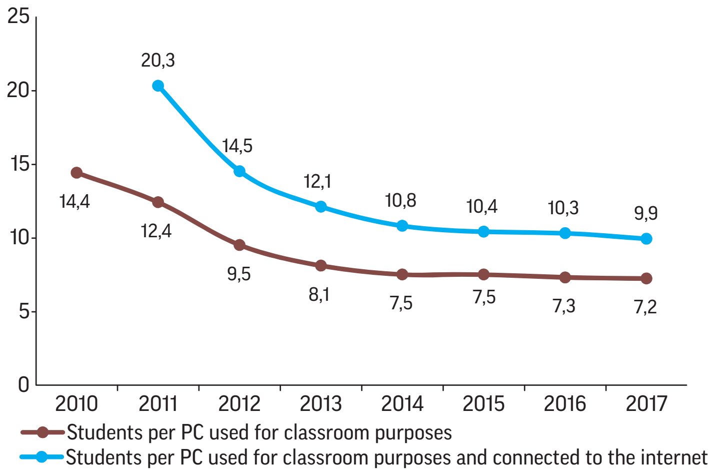
1) The conservative or extensive approach, in which there is a mass infusion into schools of the necessary tools and infrastructure, and existing analog resources are digitized.

2) The innovative, or intensive approach, which focuses on implementing certain cutting-edge technologies, programs, or courses, and creating new web-based resources and platforms.

The conservative approach in Russia is measurable by the statistical increase in a majority of the available data points. The biggest leap occurred in the first third of the 2010s, after which the tempo of growth slowed down, partially due to the fact that most of the basic needs of schools were met (Fig. 1.27).

According to the OECD's 2015 report "Education at a Glance," Russia is in 29th place globally in terms of students per PC, ahead of China, Japan, South Korea, Turkey, Finland, Sweden, Italy, and others. At the same time, about half of the teachers who participated in the international ICILS study indicated that they were dealing with obsolescent computers, poor internet connectivity, or lack of access to IT resources. 45% of teachers said their school didn't have enough computers, 47% said the school lacked access to digital teaching resources, and 34% responded that the school's computers were outdated. In terms of internet connectivity, 43% of teachers faced insufficient computers with internet access, and 62% complained of a low-quality internet connection at their school.

Fig. 1.27. Availability of personal computers (PCs) to school students



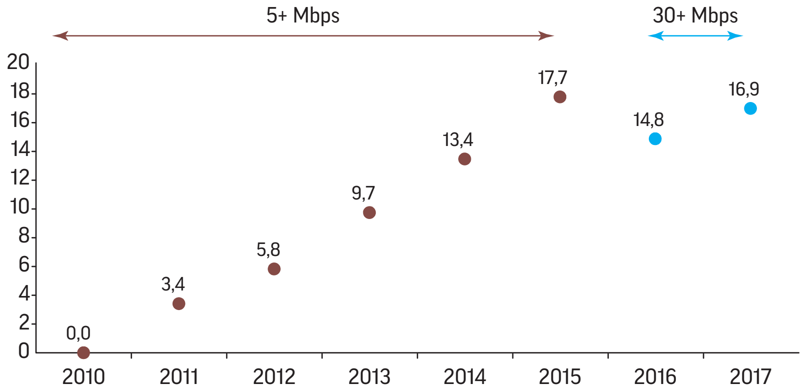
Sources: Rosstat, Ministry of Education and Science.

This seeming contradiction is easily explained by looking at the history of school hardware and its quality. Since the main wave of schools being equipped with computers ended around 2012–2013, the existing computers in Russian schools are quickly becoming outdated.

The period in question is also characterized by an increase in internet access at schools. According to 2017 data, 99% of Russian schools were connected. However, today it is insufficient to simply speak of a school having internet access, since the speed of access is also important (Fig. 1.28). The fact that even in official statistics, the definition of what makes a fast connection is always changing illustrates the situation today. Just three years ago, 5 Mbps and faster were considered high-speed, while today that position is not even in the statistics. Since 2016, connections of at least 30 Mbps are considered high-speed.

The upward trend seen here is relative, given a situation of relatively poor internet connectivity. In 2017, five in six schools had speeds of below 30 Mbps.

Fig. 1.28. The share of schools with internet connections of 5+ Mbps and 30+ Mbps (%)



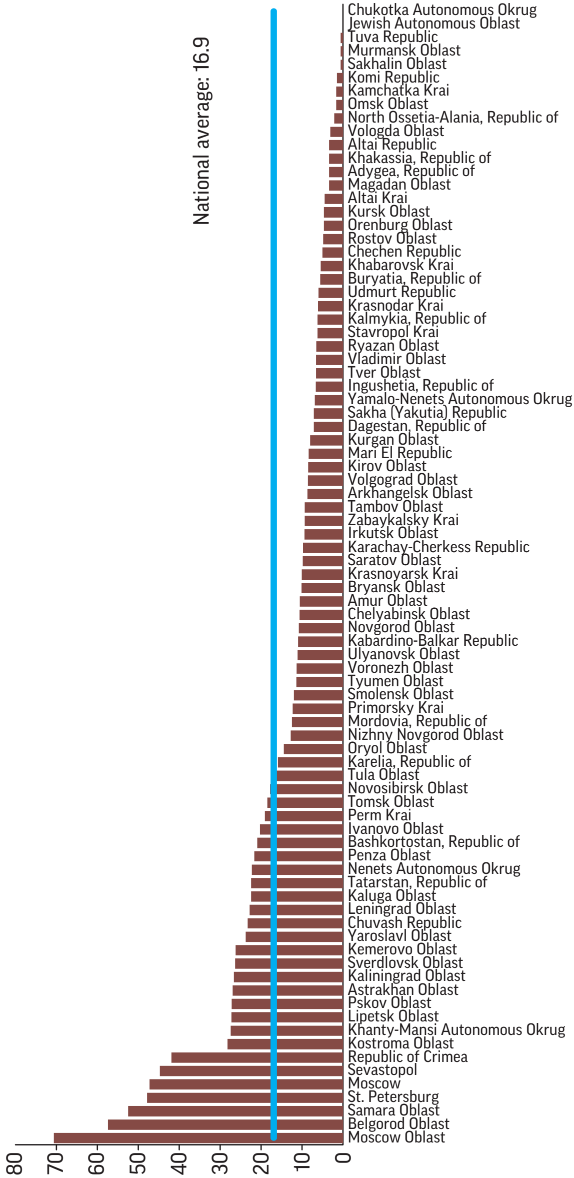
Sources: Rosstat, Ministry of Education and Science.

The percentage of schools with high-speed access is highly variable region to region (Fig. 1.29). In a number of regions, the share of such schools is more than 40%, while in the Chukotka Autonomous Okrug and the Jewish Autonomous Oblast there are no such schools. Typically, many of the regions with low connectivity speeds at schools are in the group of regions with the highest level of rural populace. As a result, the gap between regions is also present between urban and rural areas. If 28% of urban schools have speeds over 30 Mbps, then the rural figure is three times lower, at around 9%.

The gap between the city and the country remains steady (Fig. 1.30): the average large urban school has speeds of 2–30 Mbps, while in rural areas the majority of schools have low internet speeds. Almost 40% of schools have connectivity of 256 Mbps or lower.

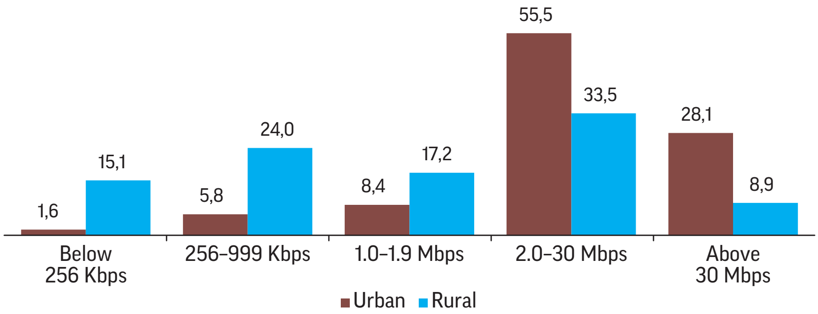
One in six rural schools (15%) have a maximum speed of 256 Kbps. In practice, this means that it would take an entire class period to download a high-quality textbook with modern design, while a video file would take a teacher almost two full workdays to download.

Fig. 1.29. The share of schools with internet connections above 30 Mbps, 2017 (%)



Source: Ministry of Education and Science.

Fig. 1.30. Distribution of schools by maximum internet connection speed, 2017 (%)



Sources: Rosstat, Ministry of Education and Science.

There is a general upward trend for all IT-related statistics: having a website, e-mail, electronic grading and journaling, and portable computers (laptops, tablets).

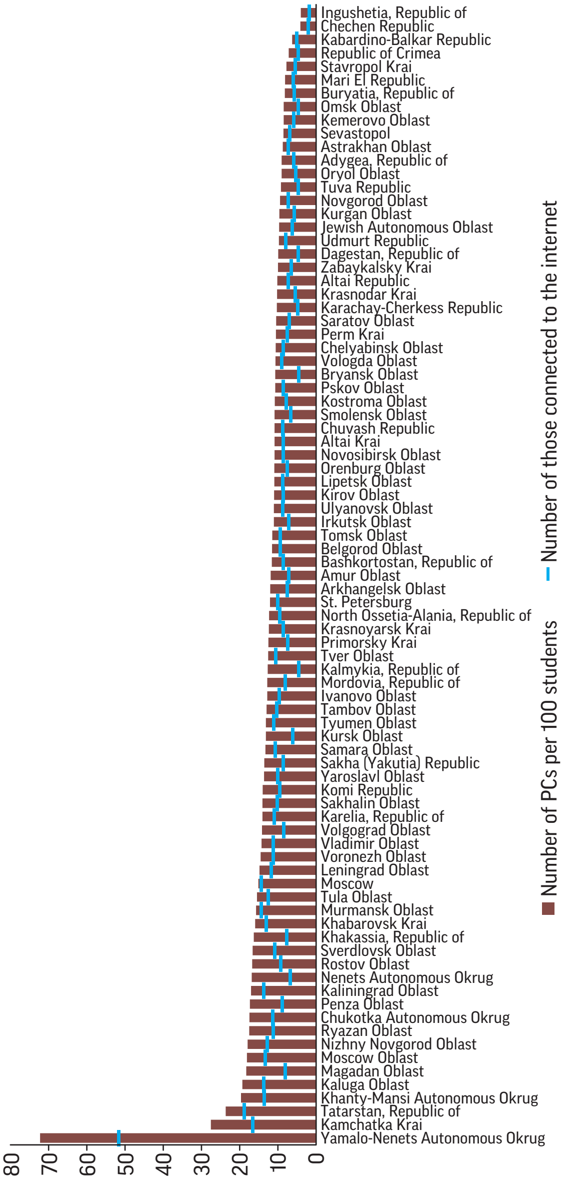
However, in certain measures of how well-equipped schools are with digital tools there is a growing differentiation among regions (Fig. 1.31) and between urban and rural schools.

In four years, the national average share of portable computers in schools increased by 8.4%. At the same time, the inter-regional differences in portable vs. stationary computers stayed the same (Fig. 1.32).

In the case of other classroom technology, we see that in 2017 there were about eight multimedia projectors and four interactive whiteboards per school building.

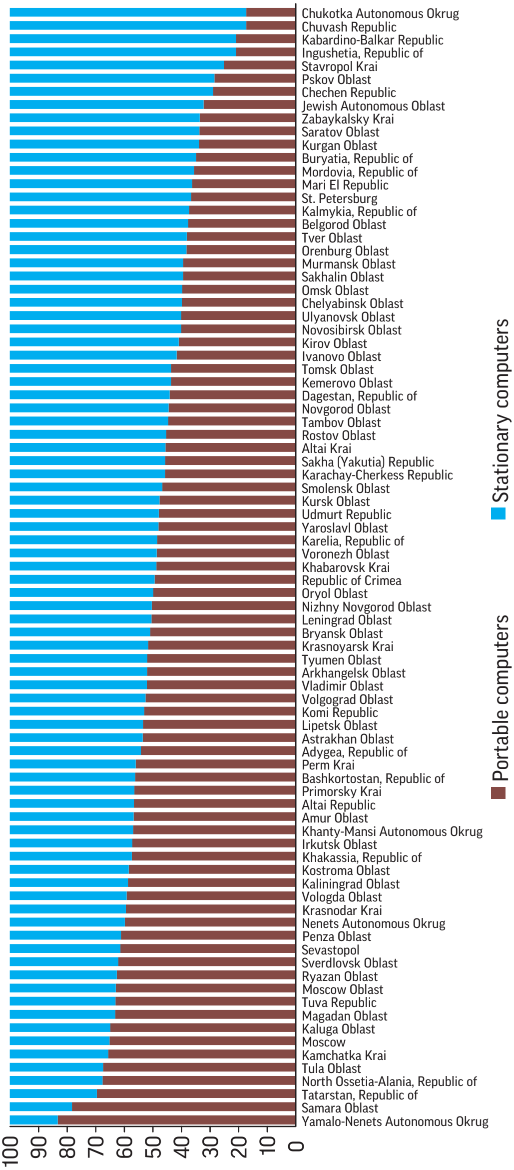
From the point of view of schools' preparedness for digitization, it's important to look separately at the issue of specialized software (excluding general-use software). This statistic became available only from 2016, which doesn't allow for a deep look at the trends in how schools are adopting informational and teaching software. It's possible to note, however, that the most intensive adoption is related to building up electronic libraries in schools, which increased in number by 17% in a single year.

Fig. 1.31. Number of PCs, including those connected to the internet, in classroom use per 100 school students, 2017



Source: MSO.

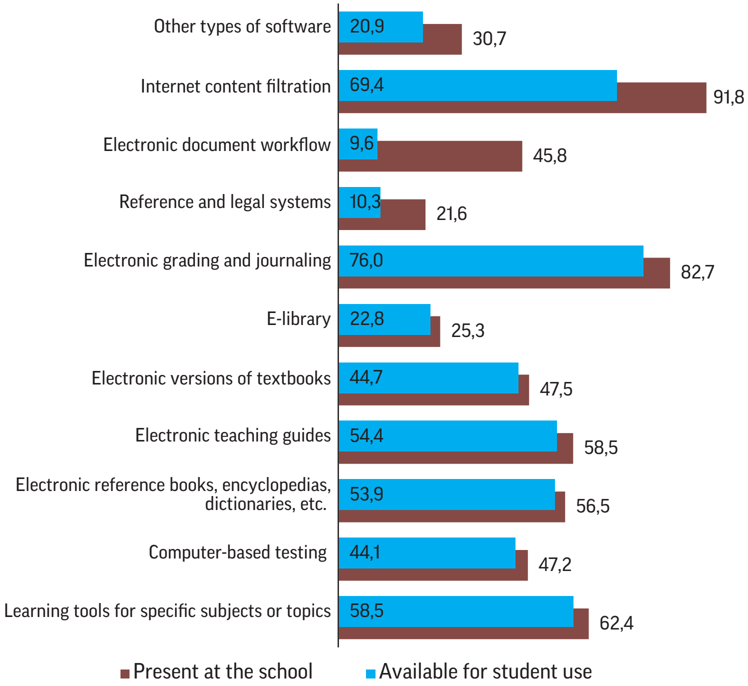
Fig. 1.32. Proportion of portable and stationary computers in schools of the total number of school computers, 2017 (%)



Sources: Rosstat, Ministry of Education and Science.

The most widespread software packages are systems of content filtration for internet browsing, as well as electronic grading and journaling (Fig. 1.33).

Fig. 1.33. The share of schools with specialized software packages, 2017 (%)



Sources: Rosstat, Ministry of Education and Science.

According to Rosstat data, one in every four Russian families in 2016 did not have a computer with internet access. This means that for children from these families, the school becomes an important place for learning computer literacy and accessing online resources. Yet the least widely available type of school software remains e-libraries and electronic reference systems. They are present in just a quarter of schools, and the latter are most often inaccessible to students.

Of the 25.3% of schools that have an e-library, only 22.8% offer access to students. That means that 2.5% of schools (about 1100 in total), spent money to create a service, but this led to no change in the educational process. 19 regions have e-libraries in less than 10% of schools (Fig. 1.34), while in Omsk Oblast no schools have them. As with most of the IT-related statistics, rural areas lag behind in providing e-libraries: 28% of urban schools offer students access to e-libraries, while only 16% of rural ones do so.

Electronic documents took second place after printed materials in terms of new additions to school libraries. Calculated on a per-school basis, each school added an average of 12 such documents.

A rather ambiguous statistic is the reduction in the number of printed editions available per student, totaling 18% in five years, given the fact that e-libraries don't represent a viable alternative (Fig. 1.35).

On average, for every school library seat with a computer there are more than 300 students, and that's not taking into account the fact that not all of those computers are connected to the internet.

Russian school students' access to digital information resources is provided in part by computer science classrooms, which exist in 83% of Russian schools. According to federal statistics, the average computer science classroom in Russian schools in 2017 had 15 seats, with 28 students per seat. But these classrooms are also used for additional classes that the federal statistics have no information on.

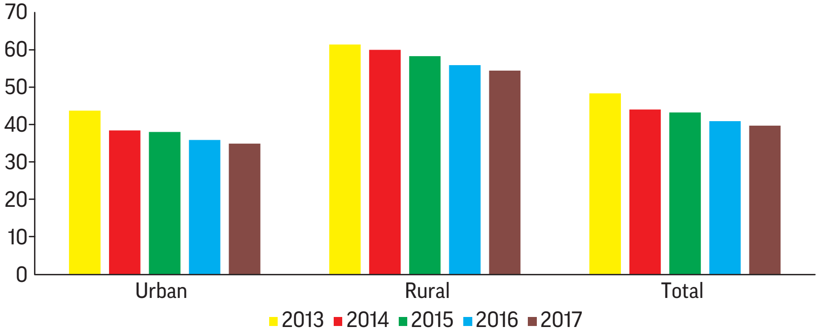
In the 21st century, a school's capacity for individualization of education and supporting the motivation of students is closely linked to its ability to provide technical and informational resources. However, the availability of these new types of resources does not automatically mean that they are made use of in practice.

According to MEMO's 2016 teacher survey, only 16% of respondents to the question "What technologies have you used in your

Fig. 1.34. Share of total schools with e-libraries that are accessible to students, 2017 (%)

Source: Ministry of Education and Science.

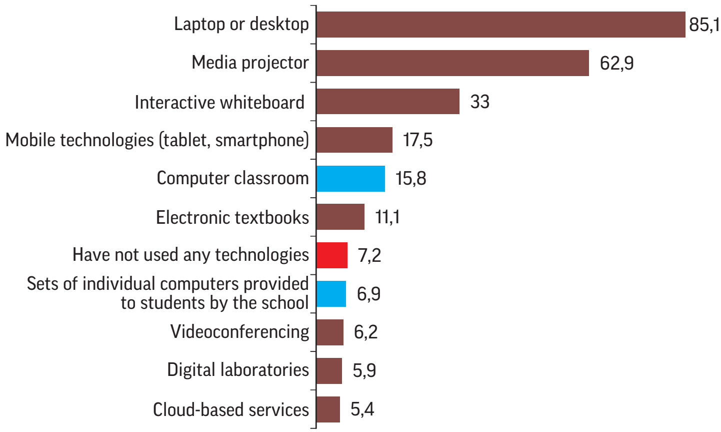
Fig. 1.35. Number of books (including textbooks), brochures, and journals per student



Sources: Rosstat, Ministry of Education and Science.

work at school?" said that they made use of a computer classroom (Fig. 1.36). 7% of teachers had never used any digital technologies or computers.

Fig. 1.36. Teachers' responses to the question "Which technologies have you used at your school?", 2016, (% of respondents)



Source: MEMO.

85% of respondents used a computer-based setup for teaching, one in three used an interactive whiteboard, and two out of three used a multimedia projector. However, those who use this equipment average no more than 5–8 hours per week, or 1–2 class periods per day.

Findings

Russia is among the world leaders in school enrollment rate. However, there are a number of barriers for providing universal access to education regardless of location, stemming from geography, demographics, and socioeconomic differences between cities and regions.

The government's policy goals of universal access to quality education were addressed through optimizing school networks, improving facilities and technological resources at schools, and connecting them to the internet.

As a result of these efforts, Russian school facilities have been renewed over the past 15 years, and have largely emerged from a state of disrepair. Russia has achieved a rate of education infrastructure development that is among the world's fastest, and has shown good results in international measures of school computerization.

However, many infrastructural problems remain for Russian schools. These include basic facilities such as building repair and plumbing, specialized facilities to meet the demands of the FGOS, and the need to update outdated classroom technologies. The deficit of specialized classrooms makes it impossible to carry out activities related to specialization, extracurricular education, developing digital literacy, and supporting the most motivated and talented students.

The quality of infrastructure for making use of electronic resources and distance learning tools is especially important today. To be globally competitive, a school's internet connection should be no less than 100 Mbps. This level of connectivity must be reached in the next two or three years.

Removing barriers to access for disabled and special-needs students remains a key challenge.

The modern system of specialization for upperclassmen lacks accessibility. Contemporary educational technologies related to individualized plans of study and online schools are almost nonexistent.

The architecture and learning environment of Russian schools is archaic. A new program is needed to develop new learning environments that have the ability to adapt situationally and integrate physical infrastructure with cyberspace. This challenge can be effectively addressed by creating incentives for private investment.

As the school-age population continues to grow, the reality of schools working in two or three shifts remains a key problem. It can be solved by continuing to actively build new, modern school buildings while also renovating and reequipping the ageing set of already existing buildings. It must be kept in mind, however, that a demographic decline is expected after 2026.

Despite the fact that school districts have undergone major reform, the challenge of finding efficient organizational models for regional and municipal school networks remains a prominent one for strategic development.

In the majority of regions, consolidation of school systems has either already reached its potential or is limited by geography. However, there are regions where such reorganization was not carried out fully, which poses budgetary risks in the short term.

It's clear that we need a more nuanced palate of solutions that take into account local specifics, in addition to already widespread practices of closing, consolidation, and filialization. New solutions should combine the needs of accessibility, inclusivity, individualization, and economic viability in education. In rural areas, the means for connecting people to modern resources, such as school buses and distance learning tools, must continue to be developed. Various forms of resource sharing and integration are a powerful tool. They include creating associations and networks of schools, as well as integrating schools with other institutions like extracurricular centers, vocational institutions, colleges and universities, businesses, and other public organizations under ministries of culture, sport, etc.

The great challenge over the next few years is not to merely restructure the school system, but rather to create a new infrastructure for developing human potential, especially in small towns and villages, which expands the ability of young people to choose the trajectory, content, and form of their education.

Chapter 2

Education Quality

Assessing the quality of schooling remains a subject of hot debate. A maximally balanced and objective approach must be a multifaceted one, using a wide range of tools such as international comparative studies, independent national studies of education quality, and surveys. In Russia in recent years, major steps have been taken to develop the system of education quality assessment. This allows us to present a multifaceted set of findings in this chapter.

We can offer an array of data that is highly descriptive of the academic achievements of Russian school students. However, this is not sufficient for a full picture of the situation. The analysis of their work must come out of an understanding of the demands placed on education in the modern world. Some of the more important of these include: bringing the maximum number of young people to a minimum level of functional literacy, closing the gap in outcomes between students of different socioeconomic status, and developing skills for the 21st century.

2.1. School quality as measured by Russian and international studies

International comparative studies

International comparative studies are a tool that measures educational quality in various countries and allows us to look at each of them in relation to the rest of the world. Because of this, the results of these international comparisons become more and more important to developed countries each year. The fact that making it into the list of top 10 countries by school quality is the primary goal Russian education policy for the period up to 2024, according to the presidential decree of 2018, shows the high priority given to international education quality rankings in Russia's strategic development goals in the middle term.

Russia's position in the international comparative rankings has a dual nature. On one hand, it is among the leaders in measures such as the reading level of students leaving elementary school. On the other hand, the outcomes of Russia's education system lag behind, for example, in skills measurements of high school students as well as adults. Russia has been taking part in international studies for more than 20 years. Today there exist several large-scale studies that measure education systems in different countries. The most well-known are PIRLS (Progress in International Reading Literacy Study), TIMSS (Trends in Mathematics and Science Study) and PISA (Programme for International Student Assessment).

Progress in International Reading Literacy Study (PIRLS)

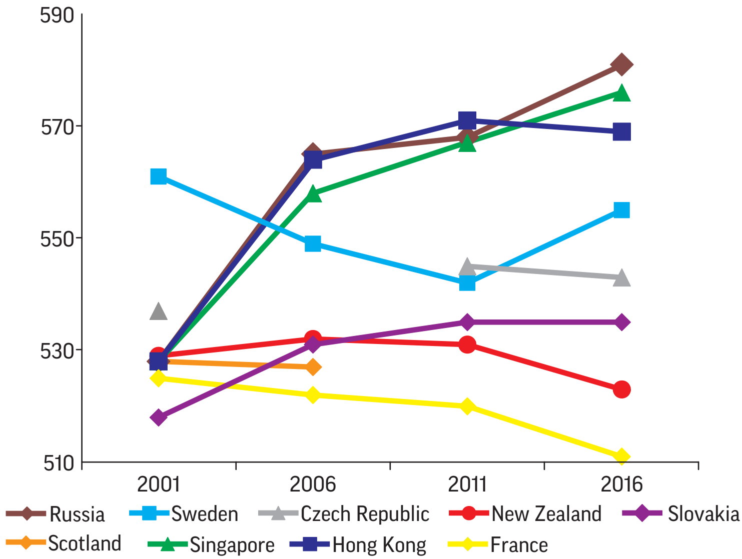
PIRLS is a monitoring study organized by the IEA (International Association for the Evaluation of Educational Achievement)[1]. This study compares the quality of reading and understanding texts by elementary school students in different countries, allowing us to

[1] See: <https://timssandpirls.bc.edu/>.

find differences among national education systems. PIRLS has been conducted every five years since 2001, and Russia has taken part in each of the waves.

In the first wave, Russian fourth graders showed modest results, averaging 528 points (Fig. 2.1). In that wave, statistically similar results were shown by countries like the Czech Republic, New Zealand, Scotland, Singapore, Slovakia, Hong Kong, France, and Greece (which entered PIRLS only in 2016). In 2006, three countries made a leap forward. Russian fourth graders scored an average of 565, which put them in first place. Russia repeated this success in the 2011 and 2016 waves. The other countries listed did not see major changes in their scores, which had a general downward trend. In 2016, Russia took first place.

Fig. 2.1. Trends in PIRLS scores (points)



Source: OECD.

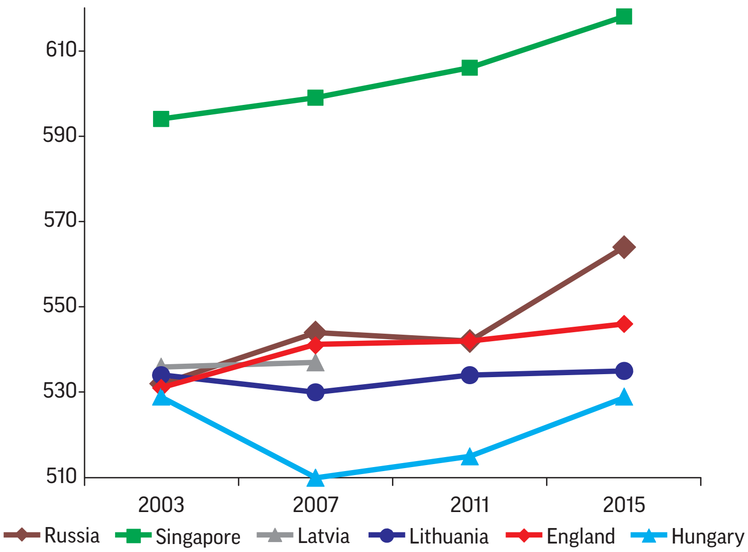
Trends in Mathematics and Science Study (TIMSS)

The TIMSS monitoring study, also run by the IEA, has taken place in almost 60 countries, every four years since 1995. The goal of the TIMSS study is to assess the math and science literacy of fourth graders (TIMSS-4) and eighth graders (TIMSS-8). The content of the study matches the curricula of each country.

TIMSS-4

Mathematics. The first wave was carried out in 2003, and Russian fourth graders participated. The results from this wave were fairly positive in math, with a 532-point average (Fig. 2.2). This was an above-average mark internationally, but corresponded with a mid-range grade among participating countries. The Russian number was comparable to those of Latvia, Lithuania, England and Hungary.

Fig. 2.2. Trends in TIMSS-4 math scores (points)



Source: OECD.

In 2007, the average scores from Russia, England, and Singapore went up. However, Hong Kong beat out Singapore for first place, even though the difference in their scores was not statistically significant. Latvia and Lithuania's scores did not change significantly, while Hungary's fell by 19 points. Russian fourth graders therefore had the best results out of the group of countries with similar scores in the first wave.

There was no significant change in scores in 2011 for Russia and the group of countries with similar scores.

In the last wave of 2015, Russian fourth graders took seventh place. Their average scores went up more significantly than any of its "neighbors" from the first wave. Between the last two waves, Russian students showed a significant improvement of 24 points. This is the biggest such leap for Russia, and the biggest of all the other countries in this wave.

Science. In 2003, five countries had results similar to Russia's in the science category (Fig. 2.3). In subsequent waves, Russia's results rose steadily: by 20 in 2007, by 6 in 2011, and by 15 in 2015. None of the countries with comparable scores in the first wave showed such improvement. Russian fourth graders took fourth place.

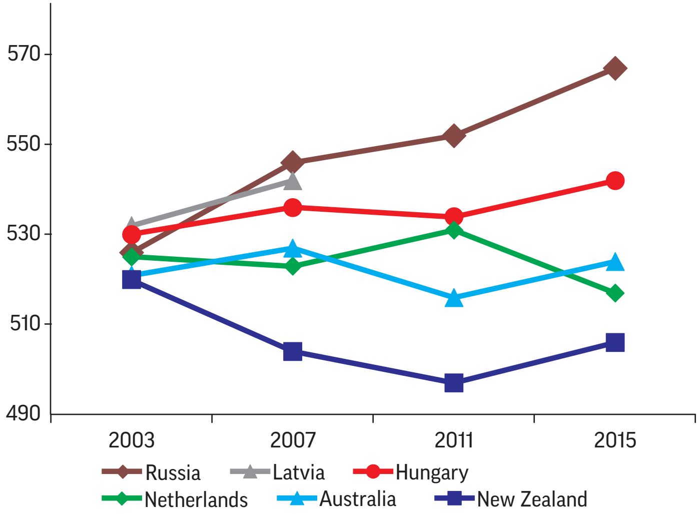
TIMSS-8

TIMMS for eighth grade has been conducted since 1999. Russia had an average score of 526 points (Fig. 2.4) in the first wave in 1999. Eight countries showed similar results: Slovakia, Hungary, Slovenia, Australia, Malaysia, Finland, Canada and the Czech Republic[2]. In the 2015 TIMSS-8 study, Russia came in sixth overall. Over the past 20 years, Russian eighth graders have shown the best results out of the group of countries with comparable scores in the first wave of TIMSS.

Science. In the first wave of 1999, England, Slovenia, Hong Kong, Bulgaria, USA, New Zealand, Finland, and Canada (Fig. 2.5) all

[2] Finland took part in TIMSS-8 only in 2011, Canada in 2015, and the Czech Republic in 2017, so their trend lines cannot be analyzed.

Fig. 2.3. Trends in TIMSS-4 science scores (points)



Source: OECD.

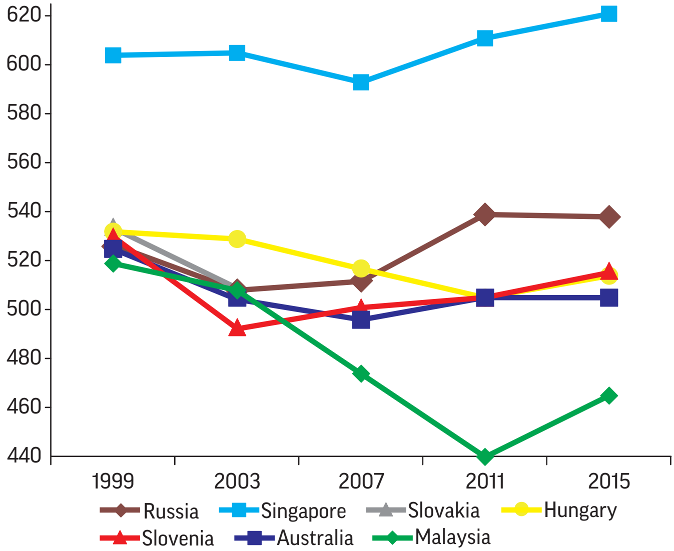
showed results similar to Russia's. However, Finland and Canada subsequently participated only in 2011 and 2015 respectively, so they are omitted from our analysis. In 1999, first place was shared by two countries, Singapore and Taiwan (Republic of China).

In 2003, this group of countries showed the following changes: scores from Singapore, Hong Kong, USA, and New Zealand improved, England and Taiwan stayed the same, and Russia, Slovenia and Bulgaria went down.

In 2007, the scores of all the countries in this group returned to the level of the first wave, excluding Taiwan, which dipped below their 1999 level. The science literacy of Bulgarian eighth graders continued to decline, and 2007 was the last year that country participated in TIMSS.

In 2011, Russia's and Singapore's scores went up, while all the other countries did not see significant change. Between 2011 and

Fig. 2.4. Trends in TIMSS-8 math scores (points)



Source: OECD.

2015, however, all the countries had stagnant scores. Russian eighth graders took seventh place in science in TIMSS-2015.

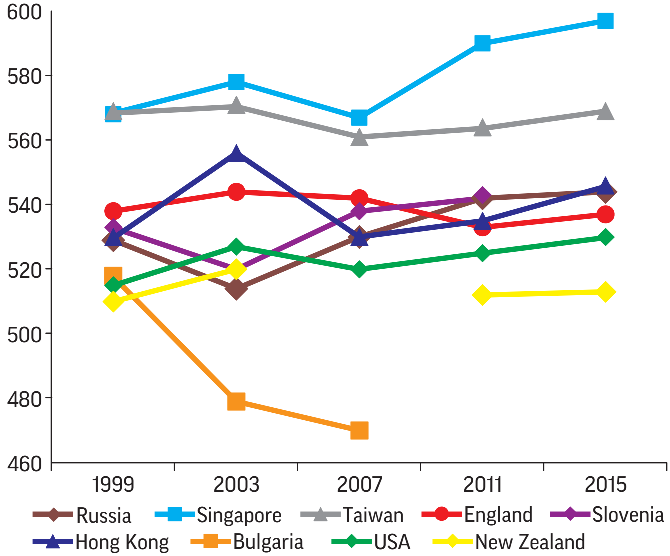
Programme for International Student Assessment (PISA)

PISA, the Programme for International Student Assessment[3], is an international education monitoring program carried out every three years since 2000 among 15-year-old students enrolled in schools or professional training programs. PISA assesses students in three subjects: math, science, and reading. PISA is overseen by the Organization for Economic Cooperation and Development (OECD), so the available comparisons are with OECD member countries during a given year.

Mathematics. Russian math results in 2000 were significantly below the OECD average (Fig. 2.6). Spain and Poland had similar re-

[3] See: <http://www.oecd.org/pisa>.

Fig. 2.5. Trends in TIMSS-8 science scores (points)

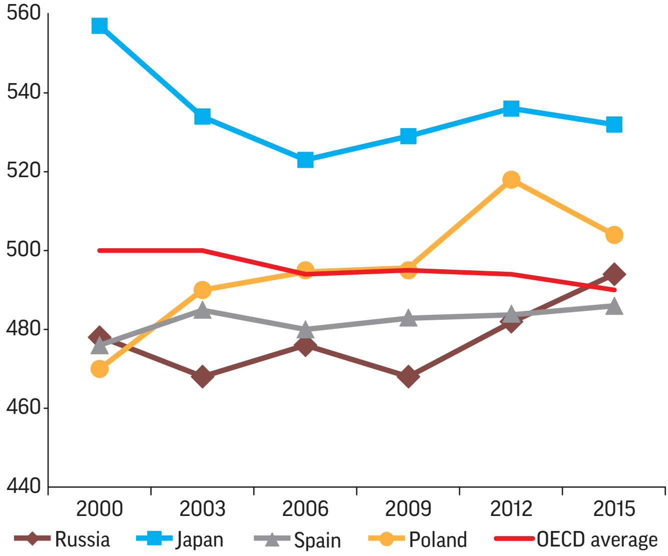


Source: OECD.

sults, while Japan took first place in the first wave of the study. In 2003, Russian and Japanese results both fell, while Poland and Spain's scores improved. By 2006, the OECD average had decreased, while Russia's scores went up, bringing those numbers closer together. In the 2012 wave, we see a significant rise in Russian and Polish scores. In 2015, Russian scores finally found themselves above the OECD average mark. It's worth noting that even though the OECD average fell in 2015 compared to 2012, the Russian score for that year is also comparable to OECD averages from 2006, 2009, and 2012.

Science. Russian students' science scores in 2000 were fairly low, coming in 40 points below the OECD average (Fig. 2.7). Similar science results were seen in Greece, Latvia, and Portugal, while Korea had the highest marks. By 2003 the Korean scores decreased and Fin-

Fig. 2.6. Trends in PISA math scores (points)

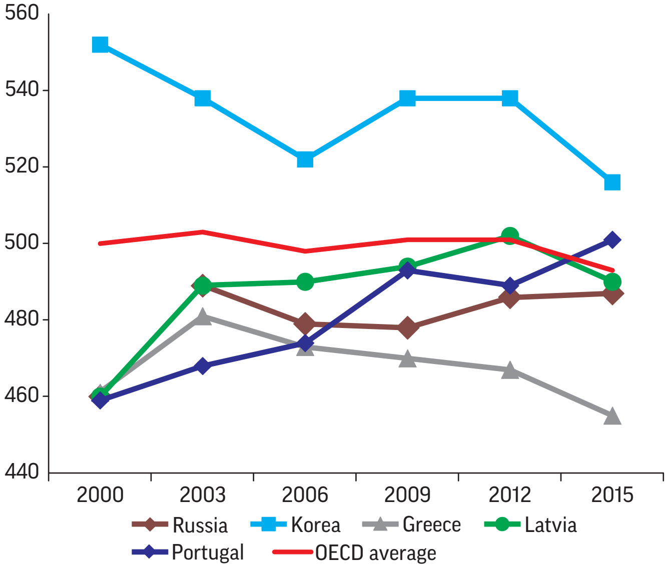


Source: OECD.

land took over first place. Other countries in our sample went up sharply, with Russian scores increasing by 29 points. In subsequent waves the Russian scores improved steadily. Additionally, the OECD average decreased over that entire period, and in 2015 Russian scores moved close to the average mark. Finland continued to lead until 2012, when Hong Kong and Singapore jumped ahead.

Reading. It's important to point out the significant increase in reading literacy among Russian 15-year-olds participating in PISA (Fig. 2.8). In 2000, the gap between Russia's scores and the OECD average was around 40 points. Portuguese and Latvian students had similar averages, while Finland took first place. By the next wave in 2003, countries with scores close to Russia's deviated sharply: Russian scores fell, Latvian scores rose, and Portuguese scores stayed put. The only noteworthy change from 2006 was a decrease in the

Fig. 2.7. Trends in PISA science scores (points)

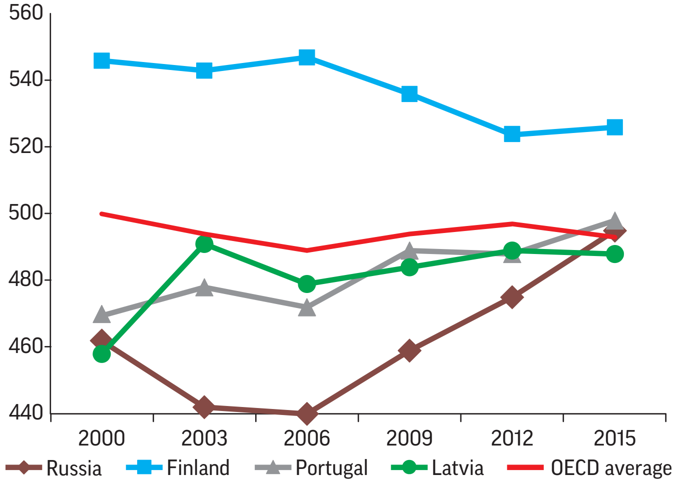


Source: OECD.

OECD average as well as in Latvia's scores. Only after 2006 did Russian results start to rise sharply, and in 2015 they reached the OECD average. At the same time, first-place scores went down from 2000, with Korea, Shanghai (China), and Singapore each taking the top spot.

Russian elementary school students show fairly good results in international studies across all subjects. In PIRLS, Russia steadily gets top rankings across the whole period of the study, and is top-ten in the TIMSS rankings. The following trends can be noted for Russian fourth graders: reading, math, and science scores increased up until 2006–2007. They remained stagnant until 2011, after which they continued to increase. These results may be linked to changes in education policy at the time, which impacted the whole range of subjects taught in elementary schools.

Fig. 2.8. Trends in PISA reading scores (points)



Source: OECD.

Eighth graders (in the TIMSS study) also reach a top-ten rank beginning with 2007. Similar trends as above can be seen in the middle-school results for math and science: a fall between 1999 and 2003, followed by steady growth and stagnation in 2015. Given this, we can form a hypothesis about changes in education policy that affected both elementary and middle schools. The fact that TIMSS testing content is fairly closely linked to the specific curriculum adds weight to this hypothesis.

Finally, the results from testing 15-year-olds in the PISA studies were relatively weak, and only in 2015 did they start to catch up with the OECD average. It's important to note that this growth was different in different subject areas. The math scores changed little between 2000 and 2009, and then rose steadily. Science scores jumped up in the second wave in 2003, fell slightly in the third wave in 2006, but began to ascend again from 2006 onward. We also note that the increase in reading scores came earlier than that of mathematics.

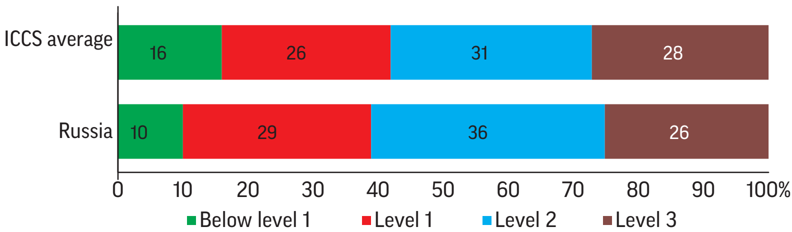
In the last wave of PISA an additional set of questions were added to the usual test, measuring collective problem solving. More broadly, these tasks measure how effectively students can participate in a process involving two or more people trying to solve a problem and sharing their opinions, knowledge, effort, and abilities. The tasks are presented in a digital format that imitates working with a group of students.

Russian students had below-average results and were ranked in the low 30s among OECD countries.

The International Civic and Citizenship Education Study (ICCS)

Russia is showing progress in this study (Fig. 2.9). In 2016, the average Russian student scored 545, with the average score among participants being 517. This ranks seventh on the global charts. In the previous cycle in 2009, Russia came in 19th. Russian students scored higher than the survey-wide average by 28 points. Denmark tops the ratings with an average of 586 points. Additionally, Russia is among the leaders in rate of improvement with +38 points, trailing only Sweden at +42.

Fig. 2.9. Achievement in civic education among Russian school students, ICCS, 2017 %



Source: IEA.

Russia's rank in international quality of life ratings that include education as a criterion

Besides the international comparative studies of education quality, education comparisons are used in a number of other international comparisons in which Russia takes part.

The Pearson Global Index of Cognitive Skills and Educational Attainment[4] is based on two types of criteria:

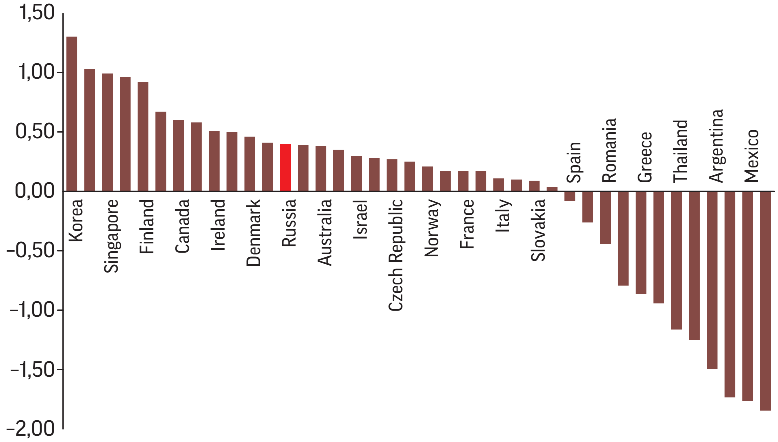
1) Cognitive skills
- International studies of reading ability and comprehension (The Progress in International Reading Literacy Study, PIRLS);
- International studies of math and science education outcomes (The Trends in International Mathematics and Science Study, TIMSS);
- International assessment of educational achievement (The Programme for International Student Assessment, PISA);

2) Level of education
- An index of the functional literacy of population. Data from the international study PIAAC (The Programme for the International Assessment of Adult Competencies);
- An index of the share of students who finish upper secondary and tertiary education. Data from the international study Education at a Glance by the OECD and OECD partner countries.

According to the 2014 index, Russia ranks 13th out of 40 countries (Fig. 2.10). In the cognitive skills metric, Russia ranks 9th, but in the education metric it ranks just 20th. Lagging behind in education metrics can be explained by the low level of functional literacy among Russian adults, based on PIAAC data. In two other components, the rates of enrollment in high school and vocational training, Russia is among the world leaders.

[4] See: <https://www.pearson.com/corporate/news/media/news-announcements/2014/05/new-global-educationindexshowsasiansuperpowersexcel>.

Fig. 2.10. Russia's rank in the Pearson Global Index of Cognitive Skills and Educational Attainment



The Education for All Development Index EDI is used in UNESCO reports on countries' achievements within the "Education for All"[5] program. It's calculated according to the following criteria:

1) The share of preschool-age children enrolled in general educational programs

2) The population's literacy rate among people 15 years of age or older

3) The expected share of first graders who will go on to fifth grade

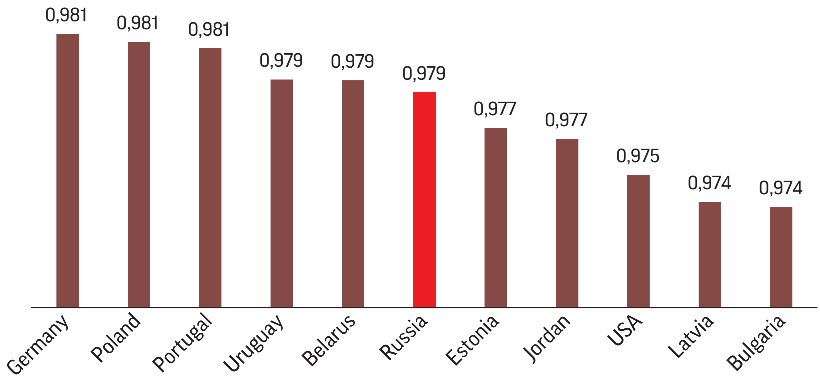
4) A gender parity (equality) index. Calculated as an average of three indicators:

- ratio of girls to boys in preschool education
- ratio of girls to boys in K-12 education
- ratio of literate women to literate men

In 2015, Russia held 32nd place out of 92 countries for which the index was calculated (Fig. 2.11).

[5] <https://en.unesco.org/gem-report/education-all-development-index>.

Fig. 2.11. Countries' ratings in the Education for All Development Index



Source: UNESCO.

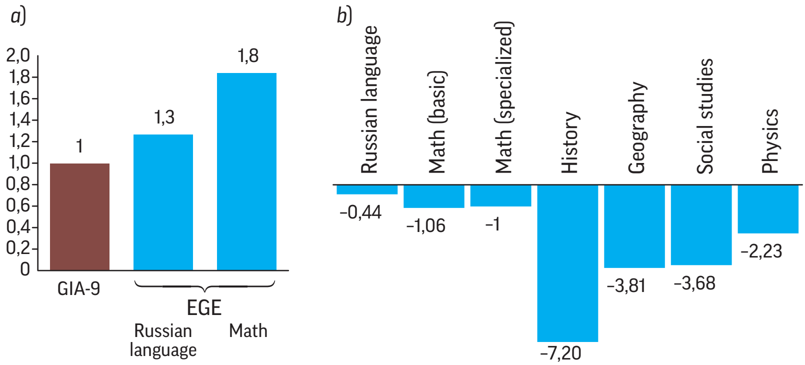
The results of Russian studies of education quality

Internal Russian studies don't allow for an international picture of the school system, but do give us a view of the issues that matter most to those who ultimately pay for education internally: families, employers, and the state. They also give us a good idea of the scale of inter-regional differences in public education services.

Since a majority of information about education outcomes, most importantly the results of the Unified State Exam (EGE) and the Basic State Examination (OGE), are secret, we can access only a limited set of data for our analysis. One source is the Education System Monitoring (MSO) program. It offers generalized data from the State Final Examination (GIA), which is taken by 9th and 11th graders. Specifically, MSO allows us to estimate the share of graduates who received unsatisfactory grades (Fig. 2.12).

In 2017, 1% of ninth graders failed the OGE and did not get their "general basic education" (middle school) diploma. In the EGE, 1.3% of eleventh graders failed to get the minimum score on just one of the subjects, Russian language. In the math portion, 1.8% of participants failed to reach the minimum.

Fig. 2.12. The share of graduates who received unsatisfactory grades on GIA and EGE exams in 2017 (a), and the change in results from 2016 (b) (%)



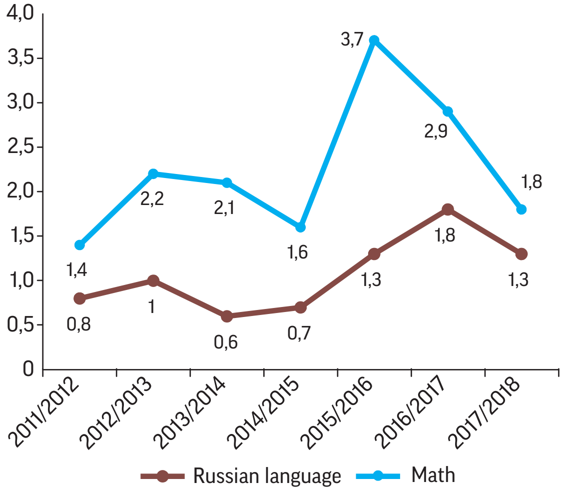
Sources: Rosstat, Ministry of Education and Science.

The share of students who fail to pass the Russian language portion of the EGE has increased each of the past few years. A small decrease in that figure in 2017 can hardly be viewed as an improvement. The number for the math portion has been variable in both directions, with a downward trend in recent years (Fig. 2.13).

It's impossible to make conclusions about the quality of preparation in specific subjects based on the change in the number of high-scoring test takers (earning 81–100 points). Unfortunately, there is no external audit of the EGE, nor is there a system for comparing assignments from various years. Some experts believe that the assignments themselves are getting easier year to year, which results in a greater number of perfect scores and an increase in the average score. An analysis conducted by the Federal Service for Supervision in Education and Science (Rosobrnadzor) reveals certain specificities in some subject areas (Fig. 2.14) and formulates signals for making policy decisions towards improving curricula, teaching methods, and professional development.

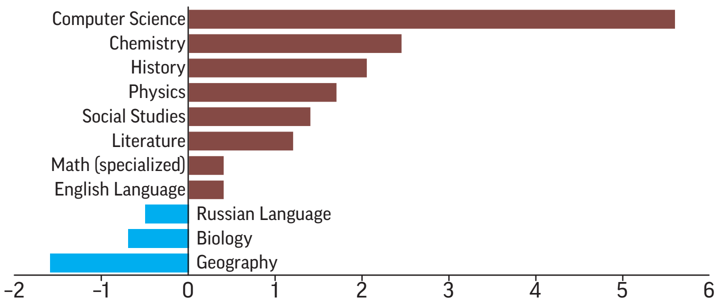
In Russia, National Education Quality Studies (NIKO) have been conducted since 2014. They are based on representative selection

Fig. 2.13. Share of graduates with unsatisfactory scores on the EGE (%)



Sources: Rosstat, Ministry of Education and Science.

Fig. 2.14. Changes in the share of high-scoring EGE results by subject, 2017 %



Sources: MSO, Rosobrnadzor.

and look at various subjects in the school curriculum with the aim of revealing basic methodological problems in each subject area.

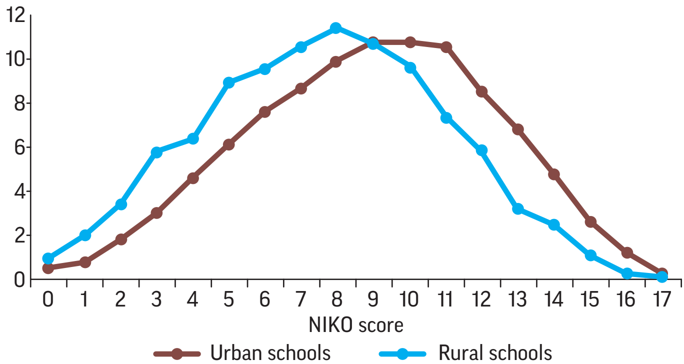
The NIKO results from seventh graders in 2017 showed that a significant portion of students have weak basic math skills: knowledge of numbers, ability to solve text-based, geometric, and other problems, ability to solve practical problems, and work with information.

In NIKO's 2016 assessment of the quality of English-language education, it was shown that the absolute majority of fifth and seventh graders did not have a strong grasp of even elementary speaking and reading-aloud skills.

In history and social studies, the 2016 NIKO results were very region-dependent. For example, successful completion of an assignment on local history ranged from 2% to 72%. There was also found to be a low level of important general academic skills, logic, and universal skills such as structuring a text, analysis, using contextual data, comparison, etc.

Nearly all of the NIKO studies reveal differences between results from urban and rural schools (Fig. 2.15).

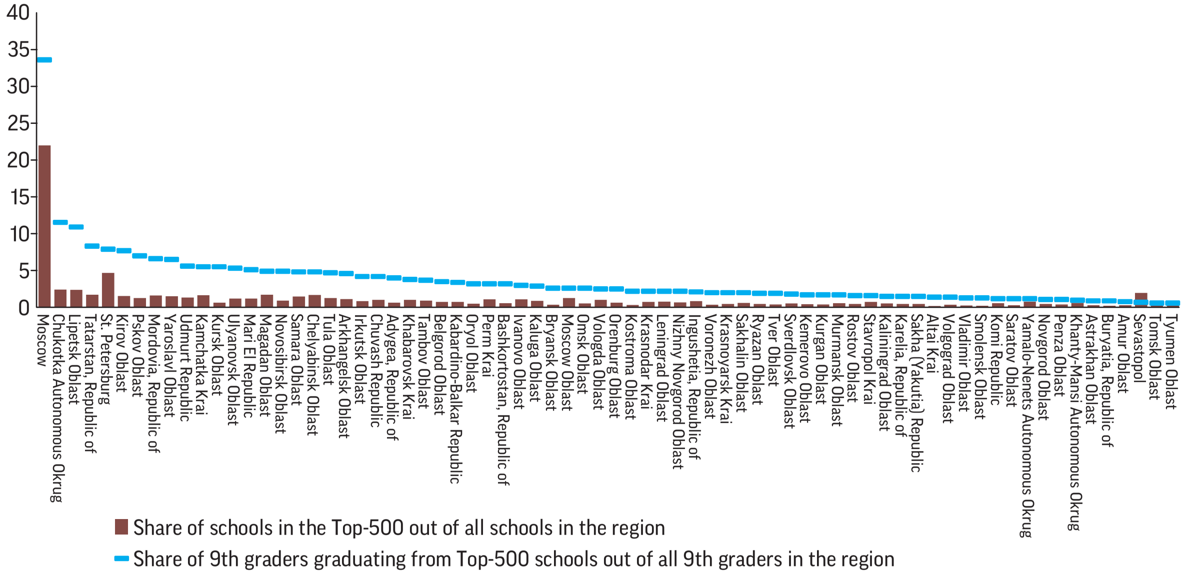
Fig. 2.15. NIKO math results among 5th graders at urban and rural schools, 2014 (%)



Source: NIKO study.

A high level of regional differentiation in the outcomes of schooling is shown in the study "Best Russian Schools. Top-500 schools showing high education outcomes," which is published annually by the Rossiya Segodnia news agency's Social Navigator (Fig. 2.16).

Fig. 2.16. Share of schools in the Top-500 by region, 2016 (%)



Source: Rossiya Segodnia news agency's Social Navigator; Rosstat.

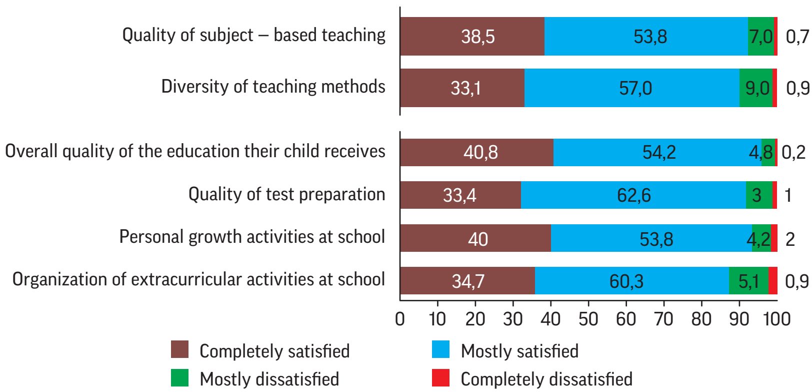
The population's satisfaction with education quality

The majority of education researchers note that the level of the population's satisfaction does not depend on the real conditions and outcomes being provided. However, the judgment of the primary consumers of education services remains one of the leading criteria for determining the quality of education.

In the MEMO studies of education quality, a high level of satisfaction is shown among the parents of school students (Fig. 2.17). Only 4.5% of those surveyed indicated one of the levels of dissatisfaction with education quality at school. However, the level of satisfaction with preparation for nationwide final exams (OGE, EGE) had twice as many dissatisfied responses (8.6%). About the same level of satisfaction was expressed by parents when asked about non-academic personal development activities at school.

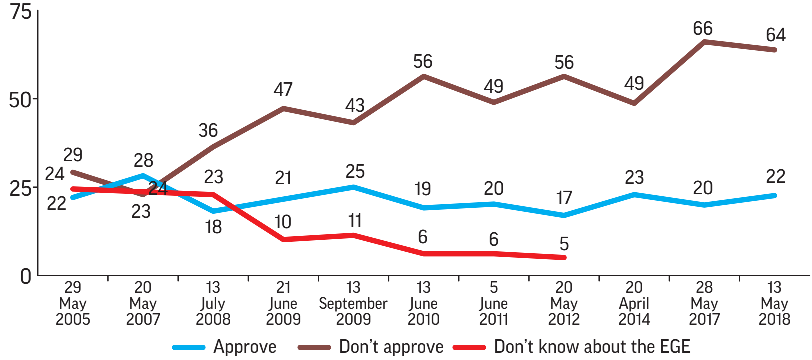
According to data from a Russian Public Opinion Foundation (FOM) study from May 2018, the number of parents unhappy with the EGE remains stable (Fig. 2.18).

Fig. 2.17. Parents' responses to questions about their satisfaction with schools overall, with test preparation, and with the quality of non-academic personal growth activities



Source: MEMO.

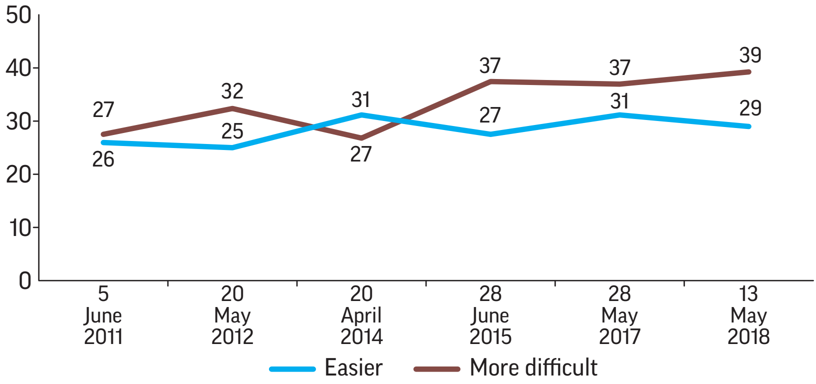
Fig. 2.18. Responses to the question: "Do you approve of the EGE?" (% of respondents)



Source: Russian Public Opinion Foundation (FOM) (http://fom.ru/Nauka-i-obrazovanie/14036).

In addition, 39% of parents believe that the university admission process became more difficult after the introduction of the EGE (2.19).

Fig. 2.19. Distribution of answers to the question: "Has university admissions become easier or more difficult after the introduction of the EGE?" (% of respondents)

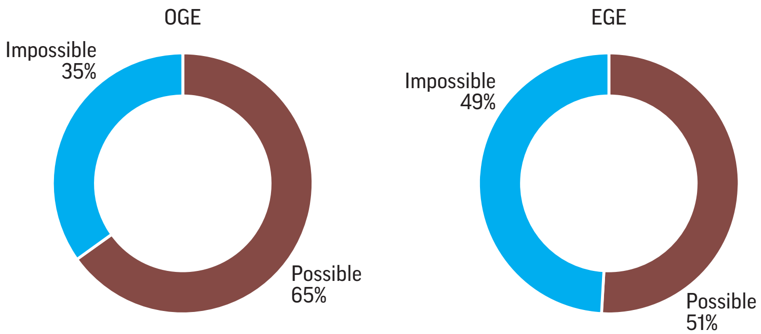


Source: FOM

The reasons the majority of parents cite for disapproving of the EGE was an increased workload for their children (24%) and a change in the required knowledge, which was made more shallow by the introduction of the EGE (10%). As far as the increased workload, students themselves have also indicated this. In an ONF survey[6], 58% of school students said that they are given too much homework and not enough time to complete it.

According to monitoring data from the RANEPA Center for Lifelong Learning Economics, almost half of parents of school students (49% of respondents) feel that it's impossible to get high marks on the EGE without additional tutoring. In the case of the OGE, more parents believe it's possible to have success on this test without additional lessons: 65% feel it's possible to get high marks just by going to school, while 35% stated a need for additional tutoring [Monitoring effektivnosti…, 2018] (Fig. 2.20).

Fig. 2.20. Parent's answers to a question of whether or not it is possible to be successful on the OGE and EGE without additional tutoring (% of respondents)



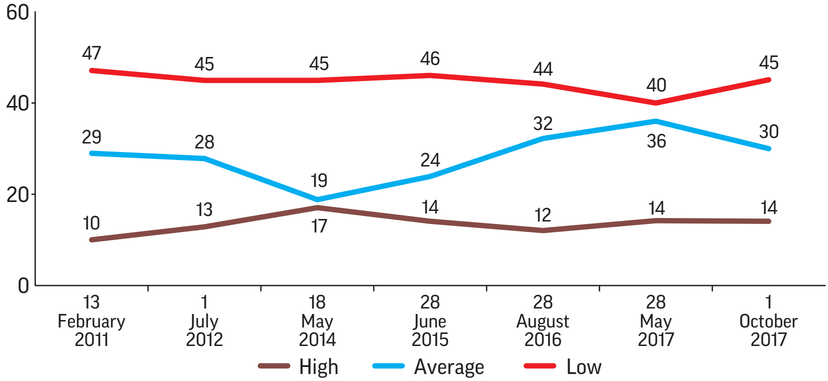
Source: RIA News (from RANEPA data).

[6] See: <https://pedsovet.org/beta/article/skolniki-predlagaut-otmenit-domasnie-zadania-i-vvesti-sistemu-rannego-vybora-professii>.

It's worrying that teachers are more pessimistic on this point. Only 32% of teachers surveyed felt that the majority of schools were able to provide the level of preparation needed to pass the OGE and EGE. Another 30% said that only the best schools were able to provide the needed knowledge. However, only 38% of teachers answered that it was impossible to do well on the OGE and EGE without extra preparation.

The results of the Russian Public Opinion Foundation (FOM) surveys[7] show that the share of those who have a low opinion of Russian schooling has increased significantly in the past three years. In 2014 only 19% were dissatisfied with schools in Russia, while in 2017 that number reached 30% of surveyed residents (Fig. 2.21).

Fig. 2.21. Responses to the question: "How do you assess the overall quality of schooling in Russia today: low, average, or high?" (% of respondents)



Source: FOM.

However, Russians who have a school-age child or teen in their family generally have more positive opinions of schools. The positive outlook tends to decrease with age: younger people age 18–30

[7] See: <http://fom.ru/Nauka-i-obrazovanie/13786>.

view schools positively in 20% of cases and negatively in 23%; among people over 60, those figures are 9% and 32%, respectively.

In rural areas, people have a higher opinion of Russian schools. In 2016, 16% of rural respondents had a high opinion of them, and 28% had a low one.

Surveys of students about the quality of their schools is a rare phenomenon, but an important one for getting a full view of the situation. In an ONF survey from 2017, one in three school students (about 32%) felt that they had insufficiently deep knowledge in subject areas. 28% indicated that they lacked subjects that were useful for their chosen profession. 17% of the teenagers surveyed were unhappy with how teachers interacted with them, and 14% wanted teachers to pay more attention to what was going on in class. Almost 12% of students said there weren't enough extracurricular group activities at school. Only 12% reported that they did not feel a lack of anything.

More than half of all school students surveyed were unhappy with their large workload and lack of free time to pursue their interests.

2.2. The functional literacy of Russian 5th–9th grade students

Functional illiteracy among the adult population is a serious challenge for education policy and social inclusion. Functional illiteracy is defined as a literacy level that makes it impossible to use basic reading, writing, and numerical skills to solve a wide range of problems in daily life.

One of the core goals of schooling is to provide functional literacy for all graduates. Without this, it's impossible to speak of quality schooling.

Today, a relatively high percentage of the adult population remains functionally illiterate. According to 2016 data from UNESCO, only 9% of the population from 15 to 24 years of age does not have basic reading and writing skills [Literacy rates…, 2017]. For example, in 2011 there were about 80 million functionally illiterate adults in Europe, with rates of 8% in Sweden and 40% in Portugal [OECD and Statistics Canada, 2000]. While functionally illiterate adults are not socially dysfunctional, an inability to participate in civic and economic life puts young people and adults on a path to failure in the workforce and slows down the country's economic development. As an example, according to the World Literacy Foundation's 2015 report the cost of functional illiteracy in Russia was 14.11 million USD [Cree, Kay, Steward, 2012].

Schooling plays one of the biggest roles in the emergence of functional illiteracy among the adult population. The factors include: the number of years spent in school, the practice of holding students back for a second year, poor attendance, and the lack of an individualized approach to students.

In the literature there is often a distinction between complete illiteracy and functional illiteracy [Martinez, Fernandez, 2010]. Complete illiteracy implies a complete absence of basic reading, writing, and numerical skills. Functional illiteracy is defined as a person's inability to participate in activities for which literacy is a requirement, as well as the inability to use reading, writing, and numerical skills for developing themselves and their community, both local and global [Education for All, 2006]. So while a fully illiterate person cannot read, write, or calculate, a functionally illiterate individual may have these skills but be unable to use them to complete practical tasks. Such tasks may include:

- reading medicine labels
- filling out job applications
- carrying on business correspondence
- applying for a mortgage
- reading a bank statement
- comparing the prices of two or more products to find the best deal
- paying at the cash register

Functional illiteracy also limits a person's ability to participate in activities that demand critical thinking in addition to reading, writing, and numerical skills. Such tasks include:

- understanding government policy and voting
- using a computer to interact with government agencies
- calculating risk and reward in investing
- using a PC or mobile device to search for information
- critically assessing advertisements

It's important to note that functional literacy today is viewed in terms of having the skills to work with information, as presented in various formats such as printed and visual material (books, magazines, signs, posters, etc.), as well as media (radio, television, computers, or smartphones).

According to a study done by A. Cree and his coauthors [Cree, Kay, Steward, 2012], people who don't achieve basic functional literacy have lower incomes and a higher risk of homelessness and incarceration. Functional illiteracy is linked to a minimal level of pay increase per year of work experience, a low level of economic activity, reduced productivity in the workplace, a subjective sense of low quality of life, and reduced life expectancy.

Causes of functional illiteracy may be a nexus of social, psychological, and neurobiological factors [Vágvölgyi et al., 2016]. Experiences at school and within the family may act as catalysts of functional illiteracy for students with certain speech or cognitive impairments [Eme, 2011].

In schooling, a source of functional illiteracy may be the impossibility for the teacher and the school to take into account the specific needs of each student. As a result, less talented and motivated students fall behind their peers long term. Another risk factor is a lack of models of skill acquisition within the family, which can then lead to disinterest and avoidance in learning. Finally, success at school is significantly correlated with the economic state of the student's country. Annual GDP growth per capita increases the average scores of students by 1.59 standard deviations [World Development Report, 2018]. Ultimately the number of years spent in school is not as significant a factor. The quality and content of the education matters more.

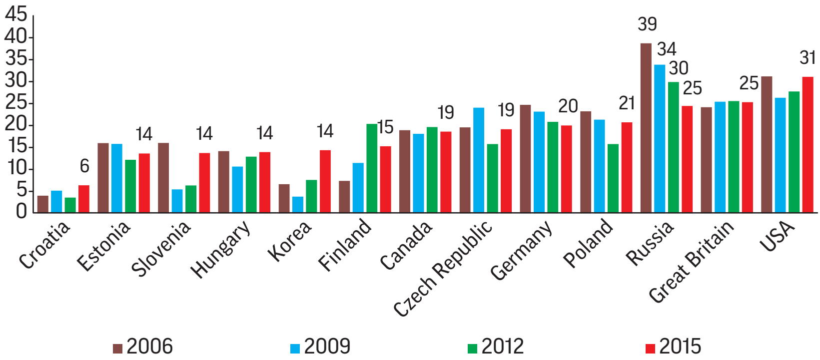
To understand the state of functional illiteracy in Russia, we will first look at functional literacy trends among 15-year-old students in Russian schools (using PISA data). Second, we will compare functional literacy in cases where a task is to be done on paper vs. on a computer (using PISA data from 2012). Third, we will analyze the information literacy of Russian school students (using ICILS data from 2012).

Functional literacy vis-a-vis subject-specific skills

In addition to using PISA data for comparing education quality in Russia with that of other countries, PISA scores may also be used to analyze the functional literacy of Russian school students [PISA 2015. Assessment…, 2017]. Student scores in the three subject areas of PISA are usually presented via six levels of achievement, or benchmarks. Each level is populated with different content, which demonstrates students' ability to solve specific problem types. The minimum cut-off for functional literacy is considered to be the second level on this scale. For example, the lowest level of achievement means that a student can solve only the simplest problems in familiar situations (math), can read short, simple texts (reading), and can describe a situation using only obvious information (science). Those who reach the second level can: 1) discern mathematical problems, recruit additional information from a single source to solve them, and use basic algorithms and formulas (mathematical literacy); 2) find the main idea in a text, find links between a text and their own experiences, and state their own point of view with support from quotes from the text (reading literacy); 3) identify clearly formulated scientific problems in simple situations, draw conclusions based on simple investigations, explain simple phenomena in familiar situations (scientific literacy). Achieving the second level is the minimum cutoff for functioning successfully in the modern world. Moving from the first to the second level of achievement indicates functional literacy.

According to the most recent PISA wave in 2015, 25% of Russian school students[8] failed to reach the minimum level of functional literacy in at least one subject area (Fig. 2.22). In Hungary, Finland, and Korea that figure is about 10–14%. Specifically, 19% of the Russian students were functionally illiterate in math, 20% in science, and 20% in reading. These students experience difficulty mastering the corresponding disciplines. Furthermore, 8% of 15-year-old school students failed to reach the minimum literacy level in all three areas. These students are in a high-risk category for social disadaptation.

Fig. 2.22. Share of students failing to reach the second level of literacy in at least one subject, PISA (%)



In the period from 2006 to 2015, the number of Russian school students failing to meet the functional literacy minimum declined in all three subject areas: from 39 to 20% in reading, from 26 to 19% in math, and from 25 to 22% in science. Despite the positive trend,

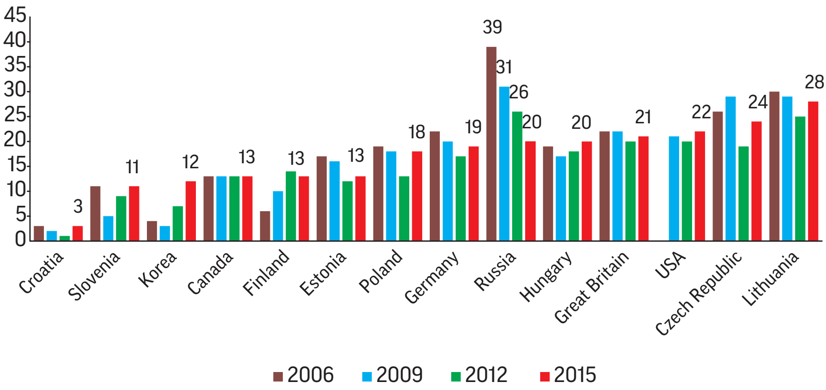
[8] Only those who were enrolled were selected to participate.

however, the number of students failing to reach the second (minimum) level of literacy remains consistently high compared to other countries.

We will now compare the test results of Russian school students with those from other countries vis-a-vis the trends in each subject area. For comparison we chose other formerly socialist countries with similar economic conditions to Russia (per capita GDP of no more than $25,000 in 2016)[9], as well as countries with developed economies (per capita GDP greater than $25,000 in 2016). Croatia, Slovenia, Estonia, Poland, Hungary, Czech Republic, and Lithuania are in the first category, while Korea, Canada, Finland, Germany, Great Britain, and the USA are in the second category.

In countries like Croatia, Slovenia, Finland, Estonia, Korea, and Canada, the share of students failing to reach the minimum second level of reading literacy in 2015 was significantly lower than in Russia, within a range of 3–13%. In Russia, such students were 20% of the total (Fig. 2.23).

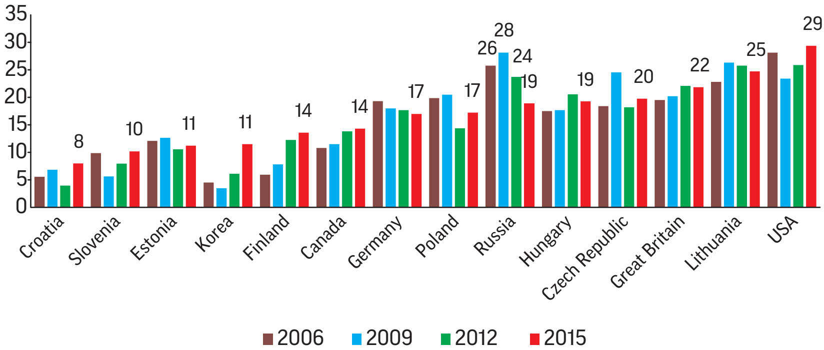
Fig. 2.23. Share of students failing to reach the second level of reading literacy, PISA (%)



[9] Based on World Bank data. See: <http://databank.worldbank.org/data>.

In math, the number of Russian students failing to reach basic competence in 2015 was also higher than for other countries: in Croatia, Slovenia, Estonia, Finland, Korea, and Canada the share of students failing to achieve basic competence was 8–14%, while in Russia that figure was 19% (Fig. 2.24).

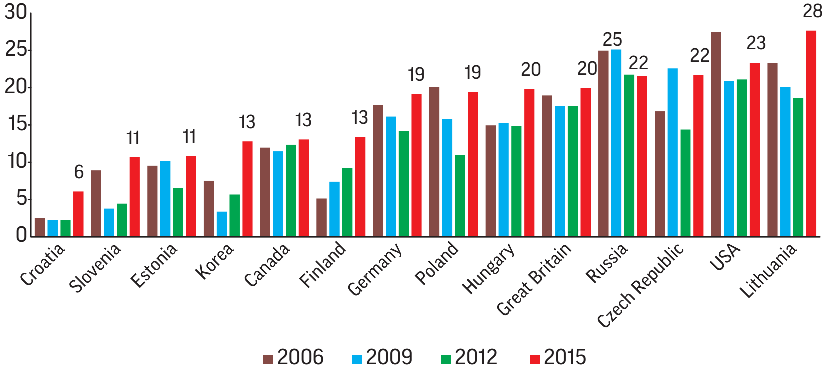
Fig. 2.24. Share of students failing to reach the second level of math literacy, PISA (%)



At 22%, the level of illiteracy in science among Russian school students was significantly higher than countries like Croatia, Slovenia, Estonia, Finland, Korea, and Canada, where it was no more than 13% (Fig. 2.25).

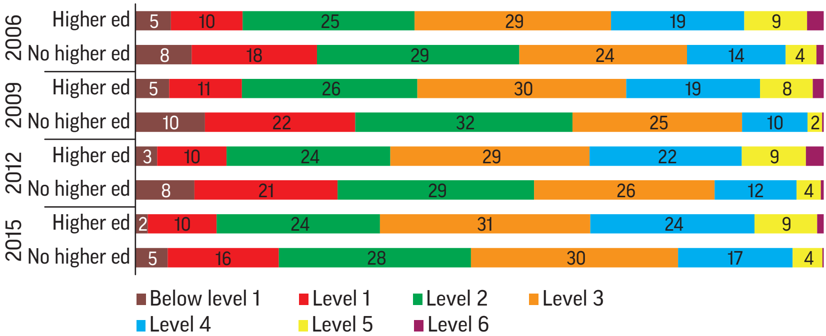
As we stated earlier, social and family contexts may be a cause of varying levels of functional literacy among school students. We will now look at the level of functional literacy in math vis-a-vis the level of education of parents. In the category of students failing to reach the second (minimum) level, we more often see mothers without higher education. This tendency continues to be true for four PISA waves from 2006 to 2015. The results from 2015 show that 21% of students with mothers without a higher education failed to reach the minimum level. Among students whose mothers did have a higher education, that figure was only 12% (Fig. 2.26). Therefore, functional

Fig. 2.25. Share of students failing to reach the second level of science literacy, PISA (%)



illiteracy is more common among children whose families have low cultural capital.

Fig. 2.26. Distribution of students by level of math literacy vis-a-vis their mother's education, PISA (% of students)



Functional literacy vis-a-vis test formats

In 2012, PISA testing was conducted in three subject areas in a paper-based format in 65 countries. Also in 2012, 32 countries participated in a computer-based version of the PISA test. The computer-based study was done in only two of the subject areas, reading and mathematics. The same group of students took both tests, so their results can be used for comparative analysis of outcomes.

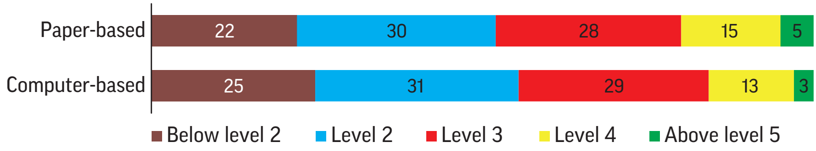
Overall, Russian participants in the computer-based version of the PISA reading test took 23–26th places out of 31 countries, while on the written test they took 38–42nd places out of 65 countries [Students, Computers and Learning…, 2015]. In the computer version of the math test, Russian students took 19–24th places among 31 countries, and on the written version, they took 31–39th places out of 65 countries. In other words, the reading and math literacy of Russian students is equally low compared to other countries no matter which format of test they take. However, to find deeper differences we need to look at the specific levels of scores received.

In the whole PISA dataset, the correlation between the results of the written and computer-based reading tests equaled 0.81, meaning that students from the majority of countries managed well with both written and computer-based tests. In Russia, however, the correlation between scores on the written and computer versions of the test was 0.69. In other words, the reading literacy of Russian school students is more dependent on the test format than students of other countries. The difference between scores on written and computer-based tests in Russia was a significant one, averaging 10 points. Students did better on the paper-based version.

The distribution of levels of reading literacy among Russian test takers also showed a small dependence on test format. In the computer-based format, slightly more students (25%) failed to reach level two compared with the paper-based PISA reading test (22%) (Fig. 2.27). So one of the problems for Russia's students is the form in which information is presented for use.

It's important to look separately at the results of the highest and lowest-scoring students in the PISA study, vis-a-vis testing format. Among the lowest-scoring Russian students, 8% fared worst only on the written version, 10% only on the computer version, and 14% did

Fig. 2.27. Reading literacy levels of school students vis-a-vis testing formats, PISA, 2012 (% of students)



equally poorly on both. Among the highest scorers, the differences were not as evident, but still visible: 3% got high marks on the written test, 1% only on the computer-based test, and 2% got the top scores on both versions. Therefore, the weakest students are the most differentiated depending on test format, unlike the strongest students.

In mathematics, the situation of literacy vis-a-vis testing forms is somewhat different. In the PISA results overall, the correlation between scores on the written and computer-based versions in math is significant, equaling 0.86. In other words, students in most countries did equally well on both tests. However, this figure is greater than the one for the reading test. In math, 20 participant countries got better scores on the computer, and 11 countries did better without the computer.

In Russia, the correlation between the computer-based math test and the written one was significant at 0.79. However, the difference in assignment completion between computer-based and written form was not significant. Therefore, in Russia reading literacy is more dependent on test format than math literacy.

Computer and information literacy

The International Computer and Information Literacy Study (ICILS)[10] was conducted in 2013 in 21 countries with a goal of determining the level of computer and information literacy among eighth graders

[10] For a detailed description, see: <http://www.iea.nl/icils>.

[Fraillon, Schulz, Ainley, 2013]. ICILS defined computer and information literacy as the ability to use computers in personal, research, creative, and communicative tasks, to make it possible to successfully learn, be productive, and participate in civic life. Therefore, the results of this test can be interpreted as a specific form of functional literacy.

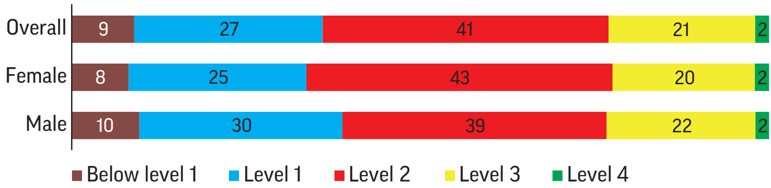
The average score on the ICILS for Russian test takers was 516, which was significantly lower than that of five countries (Czech Republic, Australia, Poland, Norway, Korea) and significantly higher than that of six countries (Croatia, Slovenia, Lithuania, Chile, Thailand, Turkey) [Fraillon et al., 2014]. It's important to note that, while 21 countries participated, aspects of the study make it possible to compare the results of only 14 of them. In other words, Russia placed 6–8th in computer and information literacy, together with Germany and Slovakia. Russian school students were in the middle of the pack in ICILS.

ICILS participants were all eighth graders, but the average age varied significantly from country to country, from 13.9 to 15.2 years. In 2013, Russian eighth graders were the oldest of all participating countries. Therefore, Russia's results may be partially attributed to the greater life experience of the students compared to other countries.

For a more detailed presentation of the data, ICILS test scores were also presented in the form of four levels of literacy, or benchmarks. Like in PISA, the content of each level demonstrated students' ability to solve particular types of problems. First-level tasks show the ability to do simple operations on a computer without help: follow a hyperlink from a text document, insert an image into a document, identify the recipients of an email copy. The key first-level task that differentiates it from tasks below level one tests the ability to create digital information without instructions or outside help. It's important to note that second-level tasks demand familiarity with tools for securing personal data on the internet. The highest, fourth level demands critical thinking skills in searching for information on the internet.

9% of Russian students were below level one on the ICIL metric, and an additional 27% failed to reach level two (Fig. 2.28). A mere 2% achieved the fourth level of computer and information literacy. Female participants outstripped the males significantly, by an average of 13 points.

Fig. 2.28. Levels of computer and information literacy of Russian students, ICILS, 2013 (% of students)



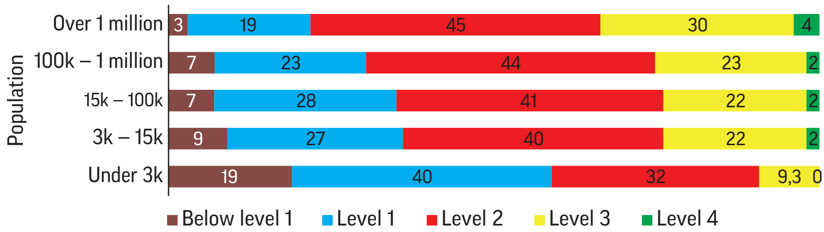
Overall, the test results show that about 36% of Russian eighth graders are capable of doing only the most basic computer tasks, meaning they did not get beyond the first level. As with the educational outcomes in other subject areas, computer and information literacy is closely tied to individual traits and the family context. Altogether, individual and family traits determine the ICILS results of Russian students by 17%. The average score difference between those with and those without parents with higher educations was 50 points (the highest level of education of the two parents is taken into account). The presence of IT resources at home (the number of computers and internet access) accounted for 12% of the outcomes on the test.

Another set of factors for computer and information literacy is students' confidence in their knowledge and their interest in computer technology. A student's confidence in his or her ability to independently complete basic computer tasks is positively correlated with computer and information literacy, with a coefficient of 0.28.

Interest in computer technologies does not play a significant role in computer and information literacy levels.

The size of a student's hometown is also correlated with education outcomes (Fig. 2.29). Of those who lived in towns and villages under 3,000 in population, about 60% of Russian eighth graders mastered only the first level or below, and none of them successfully showed the fourth level of literacy. The situation in these towns differs significantly from larger municipalities. Those hailing from Russian cities above 1 million in population scored highest on the ICILS test, but even of those only 4% demonstrated the highest level of computer and information literacy.

Fig. 2.29. Levels of computer and information literacy vis-a-vis population of student's home town, ICILS, 2013 (% of students)



Overall, despite positive trends, the level of functional illiteracy in math, reading, and science varies from 19 to 22%. According to PISA data, this is higher than in other countries. The education level of parents plays a large role in the development of functional literacy in children and teens: 21% of school students whose mothers aren't college-educated failed to reach the minimum level, while students whose mothers have higher educations were almost twice as likely to be functionally literate.

Looking at the results vis-a-vis testing formats shows that reading and math literacy among Russian school students was equally low in both written and computer-based tests. In both cases, the results are below the OECD average. Reading scores were significantly lower on the computer-based test than on the written one, with an average difference of ten points. A larger share of students ended up categorized as functionally illiterate on the computer test than on the written one, 25% to 22% respectively. Lower-scoring students show a bigger difference between the two test formats than the stronger students do. In the math portion, the test scores of Russian eighth graders did not differ vis-a-vis test formats.

Finally, the ICILS 2013 study shows 36% of eighth graders with a low level of computer and information literacy. Only 2% reached the highest level, which required critical reading skills in searching for information online. The data shows that computer and information literacy is closely tied to individual traits as well as socioeconomic background: the greater the resources in the family, the greater the functional literacy of the student in this area. The lowest ICILS scores came from residents of towns of less than 3,000 in population. In this group, only 60% of Russian eighth graders were able to complete the most basic computer tasks.

It is clear that the problem of functional illiteracy, which is academic underachievement in its most pronounced form, remains an urgent one for Russian schools.

2.3. Education inequality: scale, trends, progressive policies

International studies [Coleman, 1966; Bourdieu, Passeron, 1977; Breen, Jonsson, 2005; Rivkin, Hanushek, Kain, 2005; Hedges, Laine, Greenwald, 1994; Wilson, 1987; White, 1982], as well as Russian ones [Konstantinovsky, Kurakin, Vakhshtayn, 2006; Pinskaya, Froumin, Kosaretsky, 2012; Prakhov, Yudkevich, 2012; Roshchina, 2012; Yastrebov et al., 2014] show convincingly that the key factor for academic outcomes is the set of socioeconomic resources provided by the student's family.

Creating the conditions for educational equality for students from families of differing socioeconomic status has been one of the key goals of education as a social institution for decades. Since school students have no control over their socioeconomic bracket, it's necessary to create a fair educational system in which achievement is based primarily on ability [PISA 2015. Results..., 2016]. Today, providing students from disparate social contexts with an equal shot at high academic achievement is one of the key indicators of a fair and high-quality education system [Field, Kuczera, Pont, 2007]. Having such a system plays a large role in providing all school students with the basic skills needed to function in society and fulfill their human potential. Furthermore, providing social equality in education is one of the stated policy goals of education development in Russia: "Children must not be held hostage by the social and cultural status of their families" [Putin, 2012].

However, despite the desire to create equal opportunities for school students from varying socioeconomic backgrounds, in practice not all countries are able to reach this goal. While some education systems have a relatively low level of inequality among students, in others the differences between students of various social groups is rather large [PISA 2015. Results..., 2016].

Differences in academic achievement can be linked not only to characteristics of the students themselves, but also to those of their schools. Studies show that the socioeconomic status of students is one of the primary factors for academic success, both on an individual level as well as on the level of an entire school [Sirin, 2005; White, 1982; Coleman, 1966; Perry, 2012]. The socioeconomic status of an individual is defined by his or her position in the social structure of the society and by access to various forms of capital [Mueller, Parcel, 1981].

In situations of high socioeconomic inequality among pupils, schools play a significant role in shaping academic achievement. They can either reproduce existing social inequality or even increase it, or they can act as a social ladder and give effective support to students with low socioeconomic status. To understand how schools function in the educational system, it's important to analyze the differences within the cohorts of students in terms of the socioeconomic status of their families, the conditions under which education takes place (financial, staffing, facilities), the nature of educational outcomes, and their connection to the social conditions of schooling.

In this discussion, we use the concept of "socioeconomic segregation of schools" to reflect the way in which students of similar socioeconomic status are grouped together throughout the school system.

A high level of socioeconomic segregation means that there are significant differences between the socioeconomic status of different school's cohorts [Flaxman, 2013]. In other worlds, students of high socioeconomic status are concentrated in certain schools, and students of low socioeconomic are grouped in others.

Segregation in school systems is traditionally viewed as a significant problem. A high level of segregation tends to have a series of negative consequences. First, it is associated with a decreasing level of academic achievement, which is often attributed to the "peer effect" [Borman, Dowling, 2010]. Second, segregated school systems are rife with low educational and career ambitions on the part of students. This leads to a situation where pupils from socioeconomically disadvantaged families have a decreased chance of being educated [Flaxman, 2013]. Finally, in schools where students of low socioeconomic status are concentrated, a social environment is created that supports an increasing level of deviant behavior among the student population, which hinders normal socialization [Gorard, 2009].

On the other hand, education systems with student populations of mixed socioeconomic status have positive effects on education outcomes. The presence of such schools helps lower socioeconomic inequality by diminishing the correlation between family income and educational achievement [Flaxman, 2013; Gorard, 2009]. This is a hallmark of how fair, high-quality education systems evolve.

In Russia, the mechanisms by which families of different socio-economic status are distributed among schools, and the consequences of this, are both insufficiently studied.

From 2014 to 2017, HSE's Institute of Education conducted a multifaceted analysis of studies on the following set of issues: trends in socioeconomic segregation in the Russian school system compared to other countries; differences in the resources and outcomes of schools with differing socioeconomic status of students; determining the correlation between the level of school segregation and academic achievement. The analysis looked at: data from the PISA international education quality monitoring studies; data describing the social makeup of students and school resources; results from school principal and teacher surveys done in the context of the Monitoring of Education Markets and Organizations studies of 2014–2016; as well as data from the International Bank of Reconstruction and Development report of 2018, "Education Equity in the Russian Federation: Summary Report" [Shmis, Parandekar, 2018].

Segregation of Russian schools: scale, trends, links to education outcomes based on PISA results

A statistical analysis was done based on the PISA international education quality monitoring studies of 2003–2015. In the PISA studies, participating students took standardized tests in math, reading, and science, and answered questions in additional questionnaires about their socio-demographic characteristics. Students enrolled in general-education schools were selected for the analysis[11].

To analyze the level of segregation in the Russian school system, an index was used that was designed to calculate the level of homo-

[11] Vocational school students, who also participated in PISA, were excluded from the analysis.

geneity of distribution of students who shared certain characteristics among schools [Duncan, Duncan, 1955][12].

As an indicator of the socioeconomic status of students, the study uses one of its key indicators: the parents' education level [Sirin, 2005]. PISA data contains information on the highest level of education between the two parents. In our case, the variable used for socioeconomic status is whether or not the mother of the student has a higher education. Analysis of the data took place in two phases, using descriptive statistics and multi-level regression. Step one was to do a descriptive analysis of trends in the socioeconomic segregation index in Russia from 2003 to 2015. Then the link between the socioeconomic segregation of Russian schools and educational achievement in the PISA tests from 2003–2015 was studied.

Trends in the socioeconomic segregation of Russian schools

In the 21st century, the level of socioeconomic segregation of Russian schools increased up until 2012 (Fig. 2.30). In the last year of the study there was a drop in the index, which brought it close to 2003 levels.

Overall, from 2003 to 2015 the level of concentration of students with low socioeconomic status in schools changed little. An index of 0.3 or more is generally considered to represent a high level of segregation in the school system, and indicates a situation of inequality [Massey, Denton, 1987]. This means that for the whole period in question, there was a significant difference among Russian schools in terms of the socioeconomic status of students. Both majority-low and majority-high socioeconomic status schools are noted.

In addition to looking at the trends in segregation levels within the country, it's important also to compare the Russian data with that of other countries. Nine countries were chosen for comparative

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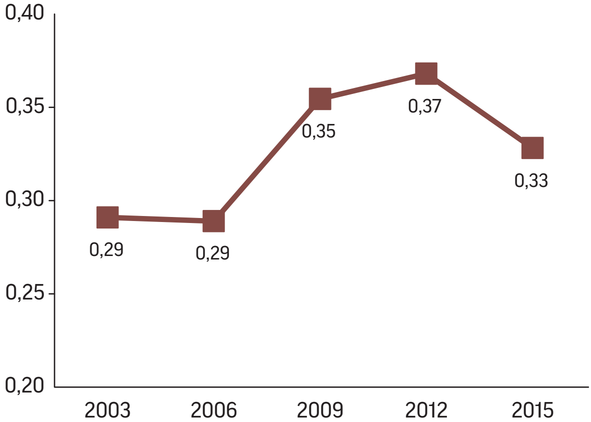
[12] This index is most often used in social research aimed at various forms of segregation. The magnitude of the index reflects the share of students who should be redistributed among schools in order to reach parity. A high number means that there are large differences between schools in the number of students of varying socioeconomic status.

Fig. 2.30. Trends in the segregation index in Russia

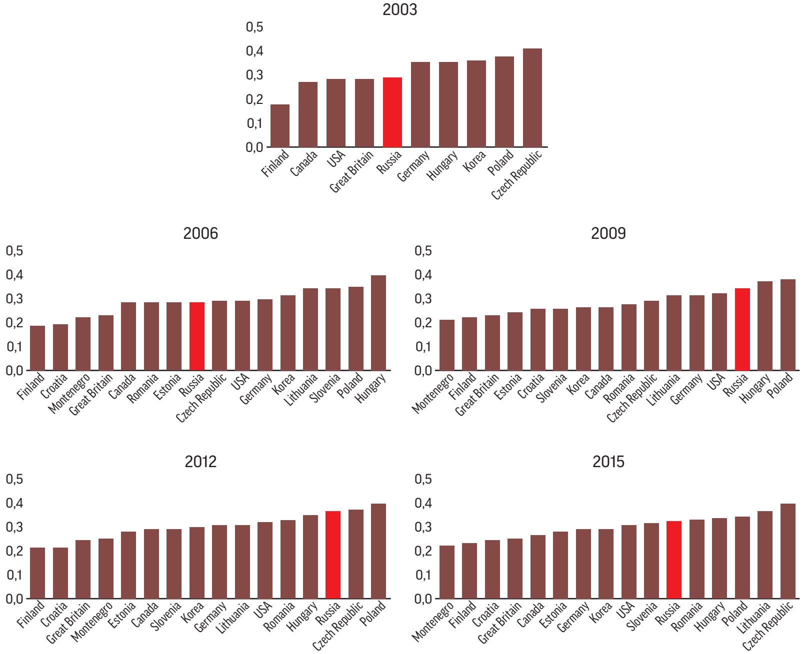


analysis: Great Britain, Hungary, Germany, Canada, Korea, Poland, USA, Finland, and Czech Republic. Education systems that resemble Russia's, as well as those with relatively high education outcomes among school students, were selected.

The results of the comparative analysis confirm the increasing level of segregation found in looking at the trends inside the country (Fig. 2.31). In 2003 and 2006, the socioeconomic segregation index of Russian schools was at an average level. The index was lower only in countries like Finland, Canada, USA, Great Britain, Croatia, Montenegro, Romania, and Estonia. By 2012, the segregation index for Russian schools rose, bringing it into the top-three most segregated systems alongside Hungary and Poland.

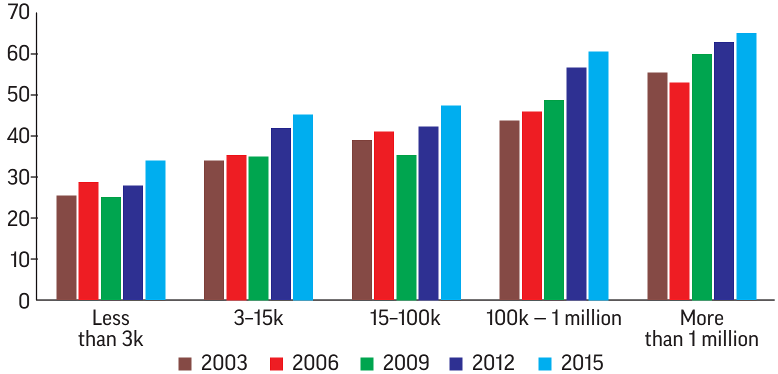
Therefore, both the analysis of segregation levels within the country from 2003–2015 and the comparison of that data to that of other countries showed that Russian schools in recent years differ greatly from one another in terms of their student bodies. These differences may be related to school location, methods of selectivity for admission, school choice criteria on the part of parents, as well as existing legislation in the country [Gorard, Taylor, 2000].

Fig. 2.31. Segregation index for Russia and other countries



In the Russian case, it is assumed that differences between rural and urban territories also play a large role in creating socioeconomic segregation among schools (Fig. 2.32). In small towns and villages of under 3,000 in population, the share of students that come from families where the mother lacks higher education is no more than 34%. In large cities, on the other hand, that figure never dipped below 53% over the period in question. Schools in small towns with low socioeconomic status among their students can demand extra support, since they are asked to do their work in a difficult socioeconomic context.

Fig. 2.32. Trends in the share of students whose mother lacks higher education, vis-a-vis the size of their hometown population, Russia (%)

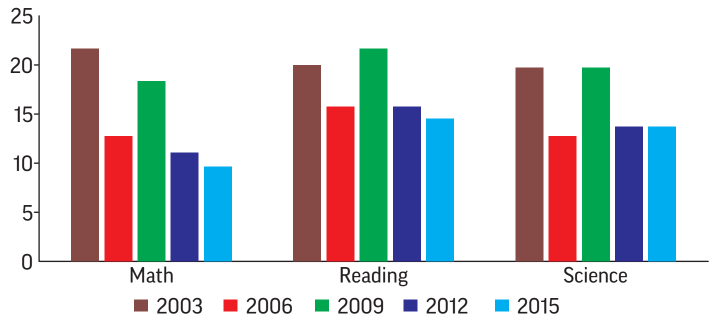


The correlation between the socioeconomic segregation of students and academic achievement

Overall, the differences in test scores in math, reading, and science are more determined by differences among schools rather than among students. Over the period in question, this figure was from 36 to 47% in math, from 33 to 65% in reading, and from 31 to 48% in science. It's noteworthy that the lowest such figure was in 2015. This shows that in the most recent PISA wave, the academic achievements of students in different schools became more uniform, and the results became slightly less tied to schools.

In terms of the link between the concentration of students of high socioeconomic status at school and the results of math, reading, and science tests, the correlation between the two variables was positive and statistically significant over the whole period in question. It was shown that the larger the share of a school's students with mothers who had higher education, the higher the academic achievement of the students. Over the period in question, an increase in the level of concentration of students with high socioeconomic status resulted in a rise in test scores of 14.7 in math, 17.6 in reading and 15.8 in science (Fig. 2.33). Therefore, the composition of the student body had the biggest impact on reading scores. However, in 2015 the mother's education level had more of an impact on math and science test results than the size of the home town. The results were different in the case of reading: the school's location in a small town resulted in more significant changes in reading test scores than whether or not the student's mother had higher education. It's noteworthy that the trend from 2003 shows a gradual decrease in the strength of correlation between living in a small town and academic achievement.

Fig. 2.33. Trends in the impact on PISA scores of the share of students whose mother had higher education, Russia



It's important to note also that the trends showed a decreasing correlation between the concentration of students with high socioeconomic status in a given school and academic achievement (see Fig. 2.33). In 2003, across all subjects, an increase in the share of students whose mothers had higher education was reflected in no less than a 20-point increase. In 2015, however, the increase in points was only 10 to 15. This weakening of the correlation was most prominent in math: the number of points tied to an increase in the concentration of students with high socioeconomic status was cut by more than half in the most recent study. The trend reflects a decreasing correlation between the socioeconomic status of a school's student body and academic outcomes. The diminishing of this correlation may be tied to an increase in the test results of socioeconomically disadvantaged students, or a general decrease in inequality in the Russian education system [Kapuza et al., 2017].

Differences in conditions and outcomes of schools serving families with varying levels of social, economic, and cultural resources

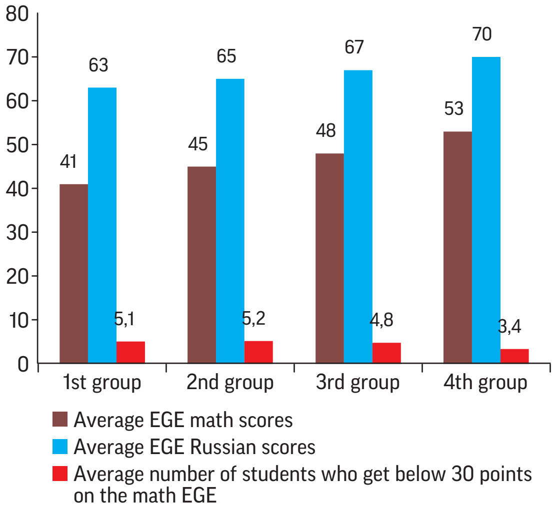
To analyze the educational outcomes at schools with children of varying levels of social, economic, and cultural resources, the HSE's Institute of Education has developed a multifaceted metric: the Social Prosperity Index (SPI). It is based on a set of characteristics describing a school's student body, such as the education and employment of parents, family structure, and the behavioral and linguistic traits of students. These data points are the most effective for revealing the greatest correlation with the educational outcomes of schools; in this study, that metric is represented by EGE test scores.

Firstly, it's important to note that schools with different SPI vary significantly in data points that are descriptive of the economic and cultural potential of students' families, such as parents' education levels, their professions, etc. As the results of the analysis show, in the least prosperous schools with the lowest SPI, only one in eight students lives in a family where at least one parent has higher education, and nearly one in five has unemployed parents. On the other hand, in the most prosperous group of schools seven of ten students are children of parents with higher education. In these schools, it is very rare to see children of unemployed parents. Furthermore, schools with low SPI see a greater number of students with deviant behavior patterns who are subject to disciplinary measures in the school or enter the juvenile justice system.

Socially prosperous and successful schools are mostly located in cities, and a large portion of them offer advanced academic programs: more than a third of them fall under the "lyceum" or "gymnasium" categories. However, low-SPI schools are not only in rural areas. A good number of them are urban schools, generally located on the outskirts or in suburbs.

The analysis reveals a direct, linear correlation between SPI level and average scores on the EGE test (Fig. 2.34). As the SPI increases from the first group of schools to the fourth, the average EGE scores also grow, and the number of students failing to meet the math competency minimum of 30 points decreases.

Fig. 2.34. EGE test results in Russian and math in schools with differing SPI levels (% of school principal survey respondents)



It must be presumed, therefore, that schools that educate students from families of low social status have a much lower chance of achieving excellence, especially if they are in rural areas.

It's important to point out that schools that teach students from socially unprosperous families have a far lower rate of graduates attending colleges and universities, despite the fact that graduates of these schools get high marks on the EGE. The rate of college admission at these schools is lower than that of schools where EGE scores are lower, but the students are from socially prosperous families.

It is possible to assume that we are witnessing a phenomenon of disrupted educational mobility, or a roadblock to social mobility, wherein schools provide a good support system for the competitive environment of college admissions and receiving quality professional training, but graduates fail to take advantage of these opportunities. It's clear that the causes of such a phenomenon fall outside of the school's sphere of influence.

The study's data shows that schools that teach students of different social status are differentiated not only by the quality of education, but also by the level of resources available to them. In schools with more prosperous student bodies, there is a higher percentage of teachers with high-level professional training. At less socially prosperous schools, only 33% of teachers have the highest level of professional certification, while 20% are without a professional certificate altogether. On the other hand, 45% of teachers at more socially prosperous schools have the highest level of certification, and only 15% are without certification. So families with the greatest social, economic, and educational resources available to them interact with the most professionally qualified teachers, and vice versa.

When it comes to the financial resources of schools serving children from families of differing socioeconomic prosperity, the level of teacher salaries is a convenient measure to look at, even if it's an indirect one. According to the study's data, the compensation of teachers, administrators, and other personnel increases according to the school's level of social prosperity. In large part, this correlates to the rural or urban nature of the school district. More prosperous schools are more often in large cities, where salaries are higher than in rural areas and small cities. Teachers in the most prosperous schools make up to 1.5 times more than those in the least prosperous ones.

Of course, the significant differences in administrator salaries between the two groups of schools is also important. School principal salaries are not connected to outcomes, and are highly dependent on the prosperity of the school, which in turn depends on the type of town or city in which the school is located. Administrative staff in socially prosperous schools, even if they produce poor academic results, make significantly more than those in schools with low SPI and excellent results.

This situation can be considered not only unfair, but also strategically unfounded. Such a fiscal policy does not incentivize the high-quality administration needed to bring socially unprosperous schools on the path to excellence in the face of a difficult student body and limited human resources. It makes it impossible to attract qualified, experienced administrators to lead the most difficult schools, and prevents them from hiring highly qualified teachers.

Another important factor to look at here is the funding needed to hire support staff to work with students. The least prosperous schools find it even more difficult to hire psychologists and social counselors than most schools, where pay for those positions is already very low. Of course, the least prosperous schools are the most in need of those specialists, given the difficulties of the student body and the lack of resources in students' families.

A more direct indicator of a school's financial resources is information about their income structure. Only high-SPI schools get significant funding from income-generating activities. Income from privately funded programs contribute substantially to their budget, accounting for more than a quarter of it. The other three groups of schools, especially the socially unprosperous category, are almost entirely funded by public money. This makes budget cuts like the one that happened in 2003 very dangerous; they affect all schools, but socially unprosperous ones are the most sensitive to them. In these schools, twice as many principals (28.5%) indicated a diminishing level of public funding than reported a rising level of funding (14%). In the case of non-public funds, 30% of them reported a decrease, and 11% reported a rise. The opposite is true of the most prosperous schools: 32% of principals reported an increasing level of income, and only 11% reported a decrease. The situation is most dramatic in low-SPI schools with low academic outcomes. Based on the principals' reports, these schools are experiencing the sharpest financial declines.

The fact that school differentiation based on the social characteristics of the student body is accompanied by financial differentiation, in which the least prosperous schools are the most hard-pressed, is confirmed by another set of data: funding for school programs outside of the standard academic curriculum. Monitoring data shows that schools with the lowest SPI receive funding less often for innovative projects and for work with gifted or special-needs students. Almost two-thirds of school principals in this group stated that they had never received additional funding. In other groups, about half of principals gave the same response.

Innovative programs in schools with the lowest SPI were funded two times less often than in the other groups of schools. Work with gifted students was funded 2–2.5 times less often than at prosperous schools. Even work with special-needs students was funded not more, but less often than in the other groups. This is in spite of the fact that socially unprosperous students cannot rely on resources from their families and are maximally reliant on school resources. Such schools need additional specialists for this purpose, but they are unable to hire them due to the aforementioned lack of funds.

If we compare the distribution of financial resources at the highest-performing and lowest-performing schools, we can confirm the fact that socially unprosperous schools are discriminated against in terms of the funding required to work with students who need extra attention. The schools that show the highest levels of academic achievement receive very different levels of support for work with gifted students. Such work is funded four times more often at high-SPI schools than at schools with the lowest SPI. In other words, socially unprosperous schools are not expected to pay attention to their gifted students, or it is assumed that they have none. Special-needs students are seen as the only group that requires extra attention at such schools.

The situation is such that school differentiation along social lines is accompanied by financial differentiation. Schools working with the least socially prosperous students get practically no support for innovation or for work with gifted and special-needs groups. Salaries are lower across all categories at these schools than at prosperous ones. Income from privately funded ventures is minimal, and they are almost entirely reliant on public funding, which a large portion of principals say is being cut.

This financial policy fails to incentivize high-quality teaching and administration, and goes against international best practices of supporting the schools that work in the most challenging social contexts and receive special funding.

Given all of this, it becomes clear just how special it is to find a school that is able to achieve academic excellence while teaching students with the lowest levels of socioeconomic and cultural resources. Nevertheless, such schools exist. Both international and internal Russian studies show that even among schools in the lowest 25% by social prosperity it is possible to achieve results on the level of the top 25% in terms of PISA, TIMSS, and EGE test scores. Certainly, such schools are few in number, not more than 5% of the national sample. This is the category of resilient schools, able to thrive in unfavorable or hostile conditions.

What allows these schools to overcome the lack of social prosperity and financial resources and provide their students the opportunity to receive a quality education, thereby improving their students' chances in life?

Studies have revealed the special educational approaches of these schools, which are able to contribute significantly to their students' high educational achievement. First and foremost is a focus on education outcomes, with attention paid not only to upper grade levels, but with an eye towards various kinds of achievement at all levels. The leaders of these schools understand that they must offer the maximum possible educational opportunities to their students despite limited resources. An example of this is offering a specialized track that prepares students for college and helps them be successful on the EGE.

Let's keep in mind the fact that this resilient category of schools, unlike socially prosperous ones, are not selective at any grade level, and are far less likely to deny admission during the transition to the upper level between ninth and tenth grade. These schools therefore give the majority of their students the opportunity to stay in the academic track for the maximum period without filtering out unpromising or difficult individuals.

Policies of equal access to quality education

In the world's leading countries, education policy is directed towards closing the gap between groups of students and equalizing the opportunities for young people from families of low socioeconomic status to achieve academic excellence. Measures for overcoming education inequality are system-wide, large-scale, and ongoing national programs. Their status is secured by regulatory acts and significant budget allocations. We find a wide range of such programs around the world. One option is continuous government support and priority funding for socially unprosperous schools, which may be done via an added funding coefficient for low-income territories and student populations, or an educational voucher for attracting the best administrators and teachers looking for career opportunities. In all cases, the first step is to create a system for identifying students and schools who are living in disadvantaged social conditions, which allows the support measures to be directed to the right place.

Another practice that is becoming more and more widespread is remedial education, which seeks to prevent students from falling behind and dropping out of the system. The at-risk students, who tend to be from low-income families, are provided with additional classes, individual tutoring and counseling, and pre-professional training within the school system.

From 2008 to 2017, international policies of equal-opportunity education shifted from trying to improve the education system overall to targeted assistance for certain groups, such as:

- migrants (Finland, Germany, Slovenia)
- native peoples (Australia and New Zealand) and ethnic minorities (Portugal, Slovenia)
- low-income families (Belgium, Germany, Hungary, Great Britain, Chile)
- special-needs students (Australia, Belgium, Latvia)

Policies of dampening the impact of low social status on academic achievement are still the most prominent.

Belgium, for example, offers grants to schools based on the number of families of low social status they serve. Social status is determined by a number of criteria: the mother's level of education, the language spoken at home, family income, and the nature of the family's neighborhood. Based on these factors, extra hours of instruction are provided in elementary and middle school. In Chile, both public and private schools all receive additional funding for every student from a low-income family. Schools that receive subsidies must develop a detailed plan for educating such students and participate in a monitoring program specifically for schools that participate in the program. German students from low-income families get subsidies to participate in extracurricular activities: field trips, music, culture, and sports. In England, schools get extra funds for special support programs for all students who qualify for free lunches. Over the past seven years, per-student funding has increased almost threefold.

Schools are given autonomy in how they make use of the funds. In working with the children of migrants, programs include classes to prepare them for school and to assist them during school, especially in learning the national language. Parents are also asked to get involved, and teaching assistants of the same national origin are hired. It's important to note that while OECD countries take different approaches to equalizing opportunities, they are all united by a tendency to strengthen system-wide policies rather than creating one-off, localized projects. Some of the programs underwent minor reforms in 2008 [Education Policy Outlook…, 2018].

It's also important to note that the various projects for equalizing opportunities and supporting students from low-income families enjoy wide social support, and are initiated and carried out not just by the government, but also by philanthropic foundations.

In Russia, government policies of providing equal access to quality education emerged in the 2010s.

The government order No. 1756-r of December 29, 2001, "The Conception for the Modernization of Russian Education to 2010" declared social demands for the education system, including the need to "provide universal, equal access for young people to high-quality education in accordance with their interests and independent of their family wealth, place of residence, nationality, or health status." One of the key goals of the document was the provision of government guarantees of access and equal opportunity for getting a full education, regardless of locale or family income.

The means by which rural school-age citizens were to be provided high-quality education was the restructuring of rural school districts. School students with special needs would be provided with medical and psychological assistance and special conditions for learning, primarily through their local schools. Students with problems of an antisocial nature would be assigned mandatory psychological assistance in the school context.

Two major campaigns were launched in Russia aimed at overcoming inequality between rural and urban schools: the restructuring of rural districts and the presidential program "School Bus."

2012 saw the first government policy directed towards overcoming inequality between schools. In V.V. Putin's article "Building Justice. A Social Policy for Russia" [Putin, 2012], he wrote: "In some of our large cities we find groups of schools with consistently poor learning outcomes. Such schools have almost no straight-A students or olympiad participants, but many students with learning difficulties, Russian as a second language, or deviant behavior. Schools that are faced with difficult social conditions deserve financial support and help for their teachers, not just the gymnasiums and lyceums that tend to serve the children of affluent parents."

Presidential Order No. 599 of May 7, 2012 "On Measures to Implement Government Policy on Education and Science" presented a goal of supporting teachers who work with students from low-income families. Unfortunately, this presidential decree was implemented only on the surface. Effective, system-wide practices of supporting school staff who work with socially disadvantaged students were not put in place.

In 2013, policies for overcoming education inequality were laid out in a roadmap document called "Changes in social institutions aimed at increasing the effectiveness of education and science." This roadmap contained plans for regional programs to support schools that were working in difficult social conditions and teachers who worked with children from low-income families.

Government decree No. 295 of April 15, 2014 instituted the Russian Federation initiative "Education Development for 2013–2020." One of its stated goals was to close the gap in educational achievement among students by boosting the efficiency and quality of schools with low education outcomes.

Among the presidential orders of 2015 coming out of the State Council session on improving the education system was an order to the Ministry of Education and Science, together with regional education authorities, "to develop and implement measures to create conditions for schools with consistently low outcomes to provide quality education." [Perechen porucheniy…, 2015].

In 2016, the Federal Program for Developing Education in the Russian Federation for 2016–2020 was launched. One of the expected outcomes was support for no less than 20 regions to implement modern methods of support for schools with low outcomes and those that operated in disadvantaged social conditions. The results were implemented in over 70 regions. In 2017, the program carried out a selection of regions to receive subsidies from the federal budget to finance programs for supporting low-performing schools and those that worked in disadvantaged social conditions. Ultimately, 51 regions received support. However, the scale of the programs, and the level of involvement on the part of administrators and experts, were clearly varied. While the program was well-run in regions such as Yaroslavl, Moscow, Tambov, Tomsk, and Krasnoyarsk, there are examples of surface-level engagement in other regions.

The small size of the project budget is noteworthy. The 2017 subsidy totaled 65 million rubles, and in 2018 the budget was 114 million. For comparison, we can see that England allocated far more to the “City Challenge” project, carried out between 2002 and 2011 in London, Manchester, and a number of districts. The goal of the project was to create equal education conditions for high and low-income families. The budget was 80 million GBP for London, and 50 million GBP for Manchester. In America, the “Every Student Succeeds Act” allocated more than 60 billion USD to improve academic outcomes for students from low-income families.

While the government has been paying more attention to the problem of school inequality, it’s also true that at this stage the initiatives have been local, both in terms of geography and in terms of strategic scope. They have been carried out as discrete ministry initiatives rather than being applied in a system-wide manner. The needed legislative and financial backing has not materialized on the national or regional level, and public interest has not been engaged. One development that brings optimism is the engagement of philanthropic organizations in the issue of equal opportunity. Sberbank of Russia is a supporter of the “Teacher for Russia” program, which trains and gives continued support to graduates from top pedagogical programs to work in schools with challenging social conditions.

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Overall, the Russian school system can be said to have a high level of socioeconomic segregation, with schools differing greatly by the socioeconomic status of their students.

From 2003 to 2012, Russian schools became more and more segregated. The trend in increasing segregation was especially evident when compared to statistics from other countries. It's important to note that while the segregation levels were already high in 2003, they reached their peak in 2012. One possible factor in the high level of segregation in Russia is the gap between urban and rural territories.

Schools where student bodies differ along socioeconomic lines have markedly different working conditions, in the level of funding, presence of qualified teachers, salaries, and the presence of specialists who work individually with students such as psychologists and social counselors.

Schools with high concentrations of socioeconomically advantaged students tend to produce higher results in both the EGE and international studies like PISA. Schools that differ along socioeconomic lines also differ greatly in the educational trajectories of their students, in terms of transitioning into 10th grade and entering university. However, certain schools that serve socioeconomically and culturally underprivileged families do produce high outcomes.

Segregation in Russian schools may be one of the factors of educational inequality in the country. However, the overall level of educational inequality in Russian schools is significantly less than that of the majority of competing countries. The gap in academic achievement between high and low-socioeconomic status students is only half of the European average [Shmis, Parandekar, 2018].

One path forward for reducing inequality among schools is direct support for schools that serve socially disadvantaged populations.

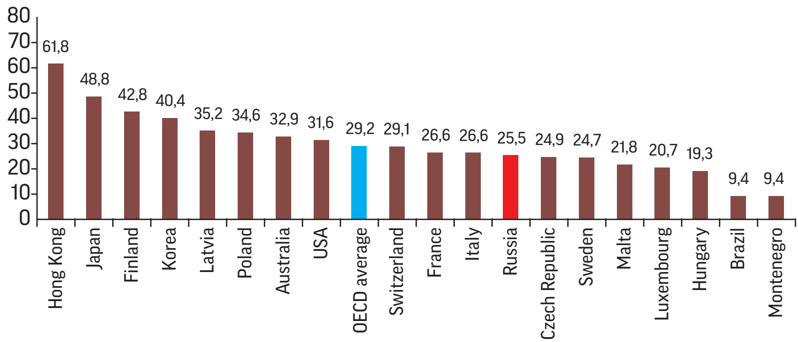
This policy should be applied system-wide and be supported by legislation and sufficient funding.

2.4. The academic resilience of Russian schools

Researchers have studied academic achievement for many years now. One object of study is resilient students, those who achieve academic excellence despite their low socioeconomic status. The share of such students is often seen as an indicator of a school system's effectiveness in terms of providing universal access and equal opportunity in education [Erberber et al., 2015; PISA 2015. Results..., 2016; Agasisti et al., 2018]. As a group, resilient students represent a large amount of human capital that would remain unused without proper support.

According to data from PISA (Programme for International Student Assessment), the share of resilient students in the Russian population is 25%, which is lower than many Asian and European countries. A student is considered resilient if they come from the lower quartile of the PISA index of economic, social, and cultural status for their country, but also show academic achievement in the top quartile for their country (Fig. 2.35).

Fig. 2.35. The share of resilient students, OECD, 2015 (%)



However, this approach has a number of important drawbacks. Achievement varies significantly among countries. The scores that are high in one country may be low in another. The same can be said about families' socioeconomic status (SES). Therefore, students from one set of countries could be on the low end of SES, and those from another set would find themselves on the high end of achievement. This would lead to an inaccurate count of the share of resilient students in each country. That is why we see it as more productive to analyze resilience from the point of view of a single country, e.g., to categorize each student as resilient by taking into account achievement and socioeconomic status within each country.

Looking at the internal or national statistics for resilience using OECD data [Equity in Education…, 2018], about 13% of students from families with low socioeconomic and cultural resources show high achievement in scientific literacy, which puts Russia about even with the OECD average.

Another statistic that reveals the level of resilience in the country is the share of low-SES students who achieve level three on the PISA tests. From this point of view, Russia is not far off the OECD average.

Researchers at the HSE's Institute of Education looked at unique data from the Russian longitudinal study "Education and Career Trajectories," which contains results from two large-scale international studies, TIMSS and PISA. Resilient students were studied in the context of internal Russian levels of socioeconomic status and educational outcomes. This revealed that only a small percentage of students from families with low socioeconomic status achieve high outcomes. Resilient students represent only 7.4% of the participants in TIMSS, and 7.1% in PISA. 4.2% of students fall into the resilient category in both tests, meaning that they received high scores on both TIMSS and PISA math tests. The international comparative studies show that these figures are fairly stable and have changed only slightly over the period of observation from 2003 to 2015.

In this context, it becomes important to study the factors that allow these students to achieve academic success. By finding the school-based factors that play a role in resilience we can formulate recommendations to help students from disadvantaged families to reach their full potential, expanding their access to high-quality education.

Given the specific distribution of SES and test scores in Russia, groups of resilient students were identified based on PISA, TIMSS, and both tests simultaneously. Their distribution in schools is shown in Table 2.1.

Resilient students' average scores in both PISA and TIMSS are significantly higher than the average scores of all other groups, including the high socioeconomic status group. Another big difference emerges in the comparison between resilient and non-resilient students with low SES: 134 points in TIMSS and 137 in PISA.

Looking at the schools attended by resilient students, it turns out that 24% of the TIMSS group and 21% of the PISA group went to schools of special status[13].

Another interesting group is that of students who were deemed resilient in both TIMSS and PISA. 34% of them attend lyceums and gymnasiums, 45% attend schools with high SES, and 36% with mid-level SES. So a significantly smaller share of these students attends schools with average SES that is as low as their own.

However, the simple fact of attending a special-status school or a school with a higher average SES does not explain the high achievements of certain disadvantaged students. What specific factors allow these students to achieve excellence?

Resilient students in both PISA and TIMSS feel better at school (Table 2.2). These students are confident that their teachers believe in them and expect good results from them. Furthermore, while the general expectation level of teachers at the school does not vary

[13] This category includes gymnasiums, lyceums, and education centers.

Table 2.1. Characteristics of resilient and non-resilient students

Group	*N*	TIMSS score	PISA score	Gymnasiums & Lycees	High-SES schools
				%	
	Resilient (TIMSS) 8th graders				
Resilient	362	625	—	24	34
Non-resilient with low SES	1133	491	—	8	10
	Resilient (PISA) 9th graders				
Resilient	314	—	573	21	33
Non-resilient with low SES	1028	—	436	9	10
	Resilient (TIMSS & PISA) 8th and 9th graders				
Resilient	185	631	585	34	45
With low SES	1495	522	465	—	—
With mid-level SES	2034	543	493	18	33
With high SES	1360	555	505	31	54

greatly, the expectations in math specifically vary significantly. Students seem to "read" a specific signal related to a specific subject more clearly than the general atmosphere of the school. One must also note that in PISA, school-based factors play a smaller role than in TIMSS.

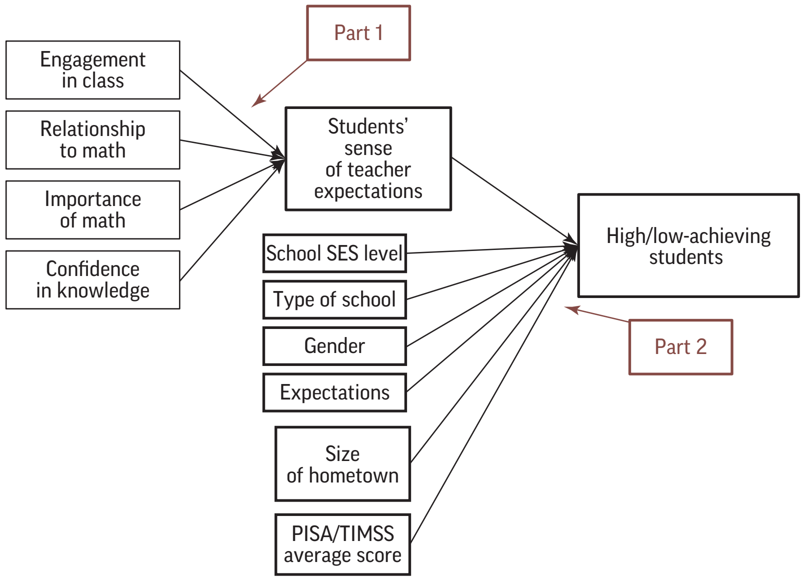
Based on the final model, some of the factors have a direct impact on a student's likelihood of becoming resilient: gender, type of school, average SES at the school, teachers' expectations, average PISA or TIMSS score, and the size of the hometown. On the other hand, indexes related to students' opinions about math have an indirect relationship to this likelihood (Fig. 2.36). They act through the prism of the student's sense of the teacher's expectations of him or her. This model offers the best statistical indicators of quality, which means that it describes the real data better than others.

Table 2.2. Individual and school-based factors of resilience. Comparison of resilient and non-resilient students from the low socioeconomic status group

Group	Number of students	Well-being at school	Relationship to math	Importance of math	Confidence in learning math	Engagement in math class	Academic expectations of the teacher, in the student's opinion
TIMSS							
Resilient students	362	0,06*	10,8*	10,1*	10,8*	10,5*	6,0*
Non-resilient students with SES 1	1134	0,01*	9,9*	9,7*	9,2*	9,8*	5,0*
PISA							
Resilient students	314	0,04*	10,5*	9,9*	10,4*	10,1*	5,7*
Non-resilient students with SES 1	1028	0,001*	10,04*	9,8*	9,4*	9,9*	5,1*

* Level of statistical significance — 90%.

Fig. 2.36. Interrelationship of factors with the probability of becoming resilient



The key result of this analysis is the following: it's important for low-SES students that their teachers demonstrate high expectations of them. Through this mechanism, various positive attitudes toward math increase the probability of a student becoming resilient (see part 1 on Fig. 2.36). This is a key point that is worth reiterating: interest in the subject, engagement in class, and confidence in knowledge do not by themselves give a student the opportunity to become resilient. They start to play an important role only if the student experiences a high level of expectation of his or her work.

Russian studies have shown that not only individual students, but also schools that work in socially disadvantaged conditions are able to reach high academic achievement. Such schools are also considered resilient, able to endure in the face of disadvantageous external factors. These schools differ widely in number of students, curricula, and geography, but are united by similar strategies of high expectations and demands of students, individual support and motivation, and the development of skills needed for students' successful socialization.

Students from families with low socioeconomic status have a better chance of achieving high educational achievement if they are enrolled in special-status schools or schools with a high average socioeconomic status among the student body. This puts them in an advantageous educational atmosphere with an elevated level of demand for education among their peers. All this reflects positively in their academic achievement.

However, it is possible for schools with low social status that serve high concentrations of disadvantaged families to create conditions for supporting resilience. Studies have revealed a number of factors in the school that can increase students' chances of high academic achievement despite the low level of socioeconomic resources in the family. One of the key factors is a high level of expectation from the teachers. It's important for resilient students to sense the signals of high expectation from their teacher. It is through the prism of these expectations that various attitudes toward the subject come into play. This, in turn, is directly related to their chances of becoming resilient.

Another approach common to these schools is a system of transparent requirements for the process and results of education, which applies to both students and teachers: objectivity in grading, support and stimulus for students' educational activity, and an individualized learning trajectory based on academic achievement and goals.

In the context of education policy, it's important to remember that these are the very schools that fulfill the function of upward mobility and improve the life chances of children from the most disadvantaged social groups. Their strategies should be replicated, and the schools themselves should receive support at all levels of administration. Consistent application of such strategies will open new possibilities for Russia to take steps forward in international comparative studies, and, most importantly, to grow its educational potential and human capital.

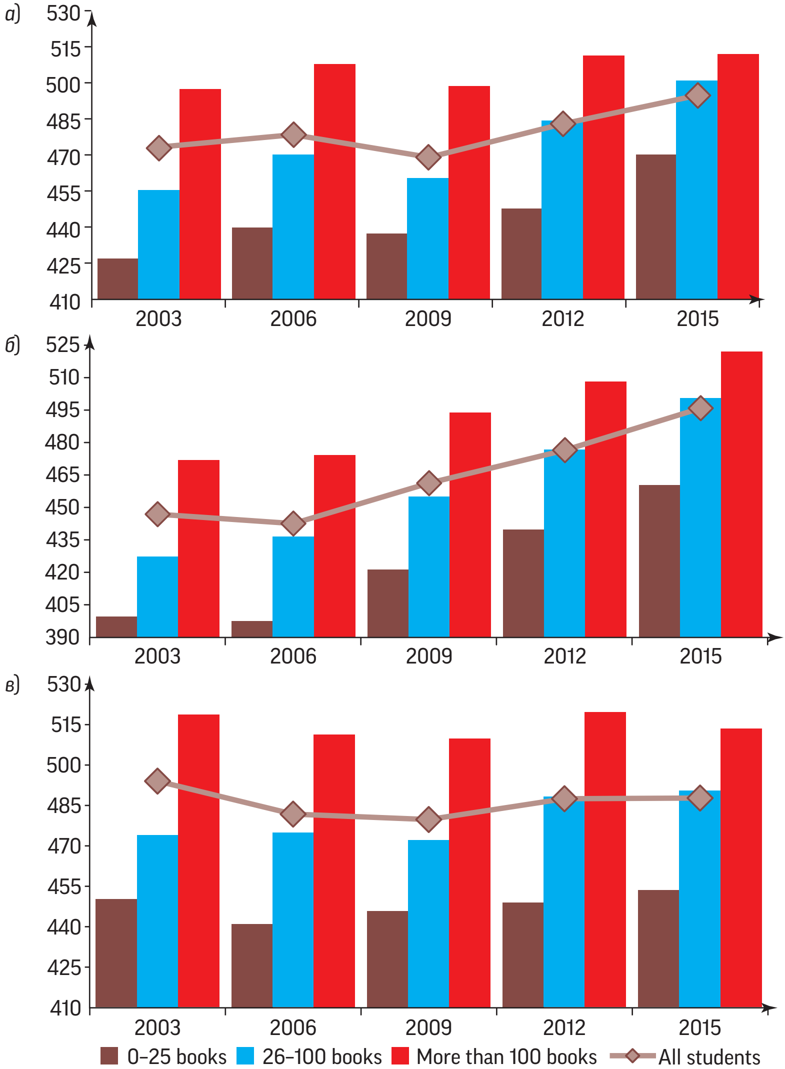
2.5. The educational achievement of students from families with high socioeconomic status: untapped potential

The socioeconomic status (SES) of an individual or his or her family reflects positioning within a social structure that is characterized by a certain level of access to material well-being, power, and status [Mueller, Parcel, 1981]. There is a significant positive correlation between socioeconomic status and educational outcomes [Konstantinovsky, Voznesenskaya, Cherednichenko, 2014; Carnoy, Khavenson, Ivanova, 2015; Sirin, 2005; White, 1982; White et al., 1993].

An analysis of Russia's PISA results from 2003 to 2015 (Fig. 2.37) shows that high-SES students (those with more than 100 books at home) on average had the lowest increase in scores across all subjects compared to other groups. In math (see Fig. 2.37, *a*), this group's scores were on the decline in 2009 and went up insignificantly in 2015. While there was an overall decrease in Russian scores at the 2009 wave, the lack of a nontrivial increase in 2015 was only among students from high-SES families. Across all the PISA waves, high-SES Russian students improved their scores by an average of 14 points in math, while middle-SES scores went up by 46, and low-SES scores by 43. These numbers show a significant gap between the trends in academic achievement in math of high-SES students compared to others.

Similar tendencies are observed in reading scores (see Fig. 2.37, *b*). In the first two PISA waves of 2003–2006, all students except the middle-SES group showed a trivial level of increase in reading scores. In 2009, students with high SES had a similar score increase to that of middle-SES students, but somewhat lower than that of low-SES students. In each of the subsequent waves, high-SES students had the lowest score increase. Over the whole period in question, scores

Fig. 2.37. Test results of Russian students vis-a-vis SES level, PISA (points):
a – math; *b* – reading; *c* – science



Source: OECD.

of the high-SES group improved by 50 points, while the middle group improved by 61 and the low-SES group improved by 61. Compared to the math results described above, high-SES scores in reading did not lag as far behind the middle-SES group. Nevertheless, the rate of score improvement in this group remains the lowest.

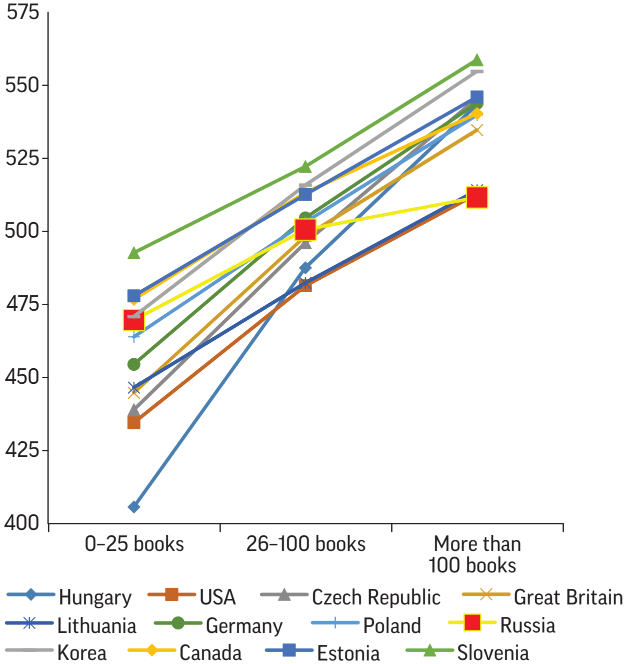
Data from the science tests show a lack of significant score growth among high-SES students (see Fig. 2.37). From 2003 to 2015, there was no significant change in this group's science scores from year to year, with the exception of 2012, when a slight increase was observed. Similar trends were also seen in the Russian science scores overall. However, it's important to consider that the total change in science scores for the high-SES group from 2003 to 2015 was a decrease of 5 points, while the scores of middle and low groups increased by 16 and 3 points respectively. Therefore, only students from high-SES Russian families showed diminishing results over the observed period, although the decrease is statistically trivial.

An analysis of categories of students with differing socioeconomic status in an international context reveals the following tendencies: in math, low-SES Russian students are at about the same level as Korea, Estonia, Poland, and Canada (Fig. 2.38), and are significantly behind only Slovenia. Middle-SES students are at practically the same level as Great Britain, Czech Republic, Poland, and Germany, but lag behind Canada, Korea, Estonia, and Slovenia. In the high-SES group, those having over 100 books at home, Fig. 2.38 shows that their achievement is significantly lower than students with similar socioeconomic status in the majority of the peer countries, with the exception of the USA and Lithuania, which are also on the bottom rung.

A similar situation is found in the reading scores. In science, Russian students with high socioeconomic status lag behind the most.

In all three subjects, therefore, Russian students with high SES have the lowest rate of score increase as compared to the middle and low-SES groups. Especially striking is the lack of score increase in the last wave of the study.

Fig. 2.38. Math test results of Russian students vis-a-vis SES level, PISA, 2015 (points)



Source: OECD.

High-SES Russian students have lower rankings than other groups when compared to other countries.

The trends in testing outcomes vis-a-vis socioeconomic status shows a need to pay attention to the high-SES group. Achievement in this group is stagnant, which may get in the way of Russia's ability to strengthen its position in international education comparisons. We can hypothesize that one of the factors here is a deficit of teacher preparedness for working with the high-potential group of students, with teachers unable or unwilling to meet the increased demand for education coming from high-SES students. Working with such a group requires extra effort from teachers, and the need for constant professional development, mastering more complex materials. Such actions may be undertaken either by highly motivated teachers, or those that are offered additional financial incentive. Without these conditions, teachers take the path of least resistance, and don't go beyond the basic curriculum.

It's clear that Russian schools must develop new initiatives aimed at working with high-achieving students from advantaged socioeconomic backgrounds. At the moment, the school system's work in supporting and developing this group of learners is not reflected in increasing scores. Making use of individualized approaches may help to improve the situation.

2.6. The motivation of primary and secondary school students: trends and methods of support

Motivation is both a key factor in and result of a good education. In recent years, there has been growing alarm among both the education community and parents regarding decreasingly motivated school students. According to an ONF survey, only a bit more than one third of school students indicated that they enjoyed going to school. One half of young people who responded admitted that while they liked their education overall, sometimes they did not want to go to class. About 12% said that learning was difficult for them, and that they attended most of their classes against their will [Opros ONF, 2018].

The Presidential Order of May 7, 2018, directly ties the introduction of new methods of education and personal development, as well as new teaching technologies, to the principle of increasing motivation for learning and engagement in the education process.

According to studies, increased academic performance is closely linked to student motivation [Singh, Granville, Dika, 2002]. This is also confirmed by data from the TIMSS and PISA international comparative studies of education quality. Moreover, studies show that children with lower aptitude but with high motivation can achieve more, both in school and in extracurricular activities, than their more talented peers who are unable to set goals and focus on achievement [Duckworth et al., 2011; Carter et al., 2012].

Scholars identify two types of motivation for learning: intrinsic and extrinsic [Ryan, Deci, 2000]. Extrinsic motivation comes from external stimuli, such as the so-called instrumental form of motivation which is linked to the student's conscious awareness of the importance of a given subject for future studies or work [Hudson, 2000]. On the other hand, intrinsic motivation comes from students' interest in gaining new knowledge, acquiring new skills, and a drive towards independent knowledge acquisition and self-education [Gordeeva, 2006]. For example, some students study hard because it is interesting for them, and some do so because they seek the approval of their peers, parents, or teachers.

Studies show that the older a school student gets, the more their interest in school as a whole and in specific subjects like math diminishes [Eccles, Wigfield, Schiefele, 1998; Hausler, Hoffmann, 1998; Jacobs et al., 2002]. A school can undertake three types of actions to combat this problem [Usher, Kober, 2012]. First, there are programs directed to students in high-risk zones. For example, in Baltimore public schools, students who often skip school are given an individual adviser who works with both the student and his or her family. This program resulted in decreased truancy and dropout rate [ibid.]. The second policy option is to direct attention to the role of teachers and other staff members in supporting student motivation, and to give them extra training with that aim. In the USA, it was shown that elementary school students were more self-confident and did better on assignments if their teachers had gone through a program to help them emphasize the efforts and independent work of their students [Stipek et al., 1998]. Finally, increased motivation can be linked to the specific conditions of a given school: class size, schedule, the psychological climate, and other aspects. For example, some studies show that students in small schools have higher academic achievement, are less likely to drop out, have a more positive attitude toward learning, and are more likely to participate in school events [Darling-Hammond et al., 2002].

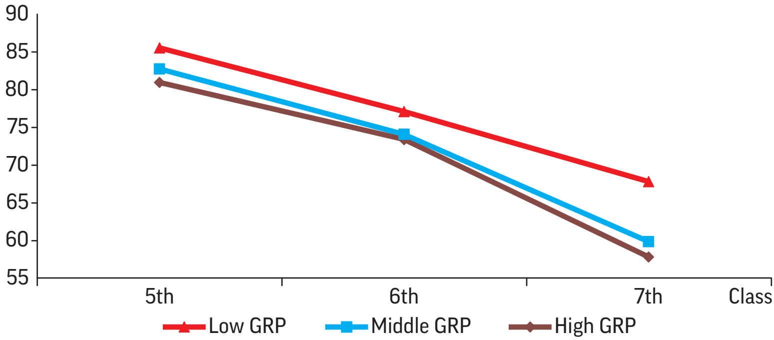
Motivation to learn can be an independent outcome of education (see, for example: [Ma, Xu, 2004; Kuzmina, 2016]). In the new Russian FGOS standards, motivation is seen as one of the personal outcomes of students' mastery of the basic curriculum [Prikaz Minobrnauki…, 2010]. However, the issue of student motivation in Russia is still given less attention than traditional subject-based outcomes.

It's possible that the consequence of this lack of attention is the currently widespread opinion in Russia that motivation among school students is on the decline, and that schools are more likely to squash the desire to learn than they are to support it.

According to data from the National Education Quality Studies (NIKO), interest in math in 2014 was in sharp decline among 5th-7th grade students (Fig. 2.39).

The PISA study includes an index of enjoyment of learning science, which reflects the level of interest and engagement among

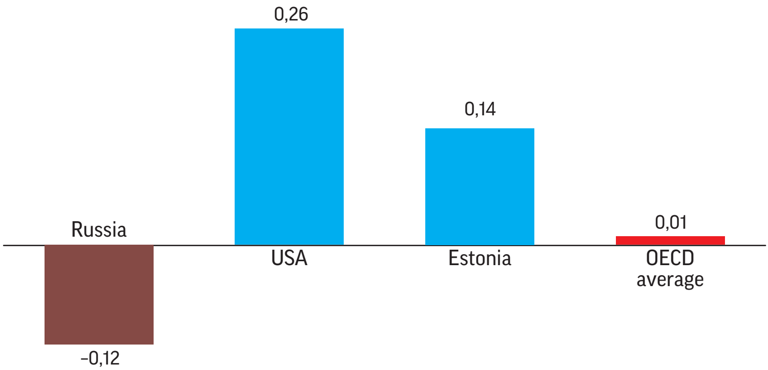
Fig. 2.39. Share of 5th–7th graders who chose the answer "I tend to enjoy math as a subject, it's my thing," by gross regional product (%)



Source: NIKO 2014.

school students in their science classes. In the period of 2006–2015, Russia's figure decreased by 12%, unlike the OECD average (Fig. 2.40).

Fig. 2.40. Change in the index of enjoyment of learning science, 2006–2015



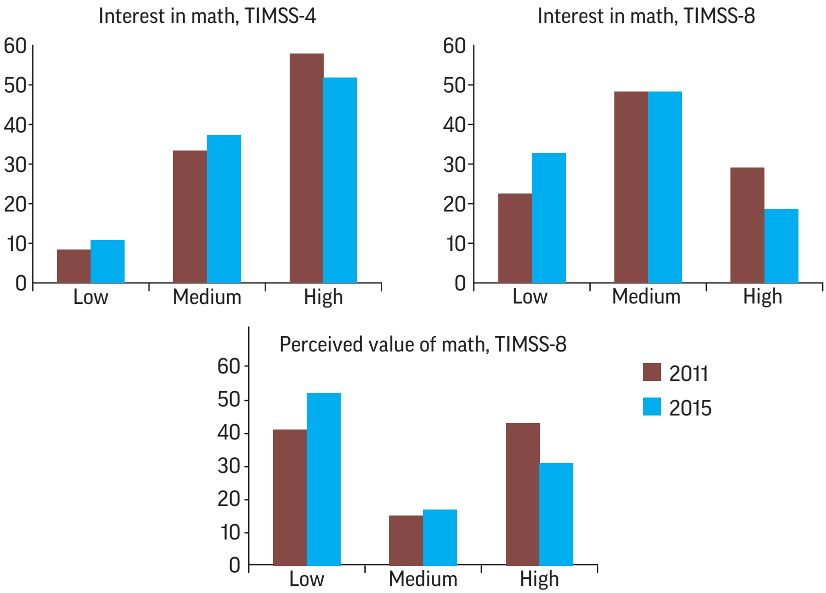
Source: PISA 2015.

The HSE's Institute of Education conducted an in-depth analysis of student motivation in elementary and middle school in Russia using data from international studies.

In the international TIMSS study[14], the intrinsic motivation of both 4th and 8th graders is measured by their interest in learning math. The study showed steady results in the expression of motivation over time (Fig. 2.41). More than 50% of 4th graders expressed a high interest in math in both 2011 and 2015, and only 10% expressed a low interest. Among 8th graders, meanwhile, a mid-level interest in math predominates, and in 2015 the number of those who marked a high level of interest dropped 10%. In the case of instru-

[14] TIMSS (Trends in International Mathematics and Science Study) is an international education monitoring effort, which since 1995 has been conducted with 4th and 8th graders every four years. It includes testing in math and science, as well as surveys of students, teachers, and school administrators. See: <https://timssandpirls.bc.edu/>.

Fig. 2.41. Trends in the motivation of 4th and 8th graders, TIMSS (%)

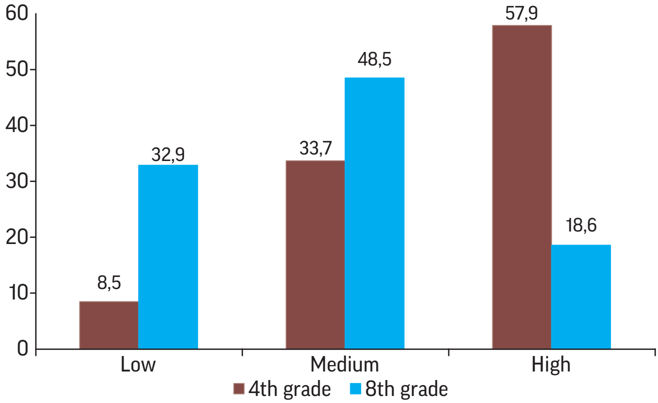


mental motivation, in 2011 about an equal number of eighth graders (around 40%) saw math as having a high importance as saw it having a low importance. But the number that saw math as highly important dropped to one third by 2015, and in that year more than half of students saw math as having low value.

Since the TIMSS study is conducted every four years, it's possible to measure the change in interest towards math within a single cohort. The same cohort of Russian 4th graders that took the test in 2011 was also tested in 2015, as 8th graders. The share of students expressing a strong interest in the subject shrunk nearly threefold, from 57.9 to 18.6% (Fig. 2.42). In 8th grade, the predominant level of interest in the subject is the middle level (around 75%).

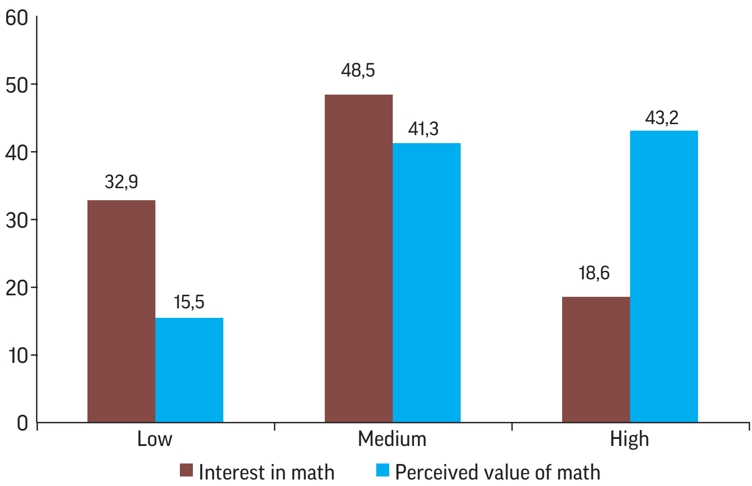
By 8th grade, instrumental motivation starts to play an important role in students' motivation (this data is displayed in Fig. 2.43).

Fig. 2.42. Change in interest towards math in a cohort of fourth graders, 2011 and 2015 (%)



Source: TIMSS 2011 and 2015.

Fig. 2.43. Interest in math and perceived value of math in 8th grade (%)

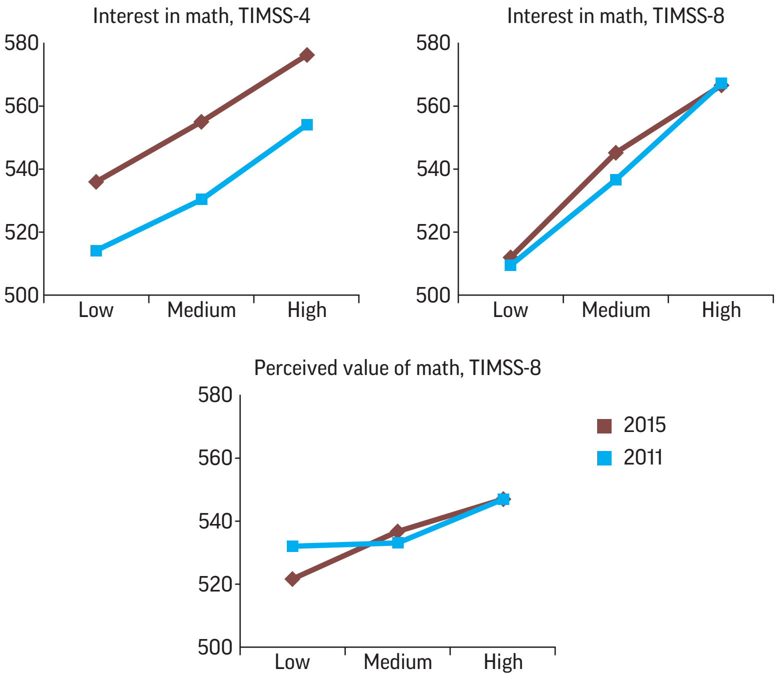


Source: TIMSS 2015.

Indeed, while almost half of eighth graders see math as having a high importance, only 18.5% say they have a high interest in it.

Motivation correlates with high academic achievement among Russian school students. Earlier studies showed that students' interest in math on average accounts for 53% of the dispersion of points in TIMMS in participating countries [Boe et al., 2002]. A high level of motivation, intrinsic or extrinsic, correlates with high scores (Fig. 2.44). In fourth grade, the difference between students with high and low interest is about 40 points. The scores of eighth graders with high and low interest are more divergent, with a 57-point difference, but they don't show a positive trend year to year. In the case of

Fig. 2.44. Math scores by level of motivation to study the subject (points)



Source: TIMSS 2015.

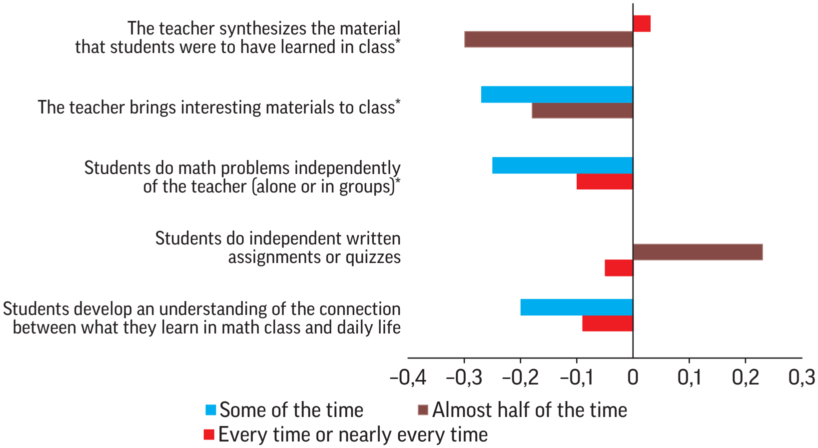
instrumental motivation, 2011 results showed almost no difference between the scores of students who viewed math as having a medium or low importance. In 2015, however, the scores of students who saw math as having low importance dropped somewhat. In the other categories, scores stayed the same.

The degree to which a student manifests motivation for learning a particular subject and for education in general is in large part determined on the specifics of the learning environment. First and foremost, it's related to the work of the teacher: teaching methods, interaction with students, level of student engagement in class, grading criteria, etc. Research shows that certain teaching modalities (active, individualized, etc.) are positively correlated with students' intrinsic motivation [Ryan, Deci, 2000; Urdan, Schoenfelder, 2006]. In fact, the teacher's role in developing a student's interest in a subject is actually greater than that of the family [Chirkov, Ryan, 2001].

To answer the question of the link between teaching practice and student interest, we conducted an analysis of TIMSS data from 2011 and 2015. We used the method of logistic regression, since it allows for control of contextual characteristics. The dependent variable was the index of interest in math discussed above.

In 2011, fourth graders found math class interesting if their teachers synthesized the material they were studying every day or nearly every day (Fig. 2.45). Compared to them, students in classes where the teacher did this only half of the time had a 30% lower chance of being interested in math. Interest in the subject is also positively correlated with having interesting additional materials in class, doing assignments independently, and having the teacher explain the link between lesson content and students' daily lives. In addition, independent quiz assignments that are done nearly every other class increase interest in the subject more than those that are done only on certain days. However, doing such assignments every day is not linked with an increase in motivation.

Fig. 2.45. Link between teaching methods and student interest in the subject, TIMSS-4, 2011. Odds ratio (0 – odds are even)



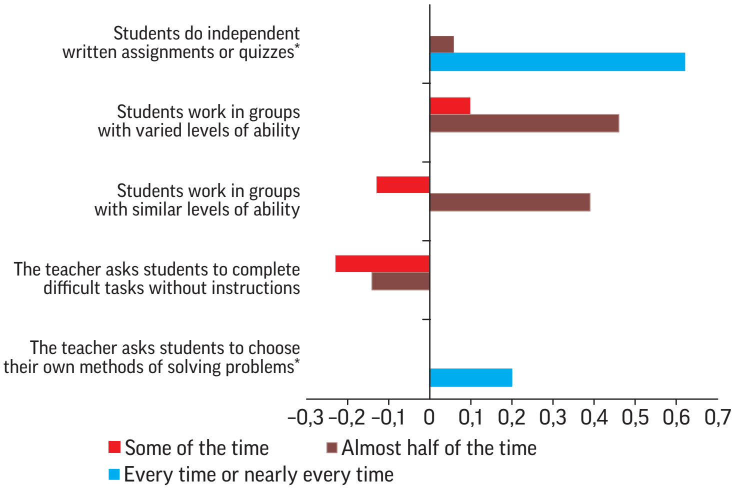
Note. Variables are sorted by the size of the coefficients.

* Reference category — "Every time."

The 2015 data presents another trend related to quizzes and independent assignments: fourth graders whose teachers give such assignments every class or nearly every class have a higher interest in math (Fig. 2.46). Doing difficult assignments often and being able to choose one's own way of solving them is correlated with interest in the subject. The results of the analysis also show that students are more interested in math if the teacher combines various forms of structuring class time. Working in groups with peers of both similar and different ability levels is tied to increased interest if these methods are used in half of the lessons rather than every time or nearly every time.

In eighth grade, there are far fewer teaching methods that show significant correlation with intrinsic motivation. In 2011, the biggest impact on student interest in the subject was from students explaining their answers in every or nearly every class session. If the

Fig. 2.46. Link between teaching methods and student interest in the subject, TIMSS-4, 2015. Odds ratio (0 – odds are even)



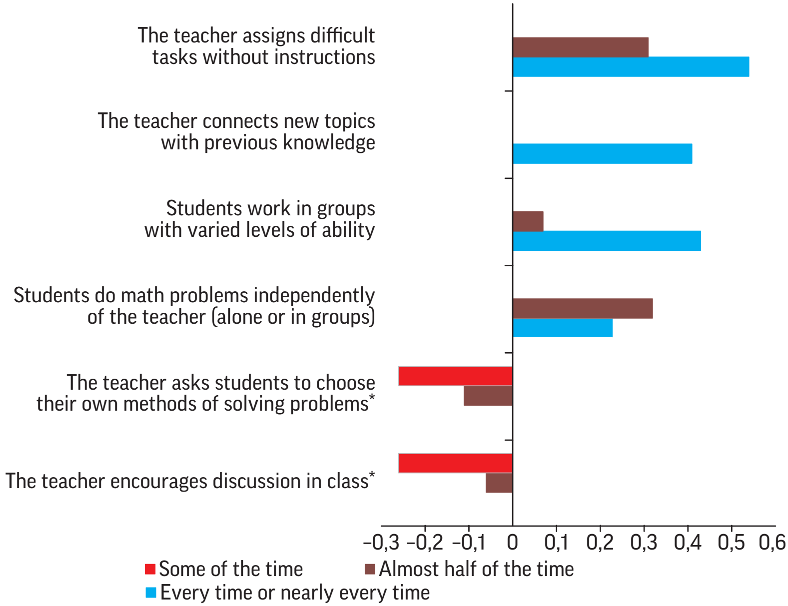
Note. Variables are sorted by the size of the coefficients.

* Reference category — "Every time."

teacher always asks students to find cause-effect relationships, his or her students have a higher interest in math than those of teachers who do this only half of the time. Interest also increases the more often teachers tie the contents of the lesson to the daily lives of students.

The 2015 data reveals that certain practices linked to interest in math among fourth graders also play an important role in eighth grade (Fig. 2.47). These include completing difficult tasks without additional instructions every class session, choosing one's own method for solving difficult problems, and working in groups with varying levels of ability. However, in eighth grade this type of group work increases interest only if it is done in every or nearly every class session. Another practice positively correlated with interest in the subject is connecting new knowledge with previous material during

Fig. 2.47. Link between teaching methods and student interest in the subject, TIMSS-8, 2015. Odds ratio (0 – odds are even)



Note. Variables are sorted by the size of the coefficients.

* Reference category — "Every time."

every class session. Assignments involving independent work such as class discussion and tasks done without teacher supervision are also linked with increased motivation.

Motivation can be both a factor contributing to high achievement in subjects, as well as an independent outcome of education. As the TIMSS data shows, interest in a subject is linked to high achievement, but this interest decreases as the student gets older. At the same time, extrinsic motivation, the importance of math for life and work, plays an important role for middle school students. In both 4th and 8th grade, high levels of interest in a subject are linked to teaching methods that activate students' independent thinking, such as class discussions or unsupervised tasks, as well as to connecting class content with everyday life.

Findings

Elevating the quality of education is the primary goal of education policy around the world. Russia seeks to be among the leaders in achieving this, and its current position is relatively high. In the global Index of Cognitive Skills and Educational Attainment, which rates the effectiveness of national education systems, Russia is in 13th place out of 40 countries in the overall index, and in 9th place in cognitive skills. Russia is in first place worldwide in terms of reading literacy (elementary school) according to PIRLS data, and is in the top 10 in TIMSS results, where it is in first place in advanced math.

Russian school students achieve excellent results in international academic competitions. On the other hand, a quarter of students fail to reach the level of basic functional literacy (in all PISA subject areas) and lag behind many countries in developing modern skills.

The share of students who are most successful on the PISA tests is noticeably smaller than in the leading countries. Students with high socioeconomic status fall behind their analogous peer group in other countries.

Overall motivation and interest in learning math and science among Russian school students drops sharply in the transitions between elementary school, middle school, and high school, which happens at a higher level than in competing countries.

In order to bolster Russia's competitive capacity and achieve high outcomes in education quality, teaching methods must be reformed in favor of activating independent learning, fostering interest, increasing engagement, and personalizing the education process. Special attention should be paid to renewing standards and programs for developing meta-subject skills, including 21st-century skills. Changes to the standards should be backed by changes in the tools for assessing education quality and outcomes, which is an area where the gap between Russia and leading countries is felt most acutely.

The national system of school quality assessment at this point unfortunately does not make it possible to objectively and transparently keep track of changes in the quality of school education. In the current system, partially because the data is not made public, it is impossible to compare education outcomes among regions, municipalities, and individual schools. This significantly limits the value of the data collected. Russia must create assessment procedures that can be used as a powerful tool to aid in the work of administrators as well as individual teachers.

In today's world, the sign of a globally competitive school system is its ability to provide equal-opportunity access to quality education. The Russian education system is contradictory in this regard. On one hand, the PISA index of academic inclusion[15] ranks Russia highly. In science, that figure was 81.2%, with an OECD average of 69.9%. Students from families of low socioeconomic status have been showing increasing results in international studies in recent years. However, the level of social segregation in schooling (defined as the concentration of students with high or low socioeconomic status in different schools) is higher than in competing countries, and the share of resilient students (those with low socioeconomic status and high academic achievement) in Russia is below the OECD average, per PISA data.

Increasing the share of students who reach a basic level of functional literacy requires creating a system of preventative and remedial work with underachievement at schools. The measures may include:

- targeted support for students from families with low socioeconomic status; targeted support (provision of personal certificates) to students from low-income families, including free additional instruction in required subjects;

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[15] The index shows the degree to which students with differing abilities are grouped in certain schools. Academic inclusion is higher where there is a wider range of test scores within each school than among different schools.

- free additional education outside the school, including in robotics, programming (including in the "children's tech hub" format), and the arts;
- participation in summer school and programs at the leading children's centers, pre-professional orientation programs; and
- psychological and educational counseling.

In order to provide equal-opportunity access to quality education, the following initiatives should be of highest priority:

- creating systems for identifying students in difficult situations (in families of low socioeconomic status, with Russian as a second language, etc.);
- increasing the per-student funding rate for schools working in difficult social contexts to allow them to hire additional counselors, social workers, psychologists, and tutors;
- offering school students with high risk of failure the chance to work with mentors (successful professionals in various fields); and
- providing grants to schools that work in difficult social environments and show poor outcomes so that they can carry out programs to improve performance, including modernizing infrastructure and engaging in professional development for staff.

Enhancing education quality is directly related to boosting students' level of motivation. Working towards increasing motivation is one of the key priorities. First and foremost, this involves improving teacher education and professional development, as well as perfecting curricula and teaching methods. Working with underachieving students is an opportunity to overcome an adverse situation in developing young people's functional literacy. Given that there is some kinship with what is required to work with students facing difficult conditions, since underachievement is often born of low quality of life, we must develop new methodologies, curricula, and pedagogical philosophies to achieve this goal.

Chapter 3

Primary and Secondary School Teachers: Working Conditions, Training, and Professional Development

It has been universally acknowledged that the quality of teachers' work is the most important factor in the quality of a country's schooling. Today, in the face of new challenges, it is necessary to objectively assess, on one hand, the potential of the teaching workforce and its preparedness to rise to the task of implementing innovative curricula and educational technologies, as well as the challenge of overcoming failing schools. On the other hand, we must look at the system of teacher training and assess its ability to prepare and engage a motivated workforce, as well as to create conditions for continuous professional development.

3.1. Primary and secondary school educators: personnel and working conditions

Staffing in Russian schools

The personnel structure of Russian schools is broken down into the categories of administrators, operational staff, and educators, who can be either teachers or other types of pedagogical workers. In the latter category are speech pathologists, pedagogical psychologists, social pedagogs, and others.

In 2017, there were 1304 thousand pedagogs working at Russian schools, which makes up 61.4% of the total 2121 thousand school staff. The largest group of these are teachers. In 2017, there were 1065 thousand teachers, which is 81.7% of the total number of educators (Fig. 3.1).

The staff structure of urban and rural schools is noticeably different (Fig. 3.2). Rural schools have 1.5 times more operational and administrative staff and a 10% lower share of pedagogical staff. This is related to the generally small size of rural schools, and a decreased ability to attract specialists such as psychologists, speech pathologists, etc.

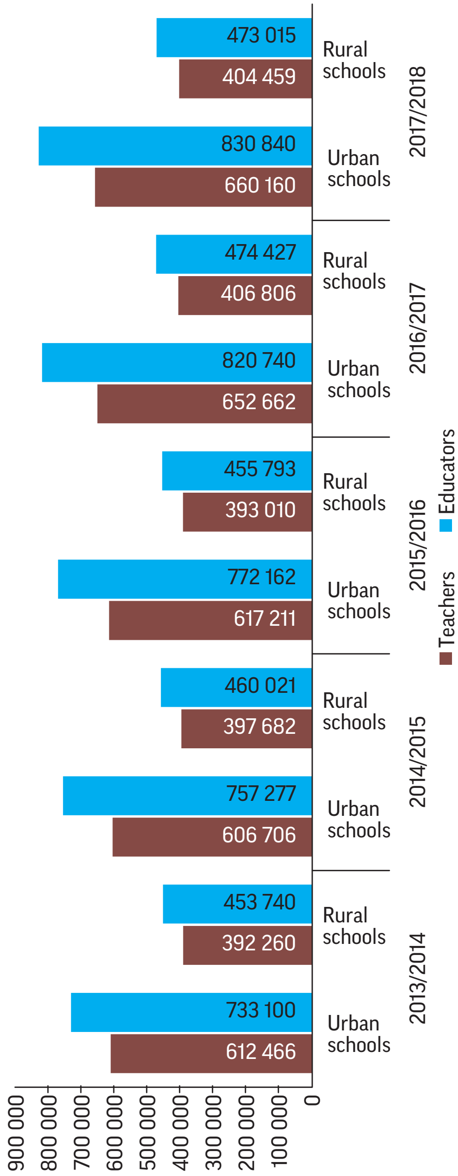
The total number of teachers decreased noticeably from 2004 to 2015, after which a trend of slow growth emerged.

Statistics show that 96.5% of positions are filled by workers under contract, with an attrition rate varying regionally between 4.1 and 14.5%. Regions with a high rate of positions filled and a low attrition rate can be considered the most stable. This is the lower-right quadrant (Fig. 3.4), representing regions with a low deficit and low turnover.

However, surveys show that the challenge staffing schools is a serious one. A study done by the All-Russia People's Front (ONF) in 2018 ["Salary and workload..." monitoring] showed that a third of all Russian schools faces a teaching staff shortage in one to three subjects, and one in nine schools has a deficit of teachers in more than four subjects (Fig. 3.5). The percentages of teachers who indicated shortages of specialists were 44 for math, 39 for foreign language, 30 for Russian language and literature, 26 for elementary education, 21 for physics, 15 for chemistry, 16 for history, 10 for biology, geography, computer science, and music, 9 for technology, and 4 for social studies, physical education, and safety.

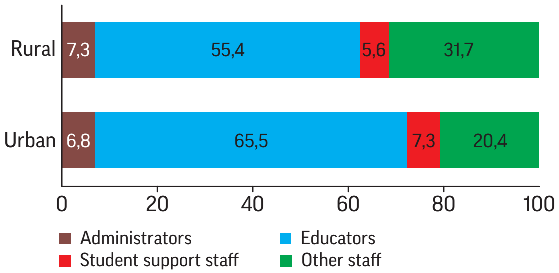
In Russia's small towns and rural areas, important subjects such as math, Russian, physics, and others are often taught by teachers

Fig. 3.1. Number of educators, including teachers, in schools



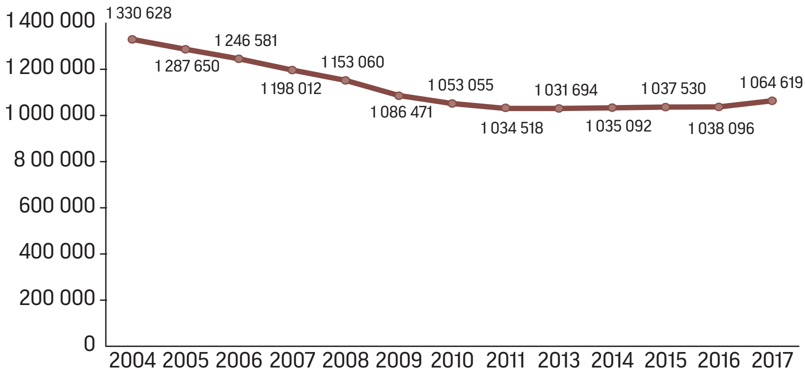
Source: Rosstat, Ministry of Education and Science.

Fig. 3.2. Personnel structure of schools, 2017 (% of total staff)



Sources: Rosstat, Ministry of Education and Science.

Fig. 3.3. Number of teachers at public (municipal) schools, not including evening (late shift)

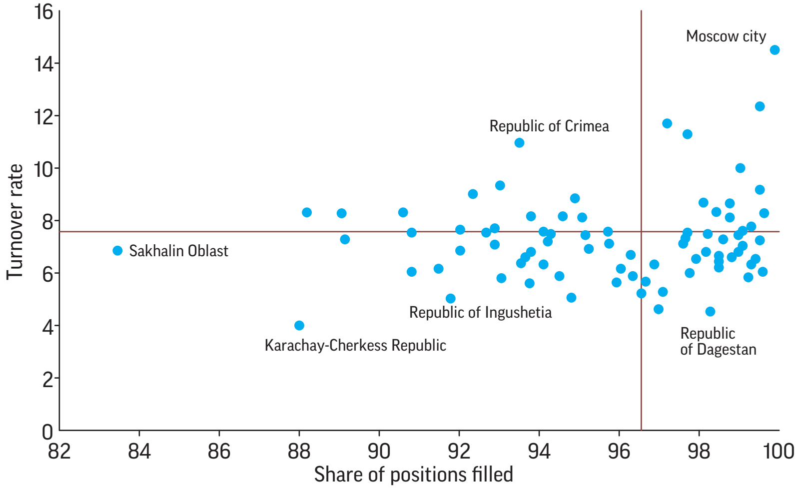


Source: Fedstat.

without the appropriate training, such as technology teachers or elementary school teachers.

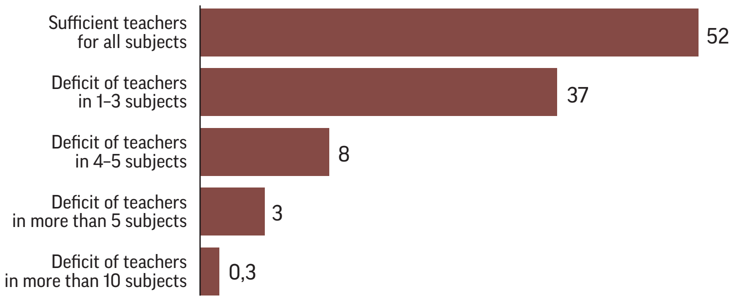
Working with special-needs students and carrying out preventive or remedial programs for underachieving or behaviorally problematic students requires the presence of specialists such as speech pathologists, special-needs teachers, social pedagogs, psychologists, and tutors. Tutors are also necessary in programs for identifying and

Fig. 3.4. Distribution of regions by level of personnel turnover and the percentage of filled positions, 2017 (%)



Sources: Rosstat, Ministry of Education and Science.

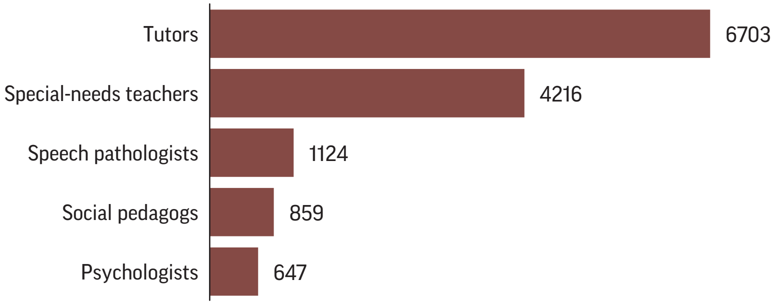
Fig. 3.5. Staffing levels at Russian schools, 2018 (%)



Source: ONF monitoring.

supporting talented students. Unfortunately, the number of such specialists among school personnel remains very low. Fig. 3.6 shows the ratios of students to full-time educators in these positions. In the case of tutors, there are more than 6700 students per tutor.

Fig. 3.6. Number of students per specialist, 2017



Sources: Rosstat, Ministry of Education and Science.

According to Rosstat data, the share of after-school educators within the education workforce is low: on average 1.7% nationwide, and below 1% in some regions (Fig. 3.7).

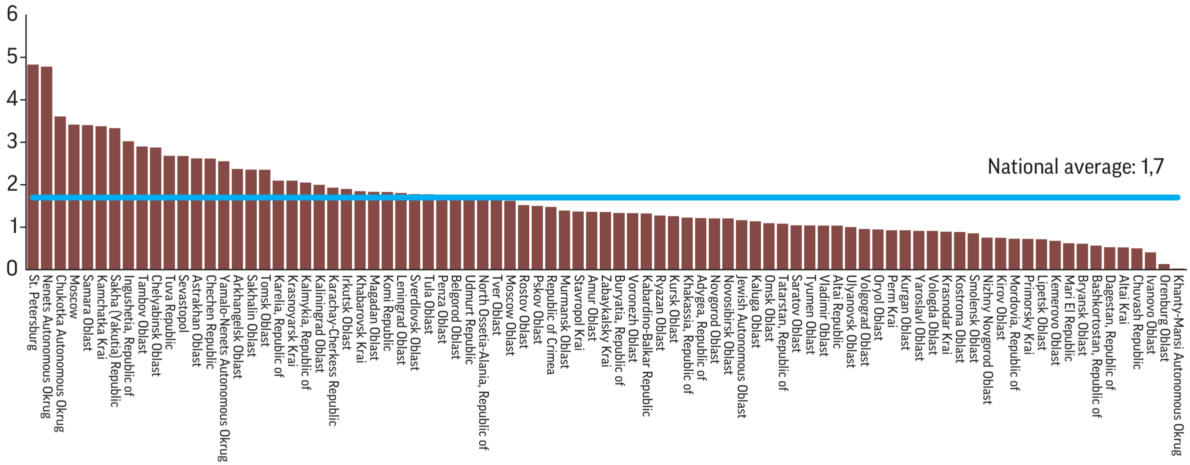
The teaching workforce in Russian schools has a marked gender disbalance. The teaching profession remains a traditionally female one. 88.2% of school teachers in Russia are women, which is one of the highest figures in the OECD data. In comparison, the 75% of teachers in the USA are women, while in China that figure is 57%. This is partially explained by the traditionally low level of salary and status associated with this profession, making it unattractive to men. In cities, the ratio of women to men is greater than in rural areas, 85 and 90% respectively. In certain subjects this gap is even wider, especially in computer science fields (Fig. 3.8). Shop class, physical education, and safety classes in rural areas are most often taught by men.

The makeup of the workforce in terms of age has, in recent years, been leveling out between older and younger teachers, with growth in the number of younger teachers.

The share of teachers who have already reached retirement age[1] in both urban and rural schools increased between 2010 and 2017 to

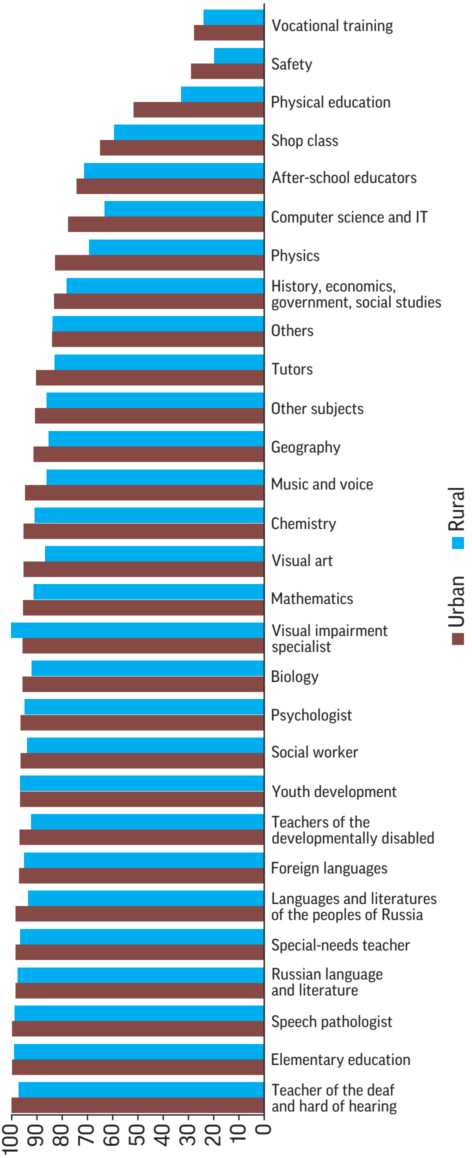
[1] With the retirement age set to increase in the coming years, the ratio of younger to older teachers will change significantly.

Fig. 3.7. Percentage of after-school educators as a share of all educators at schools, 2017



Sources: Rosstat, Ministry of Education and Science.

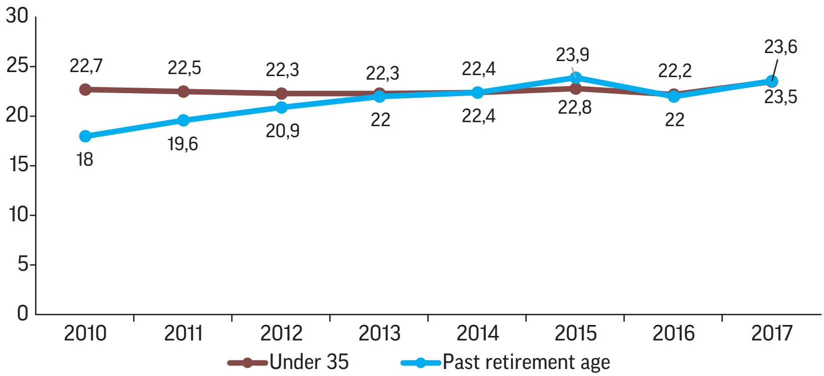
Fig. 3.8. Share of women teachers of the total number of teachers, by subject, 2017 (%)



Sources: Rosstat, Ministry of Education and Science.

make up nearly a quarter of the whole teaching workforce (Fig. 3.9). There is every reason to assume that the share of older teachers will continue to grow, both because of the continued unpopularity of the teaching profession among young people, and because of economic factors. Experienced teachers before and after retirement age make far more in salary than they would receive from their pensions, and they also have an opportunity to receive their pensions as well as continuing to teach and draw a salary. This creates a great incentive to continue working past retirement age. The lack of a truly reliable pension system for school educators has a powerful effect on increasing the age disbalance in the profession. This, along with the wide differentiation between the salaries of younger and older teachers, makes it difficult to bring in young people and renew the workforce.

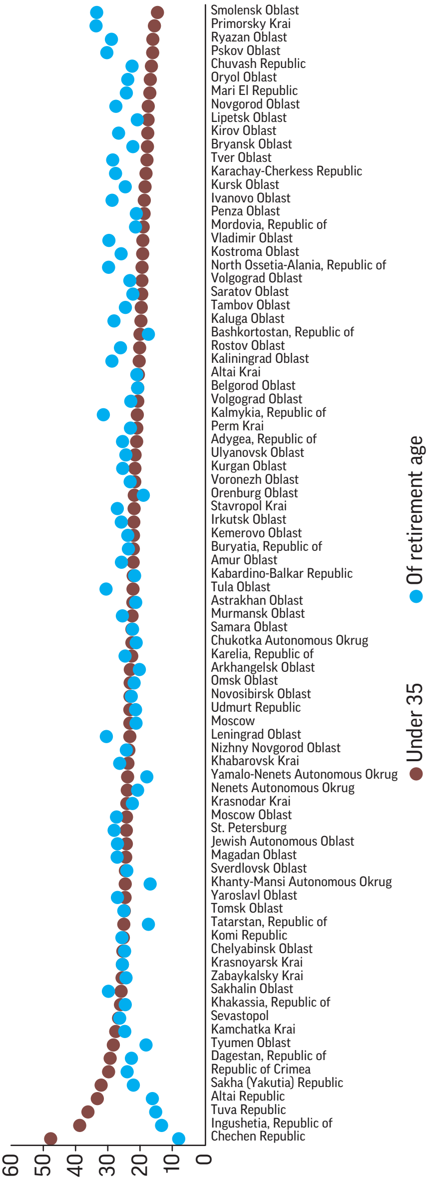
Fig. 3.9. Trends in the number of teachers under 35 years of age and over the retirement age (55 and older) (%)



Sources: Rosstat, Ministry of Education and Science.

The *age structure* of the teaching workforce is influenced by the demographic situation, as well as the level of prestige attributed to the profession in the regions (Fig. 3.10). In the Chechen Republic, for

Fig. 3.10. Share of teachers under 35 and of retirement age (55+), by region, 2017 (%)

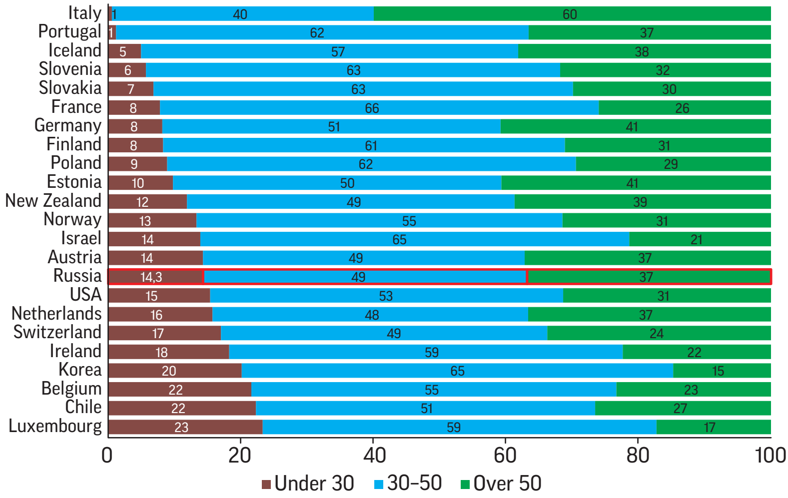


Sources: Rosstat, Ministry of Education and Science.

example, only 8% of teachers are past retirement age, and 48% are younger teachers. On the other hand, Smolensk Oblast has 33% young people and 14.8% beyond retirement age.

International statistics define a young teacher as being under 30, and those over 50 are listed as belonging to the older generation. Using these categories, Russia's teaching workforce falls close to the average among OECD countries (Fig. 3.11).

Fig. 3.11. Age distribution of school educators, 2015–2016 (%)



Sources: Rosstat, OECD.

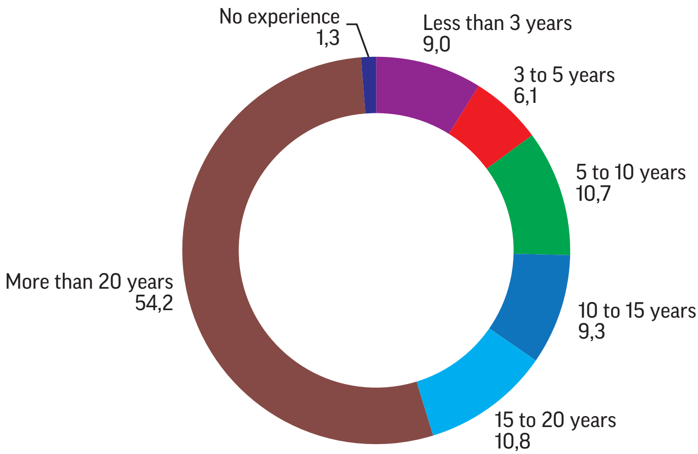
Years of experience is a metric that is traditionally used in looking at the skills and know-how of teachers. In this category, Russia's teachers are significantly ahead of the average among countries participating in TALIS.

Unlike age, years of experience gives specific information about a teacher related to his or her professional activities. In this context, the category of greatest interest is not one of the extremes, such as under 5 or over 30 years, but one of the middle groups: 5–10 years.

Many experts consider this to be the optimal range. Teachers in this group have relatively up-to-date knowledge, fresh energy, and a desire to work. They have not yet reached the stage of burnout, but have sufficient experience.

In Russia as a whole, an average of one in ten (10.7%) of school educators are in this optimal category of work experience (Fig. 3.12). However, there is a high level of regional difference in this statistic: in the Chechen Republic the figure is 16.4%, while in Ryazan Oblast it is 6.5% (Fig. 3.13).

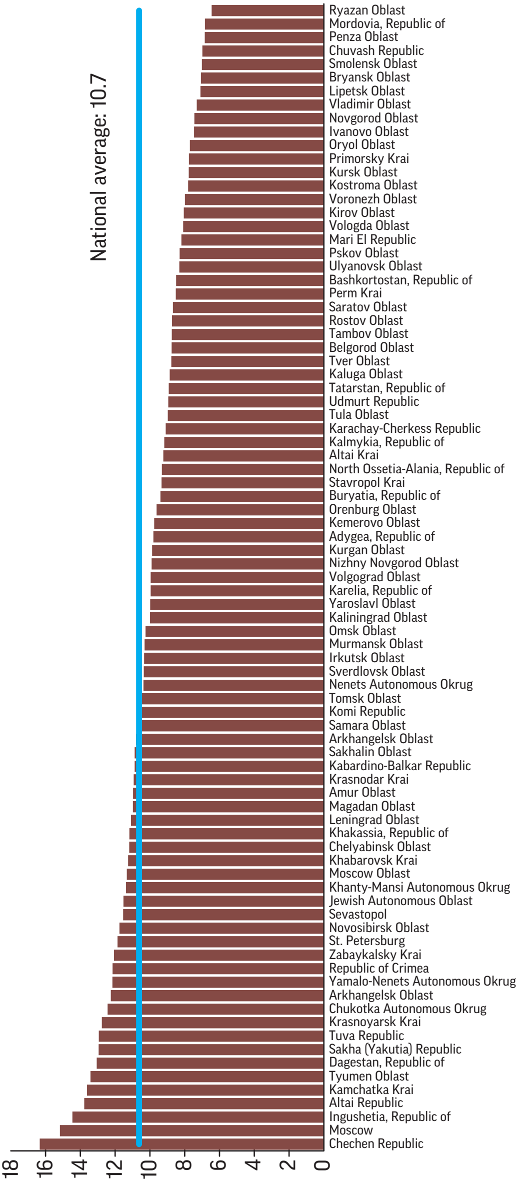
Fig. 3.12. Distribution of educators by level of work experience, 2017 (%)



Sources: Rosstat, Ministry of Education and Science.

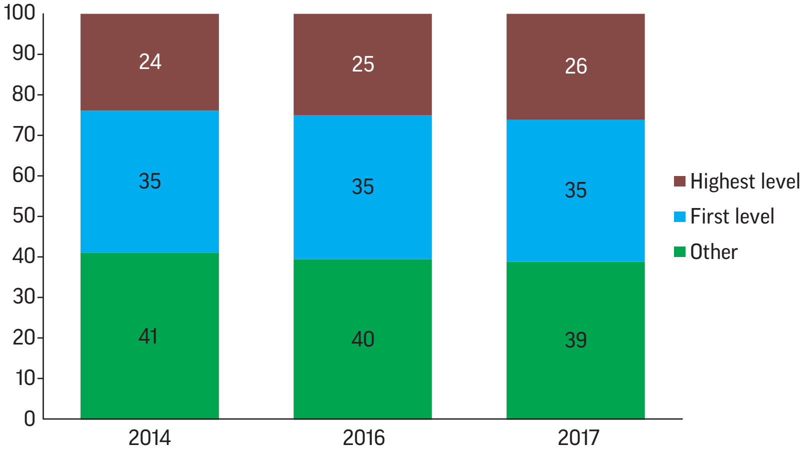
Fig. 3.14 shows the average distribution of educators by level of professional certification in Russia overall. We note that in recent years there has been a slight increase in the share of educators with the highest level of certification. However, it's hard to claim that this reflects professional growth for the workforce as a whole. The current certification system varies from region to region in the methods and criteria by which teachers are assessed. This makes it impossible

Fig. 3.13. Share of educators with 5–10 years of experience, 2017 (%)



Sources: Rosstat, Ministry of Education and Science.

Fig. 3.14. Share of total educators with given level of certification (%)



Sources: Rosstat, Ministry of Education and Science.

to compare educators directly by their level of achievement (Fig. 3.15). In practical terms, Russia lacks a single system for assessing the quality of work done by teachers and other school educators, which poses a risk to maintaining a unitary education environment across the country.

Teaching Conditions

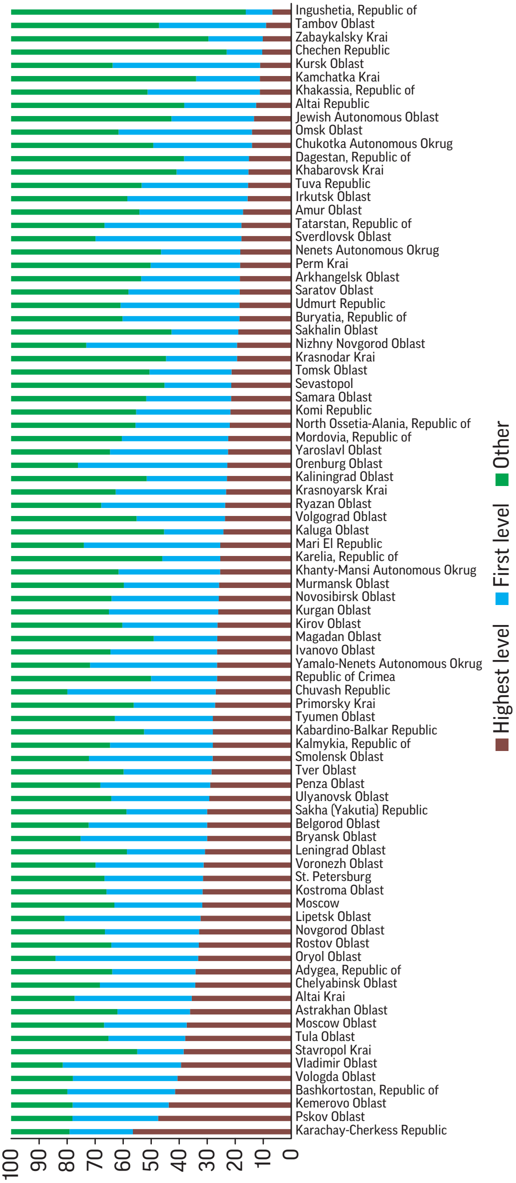
Workload

The basic characteristics that determine teachers' working conditions are workload, wages, and the workplace environment itself.

Statistics show that teachers on average work 1.3 times a full course load in the cities, and 1.2 times a full course load in rural areas. Surveys of teachers themselves (MEMO, 2016) showed that nearly half of respondents carry a 1.5x course load or more.

According to ONF monitoring, in 2018 the average teacher spent 68–70 hours a week on work, including all activities beyond teaching. This is about 10 hours a day, including weekends (Fig. 3.16).

Fig. 3.15. Share of total educators with given level of certification, by region, 2017 (%)



Sources: Rosstat, Ministry of Education and Science.

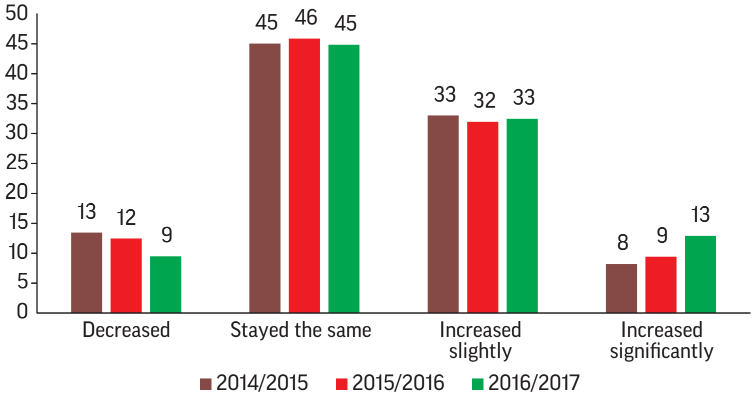
Fig. 3.16. Average teacher workload, 2018

	February 2017	May 2018
Class time	24h 30m	More than 24h
Youth development	7h 51m	6h
Class advising	6h 52m	6h
Preparation for class, grading	10h 37m	10h
Work outside of class	4h 29m	5h
Paperwork	4h 31m	4h
Committee meetings	1h 49m	2h
Meeting with parents	2h 30m	3h
Participating in seminars	1h 50m/month	2hr/month
Разработка рабочих программ	3h	3h

Source: ONF monitoring.

In the 2017 MEMO surveys, a third of respondents indicated an increasing teaching workload, and 13% saw this increase as significant. 45% said that their workload remained the same (Fig. 3.17).

Fig. 3.17. Share of total teachers' answers to the question: "How has your teaching-related workload changed in the last two years? (% of respondents)

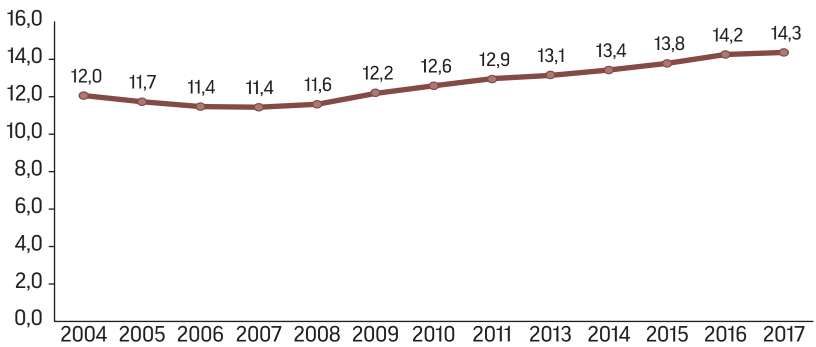


Source: MEMO.

In May 2018, a joint study by ONF experts and the “National Education Resources” foundation revealed that four in ten teachers are also employed in curriculum development, as librarians, psychologists, or social workers. One in five admitted that they were thinking about leaving the profession due to the level of impact their workload was having on their physical and emotional health[2].

After decreasing in the early 2000s, teacher workload in terms of number of students per educator at Russian schools has been on the increase since 2008. By 2017, that number had increased by three (Fig. 3.18).

Fig. 3.18. Ratio of students to teachers in Russian schools (student/teacher)



Sources: Rosstat, Ministry of Education and Science.

The student-teacher ratio in Russian elementary schools is greater than all OECD countries except Mexico, while the figure for middle schools (5–9th grade) is close to average (Fig. 3.19).

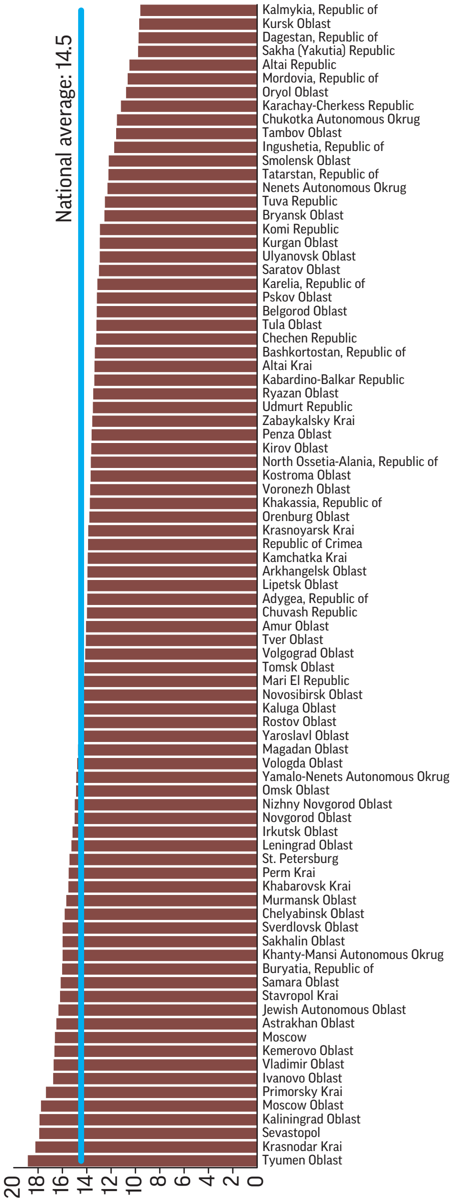
The situation is not uniform across regions (Fig. 3.20). There is almost a twofold difference between the highest (Tyumen Oblast — 18.8) and lowest (Republic of Kalmykia — 9.6).

[2] See: <https://onf.ru/2018/06/28/eksperty-onf-kazhdyy-pyatyy-uchitelgotov-uyti-iz-shkoly-iz-za-nizkoy-zarplaty-i-ogromnoy/>.

Fig. 3.19. Student-teacher ratios in elementary (a) and middle (b) schools in Russia and OECD countries, 2015 (student/teacher)

Source: OECD.

Fig. 3.20. Number of public school students per educator in Russian rural areas, 2017 (student/educator)



Source: MSO.

Compensation

In the middle of the first decade of the 21st-century changes were made to the system of teacher compensation. The "New System for Labor Compensation" (NSOT) was established. Before that, salaries were determined by teachers' level of education and work experience. In the 1990s, a unitary wage policy was established, with a pay scale that determined varying levels of teacher salaries. The differences among the highest categories were insignificant. The existing system incentivized teachers to stay on the job as long as possible to increase their seniority and salary. The system therefore produced an ageing workforce with fewer young teachers coming in and a decrease in the quality of education outcomes.

The new system of compensation was meant to incentivize teachers to produce high-quality, modern education outcomes and to motivate young teachers to work at schools.

NSOT began with regional pilot programs, but by 2012 the changes had been made in all Russian regions. According to the Russian labor code, each school is independent in determining how it pays wages, but in reality schools use models determined by their region. There are four different models used by regions, all of which share a dual structure. There is the base pay, which is stable, and tied to work load, education level, and subject taught. These rules are different in the different models. The second part of the pay structure is incentive-based. Incentive bonuses are determined by the quality of each teacher's work, and set according to the school policy on performance-based pay. These policies must adhere to local government regulations.

In 2012, the concept of an "effective contract" was established by a program in the order of the Government of Russia from November 26, 2012, No. 2190-p. This program was aimed at improving the compensation system for government workers at all levels. One of the key goals was improving the quality of work and giving workers a stake in the outcomes of their work. The transition to the effective contract was roadmapped in the document “Changes in public institutions aimed at increasing the efficiency of education and science,” ratified by the government order of April 30, 2014, No. 722-p. Specific aims of the effective contract were related to: 1) increasing teacher pay so that it matched the region’s average income; 2) the share of under-35 teachers in the overall teaching workforce; 3) the share of teachers with first and top-level certifications achieved as a result of assessments.

As is evident from the data on changes in the age structure of the teaching workforce (see Fig. 3.9), the new compensation system and the effective contract failed to bring more young people into the profession. The majority of systems for quantifying teaching quality, implemented on the school level based on regional and municipal models, as well as the procedures for monitoring and analysis, did not become effective tools for managing education quality.

The expert consensus is that student standardized test scores or competition results are not good indicators of teaching quality, since they don’t take into account the role of family, tutors, peers, and other teachers. The whole idea that student outcomes are the best indicator of teaching quality, and that we need only develop the most precise tools for measuring them, faces well-founded criticism [Berliner, 1987].

Essentially, measuring the outcomes of education must be deferred. Outcomes can only be measured in the middle term, by looking at the impact of education on professional success and personal well-being. Therefore, the numerous attempts to create incentives by offering extra compensation carry a high risk of being non-objective. Unfortunately, the new system of teacher compensation and the effective contract in Russia faced just these kinds of issues, and was unable to solve them.

The transformation of Russia’s teacher compensation system created effects that negatively altered the school environment. In studies of Anglo-Saxon school systems, these changes were described as a transition from “organic trust” given to the teacher to a “contract-based” or “bureaucratic” relationship [Dworkin, Tobe, 2014]. Teachers were ordered to take on full responsibility for student achievement, even though achievement is also determined by many other factors outside of the control of teachers and schools [Katz, 2016]. This, together with the rise of testing culture, increased stress and burnout in the teaching community, which was also seen previously in other countries.

The majority of teachers were critical of the new compensation system. The ONF/National Education Resources survey of 2018 showed that more than a third of teachers don’t understand how their salaries are calculated and how incentive bonuses are awarded. The incentive-based portion of their wages, in their opinions, is often reduced with no accountability. Some teachers get no incentive-based bonuses whatsoever[3].

The Presidential order of May 2012 included a requirement to bring teacher pay up to the regional average income. The regulation stating that teacher salaries cannot be below the regional average was part of the federal law “On Education in the Russian Federation” of 2012.

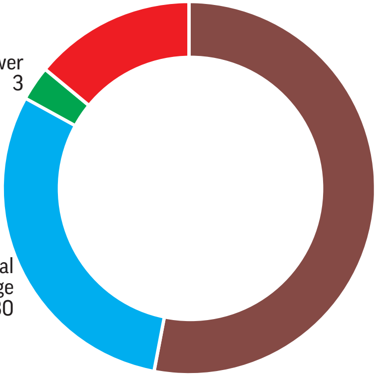
Survey results from the Russian Public Opinion Foundation (FOM) confirm that such measures were needed. In 2016, half of the population (53%) believed that teacher pay should be above the regional average. There were geographic differences, however, with 64% of people in cities over 1 million supporting high pay for teachers, and only 46% of those in rural areas (Fig. 3.21)[4].

Salary increases were achieved partially by allocating extra public funds, and partially by increasing teacher workload and student-teacher ratios. Thereby a nominal increase in teacher pay was

[3] See:<https://onf.ru/2018/06/28/eksperty-onf-kazhdyy-pyatyy-uchitelgotov-uyti-iz-shkoly-iz-za-nizkoy-zarplaty-i-ogromnoy/>.

[4] See: <http://fom.ru/Nauka-i-obrazovanie/12858>.

Fig. 3.21. Answers to the question: "Do you think teacher salaries should be lower, higher, or about equal to the regional average income?", 2016 (%)



Source: FOM.

achieved, and the presidential demand to raise it to the regional average was fulfilled (Fig. 3.22).

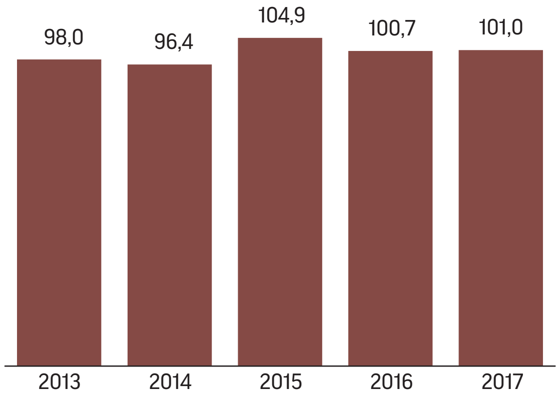
Meanwhile, the actual purchasing power of teacher salaries in 2017 ended up being lower than it was in 2013 (Fig. 3.23).

For comparison: in 1992 the average salary for educators was 62% of the average for the economy as a whole, or 176% of the poverty level. In 2000, educator salaries averaged 54% of the national average in Russia, or 85% of the poverty level.

A high level of regional difference remains for teachers in terms of their purchasing power. This statistic is seven times higher at the top of the list than at the bottom.

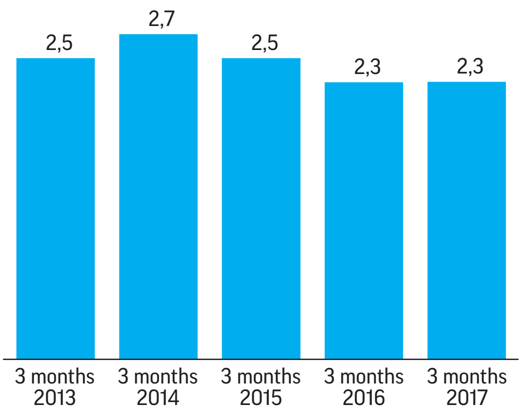
The trends in the comparison between teacher salaries and the basket of consumer goods and services are also differentiated by region. From 2013 to 2017 this ratio decreased by 0.4. The trend in all 80 regions studied was negative: from 1.5x the consumer basket in Magadan Oblast to 0.05 in the Republic of Mordovia, St. Petersburg, and Kamchatka Krai (Fig. 3.24).

Fig. 3.22. Comparison of average monthly salary of teachers at public schools to average monthly income in their region (%)



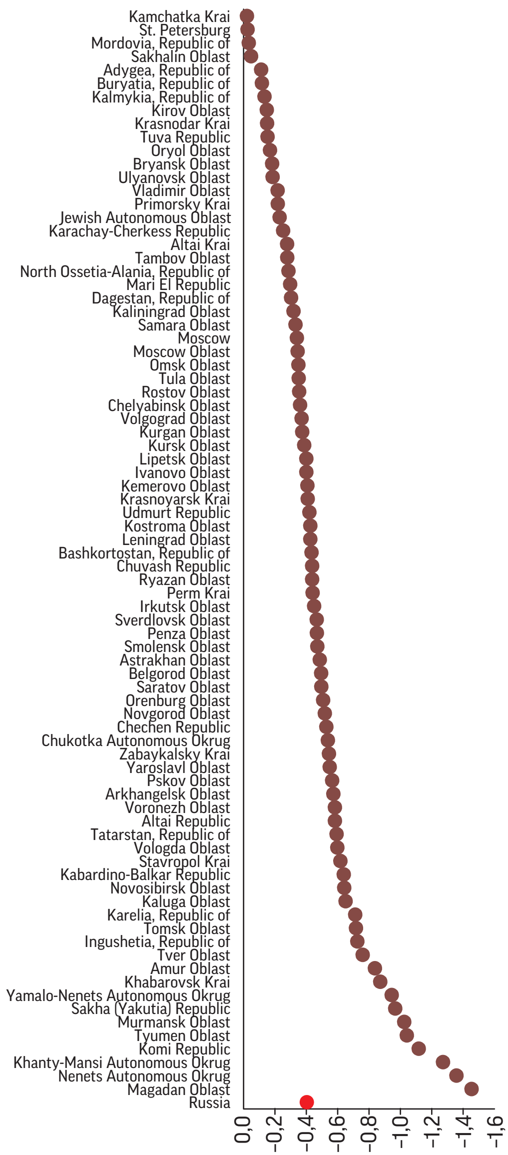
Source: MSO.

Fig. 3.23. Comparison of teacher salaries to a fixed basket of consumer products and services in Russia as a whole (multiples)



Source: Rosstat.

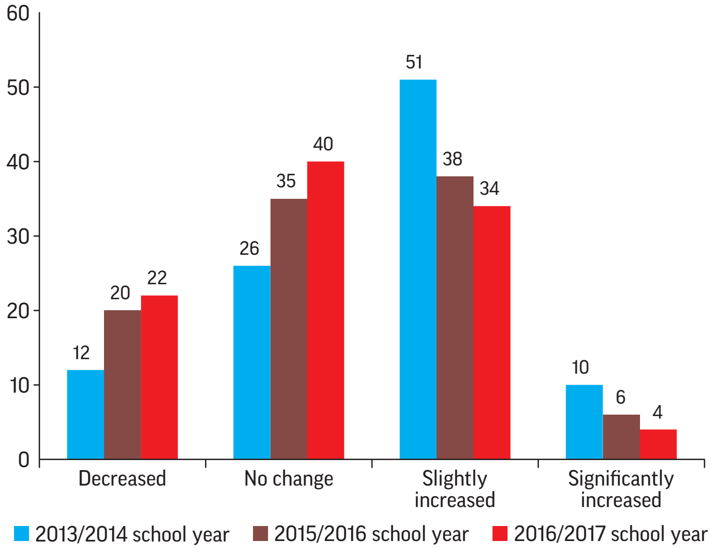
Fig. 3.24. Trends in comparison of average school teacher salaries to a basket of consumer products: difference between 2013 and 2017 (baskets).



Source: Rosstat.

In a 2017 MEMO survey, 4% of teachers said that their pay had increased significantly, and 35% answered that their pay had increased somewhat. 40% stated that their pay had not changed, and 22% had seen a decrease in pay. We also note that teachers' views of changes to their pay become more negative year to year (Fig. 3.25).

Fig. 3.25. Trends in teachers' views of changes in their salaries (% of teacher respondents)



Source: MEMO.

Average teacher salaries in Russia are noticeably lower than in developed countries in Europe, North America, and Asia, but are comparable to those of the former socialist bloc (Fig. 3.26).

MEMO surveys show that in recent years, teachers have felt a decrease in their material well-being. A majority of teachers (42%) said they were less able to pay for travel and recreation, more than a third said they were less able to pay for essential household goods, cloth-

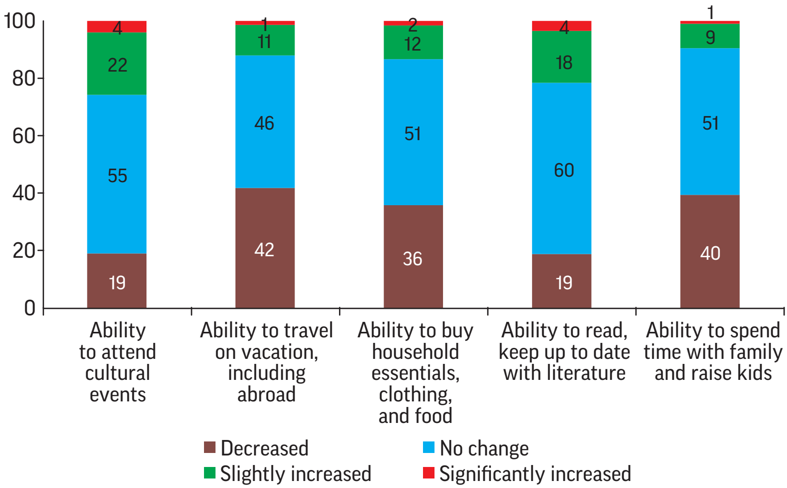
Fig. 3.26. Annual salaries of teachers with 10 years of experience, 2015 (thousands USD, with purchasing power parity)

Note: Russia — national average teacher salary.

Sources: OECD, Rosstat.

ing, and food. The time teachers are able to spend with their kids and families has also diminished (Fig. 3.27).

Fig. 3.27. Changes in teachers' material well-being, 2016/2017 school year (% of teacher respondents)



Source: MEMO.

ONF monitoring from 2018 showed that 28% of teachers live very frugally, with enough to buy the necessities but difficulty in paying for clothing and other expenses[5].

It must be taken into account that the worsening financial situation of teachers is happening in a time of overall economic decline in Russia.

Self-reporting workload

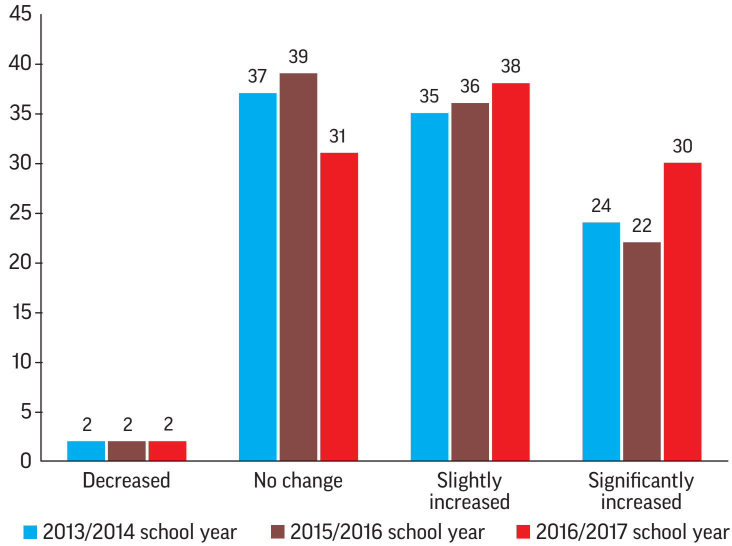
Studies and press reports show that most teachers' dissatisfaction with their pay is not the biggest factor contributing to stress and lack of motivation. In first place is the workload related to self-reporting.

[5] See:<https://onf.ru/2018/06/28/eksperty-onf-kazhdyy-pyatyy-uchitelgotov-uyti-iz-shkoly-iz-za-nizkoy-zarplaty-i-ogromnoy/>

Self-reporting and accountability takes up a major part of a teacher's work time. Self-reporting paperwork comes from external requests to the school, monitoring, and internal school quality control, as well as a large part related to quality assessment in the framework of the current system of compensation (the effective contract).

The share of those who noted an increase in this paperwork reached two thirds of the total respondents during the 2016/2017 school year (Fig. 3.28).

Fig. 3.28. Trends in teachers' assessment of their self-reporting workload (% of teacher respondents)



Source: MEMO.

We note that the decline in teacher well-being, stress, and burnout is significantly related to the growth in self-reporting workload. This process is common to many education systems that actively implement accountability and quality control measures [Ball, 2003;

Dworkin, Townsend, 1994]. In Russian schools, the situation is made worse by additional paperwork required by various government offices and departments, not only in the field of education, but also child welfare and regional economic development.

These concerns have been stated not only by teachers and school administrators, but also by the Ministry of Education and Science. The Ministry released a letter on September 12, 2012 No. DL-150/08, "On decreasing the volume and types of self-reporting required of schools," in which recommendations were presented to decrease paperwork related to self-reporting, and maintaining an ordered approach to school assessment. In 2016, recommendations were made for cutting excessive reporting for teachers in a joint letter from the Ministry of Education and Science No. NT-664/08 and the All-Russia Teachers Union No. 269 (May 16, 2016).

However, it cannot be said that these measures had a significant effect on the situation. The Ministry of Education made proposals in early 2019 to change articles 6 and 8 of the federal law "On Education in the Russian Federation." These changes allow federal regulators to establish a set of documents that would be developed with the participation of teachers, and to make these practices uniform on the regional level.

This initiative, however, is insufficiently radical to accomplish the needed reduction in routine work for teachers and school principals. Issues arise from the fact that all documents that are additional to the established set must be included in employment contracts, responsibility statements, or local administrative decrees. In addition, the problem of excessive reporting is not solved, but rather transferred from teachers to other employees. To fulfill the demands of the presidential order to decrease teacher workload, we need not only deeper legislative reform, but also new, digital practices.

Various studies have shown that teacher stress related to increasing volume and strictness of oversight has been on the rise. In addition to a level of regional and municipal testing procedures that has remained the same or even gone up, new federal tests and NIKO, the centralized assessment of teacher competence, have been implemented. Stress and professional burnout reduce teachers' ability to work individually with students, and increase the risk of conflict.

3.2. Teacher certification requirements. The professional development system

In the majority of countries, governments determine criteria for employment as a teacher. Some countries have only an education requirement, while others require practical training, knowledge, and skills. In leading education systems around the world in the 21st century, these requirements were structured and established as standards.

Professional standards for teachers make for an important education policy tool in a number of countries. They are the foundation for systems of assessing teacher professionalism, teacher training systems, and professional development. Professional standards can vary by structure or by content. Australia and England have especially defined and structured professional standards for teachers.

However, professional standards are not always written on a national level. For example, some professional associations of teachers create their own standards and define criteria for membership. Membership in these organizations is sometimes geographically based, and sometimes by subject area, for example: language and literature teachers, special-needs teachers, or simply teachers who use a given innovative methodology (personal development, group learning, etc.).

In all cases, professional standards share a number of characteristics. They are the basis of teachers' understanding and planning of the education process, and the starting point for professional dialog and reflection, which has a broader impact on education quality. Professional standards outline the structure of a teacher's career and create concrete steps towards professional development, while avoiding declarative and imperative forms. They do not dictate, but rather support teacher development, creating conditions for reflection on professionalism and membership in a professional community. This is how teacher standards are conceptualized, with an inherent link to what happens in the classroom. In essence, it is an orientation towards developing oneself, the community of teachers, and the students.

Professional standards are a matrix in which stages of professional growth are given step by step, with description and examples, starting with the university education. Professional traits, conditions of the surrounding environment, and results as shown in the actions and skills of students, are all included.

The Russian professional standard for K-12 teachers was passed in 2013. A key aspect of the standard was the fact that it was not implemented as part of education personnel policy, but as part of a set of professional standards for all industries[6]. Professional standards are defined as descriptions of qualifications necessary for a worker to engage in a given profession or labor function.

The transition to the new standard was set to be completed by January 1, 2020. From this moment, it becomes the main criteria for hiring at schools. Before the standard, minimum qualifications were established by the EKS, the unified qualifications manual for managers, specialists, and other staff. The content of the EKS was not renewed for a long time, and ceased to match the contemporary needs of the teaching profession.

For this reason, the drafters of the new standard aimed to establish an understanding of the modern teaching professional.

The first accepted draft of the professional standard had the quality of a manifesto. It included new demands on professional

[6] See the resolution of the Russian Government of January 22, 2013 No. 23 “On the rules for developing and implementing professional standards.”

knowledge, skills, and work experience. Some of the demands declared in this standard were above and beyond the level of many teachers. As such, the standard's potential as a tool for professional development and career growth was limited.

Work is still being done to improve the content of the professional standard. A key planned improvement is to include levels of professional mastery. A system of levels makes it possible to set goals and set a path for career growth within a hierarchy. The Australian and English standards mentioned earlier have levels. Linking levels of professional achievement with a set of skills and a certain level of remuneration makes it possible to build a teaching career and support a healthy rate of professional growth.

Creating a system of career growth for teachers has been central to school personnel policy in recent years. After a meeting of the State Council in December 2015, president Putin initiated the creation of a national system of professional development for teachers. In August 2017, a roadmap was created and approved. The presidential order of May 7, 2018 set the goal of implementing a national professional development system for educators that would reach no less than 50% of the nation's school teachers.

Creating a new professional development system for teachers required changes to certification practices.

Certification affirms teachers' qualification for their jobs based on assessment of their work, and offers an option to establish a higher level of certification. A higher certification level opens new opportunities for teachers, including a higher salary.

In the second decade of the 21st century, the teacher accreditation system changed multiple times (2010, 2011, 2014). However, it never became an effective tool for regulating the quality of the teaching workforce and providing for teachers' career growth. One of its weak points was that tools and models of accreditation differed from region to region, which made the levels attained incommensurable. The differences in assessment tools and requirements for different levels, as well as the bureaucratization of procedures, cause many experts and members of the education community to be critical of this program.

In the new certification model, which passed the testing phase in spring 2018, teacher assessment is conducted using unified federal testing materials for subject-based, methodological, psychological, and communication competencies. Special emphasis is placed on using the assessment results to design professional development courses for teachers.

However, this new model also comes under criticism from experts and the professional community for its high level of bureaucratization. One of its strong points is a unified set of requirements for accreditation levels which applies to the entire country. It also gives young specialists the opportunity to quickly achieve a higher level and increase their pay scale.

Together with modernizing the certification system, a foundational element of the national professional development system is a new system of titles: teacher, senior teacher, and master teacher. By including these in the new professional standard, the vertical administrative career track is supplemented with a horizontal track within the teaching profession. In this structure, the senior teacher would coordinate the work of other teachers, oversee methodology, and help develop individualized trajectories for students, while the master teacher would act as a mentor to younger teachers.

A good national system of professional growth allows teachers to take steps up the certification ladder which correspond to new responsibilities. Good examples of systems that take this approach are in Korea, Singapore, as well as the city of Shanghai, China.

The weak point of Russia's personnel policy for schools is poor coordination and asynchronicity of major reforms related to worker requirements, systems of assessment, compensation systems, and especially training and professional development for teachers.

3.3. Teacher training and professional development

The methods and content of teachers' training reflects directly on how effectively schools are able to educate their students.

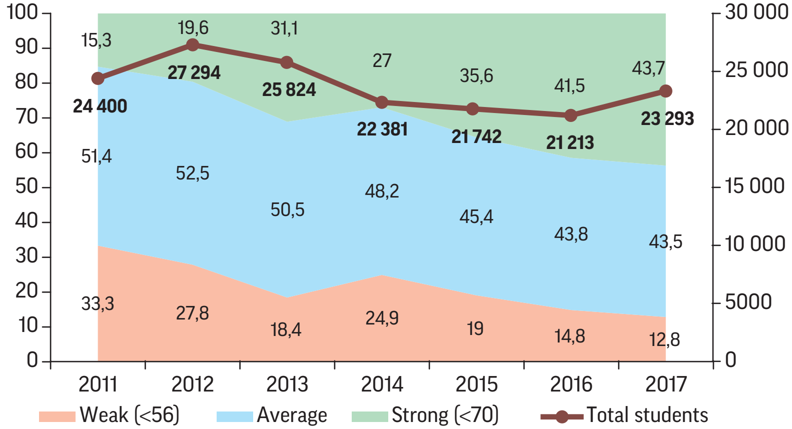
Teacher training models

Models of teacher training around the world can be divided into three categories. In the parallel model, a person enters university intending to become a teacher, and studies both subject knowledge and pedagogy more or less simultaneously. In the sequential model, the person need not decide to become a teacher at the moment of enrollment, but first masters a given discipline and receives a diploma in that field. They can then go on to get a teaching degree and become a teacher. Alternative models seek to attract people already in the workforce, usually talented professionals in a given field, to become teachers. These models usually involve a shorter period during which the skills and knowledge necessary to become a teacher are gained [What Matters…, 2012]. All three models are present in Russia today, with the first one being dominant.

The ways in which students are admitted to teacher training programs also differ from country to country. Finland, Hong Kong, and Korea are examples where admission to a teacher education program requires passing relatively difficult tests. Other countries, such as Australia and Estonia, have no such exams [Effective Teacher…, 2018]. The practice in Russia has a low level of selectivity.

The ability to attract successful high school graduates to the teaching profession is an important indicator of effective personnel policy in the school system. An upward trend in the popularity of Russian universities that offer teacher training is a positive sign (Fig. 3.29). Teacher education programs have seen their share of weaker enrollees (scoring below 56 on the EGE) cut in half in just four years, while stronger students (scoring over 70) have increased by 16.7%.

Fig. 3.29. Quality of enrollees in teacher education programs: share of strong and weak freshmen (%, left axis) and number of those given scholarship spots (right axis)



Source: Monitoring of university admissions quality.

Different countries have different minimum levels of education to become a teacher. Nearly all countries with highly effective education systems require teachers to have at least the equivalent of ISCED level 5A, or a bachelor's degree. The most effective type of teacher training is one that allows teachers to get both the practical knowledge necessary for the job as well as research and analysis skills to apply to finding the most effective teaching methods. In some education systems, such as Finland's, these requirements exceed the ISCED 5A level, and are equivalent to a master's degree [Building a High-Quality..., 2011]. In Russia, graduates of tertiary vocational programs (ISCED 5B) are able to teach in elementary schools, and bachelor's degree holders can teach in middle schools.

In some countries, practical classroom experience is required to become a teacher. Sometimes this is done as part of a teacher education program, and sometimes it is done in addition to the diploma. Where practical training is part of the teacher education program, universities pay special attention to organizing student-teaching programs at actual schools so that the training is not theoretical and students can hone their craft before entering the workforce [What Matters…, 2012].

In Russia, classroom experience is not a formal requirement for becoming a teacher. However, on-the-job training has traditionally been part of teacher training programs, and in recent years it has taken on more importance.

Another important factor in improving teacher education is the licensing process that happens after graduation. The certification itself does not guarantee a high-quality workforce of young teachers, but does have a strong selectivity effect, since only the most motivated students enter the profession. Australia, for example, has such a system. There is no such system in Russia, but in recent years the potential of implementing one has been actively discussed.

In 1990, the USSR had 198 pedagogical institutes with 993,600 students. 221,600 enrolled, and 164,500 graduated. These institutes specialized in teacher training.

Today, using 2017 data, we see that pedagogical colleges and universities are not the only institutions doing teacher training; there are a total of 225 institutions of various kinds and 90 branch campuses. 44 of them have a pedagogical specialization (at the end of the 1990s most pedagogical institutes expanded their offerings and were reorganized into universities, and others were closed or incorporated into universities).

The majority of institutions accept students into an expanded program of study called "Education and Pedagogical Sciences," taking up to 100 students per year for both paid and scholarship spots. However, there are several universities that offer more than 500 scholarship spots per year in this field.

In the second decade of the 21st century, the structure of teacher training changed as Russia entered the Bologna process. There is now a two-level system of higher education with a four-year baccalaureate and a two-year master's degree. This model makes it easier for people with bachelor's degrees in other fields to enter the teaching profession. A small number of five-year "specialist" degrees are still granted.

Overall, from 2013–2017 there was increased enrollment in the Education and Pedagogical Sciences track. The slight overall increase came as master's program enrollments actively increased, while enrollment at the bachelor's level decreased.

The share of non-scholarship spots at the bachelor's level stayed the same, at just under 50%, while non-scholarship students at the specialist level decreased to slightly over one quarter. At the master's level, the ratio stayed the same.

Enrollment quotas for bachelor's programs in the same period had no substantial change. In 2017 there were 44,000 spots. A similar situation with quotas exists at the specialist level. While there is a slight upward trend, they have no significant impact on total enrollment. Enrollment quotas for master's programs, on the other hand, have changed significantly, increasing fivefold from 2014 to 2017.

Such a major increase in enrollment for Education and Pedagogical Sciences at the master's level corresponds with a general trend towards the master's in teacher education. This may be related to an increase in demand for master's level programs, but also speaks to the priorities of the teacher training system. The question of altering enrollment quotas in this area is open for further analysis and research.

While the enrollment quotas for master's programs are on the rise, there is a significant decrease in the share of in-person enrollees, although in absolute terms the number of these is still gradually increasing [Platonova et al., 2017].

The ratio of in-person to distance learning in Education and Pedagogical Sciences bachelor's programs remains relatively stable. Within this consolidated track, the ratio of in-person to remote students follows the overall national average for all subjects. However, it's important to take into account trajectories of transition between different levels of education, such as between vocational schools and universities, and the probability of changes in specialization.

The trends in enrollment vis-a-vis in-person and distance learning for Education and Pedagogical Sciences master's programs are skewing heavily toward distance learning, which increased its share from 35% in 2013 to 52% in 2016.

For a number of years, Education and Pedagogical Sciences graduates numbered around 100,000 people. In a comparison to ten years earlier, the 2015/2016 figure is down by about 30,000. The lowest number of graduates, 97,000, was in 2012. The share of Education and Pedagogical Sciences degrees out of all bachelor's, specialist's, and master's degrees is also down [ibid.].

Practically all regions offer teacher training programs, although the scale differs widely. A number of regions have a deficit of teachers that cannot be met by the internal flow of graduates, especially given that a large part of these graduates don't end up working in the field. Other regions have more graduates than they need. There are imbalances in training vis-a-vis subject areas. An effective system for predicting demand for teachers has not yet been put in place.

Since 2014, a national initiative for modernizing teacher education has been active. It seeks to modernize federal education standards (transition to FGOS 3+++), develop new pilot and basic education programs, increase the practical aspects of teacher training (implement various on-the-job activities including a student teacher program), create models of networked collaboration among universities and schools, and create independent assessments for students' professional competencies. The agenda includes the creation of regional centers for continuous teacher education, which are intended to become centers for developing and implementing new practices such as goal-oriented learning and digital teacher education platforms.

The project seeks to create a multi-level, variative model for teacher education.

After graduation from university, teacher professional development takes the form of additional professional coursework. Creating conditions and incentives for professional development is a major component of schooling policy around the world. Professional development systems facilitate the maintenance of up-to-date teaching practices in response to changing conditions. For most countries, the path to higher levels of certification is linked to hiring practices and fulfillment of teacher contracts.

The process for gaining higher levels of certification varies from country to country. In some cases, the financing of professional development, as well as determining its content, may be led by the private or public sector to varying degrees. The decentralization or privatization of professional development services is known to increase competition, which improves quality. However, a decentralized system is more difficult to oversee. Furthermore, decentralized financing for professional development puts teachers from poorer regions at a disadvantage. When the content of professional development programs is determined by a decentralized system, it may be more tailored to the specific needs of teachers. However, this may hinder national authorities from using the professional development system to achieve national education policy goals [What Matters..., 2012].

In some countries, participation in professional development is voluntary, while in others it is mandatory. When it is mandatory, teachers may approach it in a formal way, focusing on fulfilling the requirements, rather than using it as an opportunity for professional growth.

Certain countries use incentives to stimulate participation in professional development, such as increased salary, promotions, decreased workload, or inclusion of professional development time into paid hours. If incentives are absent, and participation is voluntary, the participation rate may be too low, especially when teachers are overworked [What Matters..., 2012]. Germany is an example of a system where professional development is paid for by the teachers themselves.

The formats by which one reaches a higher level of certification are quite varied. They can be specialized programs run by government or independent providers such as universities or specialized centers. In recent years, the trend has been towards increasing the role of on-the-job learning, including school partnerships and professional learning associations of teachers.

In Russia, article 48 of the federal law "On Education in the Russian Federation" includes a mandate to "systematically increase one's level of professionalism." According to the law, teachers have the right to increase their certification level every three years, and must do so every five years. The employer has the right to determine the time frame within these parameters.

In article 76 of the law on education, additional professional education is defined as participation in programs for higher levels of certification or professional retraining. These can include short-term programs of a minimum of 16 hours. Retraining programs offer new skills necessary for carrying out new tasks or gaining a new certification. These programs have a minimum of 250 hours.

Professional development training programs can be one-off, continuous, or in stages. They can be directed towards mastering subject areas, courses, disciplines, or modules. They may have a practical or internship component, or involve collaboration in a school network format. Russian education policy divides the responsibility for professional development between regions and municipalities. Regional financing differs from region to region. Teachers in one region cannot receive instruction funded by another region. If a teacher pays for professional development courses using their own money or a school's private funds, it's possible that this would not count towards their federally mandated requirements. Inter-regional differences in the number of required credit hours for professional development can impact the quality of the teaching workforce.

Until recently, teachers could only increase their certification level through a regional professional development institution. The monopoly these institutions enjoyed had the effect of decreasing the quality of the courses. The situation caused teachers to view these courses as a mere formality. The professional development programs themselves were not updated, or updated slowly, without regard for the real needs of teachers of different experience levels. In recent years, some regions have adopted regulations that allow teachers to enroll in professional development courses at other approved institutions, and use regional public funding to pay for them.

In a number of regions, however, this opportunity is merely there as a formality, since administrative barriers are erected that prevent people from actually taking it. There are also financial barriers that inhibit this initiative. Schools themselves are responsible for creating the conditions and carrying out programs of professional education for teachers. A number of regions include professional development in their school budgets, but in the majority of cases this funding is insignificant. As a result, when regions report on their implementation of professional development systems, in many cases this just means that teachers are still choosing courses at the local professional development institution. An example of a region that truly implemented a distributed system of professional development, where the teacher can take their money anywhere, and can choose from a wide variety of programs offered by many different organizations, is Moscow.

As has already been discussed, regional institutions of professional development play the key role in certifying teachers at various levels. In 2017, the MEMO surveys showed 79% of teachers using these institutions to achieve higher-level certification. A large portion of these centers existed in the Soviet period, when they were called institutes of teacher improvement. In the post-Soviet era, some of them shifted to analytical and methodological support for education systems in the region, developing reform initiatives, and designing programs of study. Beginning with the 1990s, the system of continuing professional education came under criticism, but the fundamentals have remained the same.

According to MEMO surveys, up to a fourth of teachers are involved in programs run by universities and local methodological centers. The latter were created in the USSR, and showed good potential as they began to play an important role in supporting the work of teachers. Highly experienced teachers, who were called "methodologists," visited classrooms, gave input on lesson plans, and gave recommendations for professional development. In the post-Soviet era, the effectiveness of these services generally decreased. In some regions they ceased to play a noticeable role and were dissolved. Today, these methodological centers are being strengthened, and brought together in networks and other structures. The survey showed that more than 18% of teachers made use of private centers, and the popularity of these venues is on the rise.

Teachers' mobility in terms of professional development and certification is low: only 10% of them participate in programs run by other schools in the region, and even fewer of them go to other regions for this purpose (8%).

Between 2010 and 2015, a federal initiative created student-teacher programs at some of the best schools. Innovation hubs were also created on both the federal and regional levels. However, this model of professional development on the job, which we have noted is considered to be the best approach, is not supported in a broadly institutionalized way. It is financed primarily through individual development projects at various levels (regional, municipal, school).

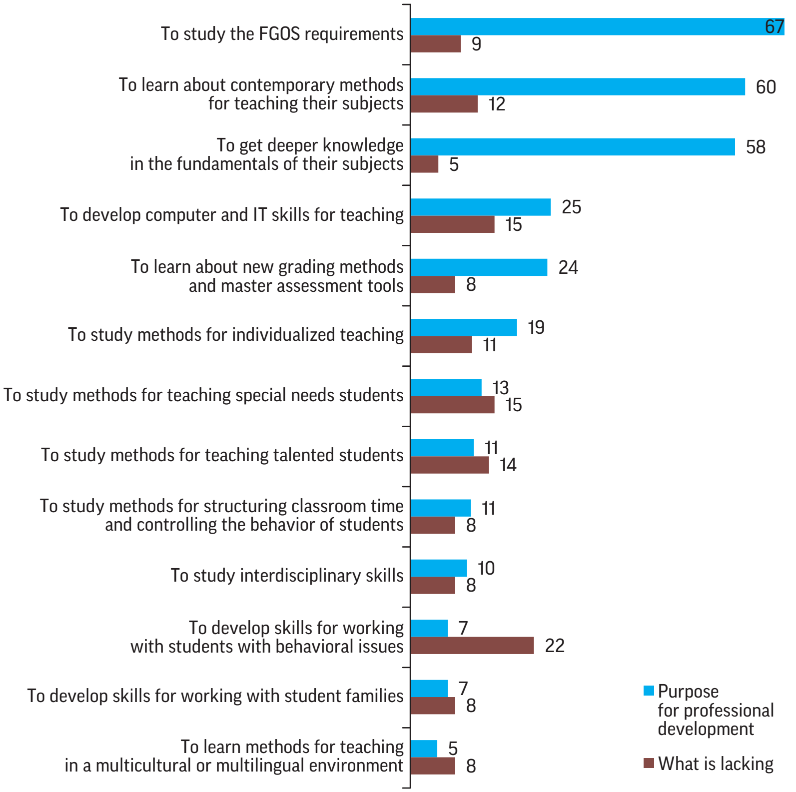
Successful education systems, such as Canada (Ontario), Finland, Japan, Korea, and Singapore, allot a significant amount of time within the school context for teachers to participate in perfecting their craft, including collaborative analysis of teaching, as well as mentorship and professional development [Darling-Hammond, Rothman, 2010; Darling-Hammond, 2011; Levin, 2008]. Furthermore, successful systems tend to use less of the teachers' time for direct work with students, as compared to other systems. More time is given for collaborative work with other teachers, in-person professional development sessions, and research for improving teaching methods. For example, in Japan almost 40% of a teacher's work time is allocated to these types of activities, while in Ontario that figure is 30% [Darling-Hammond, Rothman, 2011].

The ways in which the working time of teachers is regulated and compensated in Russia leave little opportunity for professional development in the workplace. The increasing workload mentioned earlier makes these opportunities even fewer.

Over the past two years, the share of teachers who say that nothing is lacking in their professional training increased from 22% in the 2014/2015 survey to 30% in 2017. The most common deficits cited are lack of skills in working with students who have behavioral issues (22%), methods for working with special needs students (18%), and insufficient skills in computer and information technology (15%). However, the survey shows that professional development courses on offer do not match up with the areas of deficit (Fig. 3.30). For example, the skills mandated by the FGOS are already not among the areas of deficit. In two years, the number of those who cited these as deficit areas decreased from 18 to 8%, but the FGOS subjects were the focus of 67% of all professional development courses for teachers in 2016.

As both comparative international and internal Russian studies show, the focus of most Russian professional development programs is subject-based content and methods for teaching a given subject. Russian teachers are far less likely to have the opportunity to study methods of individualized teaching, teaching special-needs students, or working with students who come from a different cultural context. According to TALIS data, the skills and training of teachers

Fig. 3.30. Share of school teachers answering the questions: "With what purpose do teachers participate in professional development? What knowledge or skills do they lack for effective teaching, in the opinion of teachers themselves?", 2016/2017 school year (%)



Source: MEMO.

who work with the most difficult student groups are at a lower level than teachers who work under easier conditions. It is these teachers, in addition to young teachers, who are most likely to indicate a need for additional training, especially in teaching special-needs students and working in a multicultural or multilingual environment.

Another problem is that professional development programs are often merely verbal, and don't solve the problem of providing teachers with contemporary teaching tools and technologies. Professional development programs don't always provide teachers with useful tools for creating environments for independent learning, stimulating discussion and dialogue in the classroom, differentiating assignments and activity types for different groups, and stimulating critical thinking.

TALIS data reveals that Russian teachers see fewer obstacles to their professional development than the average in other countries. 40% of teachers participating in the MEMO survey indicated that there are no obstacles to their professional development. The most common obstacles cited were the fact that they were not directed to attend professional development courses (15%), and a crowded work schedule (12%). Only 9% of respondents indicated that "there are no professional education courses available that are of interest to me," and 8% said that professional education is too expensive.

Teacher placement and quality-control policies

The aforementioned PISA-based OECD report "Effective Teacher Policies: Insights from PISA" highlights the positive correlation between PISA results and school autonomy in hiring teachers, as well as the subsequent management of their work. This also includes internal professional development programs of various formats.

Nearly all OECD countries give schools significant autonomy in hiring and firing teachers. Such policies are common across Western countries, where OECD data shows that 80% of 15-year-old students attend schools with such policies (about 75% in Germany). In East Asian countries (Japan, Korea), as well as Cuba, the levels of autonomy are lower, with up to 50% of 15-year-old students attending such schools. In Australia, Canada, Finland, and some other countries, the policies for hiring are more autonomous than those for firing teachers. Russia is also characterized by high autonomy in hiring, and low in firing.

The challenge of personnel policy for weaker schools and those that work in difficult social conditions is an important one. Attracting good teachers to work at such schools, which may have a disadvantageous location or disadvantaged student body, is common practice in Europe, North America, and Asia, including China. In Russia, the fair distribution of teachers is controlled by administrators in each region. Teachers are not assigned to schools or transferred from one school to the other, but rather apply for work at the school itself. Since governments don't directly regulate the flow of teaching staff, the most effective way of distributing workers equally is creating incentives, for example increased pay, bonuses, stipends, housing, or transportation and food subsidies.

The "Teacher for Russia" program is one of the mechanisms being used to attract young teachers to work in difficult schools. The program was launched in 2013, in partnership with Sberbank and its philanthropic fund "Investment in the Future." Since 2015, the program has been in close partnership with the HSE. It is part of the large international program "Teacher for All," which is active in many countries around the world. The goal of this program is to identify highly motivated upperclassmen at universities who are not specializing in teaching, and attract them to the teaching profession. This program successfully launched in a number of Russian regions: Moscow, Kaluga, Voronezh, Tambov, and Novgorod. An important aspect of this program is that the motivated young people don't simply study how to teach their subjects, but do so using the most contemporary technologies and approaches.

Findings

Teachers, their skills, and their level of motivation are key factors in the quality of schooling. Russian education policy turned its attention to the question of human resources belatedly, giving priority first to financial, administrative, and even material and technical aspects.

The steps that were eventually taken in this direction lacked continuity and unification. The first priority became stimulating quality work using assessments of teaching outcomes. The new models of compensation increased teachers' attention to the outcomes of their work. These approaches, however, often did not increase motivation for professional growth or help teachers uncover their full potential. Thus they did not result in the expected increase in education quality. This came as a result of a model of assessing outcomes and work quality that was insufficiently well designed. There was a gap between issues addressed in assessment and those relevant to professional standards and professional development.

Over the past 10 years, professional standards have become central to assessing the work of teachers and to teacher personnel policy as a whole around the world. They form the basis of criteria for assessing the quality of teaching under observation. Because a professional standard is structured in levels, it allows the teacher to determine a step-by-step path for their personal growth in the profession, and creates a roadmap for various trajectories of career growth. The system of compensation and other forms of motivation for teachers is then securely based in observations of professional mastery that are tied to the standard and can be compared to other teachers' level of professionalism [Danielson, McGreal, 2000; Darling-Hammond, 2012].

The creation of a Russian national standard for the teaching profession and a system for career growth was a strong step in this direction, which is so important around the world. However, the challenge of creating a system that links together professional requirements with the tools and results of assessment, as well as with the content of professional development programs and teacher training, has so far not been met in the current system.

One of the achievements in recent years has been the increase in teacher salaries, which occurred under the effective contract model. This may have not radically changed the position of teachers in society, but has somewhat increased the status of the profession. Unfortunately, the effective contract system led to increased teacher workload, and led to professional burnout among some educators. This has created a risk of decreasing education quality and worsening social climate in schools.

It is strategically important to orient teacher training and professional development programs, as well as compensation systems, towards developing cutting-edge skills, content, and educational technologies, along with working with special categories of students. The lack of such an orientation was manifested in the FGOS implementation, which may become a serious roadblock on the path to the next generation of reform.

The approaches taken in recent years to assessing, incentivizing, and developing teachers have placed the individual teacher, in isolation, at the center of the methodology. Meanwhile, leading education systems around the world are more and more likely to approach human resource development using models of partnership and collaboration, such as mentorship, peer assessment, and learning within professional organizations. Russia's school personnel policy must act to support these models as a key part of the next wave of reforms.

The challenges posed by an increasing school student population are currently underappreciated. There is already a major deficit not only of specialists such as speech pathologists, psychologists, and special-needs teachers, but also of qualified teachers in certain subject areas. This deficit is projected to increase in the near term, which means that teacher education will need to attempt to boost volume. Opportunities for attracting people without pedagogical education and retraining them must also be explored.

In addition, the aging teacher population also presents a serious challenge. The question of a pension system for educators becomes relevant in this context. We must also look to create modernized systems of attracting young people into the profession.

All this amounts to a wake-up call for policymakers, who must not only maintain their attention on questions of school personnel, but intensify their attempts to radically change the system. Developing the human resource potential of the education system must include initiatives to increase the number of educators per school; improve the quality of teaching through incentives, certification, and training in modern technologies; and change the age balance.

It is important to create a flexible system that allows future teachers to get their pedagogical education on a master's level after completing a non-pedagogical bachelor's degree. Young teachers should be provided an opportunity to intern at leading schools. Educators in the early stage of their career, as well as those who face problems with professional development, must receive support from experienced mentors and be included in professional learning communities of teachers. Another promising direction for work is creating a system to bring in mentors from industry, academia, scientific research, and creative industries to work with school students.

The task of radically simplifying self-reporting processes for teachers and cutting down on routine tasks for educators and administrators will require implementing contemporary technical means, including digital technologies.

Chapter 4

Updating School Curricula: Standards and Curricular Materials

The issue of school curricula has always been the subject of active discussion in the society, and remains so today. The question of what to teach and what to learn touches on the interests of many of the participants in the education system: students, teachers, parents, administrators, and politicians. The changes in curricular standards that have been ongoing in recent years have a long historical background. This chapter looks at the genesis of how people understand the content of school curricula, and discusses the evolution of education standards, taking into account the ways in which they respond to socioeconomic and technical challenges. It also includes a survey of contemporary systems for regulating education, and looks at the development of this system in Russia.

The contemporary concept of high-quality education includes both in-depth knowledge acquisition as well as the ability to take action in various situations and apply the knowledge. For this reason, when the goals and content of education are formulated, experts look at key "competencies" that students must acquire. For competencies to be acquired, specific learning situations and assignments are needed. The authors of this chapter analyze the extent to which assignments are targeted towards developing competencies, comparing Russian and international experiences.

4.1. The content of primary and secondary education: debating and unifying teaching materials and education outcomes

In the Russian discourse, the concept of "education content" is broader than what this term connotes in English, so the direct translation is not entirely accurate[1]. This is not merely a semantic difference, but reflects differences in the understanding of the concept of education content in different countries. The situation is made even more complex by the fact that even within the Russian education discourse this concept is used in different ways. The "conceptual catastrophe" that has been much discussed in recent years [Nikitaev, 2012], has also made its mark on the education discourse. Yet, the words "content," "FGOS," "results," and "content minimum" are used over and over in research and at conferences.

The term "education standard" entered mainstream discussion in Russia only in the last 20 or 30 years. However, the question of establishing the essence of education content, i.e., the question of what to teach, has been present throughout the history of Russia's education system. In order to shed light on contemporary trends it is necessary to look at the historical roots of contemporary approaches to designing and regulating the content of schooling.

The category of education content is itself inextricable from the institution of schooling. The ideas and practices involved in creating a system of mass schooling were always linked to attempts to establish the boundaries and criteria for choosing subjects. In other words, the greater the urgency with which the question of establishing universal education was treated, the greater the weight given to the question of what to teach.

Historically, the issue of education content in Russian schools can be linked to the beginning of the 19th century, when the task of

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[1] This gap is discussed in the article [Barannikov, Remorenko, 2017].

instituting general education was formulated. In 1802, Russia's first ministry for educating the populace was created, and the task of regulating the content of education in public and parochial schools came onto the agenda [Remorenko, 2017]. In large measure, the culture of "immersion in texts" was propagated, and the choice of which texts should be read and reproduced became the key content question [ibid.].

It is during this period that an understanding of education content as a body of teaching materials was established. Such an approach, transformed and supplemented, can also be seen in later stages in the development of Russian education. In this light, the rise of the concept of "schools of knowledge" and the first unified textbooks of the 1930s; the concept of a "content minimum" for education in the 1990s; and the institution of controlled content elements in the beginning of the 21st century can all be seen as examples of a model in which the concept of education content is seen as a collection of teaching materials.

Meanwhile, another position was also unfolding in the history of Russian education. The vocational school model that was created in the early 20th century conceptually changed the focus of content from specific teaching materials to activities carried out by the student. It is at this point that ideas arise about the importance of skills and literacy, not as knowledge, but as an ability to act. It may come as a surprise to know that during these years the idea first emerged that some disciplines have an operational or instrumental character. For example, mathematics and language began to be understood as functional literacies [Blonsky, 1961]. The beginning of the 20th century also saw the emergence of: vocational practice in the school of A.S. Makarenko; the concept of personal growth and respect for the individual in the school of S.T. Shatsky; and the culture-historical conception of L.S. Vygotsky. Each of these understood education content in terms of activity. The proposals of A.V. Lunacharsky were another example of this. He emphasized the need to bring teachers into the process of constructing education content. The minimum school curriculum, he said, should be seen "as a suggestion, not as a chore" [Lunacharsky, 1958].

The understanding of content as activities or skills came about as a result of studies conducted in the middle part of the 20th century, not only abroad but also in the USSR. At this time, the concepts of personal growth, activity-oriented teaching, and task-based approaches were presented in the works of leading authors such as L.V. Zankov, V.V. Davydov, and D.B. Elkonin. These practices began to be developed later, in the 1980s, with the emergence of the teacher-innovator movement. The new "pedagogy of collaboration" opened the door to such vectors of innovation as "creative productive labor," "creative self-guidance," "collaboration with parents," "the personal approach," "collective creative child development," and others. The activity-oriented approach and the pedagogy of collaboration continue to have significant influence on education to this day.

Thus, we can say that in 200 years leading up to the end of the 20th century, two positions on education content emerged, perhaps in an indistinct way. One position understood content first of all as the body of information that is to be collected by the student and put to use after graduation. The second position looked at content in terms of a set of skills that the school helps the student to learn. It is important to note that the second position, which we support, does not ignore knowledge, but rather proposes a more complicated task of linking knowledge to skills. It is these two positions that became the two opposing camps in the period from the end of the 20th century until today, with the rise of debates around writing and reforming education standards, which are the main documents governing education content.

Different researchers who have worked on issues of education content take different approaches to describing this type of dichotomy of positions. A thorough survey of different approaches to education content is presented in an article by M.V. Boguslavsky [Boguslavsky, 2012]. He speaks of two basic approaches: subject-based and process-based. His work looks at several classifications: A.V. Khutorskoy's division of knowledge- and personal-oriented approaches; V.V. Kraevsky's classifications of content as the sum of adapted sciences, as a paradigm of knowledge, skills, and experience, and as social experience; I.Ya. Lerner's culturological approach; and a number of other approaches.

From the moment when the education standard became a reality in Russian education, after when the law "On Education" was passed in 1992, this standard became synonymous with education content. We can tell the story of the evolution of education content in the post-Soviet era in three generations of standards, together with the documents, discussions, and practices that arose around them.

The idea of implementing an education standard in the first place was related to the democratization of education policymaking. E.D. Dneprov's team wrote and proposed the 1992 education legislation, which included a plan to increase school autonomy in designing their own curricula. This put the government in the position of defining boundaries and regulatory mechanisms. Before the adoption of the standard, the key tool for defining and governing education content were state-approved curricula and methodological recommendations. These were created and adopted by the Ministry of Education (Ministry of Education order of July 30, 1999 No. 56 "on the adoption of an education standard for the school system"). At the time, teachers and schools were not allowed to deviate from this program, which meant that the issue of quality control was not as relevant. However, with the new freedom of curricular design, this became one of the central tasks for regulators. The situation took on more urgency as new, unique schools came into the system. Such "designer" schools began to emerge in the 1980s, spearheaded by innovative teachers, and continued to develop in the 1990s.

As attempts were being made to solidify the new autonomy given to teachers, a social and political debate arose around the need to establish not only standards for the performance of graduates, but also boundaries for the process itself. The debate ended in a compromise that would establish a minimum content requirement which would need to be mastered in the schooling process. This approach led to the establishment of a body of teaching material, and was given the name of "education content minimum."

The education content minimum structures a set of thematic areas and outcome requirements in various subjects across the years of schooling. These are used to determine the quality and success of the schooling process. In practice, such a system essentially adapts and transfers basic curricula and lesson plans that existed in the Soviet education system into the new format of the content minimum. Since its inception, the idea of the content minimum has undergone various iterations. It has emerged as a cornerstone of the system, influencing the design of the standardized EGE (Unified State Exam), and manifesting in the concept of controlled content elements (KES). The initial power of this approach remains to this day, perhaps not in the regulations themselves, but certainly in the minds of teachers.

The concept of minimum education content standards, as established in 1998, did enter a phase of evolution in 2004. During this latter period, content minimums for school curricula were fixed in the regulatory framework (order of the Ministry of Education of March 5, 2004 No. 1089 "On establishing the federal component of public education standards for schools"). While a skills-based methodology was already being actively discussed in the education community in 2004, these expert discussions were unable to influence the standards paradigm and shift the focus of regulation to teaching materials. This moment in the debate was analyzed in the article "Education Standards: History of Creation and Outcomes" by A.G. Kasprzhak, O.B. Longinova, and K.N. Polivanova. They write that "the most important component of the standard is still the content minimum… the oversight system will continue to be based on the content of teaching materials, while all the talk about skills-based education will continue to have a merely declarative character" [Kasprzhak et. al., 2004, p. 35]. Nevertheless, this standard did include an attempt to formulate requirements not only for acquired knowledge, but also ones that reflected learned abilities. This section of the regulations, however, turned out to be insufficiently well developed.

Also in the early 2000s, there was an international movement to rethink the ways in which education content was regulated. These processes were closely linked to the emergence of international comparative studies. The most prominent of these was PISA. When the first results were published in 2000, the term "PISA shock" was coined to describe the state of political confusion that emerged in many countries that historically saw themselves as having great education systems but produced poor results. The problem was that PISA was oriented towards testing the ability to apply knowledge. As politicians started to rethink things, the biggest questions were what should be the objects of regulation and policy design, and what should teachers and administrators focus on.

Meanwhile, a new conception known as outcome-based education, or OBE, was gaining popularity. It first arose as a critique of the concept of time-based education, or TBE. The main difference between these two approaches was in defining the fundamental element in the design and regulation of education. If the time-based model looked at periods of time studying a given subject, such as a class period or school year, as the basic building block of curricular design, then the outcome-based model saw the basic unit of education in terms of results achieved by the student. The latter approach was in sync with activity-based or competency-oriented models of education. Ultimately this led to the penetration of the idea of skills equating to education outcomes, and this concept was codified in regulatory documents on education content.

Between 2000 and 2014, countries around the world drafted a new generation of education standards that were oriented towards outcomes as the basic object of regulation. Among these standards were the National Ontario Curriculum (Canada, Ontario, 2007), the Common Core Standard (USA, 2009), the National Curriculum (Great Britain, England, 2014), the National Finland Curriculum (Finland, 2014–2016), the Australian National Curriculum (Australia, 2014–2018), and many other such documents.

In 2005, soon after the establishment of national education standards in Russia, the Russian president initiated the creation of a new standard within the framework of a national priority project. By 2008 a newly designed set of standards was first proposed in which the main object of regulation was a requirement to deliver results in education, and which included structures and conditions for carrying out basic schooling programs. Within this model, an opportunity arose to shift the emphasis from a list of topics and didactic elements to defining a set of skills that each student should acquire. Among these skills were included skills outside of specific subject areas, or meta-subject outcomes. In essence, these concepts were a manifestation of the competency-based approach. While Russia is often seen as lagging behind intellectually, the fact is that the development of new standards during this period was at the forefront of international education policy.

It must be acknowledged, however, that the development and adoption of the new standard was not a simple process, and was accompanied by an active debate. On one hand, part of the new standard was generally seen as a natural evolution, such as new requirements for school conditions. This was linked to the low overall level of material and technical facilities at schools around the country, including computers and internet access. On the other hand, implementing requirements for results without requirements for teaching materials became a point of contention. The new set of standards across all levels of education was not implemented until 2012.

A comparison of the standards of 2004 and 2012 vis-à-vis education content reveals the following key difference: the 2004 standard (the federal component of national education standards) maintained a focus on regulating minimum required materials for advancing within the school system, while in 2012 the object of FGOS regulations became education outcomes, including skills. The FGOS continued the process of democratizing the system of regulating school curricula, giving teachers and schools greater autonomy for selecting textbooks and even creating specific goals for education outcomes. The standard did not dictate the outcomes themselves, but rather indicated requirements of them.

A cornerstone of the new standard was the value of the input of schools, teachers, students, and parents in determining and selecting the content of education. The drafters of the new regulations saw that the participants in the education process should not be passive observers, but rather active designers.

The change in the basic framework had a fundamental effect on the system. At the same time that the first set of standards was established, education outcomes came into the regulatory conversation for the first time. However, the concept of education content as being equivalent to a set of outcomes and the materials needed to achieve them did not emerge in the literature until later. This shift in construct demanded many changes in related institutions in the education system, but in practice many of these institutions were unable to quickly adjust. This situation had a determining impact on what happened and continues to happen vis-à-vis the implementation of the new generation of standards.

The transition was most difficult in three related areas: student assessment, especially the EGA and GIA standardized tests; the professional development and certification system; and the production of textbooks, teaching manuals, and other materials. All these were built on top of a different conceptual basis than the new FGOS. While the new standard was oriented towards skills, competencies, and activities, a subject-based paradigm of knowledge dominated and continues to dominate the systems of assessment, professional development, and curricular materials. This gap led to great difficulties in the implementation of the new standard, which led to many of the reforms being relegated to a merely formal status.

The most instructive example in this case is that of the system of professional development and certification for teachers. The system was instituted across the country in 2010, and was intended to prepare teachers for working with the new standard. The content of many of the programs remained static, with the only change being some addition to the title of the program related to "FGOS," "metasubject," "active learning," etc. Similar things happened in the world of textbooks and teaching manuals, where texts written under the knowledge paradigm in the Soviet period remained dominant. While the content of textbooks changed somewhat according to political and economic conditions, the basic approach of working through a set of knowledge remained. The approach was further entrenched when a requirement for all textbooks to include teaching guides written by the textbook authors themselves was instituted. Now, instead of choosing material in the interest of outcomes, teachers took ready-made lesson plans and put them to use.

Evidence of this can be seen in statistics on the implementation of the standard at the elementary school level. According to monitoring data from the Eureka Institute of Education Policy in 2014, a significant portion of professional development programs continued to be conducted in a knowledge-based format. The survey of teachers showed that many of the topics that were meant to be linked to forming universal academic skills were taught without a practical component. 41.43% of teachers had no practical assignments when learning the skill of "wide-ranging search for information using libraries and the internet," while 46.55% of teachers stated that their course in "structuring work time for setting goals, creating conditions, and finding resources" was entirely lecture-based [Analiticheskaya zapiska…]. This was indicative of the overall situation in professional development programs, where teachers were introduced to terminology but did not have a chance to put it into practice.

Another obstacle to implementing the new standards was a lack of professionals who could work with the new format and shared its values. This is partially linked to the makeup of the teaching community: at the moment that the FGOS was established, more than 88% of teachers had been on the job for more than 11 years, and 59% for more than 20 [ibid.]. This had a dampening effect on the level of readiness of teachers to accept the new approach.

The FGOS turned out to be too innovative for the community of active teachers and principals. This was exacerbated by their overall fatigue from constant waves of reforms. Many researchers found this to be the case. For example, V.S. Lazarev wrote in his article "FGOS for Schools: Gaudy Declarations and Meager Results": "Once they had mastered the knowledge-skills-experience model, the teachers surveyed could not imagine that the teaching process could be structured in a fundamentally different way. It seemed to them that perhaps something could and should be improved, but no radical change was needed. About half of them saw Russian schools as being among the best in the world, but could not give any evidence to support this statement" [Lazarev, 2015, p. 12.].

The Eureka Institute data also points towards this type of phenomenon. The teachers who had worked in pilot programs and had experience working with the new standard were not recruited to train others. More than 79% of teachers went through the training for the higher level of certification under the tutelage of professors at pedagogical universities and institutions of professional development [ibid.], most of whom had not had direct experience working with the new standard. Ultimately, the situation led back to a focus on the knowledge component of teaching, which created the conditions for a gap between official policy and actual practice.

During the rollout of the new standard, the text went through several iterations. In recent years, changes have been made to the regulatory documents governing the research and methodological support infrastructure for implementing the FGOS. One of the key changes has been a differentiation in education standards and the creation of new standards for special-needs students (Orders of the Ministry of Education and Science No. 1598, No. 1599).

In response to demand from both teachers and creators of school-level standardized tests such as the EGE, requirements for programs of study in mathematics and Russian language were written out in detail.

In addition, an attempt was made to decrease teacher workload by reducing the size of the required structure for creating a course plan from eight components to three. "Course plans must contain: 1) planned learning outcomes for the course; 2) the course content; 3) plan of topics indicating the number of hours allocated to each topic)" (Order of the Ministry of Education and Science No. 1576).

While all of these changes did not alter the ideology of the standard, in recent years policymakers have been discussing the potential for mandating a change in the core structure of education content. The direction of these proposed changes is to include in the text of the standard a fixed list of topics and knowledge that must be retained. This would serve to return the focus back to the knowledge component and restore the dominance of the essential content minimum. There is no officially approved text with these changes yet, but the Ministry of Education and Science has created working groups in different subjects to work towards such changes.

It is noteworthy that this work was formally initiated by the early 2016 list of presidential orders after the State Council session of December 23, 2015 (approved by the president on January 2, 2016, No. PR-15GS). This document included the following section: "Develop a strategy for systematically renewing the content of school education based on the results of monitoring studies and taking into account contemporary advances in science and technology, as well as the needs of students and the society." While the presidential initiative was aimed at creating a system for tracking the changing demands placed on education by society, which necessarily implies a skills-based and active approach, the way in which it has been interpreted may lead to the opposite: a decreased role for activity-oriented results in an increased role of textbooks. In this context, we can formulate one of the main challenges for the Russian education system vis-à-vis regulation of education content: will the system be able to maintain the vector of reform towards skills-based, active learning, or will it return to the subject-based knowledge paradigm?

At the moment, these are hypothetical questions, and Russian schooling is operating in a system where education content is regulated in a way that supports the independence of teachers and schools. There are several regulatory regimes that govern this. The most general is the federal education standard, which formulates a general framework of requirements for school curricula. Specifically, it sets requirements for courses of study, education outcomes, and learning conditions. We have already outlined the origin of this document earlier in the chapter.

Another regulatory document is the Sample Curriculum, which offers a version for schools and teachers to refer to. Using this example, schools can design their own strategy and methods for carrying it out. When the idea of a sample curriculum was first proposed, it was meant to be one example out of many. Each school would then create its own variation. In reality, however, this curriculum went from being an example to being a model that was copied directly. It's clear that in this situation, the quality of curricula produced by schools and the level of teacher engagement in designing and implementing them was not high.

The federal education standard and the sample curriculum provide the basic framework of regulations. It is important to note that such a binary regulatory system is fairly unique in international practice. Usually, national school education systems are regulated by a single document that is either called a standard, such as the Common Core Standard in the USA, or the Bildungsstandards in Germany, or by a national curriculum such as the National Core Curriculum in Finland, the UK National Curriculum in the English part of Great Britain, or the Ontario Curriculum in Canada. The single document may also be called the syllabus, as with the National Syllabus in Singapore. The differences in terminology notwithstanding, all of these documents are primarily oriented towards describing education outcomes. The unique structure of the Russian system of regulation is not advantageous, but rather arises out of internal processes at play within Russian education. Here, the need for a sample curriculum arises when the professional community demands a clarification of the concepts outlined in the standard. Confusion on the part of teachers as to how the standard should be used leads to a desire to simply be told what to do. The sample curriculum at least partially fulfills this need.

Public discussions were held when the sample curriculum was being written. They aimed to include teachers, curriculum designers, and researchers in an open debate. The results of these discussions were involved not only in analyzing texts, but also in the collective process of curriculum design. Public discussions from 2015 to 2016 involved a total of more than 100,000 teachers from across the country. A special crowdsourcing platform was created in which more than 700,000 comments and 30,000 specific suggestions were submitted. This approach had the advantage of including teachers in the process and making them reflect on their relationship to the sample curriculum. This format presented an opportunity to overcome the gap between the declarations of the standard and actual practice.

The second level of education content regulations is made up of documents created on the level of individual schools. Designing the school curriculum is the responsibility of each school, in keeping with the requirements of the federal law “On Education in the Russian Federation.” This curricular document is intended to be the key description of the strategy for educating school students. The structure of the school curriculum is created in response to the standard. Indeed, one of the requirements of the standard is for the curriculum to have a certain structure. The curriculum has three sections: goals, content, and organization. The goals are broken down into three groups of education outcomes: personal, meta-subject, and subject-based. These goals are addressed through programs of study described in the content section, as well as descriptions of conditions (financial, material, personnel) in the organization section. Here we would like to focus on the programs of study, which are especially important to teachers as they create their individual lesson plans. While the general curriculum is directed towards the school as a whole, the programs of study are practical tools used by teachers. In the programs of study, the teacher essentially answers the question: what to teach students? In other words, what results should the students attain, and what materials and in what quantity should be used in the process?

As has already been noted, the new standard is intended to include schools and teachers in a process of independent curricular design. In practice, however, only a small percentage of schools and teachers truly take on the challenge of designing curricula. A common practice is to use sample curricula that are developed and propagated by publishers of textbooks and teaching manuals. In practice, teachers often simply adapt existing plans to their specific distribution of classroom time for each topic, leaving education outcomes and the structure of teaching materials outside of their personal reflection by using ready-made formulas.

In practice, there is a significant gap between the two levels of the system of regulating education content. One level is tied to the norms defined by the government, and the other level is carried out in day-to-day work at schools. In large part, the education outcomes that are the main focus of the standards and sample curriculum are carried out in schools as merely a ritualistic element, fulfilling the formal minimum.

In the past few years, calls for a renewed focus on the knowledge component of the standard and increased regulation of teaching materials have been getting louder. One example is the creation and development of subject conceptions and initiatives to create a unified textbook.

The first subject conception was the historico-cultural standard, developed in accordance with the order of president Putin of May 21, 2012 No. PR-1334. In large part, this document was created in response to a lack of a clear and consistent conception of Russian history. The content of the history curriculum was rethought after the removal of Soviet approaches. There was also a lack of consensus on the part of historians in terms of basic judgments and descriptions of Russian history. The change in political and economic conditions in the post-Soviet period essentially removed the category of ideology from history. Ideology was to be replaced with the consensus of professional historians regarding the content of the history curriculum for schools. This consensus was to be manifested in the historico-cultural standard.

Also at this time, the regulatory conditions for creating unified textbooks were being established. While the first such initiatives were already being launched in 2010, when I.A. Yarovaya expressed the necessity of instituting a single textbook for history, the first actual legislation was proposed in October 2014. Amendments were written to the federal law “On Education in the Russian Federation” which proposed national textbooks for Russian language, literature, and history. However, intense opposition from the professional community halted this process. The single textbook project was finally buried with the Human Rights Council document from the end of 2018. There, president Putin wrote: “The single textbook is ineffective! Because of this, the unification of textbooks is a process that raises serious doubts. Of course, it should not be a free-for-all, but the path towards a single textbook is a very questionable one”[2].

[2] See: <https://vogazeta.ru/articles/2018/12/11/quality/5504-vladimir_putin__aleksandru_asmolovu_vy_poymite_uchebniki_segodnya__eto_biznes_i_ot_etogo_neobhodimo_izbavitsya?fbclid=IwAR3r243JuwfaWbWl5m42IUY98HocgPIzvPe0SFqIfh-RAWdKCikp1Tt5IYk>.

Another noteworthy process was the spread of the idea to create subject conceptions. At the time of the discussions about the single textbook, the Conception of Mathematical Education was written, and affirmed in the order of the Russian Government of December 24, 2013 No. 2506-r. The Conception for Teaching Russian Language and Literature was established by the order of the Russian Government of April 9, 2016 No. 637-r. A discussion about creating a social-studies conception was also initiated. In late 2018, the Russian Ministry of Education established six more subject conceptions: safety, physical education, social studies, art, geography, and technology. The role of these conceptions in the actual regulation of education content is still unclear, however.

An important aspect of analyzing the recent reforms is assessing their impact on outcomes. As the regulatory regime for education content was being re-created, a new system of assessment based on different types of results, including meta-subject outcomes, was built. In practice, however, none of these systems survived long enough. The fact is that there was no real, direct assessment of the effectiveness of the new paradigm of education content and of the new standard. Among the attempts to create a system of assessment were government projects such as a national system for studying education quality. As time went on, these projects played a less and less significant role in assessing the results of the new standard.

Perhaps the only format that was able to record the successes of the new paradigm was one that looked at indirect data: international comparative studies. These studies cannot give direct evidence of the outcomes of the new standard, since many factors play into the results. Nevertheless, it is possible to look to Russia's results in studies such as PISA and PIRLS to gauge the success of the reforms that took place between 2012 and 2016.

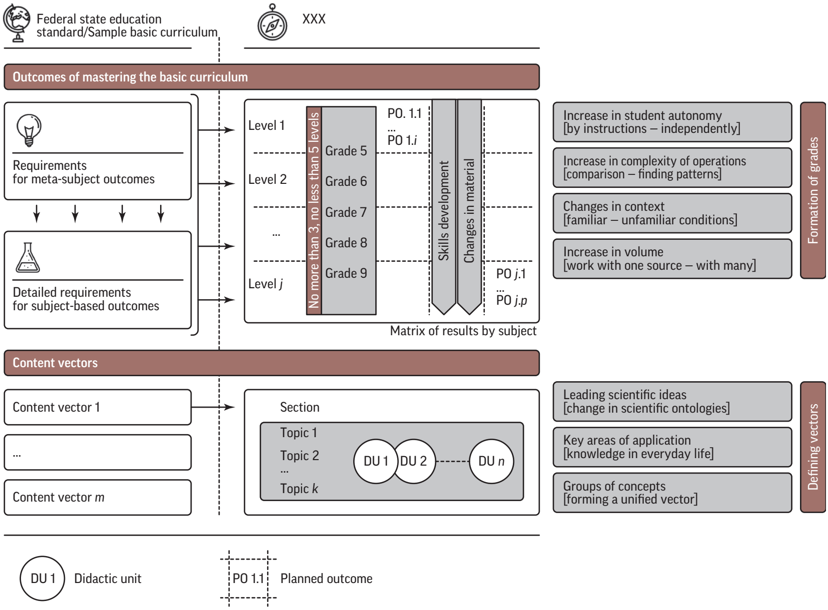
The fact that Russia showed significantly improved results in international studies is partly related to the fact that the new paradigm of education content allowed the country to increase its ability to compete internationally, at least somewhat. One of the most prominent trends in education globally is an understanding of education not as something that is made up of teaching materials, but rather as a set of skills that are formed through the use of curricula. This paradigm can be clearly seen in many regulatory documents around the world. A great example is the national curriculum in England, where the main objects of regulation are statutory requirements, which are essentially education outcomes. The content of curricula that provides for these outcomes is included only in the category of recommendation, or non-statutory guidance. The statutory requirements themselves are a continuation of the list of skills that are listed as goals in the preamble to the curriculum. Finland has a similar system with its national curriculum, where the core of the document is a set of transversal competencies. The content of the curriculum is described only in general terms, and teachers are responsible for selection.

Another important international trend is to structure outcomes based on levels of achievement, which allows for the tracking of student success. This trend can be seen in the USA's Common Core Standards, in which categories of achievement are described directly for language and mathematics.

While the Russian standard obviously does not yet function according to such logic, certain independent groups of researchers have created methodologies for structuring results in such a way. One example of this is the methodology proposed by a joint group of researchers from Moscow City University and the Federal Institute of Pedagogical Measurement (Fig. 4.1) [Barannikov et al., 2016]. The basis of this approach was a view of curricular content as a set of education outcomes and the materials that facilitate achievement of those goals. Additionally, the outcomes are structured not only by level of education, but also broken down into more minute measurements of the trends in student achievement.

To structure the second component of education content, that of the materials themselves, these researchers proposed the concept of

Fig. 4.1. Model of education content [MGPU and FIPI research group]



content vectors, which describe general thematic through-lines that form the core of each discipline. In this model, several principles of selection and structuring of materials are presented: leading scientific ideas that changed scientific ontologies, key areas for applying knowledge to practical work, and groups of concepts that combined to create a single whole.

The idea of through-lines is also an international trend. For example, in Ontario, Canada, they are called “big ideas,” while in Australia the term “strands” is used. In addition to trends related to compiling and selecting content, there are certain leading organizational tendencies. One of these is to view the standard or other documents regulating education content as constantly changing and evolving. While standards used to be renewed every 3 to 5 years, now the most accepted model is without an endpoint and is constantly being renewed.

The most prominent examples of this are the standards in the USA and the curriculum in Australia. In the latter, the documents are listed as versions (7.0, 8.0, 8.1), imitating the way in which software updates are released.

In the past couple of years in Russia, regulating curriculum content has moved in the opposite direction in terms of organization. The overall tendency has been one of unification and centralization. Initiatives to create unified textbooks, bring schools from regional and municipal oversight to federal control, detailed requirements for documents regulating curriculum content, are all attempts to push the development of education into retreat. Along with the return to a subject-based curricular construction, this situation is the greatest challenge currently facing Russian education.

4.2. 21st-century skills in Russian social studies textbooks: a comparison with leading countries in the PISA rankings

The federal education standard includes a goal of developing meta-subject skills and universal academic activities. These could also be called 21st-century skills: critical and creative thinking, as well as skills related to communication and learning. These skills (competencies, literacies), allow school graduates to maintain a capacity and readiness for self-development and renewal throughout their lives, and to feel comfortable in an uncertain world of rapid technological and social change (see: [Universalnye kompetentnosti…, 2018]).

The textbook is a foundational piece around which Russian schooling is built up. Formally, the textbook continues to be the key element in the “methodological and informational support for carrying out school programs” (FGOS for schools). Given such a role, one can expect that textbooks, teaching manuals, and workbooks develop ideas that are established in the education standard, and offer methodologies to support and develop these ideas.

The HSE Institute of Education conducted an analysis of assignments in Russian social-studies textbooks in terms of how they work towards developing 21st-century skills[3]. For comparison, we also analyzed assignments in textbooks used in English-speaking countries that hold leading positions in the international PISA study: Canada and Australia, as well as the USA, which holds a slight lead over Russia in the PISA rankings[4]. There is no single or predominant textbook used in these countries, but our analysis allows us to identify consistent general trends. A list of texts included in the analysis of Russian and foreign textbooks can be seen in the appendix to this chapter.

It must be emphasized that only the assignments, and not the content of the texts themselves, were analyzed. Six criteria were used in the analysis:

1) stimulation of thinking skills, especially critical and creative; the classification of activities (specific approaches and assignment types) was done according to Bloom's taxonomy (see: [Anderson, Krathwohl, 2001]);

2) stimulation of communication skills, cooperation, and social and emotional skills;

3) proportions of different formats for presenting information (text, table, diagram, map, image);

4) stimulation of traditional literacy (reading, mathematics), including digital formats and work with data (data literacy);

5) development of new content-area literacy (legal, ecological, intercultural, civic, medical, etc.; and

6) development of skills of self-guidance and independent learning.

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[3] Thanks to N.N. Sheveleva for helping with the analysis of Russian textbooks.

[4] The analysis of foreign textbooks was done using the library of the Georg Eckert Institute for International Textbook Research, Braunschweig, Germany (www.gei.de).

To ascertain the popularity of different textbooks and accompanying materials for social studies classes in Russian regions, in 2017 we analyzed school websites from 26 regions. These schools were participants in the PISA study. From the sites, we gathered information on which textbooks were used to teach social studies at the schools. Altogether we looked at 3189 sites of which 2525 (80%) had information on textbooks.

84% of schools used only one social studies textbook. Most often this was L.N. Bogolyubov's textbook, which was the sole textbook used in 75% of schools. 11 regions stood out in which less than 70% of textbooks were Bogolyubov.

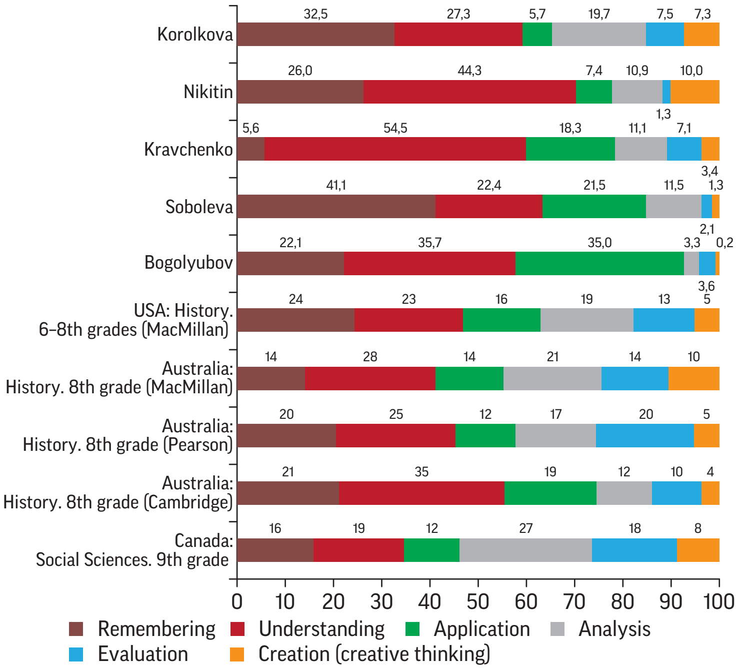
Russian social studies textbooks: wide variance in 21st-century skills

Thinking and learning skills, communication skills

More than half of assignments in all Russian social studies textbooks develop convergent thinking. In Bloom's taxonomy this includes knowledge, understanding, and application. In other words, this is linear thinking, based on following an algorithm and solving a problem step by step. In addition, the textbooks of L.N. Bogolyubov and A.F. Nikitin (see appendix) emphasize subject-based skills. The majority of assignments in these textbooks (35.7 and 44.3% respectively) are directed towards memorizing facts and descriptions of social processes. In Bogolyubov's textbook there is also a high percentage of assignments for applying this knowledge (35%). This type of assignment is related to convergent thinking, but directly stimulates the skill of problem solving.

When it comes to developing divergent thinking, which in Bloom's taxonomy includes analysis, critical thinking, and creative thinking, and which involves searching for several solutions and looking at a problem from different points of view, Russian textbooks offer far fewer assignments. In the most widespread textbook, written by Bogolyubov, only 7.2% of assignments develop divergent thinking. The biggest share of such assignments are in the textbooks by E.S. Korolkova (35%) and A.F. Nikitin (22.2%). Figure 4.2 shows a comparison of proportions of assignment types, included in foreign textbooks.

Fig. 4.2. Distribution of assignment types in social studies textbooks according to Bloom's taxonomy (%)



In Russian textbooks for eighth grade social studies, the share of assignments that involve primary sources (%) are: 17.3% in Soboleva, 12.5% in Korolkova, 11.4% in Nikitin, 9.7% in Bogolyubov, and 7.0% in Kravchenko. On average, 12% of assignments involve primary source material. However, this does not imply critical reading.

As far as developing skills of self-direction and independent learning, Nikitin's is the only textbook in which there are assignments that stimulate these areas. Even here, though, it is only 4.8%, while other Russian textbooks lack such assignments entirely.

Looking at the assignments in Russian textbooks for eighth-grade social studies, we see no indication that social and emotional skills, or skills for working groups, are being developed. Textbooks and workbooks don't include assignments that must be done in pairs, small groups, or large groups. There are no assignments that require negotiating, understanding the emotions of others, differentiating shades of meaning, motives, and emotional reactions, or predicting them in communication.

Formats of presenting information

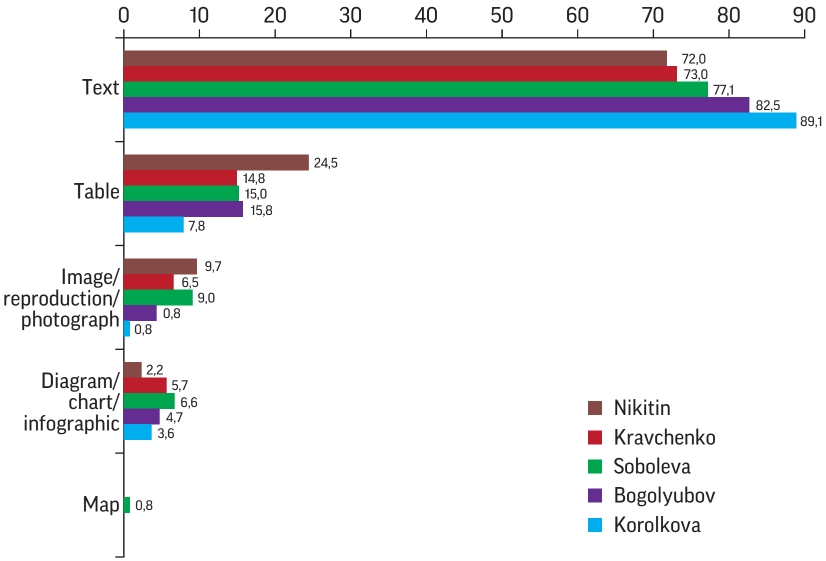
The vast majority of all Russian social studies textbooks involve working with text, meaning that in some form the students are developing traditional reading literacy. Surprisingly, the textbook with the largest share of text-based assignments (89%) and the smallest share of information in the form of tables, images, diagrams, and graphs is that of E.S. Korolkova, which stood out as having the largest share of assignments that develop critical and creative thinking. Nikitin's textbook is more balanced in presenting information in different formats: 72% text-based assignments; 24.5% with tables; 11.8% with images, diagrams, and charts. Soboleva's book is the most balanced in terms of format, with 77% of assignments using text, 15% using tables, and 16.5% using images, diagrams, charts and maps (Fig. 4.3).

Types of content-area literacy

The share of assignments thematically linked to new types of content-area literacy differs widely among the textbooks. Foreign textbooks, on the other hand, tend to have similar proportions (see below).

The share of assignments in Russian textbooks that relate to new content-area literacy varies as follows: 14.2% in Nikitin, 52.2% in Korolkova, 2.1% in Soboleva, 37.7% in Bogolyubov, 45.5% in Kravchenko.

Fig. 4.3. Distribution of Russian social studies textbooks by information presentation format



Korolkova's textbook stands out as one that offers thematic assignments for developing new content-area literacies. 37% of assignments touch on the topic of financial literacy, and more than 10% of assignments are about entrepreneurialism (Fig. 4.4).

A significant proportion of assignments in all Russian textbooks are oriented towards certain values related to friendship, care, and responsibility (Table 4.1).

The share of such assignments is about 18% in the textbooks written by Nikitin, Korolkova, and Soboleva. Interestingly, Bogolyubov's textbook has almost none of these (0.5%). Soboleva and Nikitin's textbooks are also distinguished by their percentage of assignments that are related to patriotic education and local history (13.4%).

In Korolkova and Bogolyubov, there are far fewer such assignments (2.9%).

Fig. 4.4. Assignments covering new forms of literacy in Russian textbooks (%)

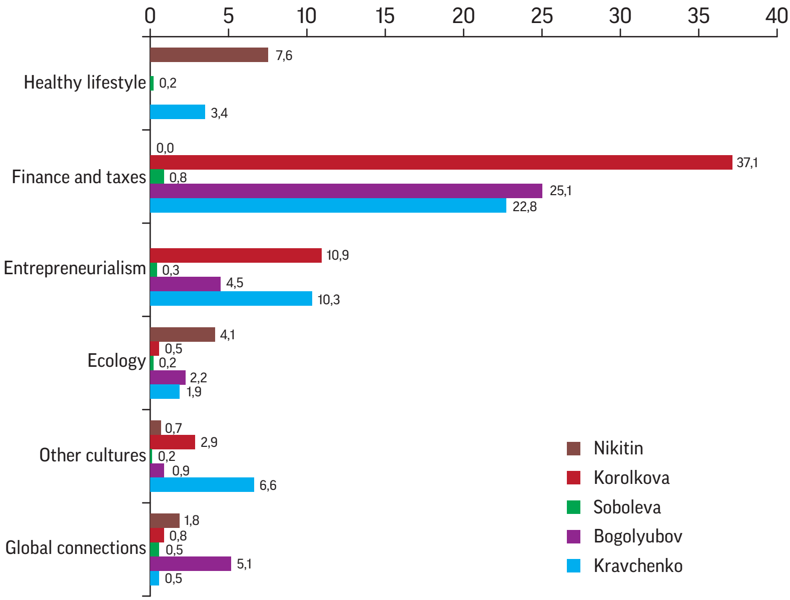


Table 4.1. The share of assignments in Russian social studies textbooks that are related to instilling values (%)

Content	Textbook				
	Nikitin	Korolkova	Soboleva	Bogolyubov	Kravchenko
Caring, friend-ship, morality	17,5	13,5	23,4	0,5	10,6
Patriotism and national cultures	15,0	4,7	11,8	1,1	3,2

Synthesizing the different measurements of our analysis of assignments in Russian social studies textbooks, we can conclude that 21st century skills are best presented in the textbooks of A.F. Nikitin and E.S. Korolkova.

Textbooks abroad: greater balance of assignment types

Thinking skills

The textbooks we looked at from Australia, Canada and the USA differ significantly from the Russian text in having a greater balance of assignment types. The proportions hold steady both in terms of topics within a single textbook (the foreign textbooks we looked at had significantly more content than the Russian ones), as well as in the proportions among textbooks in a single country, and even between different countries. All the foreign textbooks we looked at contain from 14 to 24% memorization assignments (knowledge), from 19 to 35% assignments for understanding, from 12 to 19% for problem solving, from 12 to 27% for analytical thinking, from 10 to 20% for critical thinking, and from 4 to 10% for creative thinking.

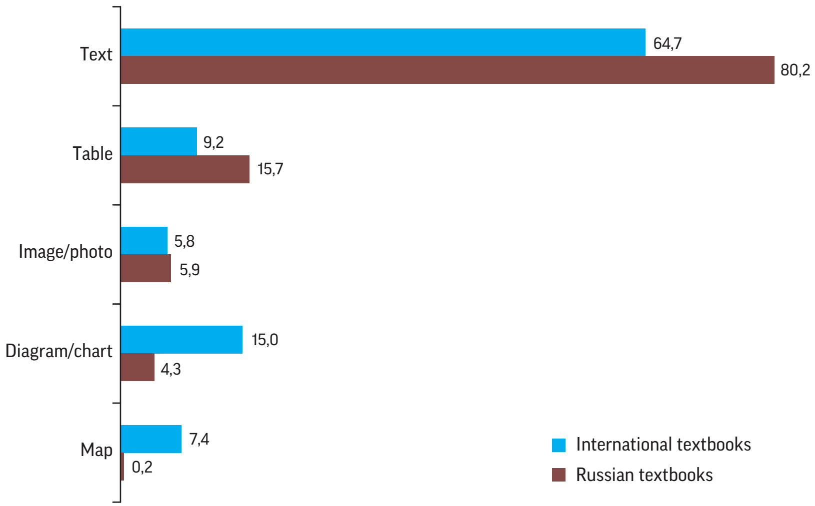
The range of assignment types in terms of Bloom's taxonomy within a single social studies textbook is 21% internationally and 33% in Russia. In other words, in Russian textbooks one assignment type often dominates, while another textbook may have a preponderance of another type. There is no stable ratio of assignment types. Internationally, different assignment types are distributed more evenly without one assignment type dominating. Among the Russian textbooks, the most balanced in this sense is Bogolyubov's textbook, and the least balanced is Nikitin's, in which almost half of assignments are directed towards understanding. On the other hand, Bogolyubov's textbook has a very small percentage of assignments for critical thinking (3.6%) and creativity (0.2%). The English-language textbooks we analyzed had an average of 21% of assignments developing critical thinking.

The share of assignments that work with primary sources is slightly higher in Russian textbooks (12.7%) than the average in Western textbooks (9.8%). There is a key difference, however. Such assignments in Western textbooks first explain to the student principles for working with primary sources before presenting the material. They teach critical thinking about the information presented, including in relation to media sources. In all the foreign textbooks we analyzed there was advice provided for searching for information on the internet. We found no such recommendations in Russian textbooks.

Presenting information

In both Russian and foreign social studies textbooks, the majority of assignments involve working with text. However, this percentage is significantly lower internationally, with 64.7% compared to 80.2% in Russia. The share of assignments that involve working with traditional tables is greater on average in Russian textbooks than in English-language ones. The share of assignments involving images is about the same, but assignments working with graphic elements (diagrams, charts, infographics) are three times more frequent abroad than in Russia (Fig. 4.5).

Fig. 4.5. Average share of assignments with different formats for presenting information in Russian and foreign textbooks (% of assignment type)



Another big difference is in what students are asked to do with the graphic information presented to them. In the foreign textbooks, in addition to interpreting the information, students are asked to present information themselves in the form of graphs, charts, or PowerPoint presentations. Such assignments are common in the foreign textbooks, and they are accompanied by instructions and recommendations, usually in the form of insets. These are instructions on how best to proceed and what to pay attention to when presenting information in graphic form. Russian textbooks seem to assume that the student will learn how to create visual information displays for social studies class in some other resource.

Social, emotional, and cooperative skills

In the foreign textbooks we studied there were many assignments directed towards developing communication and cooperation skills. In the Canadian textbook for ninth grade social sciences, group exercises accounted for 24.2% of all assignments. In Australian textbooks such exercises accounted for 8.7% of the total, and 5% in the American textbook. In addition to the assignments themselves, as with the graphic elements, the foreign textbooks presented insets about how to make decisions in groups (cooperation skills) and how to present information to an audience (communication skills).

Findings

The main differences between Russian and foreign textbooks for social studies and social sciences are displayed in table 4.2. Keep in mind that the assignments were analyzed specifically through the point of view of their potential for developing 21st-century skills, while their ability to develop subject-specific competencies were not assessed.

The most popular social studies textbook across all regions of Russia is Bogolyubov's. It is oriented towards skills such as memorizing facts and using them in standard situations. Developing skills

Table 4.2. Key differences between Russian and foreign textbooks in terms of developing key 21st-century skills

Data point	Russian social studies textbooks	Foreign textbooks
Proportion of different assignment types in Bloom's taxonomy	Unbalanced: wide range of difference in assignment types among textbooks; preponderance of one assignment type	Balanced: roughly equal distribution of assignment types among textbooks
Developing critical and creative thinking	On average 8% of assignments may develop critical or creative thinking	On average 21% of assignments directed towards developing critical or creative thinking
Skills for communication, cooperation, working in a digital environment, working with visual information	It is assumed that students already have these skills, or that teaching these skills happens outside of the social studies classroom. Assignments do not stimulate their development	Teaching these skills is included in the context of assignments within the textbooks themselves
Layout, visual presentation of materials	Layout and design are counterproductive, unattractive, difficult; blocks of information are hard to distinguish from one another*	Assignments that present visual information make up on average 15% of all assignments. The design, layout, and illustrations are reader oriented, attractive, and conducive to working with the material

* We understand that this is a subjective criterion, but the contrast with foreign textbooks is so obvious that it must be mentioned. Here you can find confirmation in the analysis of design specialists: <https://mel.fm/shkola_budushchego/3957140-barbanel>.

related to analysis, critical and creative thinking, and other 20th century skills occurs in only 7.2% of assignments in this most widespread textbook.

Assignments that stimulate 21st-century skills are most prevalent in the textbooks written by Korolkova and Nikitin, but these textbooks are practically unused in Russian schools (used only in 3% of schools). The regions with an above-average use rate of these textbooks are: Saratov, Ryazan, Ivanov, Vladimir, Ulyanovsk, Irkutsk, Kaliningrad, Moscow city and Moscow region, Kamchatka, Krasnodar, Stavropol, Perm, and the Republic of Tatarstan.

In general, the proportions of different assignment types are not as different between Russian and foreign textbooks as are the ways in which material is presented in them. In foreign textbooks, 21st-century skills are built into the assignments. Foreign textbooks offer concrete strategies for finding information on the internet, methods for conducting group discussions, steps for carrying out scientific research, and ways to visually communicate the results of the research, etc. There are also assignments that require students to work together, make plans, and take action as a team. In Russian textbooks and workbooks, some assignments require using 21st-century skills. However, the textbooks themselves do not offer tools for helping them master these skills.

Appendix

Russian and foreign textbooks and workbooks analyzed from the point of view of their capacity for teaching 21st-century skills

Russian 8th-grade social studies textbooks included in the federally approved list:

1) L.N. Bogolyubov's educational and methodical complex (UMK):

Obshchestvoznanie: uchebnik dlya 8 klassa / pod red. L.N. Bogolyubova, A.Yu. Lazebnikovoy, N.I. Gorodetskoy. M.: Prosveshchenie, 2014;

Kotova O.A., *Liskova T.E.* Obshchestvoznanie: rabochaya tetrad k uchebniku dlya 8 klassa / pod red. L.N. Bogolyubova. M.: Prosveshchenie, 2014;

2) UMK "Perspektivnaya osnovnaya shkola. Obshchestvoznanie":

Korolkova E.S., *Koval T.V.*, *Koroleva G.E.* Obshchestvoznanie: uchebnik dlya 8 klassa. M.: Akademkniga/Uchebnik, 2014;

Korolkova E.S., *Fedorov I.N.*, *Fedorova S.A.* Obshchestvoznanie: rabochaya tetrad k uchebniku dlya 8 klassa E.S. Korolkovoy. M.: Akademkniga/Uchebnik, 2014;

3) UMK "Vertikal. Obshchestvoznanie":

Nikitin A.F., *Nikitina T.I.* Obshchestvoznanie: uchebnik dlya 8 klassa. M.: Drofa, 2016;

Fedorova S.A. Obshchestvoznanie: rabochaya tetrad k uchebniku dlya 8 klassa A.F. Nikitina. M.: Drofa, 2016;

4) UMK "Obshchestvoznanie" O.B. Sobolevoy:

Soboleva O.B., *Chayka V.N.* Obshchestvoznanie: uchebnik dlya 8 klassa / pod red. G.A. Bordovskogo. M.: VENTANA-GRAF, 2015;

Soboleva O.B., *Vorontsov A.V.* Obshchestvoznanie: rabochaya tetrad k uchebniku dlya 8 klassa O.B. Sobolevoy. M.: VENTANA-GRAF, 2015.

Foreign textbooks

Australia:

History for the Australian Curriculum, Grade 8 / ed. by A. Woollacott. Cambridge, 2011;

History for the Australian Curriculum, Grade 8 / P. Addison et al. Pearson, 2011; History for the Australian Curriculum, Grade 8 / ed. by J. Clyne. Macmillan, 2012.

Canada:

Our Worldviews. Social Science. Grade 9 / ed. by Ph. Levin, T. Moline, P. Redhead. Nelson Education, 2007.

USA:

Discovering Our Past: A History of the World. Grade 6–8 / ed. by J.J. Spielvogel. MacGrow-Hill, 2011.

Chapter 5

School Funding

National education systems can be judged by the level and quality of funding they are provided, and the condition of economic relations within them. Developed countries spend no less than 5% of GDP on education funding. The level of private funding for education in these countries is comparable to the level of public funding. The structure of expenditures is also important. A significant portion of funding in countries with leading education systems is spent on developing cutting-edge programs and education technology; supporting leading schools; funding university research and programs for talented school students, bachelor's and master's students, and young scholars. However, approaches to building national systems of funding is different in different countries. High per-capita expenditures in countries such as Luxembourg don't have a direct link to a high level of education quality in the country. The key factor is not the volume, but the balance with which the funds are allocated, the fairness of the funding, an orientation towards outcomes, and the ability of the education system to attract private investment.

In Russia, the question of education funding has been a roadblock for the past 25 years. Chronic underfunding of education in the 1990s led to a crisis situation in which qualified workers fled the field, the workforce was aging, and infrastructure and technology was falling into disrepair. Low salaries, together with a large gray market sector created myriad imbalances that led to increasing territorial inequality among schools. Disadvantaged enclaves formed, as did oases of advantaged schools.

The entire history of the 21st century so far has been one of attempts to carry out education funding reform. This chapter looks at these reforms from the point of view of their outcomes and efficiency. We look at already existing as well as potential future outcomes of these reforms for school education in Russia.

5.1. School spending

In Russia, the percent of GDP spent on education remains far below the OECD average (Fig. 5.1). In 2015 that figure was 3.1%, and in recent years it has decreased due to a situation of financial crisis in the country.

Spending on schools in Russia is equal to 2.05% of national GDP (Fig. 5.2), which is actually almost even with the OECD average (2.07%), and is fairly high among the countries we looked at, where Great Britain led the way with 2.8%.

After a radical decrease in the level of education funding in the 1990s, beginning with the 2000's there has been a constant increase in the level of education funding both in nominal and real terms.

Fig. 5.1. Education spending across all levels in OECD countries (% of GDP)

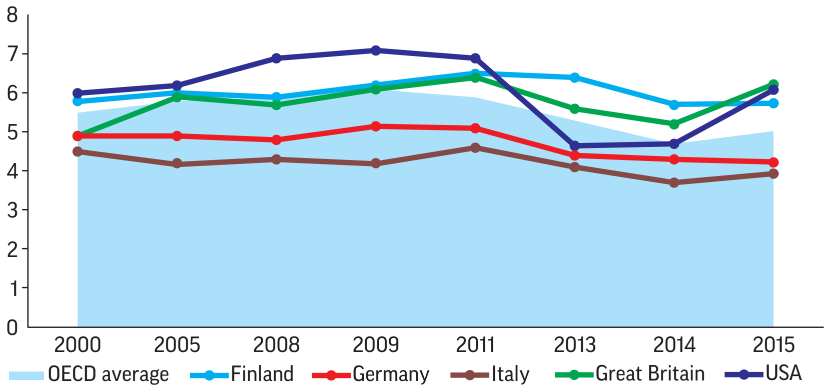
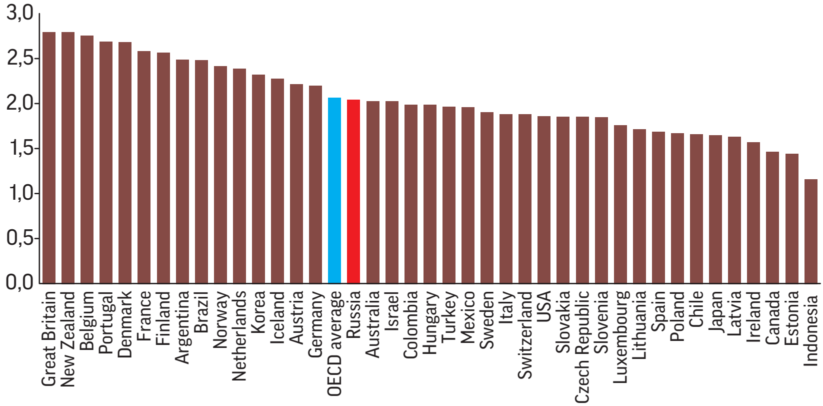


Fig. 5.2. Spending on schools, 2014 (% of GDP)



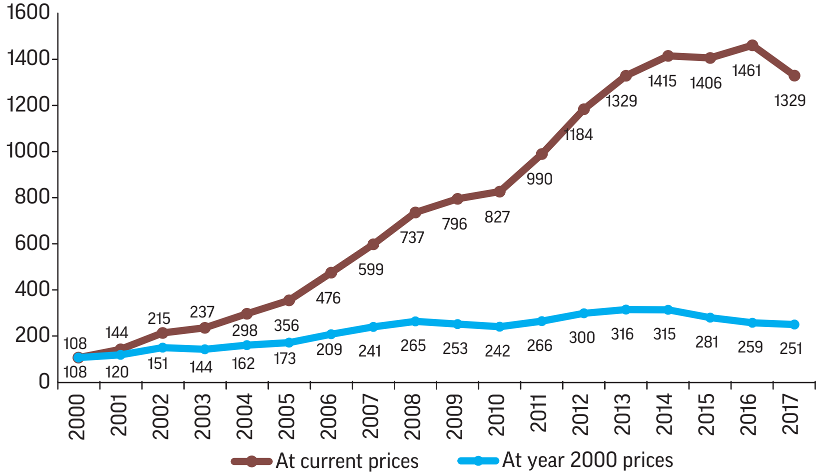
Source: Education at a Glance, 2017.

Despite the fact that the rates of growth of education funding were unable to catch up to the levels of leading countries, they made a major contribution to implementing education reforms and were key to the success of these reforms. The success was felt both in the increased level of pay for school educators, as well as in the creation of conditions for improved infrastructure and an overall increase in the quality of school education. Russia's results in international comparative studies speak to this trend.

The increased funding was achieved first of all through public spending increases. Russian public funding for school education is marked by a high level of consolidation. Schools are funded through federal, regional, and municipal budgets. However, federal funds make up an insignificant share in the structure of the consolidated budget. This is due to the way in which power is distributed between the federal government and the regions of the Russian Federation.

Federal statistics show significantly higher-than-expected growth in the nominal spending on the consolidated education budget (Fig. 5.3).

Fig. 5.3. Consolidated budget spending on schools in the Russian Federation (billions rub.)



Source: Federal Treasury.

The growth in nominal spending is more or less stable across the whole period of observation. If one looks at the trends in consolidated Russian Federation budget spending in terms of year 2000 prices, the growth will be far less noticeable, and predictable waves of decreased spending will be seen in 2008–2010, during the first economic crisis, and in 2014–2016, during the second economic crisis. However, real expenditures on school education from 2000 to 2016 increased by a factor of 2.4.

The change in spending on school education in nominal vs real terms over the four-year period between 2012 and 2016 (Table 5.1), when measuring real spending in terms of a consumer basket, shows the same patterns as can be seen as when measuring real spending using the other methodology that uses year 2000 prices. This is true both overall and on a per-student basis.

The data displayed in Table 5.1 show that the growth in expenditures in real terms and per student lasted until 2013, after which it

Table 5.1. School spending from 2012 to 2016 (nominal, real, per capita) according to federal treasury data (thousands rub.)

Indicator	2012	2013	2014	2015	2016
Nominal school spending	1 175 962 353	1 318 985 181	1 398 865 439	1 385 706 980	1 460 861 680
School spending adjusted to the cost of the consumer basket	123 539,9	126 587,6	122 114,7	106 361,7	105 175,1
Spending per student	87,46	97,35	99,27	95,62	97,61

decreased from 2014 to 2016. In per-capita terms the decreasing trend is unclear; in 2016 there was a trivial increase compared to 2015.

The comparison with OECD data shows that Russia spends less than the OECD average per capita, and is significantly behind leading OECD countries (3.6 times less than Luxembourg, and 1.9 times less than Finland). However, it is about even with other countries in its income group (Fig. 5.4).

In terms of spending growth, the Russian rate is among the highest. The 10-year period between 2005 and 2014, spending per school student increased by 3158 USD, or by 182% (Fig. 5.5). The average increase for OECD countries was 2302 USD, or 29.5%. Russia spending growth is second only to Brazil (224%).

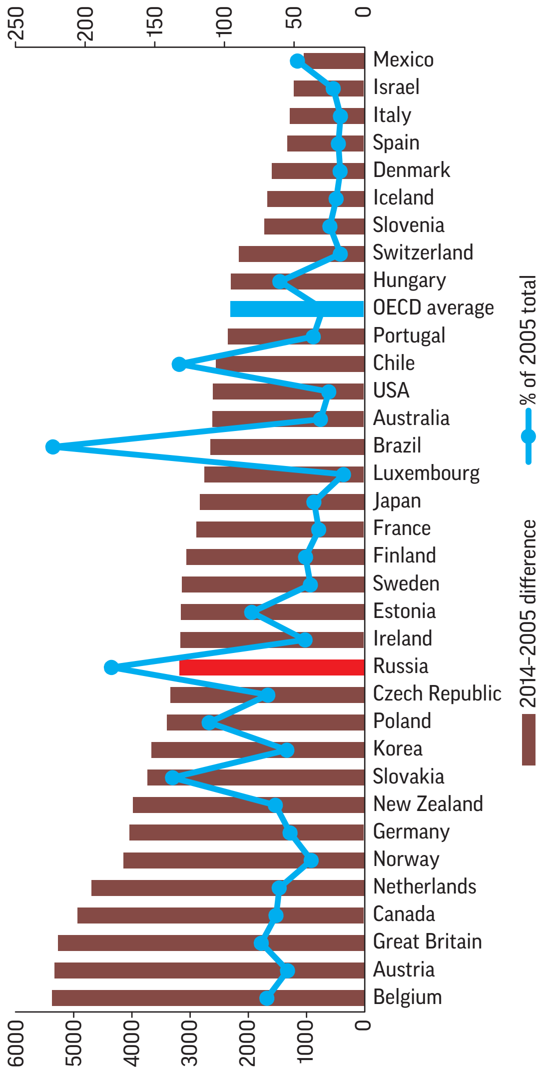
The total spent per student in Russia over a 10-year period was about 51,000 USD (Fig. 5.6), which is comparable to countries such as Slovakia, Latvia, Lithuania, and Croatia. This is significantly below the OECD average of 90,000 USD.

In the structure of overall education spending, the share of school spending remained essentially the same from 2005 two 2015, making up 44 to 46% (Fig. 5.7). Considering that there are five levels of education in Russia, the budget for schooling is the most significant.

Fig. 5.4. School spending per student, adjusted to parity of purchasing power, 2014 (thousands USD)

Source: Education at Glance, 2017.

Fig. 5.5. Trends in school spending with parity of purchasing power, 2005–2014 (thousands USD – left axis, % – right axis)



Source: Education at Glance, 2008, 2017.

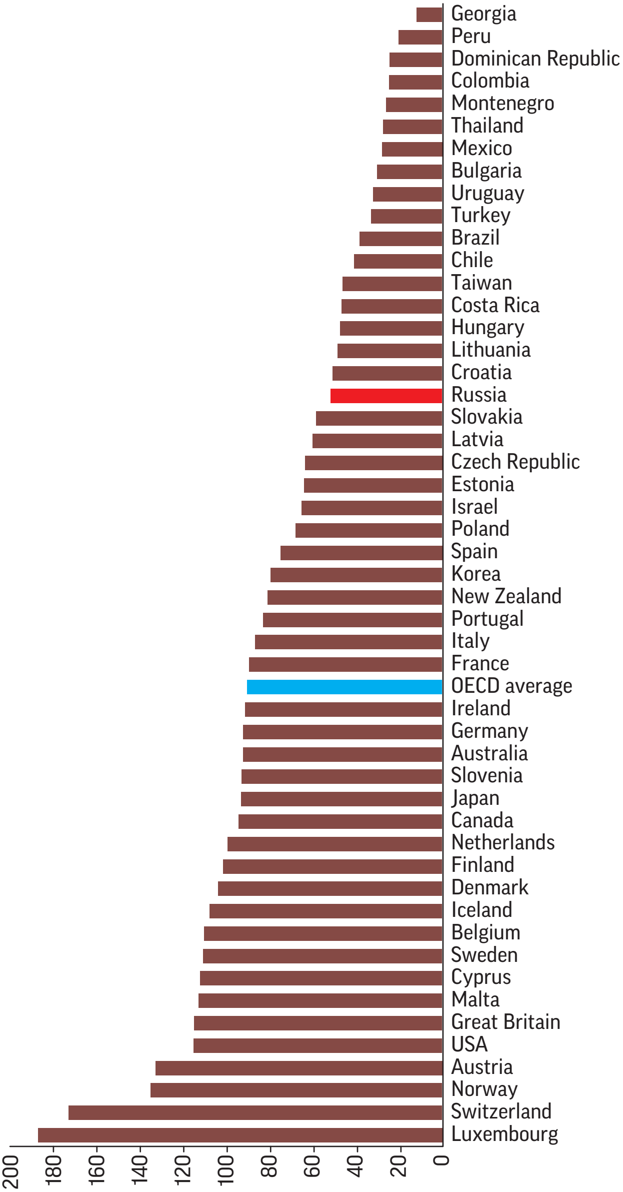
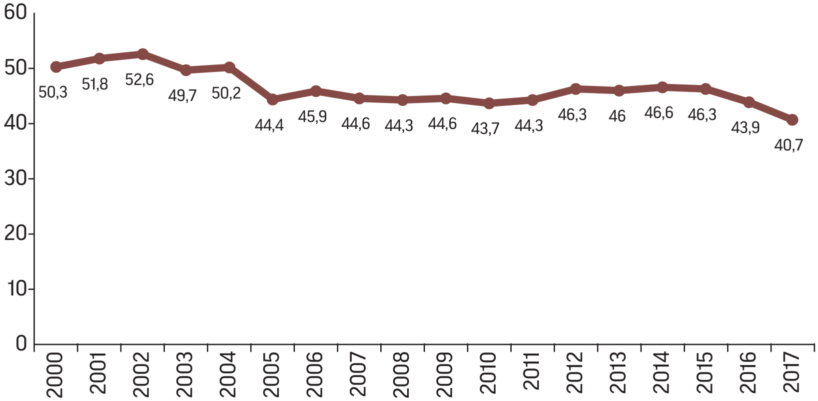


Fig. 5.6. Per-student school spending (ages 6–15) over a ten-year period, 2013 (thousands USD)

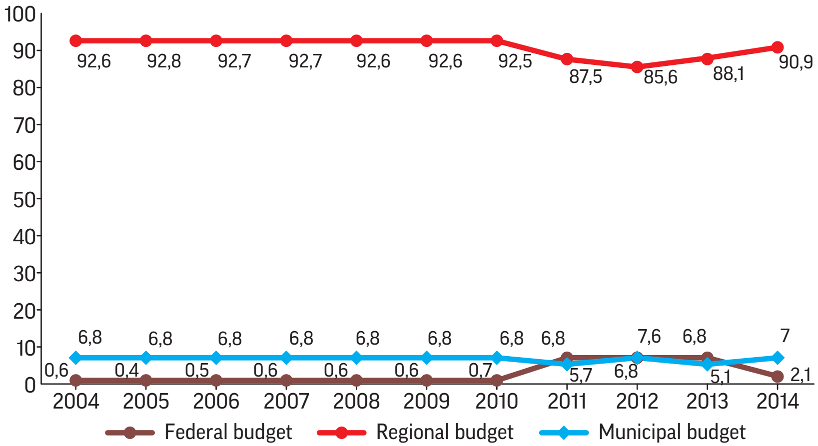
Source: OECD.

Fig. 5.7. Share of school spending in the consolidated budget of the Russian Federation out of total education spending (%)



Source: OECD.

Fig. 5.8. Spending structure of the consolidated budget of the Russian Federation for schooling (%)



Source: Federal Treasury.

Given that the share of the overall federal budget spent on schools has been more or less stable over the past 10 years, it is important to take a look at the structure of these expenditures (Fig. 5.8). Fluctuations in spending occurred in 2006, likely because of the federal budget intervention in the PNPO framework, after which there was a gradual decrease due to spending optimization as funding shifted to a per-capita model. The latest increase in the share of the education budget spent on schools occurred in 2011, and was linked to increased spending on teacher wages. By 2013, expenditures were once again balanced out, and further fluctuations were insignificant. However, after 2014 there was an increase in the share of spending on schools, primarily due to infrastructure spending linked to the economic crisis and the need to fulfill the May presidential orders.

In the structure of the consolidated budget of the Russian Federation, regions traditionally contribute the greatest share of funding for institutions that provide education services and carry out the FGOS standards. The share contributed by municipalities tends to be stable and covers the facility expenses. Since 2010, however, the federal share in school funding has increased. On one hand, this is due to the spending on targeted federal programs, such as the project to modernize regional school systems implemented between 2011 and 2013. On the other hand, this increase is related to the process of balancing out regional budgets to aid in funding the implementation of the FGOS. Already in 2014, the share of the federal budget in school spending began to diminish, increasing the strain on regional budgets.

The federal budget's share in school funding as compared to other education levels is presented in Table 5.2.

This data confirms the conclusions drawn earlier on the trends in federal school spending. Before 2010, the federal share was very low, and from 2011 to 2012 it rose significantly, while decreasing in other levels of education. Since 2013 the federal share of school funding has been diminishing once again, now falling in line with the gen-

Table 5.2. Federal share of the Russian consolidated budget for education by level (%)

Education by level	2007	2008	2009	2010	2011	2012	2013	2014	2015
All levels	21,9	21,1	23,4	23,4	24,8	23,6	23,3	21,0	20,1
Preschool	1,4	1,4	1,4	1,3	1,4	1,5	9,7	8,5	5,0
K-12	0,6	0,6	0,6	0,7	5,7	7,6	5,0	2,1	2,6
Vocational	53,1	53,0	56,5	36,4	36,8	12,4	12,3	5,0	5,0
Higher and postgraduate professional	95,0	93,9	96,4	96,5	96,5	96,6	96,7	95,9	96,4

eral trend of decreasing across all levels except higher and postgraduate-professional education.

Spending per student varies significantly by region (Fig. 5.9). The difference can be by as much as a factor of 5, from 21 consumer baskets per student in the Nenets Autonomous Okrug to 4 in the Mari El Republic.

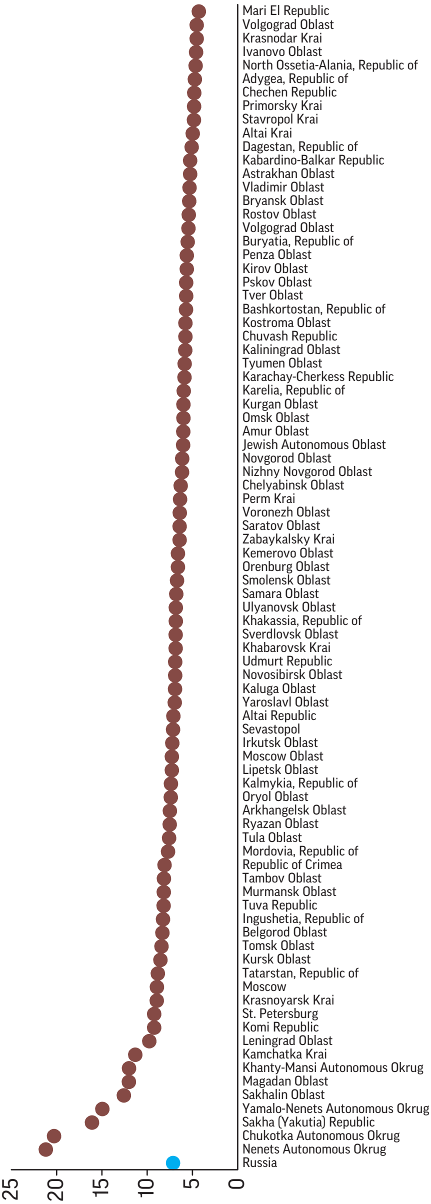
The share of private funding in the education system is comparable to public funding only in higher education. The share of private spending on schools is very insignificant (Fig. 5.10).

According to OECD data (Education at a Glance) the level of private funding in education significantly lags behind OECD countries and the OECD average (Fig. 5.11).

A MEMO survey in 2017 showed that school principals continue to find it difficult to attract private funds to meet school needs. 53.8% of respondents feel that the increase in private funding between 2010 and 2015 is below the inflation rate. However, the share of those who see a decrease in private funding has fallen from 38.5 to 20.1%. Private funds account for only 3.46% of school expenditures.

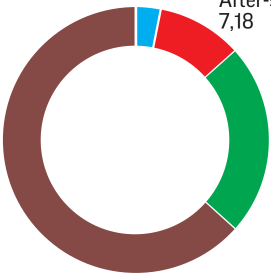
As already noted, just as most of the indicators of school functioning are highly variable region to region, so too are funding indicators. This is explained by the structure of powers and functions in

Fig. 5.9. Total public spending on education per student, Russia, 2017 (consumer baskets)



Sources: Federal Treasury, Rosstat.

Fig. 5.10. Allocation of private funds in the education system, Russia, 2015 (%)

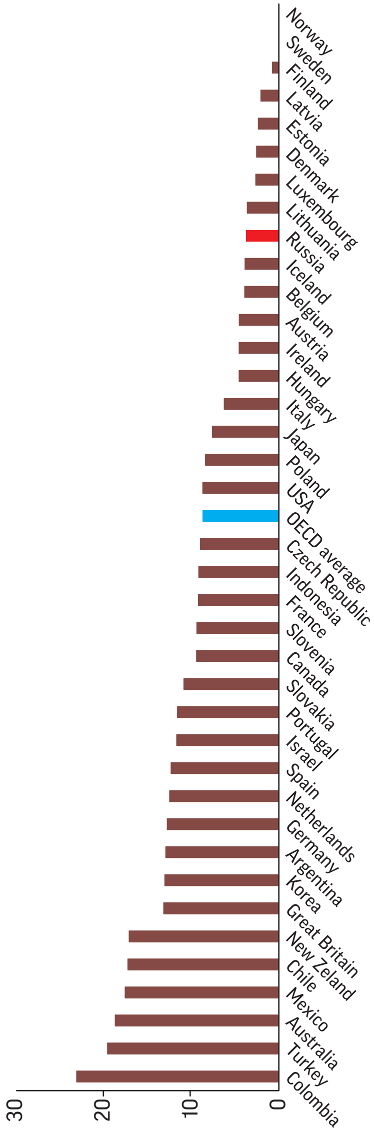


education governance, as defined by the law of December 29, 2012 No. 273-FZ "On education in the Russian Federation." Russian regions carry out school funding by disbursing grants to their constituent municipalities. A study done by scholars at HSE's Institute of Education from 2015 to 2016 revealed significant interregional differences in the size of per-student allocations in school funding. These differences are partially linked to different approaches to including or omitting various items in the budgeting for providing students with the federally mandated education services [Monitoring normativnogo…, 2016]. 0The authors of the study formulated the concept of a "fair allocation," which they feel should include all expenses related to carrying out the FGOS. Based on the analysis and comparison of the standard and fair allocations for schools in urban and rural areas, they were able to conclude that in some regions the fair allocation is below the standard, while in others the opposite is true. Fig. 5.12 shows examples of the comparison between standard and fair allocations for urban and rural schools[1].

Interestingly, cases where the standard allocation is higher than the fair one, or vice versa, are not defined by the strength of the re-

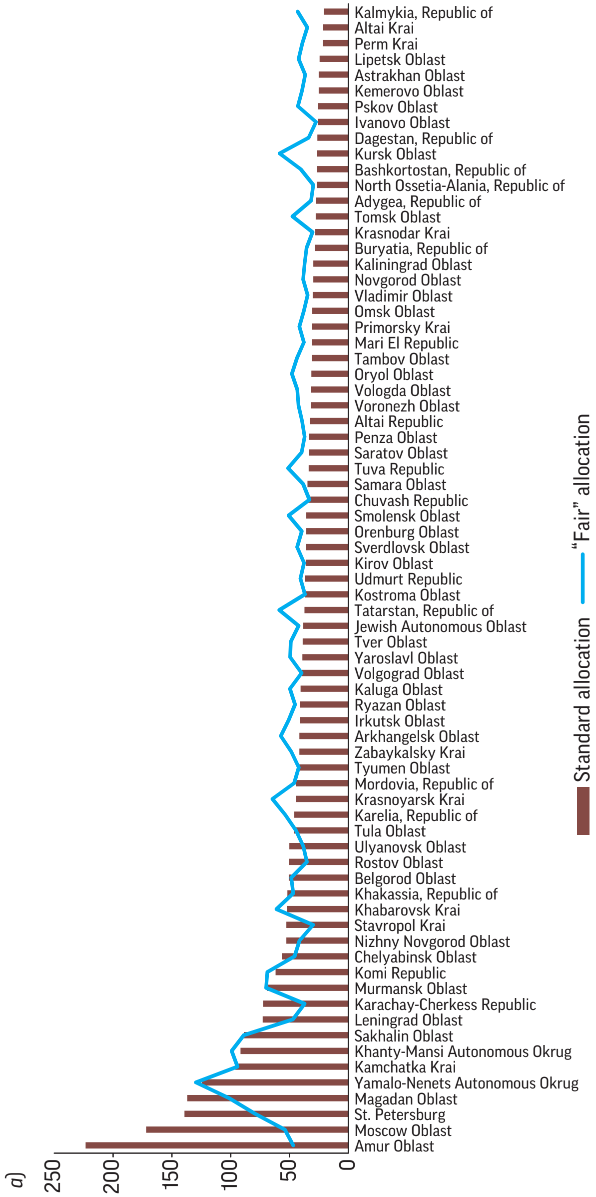
[1] The material is based on regional and municipal regulatory documents and other information received from regional and municipal education authorities with the cooperation of the Ministry of Education.

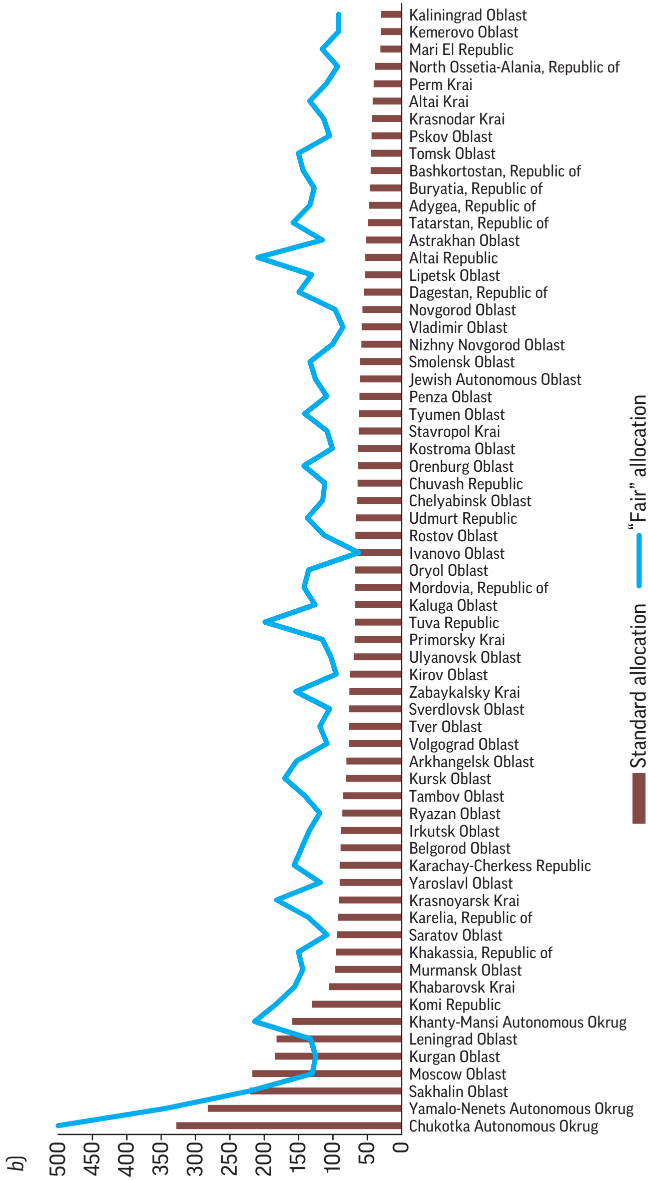
Fig. 5.11. Share of public funding in education, OECD countries, 2014 (%)



Source: OECD.

Fig. 5.12. Standard and "fair" per student funding allocations for schools in urban (a) and rural (b) areas, 2015–2016 (thousands rub.)




b)
500
450
400
350
300
250
200
150
100
50
0
Kaliningrad Oblast
Kemerovo Oblast
Mari El Republic
North Ossetia-Alania, Republic of
Perm Krai
Altai Krai
Krasnodar Krai
Pskov Oblast
Tomsk Oblast
Bashkortostan, Republic of
Buryatia, Republic of
Adygea, Republic of
Tatarstan, Republic of
Astrakhan Oblast
Altai Republic
Lipetsk Oblast
Dagestan, Republic of
Novgorod Oblast
Vladimir Oblast
Nizhny Novgorod Oblast
Smolensk Oblast
Jewish Autonomous Oblast
Penza Oblast
Tyumen Oblast
Stavropol Krai
Kostroma Oblast
Orenburg Oblast
Chuvash Republic
Chelyabinsk Oblast
Udmurt Republic
Rostov Oblast
Ivanovo Oblast
Oryol Oblast
Mordovia, Republic of
Kaluga Oblast
Tuva Republic
Primorsky Krai
Ulyanovsk Oblast
Kirov Oblast
Zabaykalsky Krai
Sverdlovsk Oblast
Tver Oblast
Volgograd Oblast
Arkhangelsk Oblast
Kursk Oblast
Tambov Oblast
Ryazan Oblast
Irkutsk Oblast
Belgorod Oblast
Karachay-Cherkess Republic
Yaroslavl Oblast
Krasnoyarsk Krai
Karelia, Republic of
Saratov Oblast
Khakassia, Republic of
Murmansk Oblast
Khabarovsk Krai
Komi Republic
Khanty-Mansi Autonomous Okrug
Leningrad Oblast
Kurgan Oblast
Moscow Oblast
Sakhalin Oblast
Yamalo-Nenets Autonomous Okrug
Chukotka Autonomous Okrug
Standard allocation
“Fair” allocation

gional budget. It is more linked to the type of work being done by administrators in using the per-student allocation as a tool for influencing the functioning and development of the school system, by including or not including certain expenditures.

Therefore, an important component of decreasing regional differentiation in school quality must be creating a single principle of fairness in determining the per-student allocation.

5.2. Modernizing School Economics

Funding is one of the most important aspects of providing resources for the education system. Schooling is a constitutional right that is provided according to the Federal Education Standard (FGOS). School education is funded based on a per-student allocation.

The nature and direction of reforms to economic relations within school education, and the education system as a whole, is largely defined by the process of transitioning from funding through budget estimates to per-student funding. Estimated annual budgets were the traditional way of funding Soviet schools and Russian schools in the first years after independence after the dismantling of the USSR. This type of funding was based on a financial plan which itemized each projected expense, estimating the cost based on the previous period. In these estimated budgets, factors such as changes in the student body or changing expenses for acquiring equipment and materials were not taken into account. Funding through estimated budgets was unaccountable, and organizations did not have to take responsibility for the outcomes of their activities. It also did not provide the opportunity for flexibility within the budget, and funds could not be moved in case of an urgent need. Estimated budgets worked well under conditions of centralized planning, with no sudden changes in funding. In the early 1990s inflation was out of control, and there were delays in the transfers of funds to schools. As a result, the system of estimated budgets went from being a stabilizing factor to an accelerator of the crisis. The budget allocations were not enough to cover expenses, and the budget system prevented schools from moving funds around based on need. Furthermore, schools that were given autonomy to attempt experimental programs were stymied by the estimated budget system.

Around the world, estimated itemized budgets have not been used in school funding for a long time. On one hand, this is related to the principle of school autonomy, and on the other hand, it is linked to the use of incentive mechanisms to stimulate education quality. In the majority of countries, formula-based funding is the main instrument of governance. However, there are different mechanisms within the basic formula-based model. In Australia, for example, goals are set by the grant giver and bonuses are awarded for achieving certain results. There are also program-oriented formats such as with charter schools in the USA, where funding is provided in a goal-oriented way to support special programs designed by the schools themselves, with strict accountability of results. In Russia in the 1990s, new budgeting mechanisms were implemented not so much to stimulate development, but rather to solve the problems of underfunding and to allow for internal distribution of funds to increase efficiency. Inefficient spending was leading to a lack of sensitivity to changes in the student body and teaching corps, labor conditions, and outcomes.

Underfunding was one of the main causes of the decrease in school quality. The 1992 law “On education” distributed the responsibility for schooling between the federal government, regions, and municipalities, with local offices becoming responsible for school governance. The problem was that different territories had different capacities for funding their schools. As a result, the general underfunding of schools was exacerbated by territorial inequality. Funds for supporting school students were also distributed unevenly. The range of per-student funding could differ by factors of ten or more. School infrastructure, especially in rural areas, utterly failed to meet the conditions for quality student life or effective education. Teacher salaries barely reached 60% of the average wages in the region, and schools practically had no financial independence for their operations.

The system of teacher compensation, which was part of the estimated budget system, was constructed around a single pay scale. Pay categories were determined by the level of certification reached by the teacher. The pay scale in no way took into account the quality of the teacher's work. The lack of a system for rewarding quality work and improvement also negatively impacted the work of teachers. With paychecks being delayed and salaries very low, together with the lack of incentives for quality work, attrition in the teaching workforce increased. The best employees gradually left schools and those who could not find jobs elsewhere came in.

The transition to per-student funding began in the end of the 1990s in Samara Oblast. This region established a dual scale, with different levels of per-student funding for urban and rural schools. Within those two groups, different allotments were established for elementary, middle and high school. The Samara experiment provided a baseline from which to modify the system by adding the "basic school" and "school bus" models. This was de facto the beginning of the rural school system restructuring process. By consolidating elementary and middle school classes under one roof, the "basic school" format allowed for decreasing the per-student funding to rural schools while improving their infrastructure and equipment. Following Samara, three more regions switch to per-student funding, the Chuvash Republic, Voronezh Oblast, and Yaroslav Oblast. They were followed by Tyumen Oblast, which differed from the previous systems in that per-student funding rates were established by each municipality rather than by the region[2].

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[2] T.L. Klyachko's article "Per-Student Education Funding: Concepts, Solutions, and Effects" (<https://direktoria.org/department/pub/2829>) states

The federal law of 7 July 2003 No. 123-FZ "On changes and amendments to Russian Federation laws related to school funding" essentially divided the responsibility between municipal and regional authorities for funding schools under the per-student system. This launched the large-scale transition of school systems to per-student funding. The rates were established at the regional level. This approach could not be extended to the federal level, since it would mean significant redistribution of funds. Starting in 2005, all Russian regions were required to establish a grant system for school funding. The grants provided funding for teacher salaries and educational expenses based on the number of students residing in the region and receiving education services at schools. Municipalities took on the funding of building upkeep as well as utilities costs. Three models of distributing funds emerged.

1. Using average per-student expenses as a baseline, essentially taking the previous year's budget and dividing it by the number of students at each type of school. The cost differences between municipalities (different unit costs) were adjusted using coefficients. Each municipality had its own coefficient calculated by dividing actual expenses in the given municipality by average (normative) expenses.

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that the experimental programs in per-student funding led to the following decisions being made in the beginning of the 2000s:

1) Not to include utilities and facilities upkeep costs in the per-student calculations, given that the properties even of urban schools, not to mention rural schools, could be very different.

2) Since Russian schools are largely governed by municipalities (school buildings and territories are their property), it was decided that the municipalities themselves would pay for the upkeep of the properties which they owned.

3) Per-student allotments could vary depending on the working conditions of the school, adjusted by coefficients. It was established that there could be no more than seven such coefficients, beyond which the system would essentially become individualized and thus retain the existing system of school funding in the region.

2. Using organizational charts. The model is based on a structure of expenditures derived from factually confirmed personnel charts.

3. Calculating the expense of carrying out a given educational program, factoring in the wages of educators and other personnel. This approach involves establishing a normative cost for a standard education program.

In this way, the per-student funding principal became standard practice in education governance. The mechanism continued to be refined in the modernization projects of 2007–2009, in the project to modernize regional school systems of 2011–2013.

Another key element in the reform of economic relations was the principle of school autonomy. The regulatory framework for this principle was established in the federal law of November 3, 2006 No. 174-FZ "On the autonomy of institutions." However, the law has yet to take its full effect. The principle of autonomy means that educational institutions take full responsibility for their activities and for reaching the benchmarks established by the governing body. However, the absolute majority of schools were unprepared to take on such autonomy. The federal law of May 8, 2010 No. 83-FZ "On changes to Russian Federation laws related to improving the legal position of government (municipal) institutions" made an attempt to push schools towards greater autonomy. The law brought the status of publicly funded institutions in line with the status of autonomous institutions, and their funding became disbursed in the form of a subsidy, as a single line item. However, the increased level of economic freedom came with a price: governing bodies no longer had subsidiary responsibility for the institution's debts. The publicly funded institution was free to make its own economic decisions, but was also responsible for their consequences.

The subsidies given to the autonomous public institutions were calculated based on the following:

- government (municipal) services;

- government (municipal) assignment for carrying out government services; and
- normative expenditures for carrying out government (municipal) services on a per-capita basis.

Normative per-capita expenditures for schools were calculated using per-student allotments established by each region.

At the outset, this step was taken to replace the previous law on autonomous institutions, which had not taken full effect. The new law created mechanisms for incentivizing school financial autonomy. Essentially, publicly funded institutions were granted most of the privileges that were previously the prerogative of autonomous organizations. Funding was provided in a single line item on a per-capita basis with the right to flexibly manage funds. They were now responsible for using those funds in the best way they saw fit to provide the volume and quantity of services required by the governing body. All funding was tied to verified indicators of expenses. On one hand, the logic of the new system significantly increased the role of the governing body in determining the volume of required services. On the other hand, the requirements for the quality of services was either formulated in a merely formal way, or was not formulated at all. The situation was also complicated by the fact that the normative funding level was established on the regional level, while the required volume of services was generally formulated by municipalities and institutions.

The outcome of the process of implementing per-student funding were the regulations outlined in the federal law of December 29, 2012, No. 273-FZ “On education in the Russian Federation.”

The funding norms included the following types of expenses:

- payroll for teachers;
- purchasing materials and valuable equipment for use in providing education services;
- purchasing educational literature;
- professional development for teachers;

- medical screenings for teachers;
- utilities;
- facilities upkeep, including rent payments;
- maintenance of valuable equipment;
- communication services;
- transportation services, including busing for students and transporting teachers to professional development activities;
- payroll for administrative personnel;
- professional development for workers not directly involved in providing education services; and
- purchasing basic materials for day-to-day operations.

These expenses encompass the full scope of funding for education service providers, as outlined by Russian law.

A system of coefficients differentiates categories of education services:

- coefficient for education type (mixed in-person/distance; distance);
- coefficient for types of technologies used in education programs (web-based, distance learning technologies, electronic education);
- coefficient for location of education (homeschooling due to health issues, schooling in medical institutions, schooling in specialized institutions of open and closed types, schooling and institutions established within the criminal justice system); and
- coefficient for categories of recipients of services (students with special needs and disabilities, students in long-term medical care).

As already seen in our discussion of the standard vs. "fair" funding norms studied by HSE experts, the actual implementation diverges significantly from the declared regulations. From the outset of the per-student funding system, cases often occurred in which funds were not fully transferred according to the norms, for example in situations of limited funding. In addition, there was a tension between the need to create equal conditions for schools and students according to the declared norms, and the reality of an individualized approach that takes into account the specifics of each organization.

The situation is complicated by the fact that in some cases the norms are individualized, while in others the specifics of the student body are not taken into account. For example, there are no coefficients for schools that work in difficult social conditions, which de facto increases the inequality of access to quality education. The same can be said of the fact that in many regions schools that offer accelerated programs have lost their coefficients. This coefficient all but disappeared after the passing of the law of December 29, 2012 No. 273-FZ "On education in the Russian Federation."

A widespread practice in recent years is providing additional funding to schools that achieve high marks in regional or municipal ratings. A de facto elite has emerged which receives increased funding by consistently staying at the top of such ratings. As a result, these bonuses have essentially become permanent. Furthermore, the criteria for receiving such bonuses are essentially just standardized EGE test scores and academic competition results. This means that most often it is not the educational results achieved by the school that are taken into account, but rather the input of households into students' education, including tutors.

The recent economic crisis, as well as the stress on the system related to the May 2012 presidential orders which mandated increasing the level of teacher salaries, have increased the difficulties of transitioning to the per-student funding model. Disproportions arise out of the need to redistribute funds in order to fulfill the salary mandate within each school. This often leads to dwindling funds for education expenses, professional development, etc.

All of these distortions to the principle of per-student funding decrease its effectiveness.

In discussing school funding, we must touch on the ambiguous situation surrounding private funds. As mentioned, the level of private funds in schooling remains very low and lags far behind developed countries. We must keep in mind that private funding is even more territorially differentiated than public funding, with wide gaps between large cities, small towns, and rural areas. The differentiation is even seen between neighboring schools, simply due to the socioeconomic differences in the student bodies. The state of private funding remains opaque. Programs of sponsorship and voluntary parental contributions are carried out in a legal gray area. Private revenue streams sometimes become involved in races to achieve high regional rankings and thus to secure additional public money.

Altogether, we find that the problems surrounding the practical implementation of new funding structures for school systems remain serious. Working out the kinks in the system, we suggest, is the most important direction of work in the process of modernizing economic relations in education.

Reforming economic relations in education is a leading factor in the process of modernization in the post-Soviet era. Many experts see these reforms as determining all of the changes that the education system has undergone.

The most important challenge of the early period of education reform was overcoming the funding gap, which had major negative repercussions on the functioning of the education system throughout the 1990s. Overcoming the funding gap was accomplished by increasing public budget allocations, first from the federal budget, and later from regional budgets as powers and responsibilities were redistributed. The changes in the budgeting structure and the move to formula-based also contributed to overcoming the funding gap.

Changes in the budget code of the Russian Federation removed the possibility for joint governance of public institutions, and eventually the possibility for joint budgeting as well. These changes catalyzed new economic mechanisms for school funding. The federal law of 6 October 2003 No. 131-FZ “On general principles of local self-government in the Russian Federation” established a complex, multilevel system of governance and budgeting. The main principle of funding schools became the per-student allocation provided for by regional subsidies to schools, most of which are controlled by municipalities.

The main principles of instituting new economic relations in the education system were the following:

1) Providing all citizens with equal access to quality education. Formula-based funding was intended to carry out this principle in practice.

2) The goal of providing fair funding in exchange for schools achieving high outcomes. Money in exchange for results was a way to stimulate school development, motivate positive change, and drive innovation in education. In the 1990s, these mechanisms came to be used to support experimental programs in schools and to compensate for their chronic underfunding. Schools sought to increase their status to that of gymnasiums or lyceums to secure additional funding for their operations as well as to attract private funds and parent donations. Sometimes this involved operating in a legal gray area. Interestingly, such illegal schemes were most commonly used by the most well-funded schools. In essence, the attempt to stimulate innovation and high outcomes ended up increasing inequality through economic mechanisms. All this was a source of social tension, and created an image of chronically underfunded schools having to fund their operations through illegal means.

Beginning in 2000, project-based and targeted methods of funding school reform took the lead in bringing about bold solutions. These targeted programs guaranteed a high level of funding for schools, provided computer equipment and internet access, modern laboratory equipment, as well as professional development for teachers and principals, all paid for by the federal budget. Project-based and targeted funding was distributed based on the principle of “money for progress.” Targeted programs were first launched from the federal level and eventually came to be initiated at the school level, driving the spread of education reforms.

An entirely new form of funding under the rubric of “money for obligations” has been instituted in the framework of multivalent projects for modernizing education. This involved a mechanism for the transfer of subsidies from the federal budget to regions for education development. This principle was used between 2011 and 2013 under the auspices of the MRSO project for modernizing school systems.

However far from all of the proposed changes to economic mechanisms were carried out in practice. For example, the mechanism of registered government obligations (GIFO) was never widely used. This experiment was never truly directed at school funding, but it involved funding university students based on their results on the standardized EGE exam. GIFO is an obligation provided by the government to the student based on their EGE score, which would pay for their university education for a given enrollment period established by the government. This obligation is activated only if the student, or any citizen having taken the EGE, enrolls in university. However, the right mechanism for fully and fairly implementing the GIFO has yet to be found.

Initially, the formula-based education funding model was intended to provide for equal access to education. However, eventually a transition to the principle of “the money follows the student” was formulated. Funding was to be detached from schools and become a mechanism for funding education programs. Education programs were thought of as discrete processes that were not tied to one single organization. The student could fulfill part of the program in one school, part in another, and another part remotely. This is essentially a transition to a personalized, voucher-based funding model. Such a model was carried out in the USA. However, while the designers of this model hoped that it would weed out low-quality education services and provide perfect equality as each student chose their own path, this did not come about. For schools, which provide a socially guaranteed service, such a market-based mechanism would lead to a high risk of having the opposite effect on fairness. There would be an unwarranted transformation of the school system, which would decrease the possibility for universal access to the quality education guaranteed by the government.

All of the changes in economic relations in recent years have been based on increasing school funding. They can function properly only in a situation of sufficient funds. Unfortunately, insufficient funding became one of the main problems for the reforms. Even though nominal spending on schools grew by multiple times over the past 20 years, real spending in comparable prices increased less significantly. In periods when the Russian economy suffered moments of crisis, the new economic mechanisms started to fail. This had serious consequences related to the need to roll back obligations and cut funding for infrastructure upgrades in order to pay teacher salaries. The targeted funding needed to create the conditions for carrying out the FGOS became impossible. The mechanism for attracting private funding to school systems in a transparent way also failed to launch. The volume of private funds is much lower in Russia than in other countries, and the way in which these funds come into the system involves questions of corruption.

Ultimately, it was the changes in the economic mechanisms that had the greatest impact on the changing face of the school system, having laid the foundation for development. The continued transformations of these mechanisms will involve searching for flexible funding models for individual education trajectories; equitable funding for in-school and after-school education, as these distinctions start to disappear; and supporting programs for leveling access to quality education.

Any discussion of education funding cannot ignore the phenomenon, noted by a number of experts, of public funds being “lost” as they are transferred from one level of government and administration to the other. In the current system, funds for providing education services as established by the FGOS are disbursed from regional budgets, while the federal budget participates in the process through a subsidy for leveling the playing field. Funds are then transferred to the governing body, which is usually local, based on norms established by the region. The governing bodies then distribute the funds to schools according to the needs of the municipality. A number of experts have estimated that the loss of funds in this process is no less than 25%, and is often higher than that. This has resulted in federal education authorities beginning to experiment with transferring school governance to the regional level. Supporters of this approach believe that this will solve the key problem of increasing the level of governance while reducing transactional losses. Opponents maintain that the transfer of authority will not solve such problems since, on one hand, it will involve increasing the number of administrative staff, and on the other hand, it will strengthen the controlling function of regional education authorities while reducing the strategic potential of regional education systems. Finally, the regions themselves feel that these proposed reforms coming from the top only serve to lower the chances for achieving real results in education development, and will increase the formal nature of governance.

Failure to take into account specific regional contexts increases the growth of regional inequality and impacts federal policy, making it oriented towards national average data. The result is that the leading regions often determine the data used to set strategic goals, while the weaker regions become outsiders to the process. It’s often the case that more than two thirds of Russian regions are below the national average in some indicators. Thus, the very structure of education policy creates an environment for increasing education inequality. In turn, education inequality cements unequal socioeconomic development and degrades human capital as a whole. We are then faced with the reality of regional enclaves of low-quality education.

Findings

In this context, we can highlight the following tendencies in school funding.

Total budget expenditures on schooling over the past 7 years increased by 61%, but decreased by 10.6% between 2016 and 2017. In the same 7-year period, real spending fell by 4.9%. From the peak in 2013, real spending actually fell by 22.1%. Schools are underfunded, which limits the capacity to fully implement the FGOS, to raise teacher salaries to a comfortable level, and to modernize infrastructure.

The decrease in school funding has led to the deformation of the formula-based funding model. The difference between actual and "fair" funding in a number of Russian regions is as much as a factor of two.

The share of school funding in the total education budget was practically unchanged from 2005 to 2015, accounting for 44 to 46%. Meanwhile, Russia is 32nd out of 39 countries in terms of per-capita spending on schools, with about 6000 USD per year. The OECD average is more than 10,000 USD.

Per-capita spending on education, adjusted to a consumer basket, varies significantly among Russian regions. The difference can be as much as a factor of five, from 21 consumer baskets per student in the Nenets Autonomous Okrug to 4 in the Mari El Republic.

The share of private funds in the school system remains insignificant. Private money in school budgets accounts for only 3.46%. The share of private funds in school budgets adjusted to 2010 prices increased annually from 2011 to 2013 by an average of 2%, but began to fall in 2014 at an average rate of 3%.

The regional disproportions in school funding allotments are not determined by the strength of the regional budget, but are more dependent on the motivation and competence of those who administer the per-student allotment budgets. A fair and consistent principle for forming the norms governing these allotments must be created to reduce territorial inequality of access to quality education.

Essential steps towards improving economic relations in the education system include: reforming the regulatory framework for public funding; allowing discrete funding of education services (tied to individual students rather than organizations, allowing for the funding of individualized education trajectories that involve multiple institutions); finding new approaches to funding school networks.

The mechanism for bringing private funds into the school system in a transparent way has failed to function. Tools to incentivize bringing private funds into school development, including tax breaks and preferential loan conditions, etc., are rarely used, but have a powerful potential for compensating for the underfunded state of the school system.

The mechanism for funding targeted aid to those in need must be perfected, taking into account the fact that criteria for qualifying for aid are different in education than in other areas of social policy.

The way in which subsidies from regional budgets are distributed to schools must be reformed so that the “loss” of funds during transfer from one budget level to another is reduced.

The funding norms must be restructured and increased so that schools can develop their digital infrastructure, update computer classrooms, provide high-speed internet, and support online resources.

Chapter 6

Systems of Assessment and Accountability in Primary and Secondary Education

Well-functioning assessment and accountability mechanisms are an essential attribute of highly developed national education systems in the contemporary world. Monitoring the education process and its outcomes on all levels is a prerequisite for effective, data-based management. The creation of a national system of education assessment, including objective and independent forms of assessment and oversight, became one of the key goals of Russian education policy in the 21st century. In this chapter, we present an overview of the path taken so far, and the structure and functions of the contemporary assessment and accountability system.

6.1. The Russian national assessment system for primary and secondary schools

The evolution of the national school assessment system

In the Soviet era, education quality was controlled by a rigid system of reglamentation of the education process: single textbooks, single schedule, uniform methodological approaches, uniform programs of teacher training, etc.

When the 1992 federal law "On education" opened the door for variation and freedom of choice of textbooks and programs of study, it became necessary to find new ways for the government to manage education quality.

The lowering of administrative barriers, as well as the increased level of school autonomy (while continuing to be publicly funded) led to the introduction of new government oversight mechanisms.

The 1992 law established assessment procedures and "regulations of the activities of education institutions" such as licensing, evaluation, and accreditation. The procedures and criteria for assessing the quality of conditions and outcomes were determined at the regional level and even at the local level, which led to significant differences in the requirements.

It became necessary to create unified federal requirements: the Federal Education Standards (FGOS), which were also created by the 1992 law. Evaluation and accreditation procedures for education institutions were to establish "the adherence of the content and quality of student preparation to federal education standards." National education standards were seen as the basis for:

- carrying out control and oversight in education
- national standardized testing for graduating seniors as well as at other levels of education
- building a system for internal quality control at education institutions
- evaluation of educators and administrators at public education institutions
- accreditation of education institutions

Since the law dictated that all education standards must be approved by the State Duma of the Russian Federation, these tasks were not able to be carried out quickly.

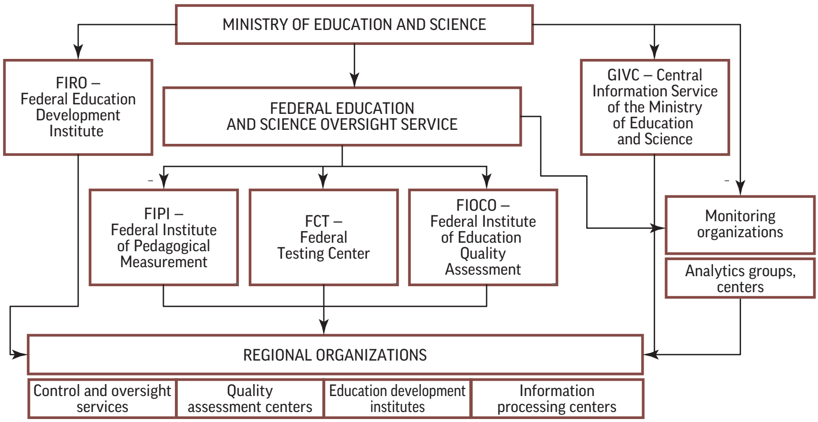
An important factor in the creation of a contemporary national system of education quality assessment was Russia's active participation in international education quality studies beginning in 1998

[Kuznetsova, 2014]. The information gathered in these studies not only allowed for the comparison of Russian education with international standards, but also raised the question of the extent to which Russian requirements for education content and level of student preparation were in line with global trends and contemporary conditions. The results of Russia's participation in international studies had an impact on some of the vectors of education content reform and on the development of the second generation of FGOS. The assessment methods and measurement tools used in international studies form the basis of Russia's own system of assessment of education quality, which takes into account global standards.

The system of education quality assessment that exists in Russia today can be traced back to 2001, with the launch of an experiment to develop an evaluation procedure for high school graduates: the Unified State Exam (EGE). In 2006, the Conception for a National System of Education Quality Assessment (OSOKO) was written, but not approved. OSOKO was designed as a system of organizational and functional structures, norms, and regulations with a unified methodological basis for assessing student achievement, the effectiveness of educational institutions and systems, and the quality of programs of study, while taking into account the needs of the recipients of education services [Kontseptsiya..., 2006]. An important stage in the development of the OSOKO was the launch of the National Project for Modernizing Education (KPMO). The project included a push in the direction of OSOKO within the framework of modernizing regional education systems. However, the attempt to implement the key elements of OSOKO during this period was unsuccessful. In 2013, a new plan for a national system of school quality assessment (OSOKOO) for 2014–2016 was developed and became the basis for the reforms of recent years.

The current OSOKO organizational structure involves federal and regional executive offices in the field of education, as well as federal and regional organizations involved in oversight and assessment procedures. These offices are responsible for developing methods and tools for assessment, as well as analyzing and storing the results, and putting together reports and recommendations based on the assessments (Fig. 6.1).

Fig. 6.1. OSOKO organizational structure before the restructuring of the Ministry of Education and Science in 2018



Each element of the OSOKO structure has its own sources of information and provides a certain level of open access to the results of their assessments. Specialized information portals that provide open access to some of the data on education quality include the Unified Information Service of the Ministry of Education and the official national site for providing information on government (municipal) institutions (the GMU site).

Thanks to the creation of a national system of education quality assessment, parents and the society as a whole have gained access to certain data about the preparation level of students and the work being done by schools and teachers. To some extent, this expanded the opportunity to select schools and plan out individual educational trajectories.

The national system of education assessment was an important step in creating a modern system of administration based on data. However, a more traditional approach to control and oversight still dominates, in which the results of assessments are used to take direct management decisions without submitting them to public discussion. Solutions are implemented without discussion of the root cause of the problem and without consulting the community. The data gained in the assessment process is not always used to improve management and teaching. The concept of "generative assessment" remains a slogan that is not often put into action.

Most Russian regions have an internal system for assessing education quality (RSOKO). At the core of these systems are various organizations such as institutes of education development (professional development) or education monitoring centers. They carry out monitoring efforts, organize assessment procedures, and even develop independent regional monitoring programs, including the needed assessment tools.

However, one of the most pressing problems both at the regional and federal levels involves the interaction of various organizations and departments that engage in education assessment and make use of the data. Even regional and municipal governing bodies are sometimes unable to access the information they need. These closed datasets include EGE results and the data of the federal statistical observation (FSN) at the detail level of municipalities and schools. A number of regions independently create their own databases, often creating redundancy in data collection. This both increases the reporting workload on schools and creates incompatibility between FSN results and internal regional data.

Between 2015 and 2016 work was done to create the "Contingent" program which would act as an interdepartmental system for student record-keeping. However, the development of this program has been put on hold.

Another problem the regions face is a deficit of specialists who are able to develop tools and methods of assessment, including assessment materials and surveys. There is also a deficit of professionals who can process and analyze the data and give recommendations for how to use data to improve education.

The assessment system for primary and secondary education quality

A system for assessing education quality provides for the monitoring of how students are being prepared at schools and makes it possible to solve problems as they arise vis-à-vis subjects, schools, and regions.

In Russia, the system for monitoring school quality is a multilevel one, consisting of several basic areas and procedures (Fig. 6.2).

Fig. 6.2. The unified system of school quality assessment in Russia, 2018

Education level	The unified system of education quality assessment (Rosobrnadzor)						Other quality assessments	
Pre-school	NIKO					Studies of teacher competencies	Independent assessments of education quality	Regional monitoring programs
1st grade								
2nd grade								
3rd grade								
4th grade			TIMSS, PIRLS					
5th grade								
6th grade								
7th grade	NIKO	BPR						
8th grade			TIMSS					
9th grade			PISA	OGE				
10th grade			PISA					
11th grade			TIMSS	EGE	Composition			

Source: Rosobrnadzor, Ministry of Education and Science.

It includes two basic vectors of assessment:

1) education outcomes (quality of student preparation, academic achievement), and

2) the activities of education institutions, including assessment of learning conditions.

In the case of school education, the greatest efforts are concentrated in the first vector, student assessment, which occurs via four fundamental assessment procedures:

- Grading within the class, which provides real-time assessment of student work or grades upon completion of the course. This is needed for effectively carrying out the education process at the school level.
- “High-stakes” standardized tests administered upon completion of a program, which assess the level to which the student has mastered the course of study, used for admission to the next level of education.
- Anonymous assessment of the outcomes of completing a course of study. This is a necessary element for the accreditation of education institutions, based on the requirements of federal education standards.
- Composite assessment of student achievement: international, national and regional studies used to assess the effectiveness of the activities and procedures of education institutions; uncovering systemic problems in carrying out education programs.

Standardized testing procedures

More and more countries are adopting standardized tests for selection of graduates for admission to higher levels of education. Similar procedures exist in the USA, Great Britain, China, Finland, Kazakhstan, and others.

The *Unified State Exam* (EGE) is a key element of the Russian system of education assessment. Fully implemented in 2009, today it is considered a successful example of large-scale institutional transformation [Bray, 2012]. The EGE is the key form of assessment of students upon completion of the basic school program, usually taken by those graduating from 11th grade. It is also an admissions test for colleges and universities in the Russian Federation. Before the EGE, schools conducted exit exams independently, after which applicants took entrance exams at the universities of their choice. In both cases, the testing in most subjects involved oral formats. These procedures did not provide for objective assessment, and created the conditions for corruption.

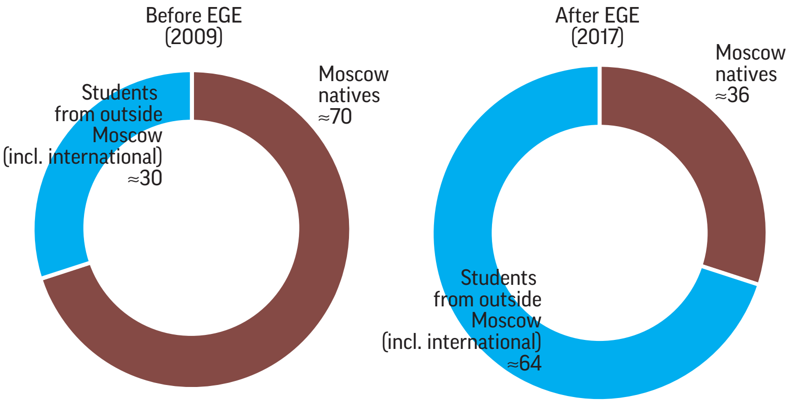
The EGE is a written standardized test. Since 2014, EGE procedures include strict measures to ensure objectivity. Specialized oversight committees are created which include the parent community. The exam is administered in specially equipped EGE centers, rather than within the walls of the school. The test sessions are recorded on video. Answer sheets are registered, copied and stored, including electronically. This allows the results to be rechecked in case of an appeal.

The math and Russian-language portions of the exam are required for all. Other subjects are open to student choice. EGE scores allow students to apply to any Russian university regardless of their place of residence without having to travel from their home region.

In recent years, the EGE has become a universal and fairly reliable instrument for selecting the most well-prepared graduates for admission to institutions of higher education. The process for admission based on EGE scores has significantly increased the level of academic mobility and access to quality higher education for students from remote regions (Fig. 6.3).

EGE procedures and testing materials are constantly being perfected to ensure reliable assessment and responsiveness to national priorities in education quality: since the 2014/2015 school year, a composition portion was added; in 2015, a two-tiered (basic and specialized) math test was added, as well as an oral component for

Fig. 6.3. Increase in the share of students from remote regions at Moscow University's before and after the launch of EGE (%)



Source: Ministry of Education and Science.

foreign-language EGE tests. Overall, there is a trend towards diminishing the multiple-choice portion of the test and increasing the long-answer portion.

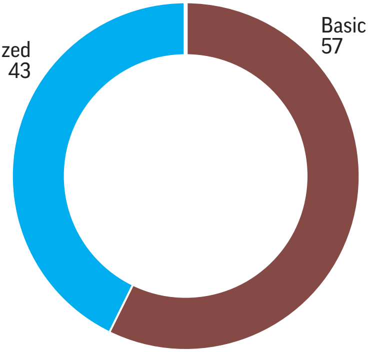
Students with disabilities and special needs are provided special procedures and test materials.

In 2017, 703,828 students took the EGE, of whom 610,654 (87%) were graduating in that year. The number of students with disabilities and special needs who elected to take the EGE in 2017 was 6194. 5619 test centers were active.

In 2017, as in 2016, the most popular among the elective subjects were social studies (55.9%), physics (27.0%), biology (20.3%), and history (20.0%). The majority of students continued to choose the basic EGE test rather than a specialized version (Fig. 6.4).

As a high-stakes exam, the EGE should not be used for assessing the quality of the education system, schools, and teachers. However, lacking other objective data about education quality, it has become used as the sole measurement of quality across all levels. As a result, Russian education has faced the same negative effects as described

Fig. 6.4. Choice of basic or specialized levels in the math EGE, 2017 (%)



Source: Rosobrnadzor, MSO.

in studies of the effects of standardized testing and accountability in the English and American education systems [Students…, 2015; Koretz, 2017; Nye, Thomson, 2018]: a tendency to harp on preparing for a limited set of tests, which decreases the overall level of education and cultural development; pushing out or excluding unsuccessful test takers who might decrease the school's overall rating. There is an increasing lack of trust among families in schools' ability to prepare their children for the EGE, and they increasingly turn to tutors, which increases the risk of inequality in university admissions. A large-scale market of "shadow education" [Bray, 2012] in EGE preparation has emerged. The fear of "not passing the EGE" has had an impact on the basic education trajectories of students, as the number of students who go directly to vocational education after ninth grade has increased significantly [Kosyakova et al., 2016].

The *Basic State Exam* (OGE) is the basic form of state assessment for school students graduating from ninth grade. It was fully implemented in 2014, and is administered by education authorities in Russian regions based on federal requirements and federal test materials. About 1.2 million students graduating from ninth grade take the test each year.

To receive their ninth-grade graduation attestation, students must pass exams in four subjects, of which Russian language and math are mandatory. The other two subjects are chosen by the students. A plan to increase this to six tests is currently being discussed, with three mandatory tests (with the addition of a foreign language) and three electives.

Recently, the OGE has also come to play a role in selection, like the EGE. Changes to testing procedures and improvements in test materials vis-à-vis reliability and compatibility of results has led to a significant increase in the exam's status. OGE scores are more and more used to select ninth-grade graduates for admission to specialized programs in 10th grade.

The majority of highly effective national education systems today are focused on developing higher-order thinking skills and the ability to use them for practical problem solving. For this reason, a number of countries are designing exams to move away from the multiple-choice format and towards essays, oral exams, and practical assignments that demonstrate skills. At the same time, certain countries are stepping up measures to increase the compatibility and reliability of assessment results. The search for balance between precision and reliability of assessment tools and their relevance to modern approaches to education content is a major challenge facing the majority of the world education systems including Russia's.

International education quality monitoring programs

International comparative studies are an important aspect of assessing education quality for school systems around the world. In Russia, they also became the prototype for designing national and regional monitoring programs such as the National Education Quality Studies (NIKO).

Russia has participated in international comparative studies run by the Organization for Economic Cooperation and Development (OECD) and the International Association for the Evaluation of Educational Achievement since 1995. The outcomes of these studies are analyzed in detail in Chapter 3.

The most significant comparative studies of education quality are the following:

- Progress in International Reading Literacy Study (PIRLS), which is conducted every five years and monitors the quality of elementary education. Its goal is to compare the level and quality of reading and comprehension of elementary school students in countries around the world and to reveal differences in national education systems in order to help improve how reading is taught.
- The international comparative study of math and science education TIMSS (Trends in Math and Science Study), which is the first monitoring study in the field of general math and science education in schools, has been active since 1995. It generates discrete datasets at the fourth and eighth grade levels for math and science.
- The Program for International Student Assessment (PIRLS) is a monitoring study of education quality that answers the question: "do 15-year-old students who have completed their school curriculum have the knowledge and skills to function fully in modern society, and do they have the ability to solve problems in various areas of human activity, interaction, and social relationships?" This study has been conducted in three-year cycles since 2000.
- The Program for the International Assessment of Adult Competencies (PIAAC) is an intermittent monitoring study of professional skills and competencies among the adult population of working age in countries around the world
- The International Computer and Information Literacy Study (ICILS), which was conducted in 2013 in 21 countries with the goal of determining the level of computer and information literacy among eighth-graders around the world

- International comparative study of civic education ICCS. This study measures the level of knowledge related to civic life among school students, and looks at their relationship with democratic values and their inclination towards future activism in social and political arenas.

National studies of education outcomes

In many countries around the world, there has been a long-established practice of conducting national monitoring efforts of school quality. The models for carrying out these studies are varied. [Klyuchevye voprosy…, 2016].

In the USA, for example, which, like Russia, has a federal structure, the federal government has a minimal level of influence on the education system, and practically all aspects of education are regulated by states and local authorities. The USA has no single education standard, but there is a national monitoring program called NEAP, in which schools across the country are systematically selected to participate. The NEAP is run by the National Center for Education Statistics, under the auspices of the Department of Education. Its goal is to collect reliable and clear information to assess the progress of school education and to develop measures for improving education in the country. In Australia, which is also a federal country, a unified national curriculum has been instituted, while maintaining autonomy among the states. Australia also conducts a national monitoring effort known as NAPLAN, in which all school students of a certain age participate.

Unitary countries are more likely to use a single monitoring system. In Chile, for example, large-scale reforms in the 1990s included the modernization of the system for assessing outcomes of school education. The Chilean Law on Education established the SIMCE national monitoring program which, as in Australia, includes all school students of a given age.

The most effective models of national monitoring efforts aim to solve specific problems in education administration and development. They are always accompanied by a strong informational service, including consulting services and channels for feedback, not only for schools but also for the consumers of education services. An important aspect of these studies is the use of contextual information for interpreting the monitoring results: socioeconomic data (education level, employment, housing conditions, etc.) and information on the immigration status of families, as well as their specific education needs. Using such data, as well as indices that describe the economic status of different territories, increases the objectivity of conclusions drawn from assessment results. In England, for example, each municipality is listed in the Index of Multiple Deprivation (IMD), and Australia has the Index of Community Socio-Educational Advantage (ICSEA). Such data allows schools and teachers to be targeted for additional financing. Schools that need additional help, as well as schools that are model examples of success in difficult conditions, can thus be identified [Yastrebov et al., 2013]. The only example of such an approach in Russia is the Index of Social Advantage (ISA) developed by the HSE's Institute of Education, which is used in certain studies for assessing the social context of the work of schools and their effectiveness [Yastrebov et al., 2014; Derbishir, Pinskaya, 2016].

Unfortunately, in Russian national monitoring efforts the model of contextualizing education outcomes remains very rare.

In some ways, Russia lags behind the majority of countries in designing a system of national education quality monitoring. However, international precedents are available to allow for the fast and effective creation of a new, internal system.

National Education Quality Studies (NIKO) conduct regular studies of school quality broken down by individual subject areas at specific grade levels. Studies include diagnostic compositions written by students, as well as surveys of students and teachers. Each of the NIKO studies involves data-gathering and analysis across a wide spectrum of indicators reflecting the condition of regional and municipal education systems.

NIKO studies have been conducted two times a year since 2014 in selected schools[1] (Table 6.1). On average, 5 to 15 schools are selected from each participating region. About 50,000 school students participate in each study.

Table 6.1. Schedule of NIKO studies

Subject	Grade levels	Date
Mathematics	5th, 6th and 7th	October 2014
Russian language, mathematics, and science	4th	April 2015
Computer science	8th, 9th	October 2015
History and social studies	6th, 8th	April 2016
Foreign languages (English, German, French)	5th, 8th	October 2016
Safety	6th, 8th and 9th	April 2017
Chemistry, biology	10th	October 2017
Literature, world literature	6th, 8th	April 2018
Geography	7th, 10th	October-November 2018
Physical education	6th, 10th	April 2019
Technology	5th, 8th	April 2019

Source: Rosobrnadzor.

The designers of testing materials for NIKO look to international examples, and orient the assessment towards skills. This significantly increases the value of the study.

However, the areas in which these results are being put to use are highly limited. Since NIKO is tailored to the local system, the results

[1] According to the official NIKO website https://www.eduniko.ru, as well as the Rosobrnadzor order of January 29, 2019 No. 84 "On conducting school monitoring in 2019."

cannot be compared internationally. The selection of schools is not representative of the regions, making it impossible to compare the results or make general conclusions at the regional, municipal, and school levels.

The consulting services for teachers announced by the designers of the study have yet to be brought on line.

National Assessment Assignments (VPR) are tests taken by school students at the beginning of the school year and after completing each course. These tests make it possible to track the knowledge gained by students in the course of the school year.

VPR is the largest-scale assessment program in the Russian education system. In April/May 2017, about 3 million 4th, 5th, and 10th graders and almost 40,000 schools participated.

The VPR protocols use a single schedule for the whole country, as well as unified assignments developed at the federal level in accordance with the FGOS. There are also unified grading criteria.

The VPR assignments are not a form of standardized testing. They are conducted by the schools independently. When carried out correctly, the assessment assignments provide schools with an opportunity for self-assessment. They can identify gaps in student knowledge and take the appropriate measures to fix them.

In practice, a low level of oversight of the VPR results leads to violations in administering the program. The data collected does not reflect the actual situation. Rosobrnadzor has recently taken significant steps towards improving the quality of VPR data. A new methodology has been developed to identify skewed results. Special attention is being paid to comparing VPR, OGE, EGE results in each school.

At the same time, preparing for, conducting, and especially grading VPR assignments takes a great deal of time on the part of teachers, increasing reporting workload and causing stress. Similar negative repercussions of testing programs were felt in many countries, especially the USA and England [Ball, 2003; Nichols, Berliner, 2007].

Independent initiatives

Among the successful examples of independent assessment efforts is iPIPS (International Performance Indicators in Primary Schools). This protocol involves diagnosing a student at the start of schooling and assessing progress from 1st to 4th grade.

The system was created by experts at the HSE's Institute of Education based on methods developed at the University of Durham, Great Britain. iPIPS is currently oriented towards establishing a point of reference from which the student can be guided through elementary school.

The iPIPS assessment for first graders establishes the student's level of cognitive (basic skills in reading and math, phonemic literacy and vocabulary) and noncognitive (personal, social and emotional) development as they enter school. Unlike many similar assessment tools, iPIPS was developed specifically for assessing first-graders and involves individual work with students in the form of adaptive computerized tests. Thanks to this new model of testing, it is possible to quickly, reliably, and comfortably assess children vis-à-vis their objective knowledge and skills at the beginning of the schooling process, and track the progress they make in the course of the first year of schooling.

iPIPS testing occurs in the middle (2nd and 3rd grade) and at the end of elementary school, continuing the logic and psychometric structure of the first-grade assessment. The format assesses basic meta-subject skills in cognitive areas (mathematical and linguistic literacy, reading comprehension, and vocabulary), students' social, emotional, and personal development, as well as their motivations and subjective sense of well-being. All the assessments take place in the form of adaptive computerized tests. The whole set of instruments allows for the individual progress of each student to be tracked year by year.

A number of other tools have been developed in Russia, such as the set of materials called "Readiness of First-graders for Schooling," developed by the Center for Education Quality Assessment at the Russian Academy of Education, under the direction of G.S. Kovaleva. These materials are designed for conducting an assessment of the level of preparedness of children entering first grade. A multifaceted, adaptive method is used, which was designed with the intention of developing recommendations for teachers and parents for best practices in supporting their children at the start of the schooling process. The protocol includes a wide selection of materials, including recommendations for studying children's preparedness for school; worksheets; questionnaires for teachers, parents, first-graders; analytic documents; videos, etc.

Several years ago, the IC Literacy Test (ICL Test) was unveiled. It was developed by the National Workforce Training Fund under the auspices of a joint program between the World Bank and the Russian Finance Ministry (the Russian Education Aid for Development Program, or READ). The test is a convenient and functional tool that allows for the assessment of 8–10th graders' (14–16 years old) mastery of modern information and communication technologies for gaining new knowledge, communicating, and doing research. The ICL test is based on real-world situations, allowing it to provide an objective assessment of school students' preparedness for life in an information society.

These studies have shown effectiveness as tools for providing more complete data for improving the work of both teachers and administrators. However, not a single country in the world has implemented them on a regular basis for the entire target group, partially because of the high cost of such endeavors.

One of the issues with national and regional studies of education outcomes today is the flawed nature of such instruments and the low quality of testing materials. Existing Russian monitoring efforts produce datasets that are incompatible not just with other countries, but also with other Russian regions. There is no capacity for tracking the results of individual schools, not to mention individual students.

Today, the goal of creating a unified system of education quality assessment remains as important as perfecting individual assessment procedures.

Ideally, all the elements involved should supplement one another. This requires not only coordinating the activities of different organizations involved in education assessment at different levels, but also agreeing on an understanding of how to define quality education. A number of researchers have pointed out that this concept continues to be interpreted using contradictory traditional, authoritarian, and illiberal ideas. Despite years of education reform in Russia, a single way of understanding what is meant by "quality education" has yet to coalesce [Minina et al., 2018].

For many countries, a key problem remains the ineffectiveness of applying the results of assessment to improving the quality of education at all levels, from the personal to the national. The Russian system continues to broaden the spectrum of assessment procedures, including mandatory ones, while the quality of testing materials remains low. There are very few steps made to open the door for feedback.

Administrators and teachers must work to develop skills for applying assessment results to improving the quality of their work. Attempts to create professional development courses to this end have already been made in the majority of high-income countries (USA, Canada, Australia, Norway, and others). However, these are only the first steps towards solving the problem. A USA-based study showed that two thirds of teachers don't know how to use data for improving the education process [Global Education Monitoring…]. In Russia, an understanding of the importance of developing these skills among teachers and administrators is just beginning to form.

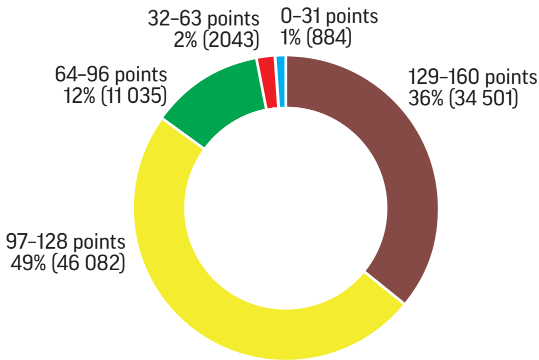
Assessing the quality of teaching and learning environments

Assessment of the quality of teaching and learning environments at the federal level is carried out by independent assessments of education quality. One of the vectors is the Independent Assessment of Conditions at Institutions which Provide Education Services (NOK UOD). This protocol was established by the presidential order of May 7, 2012 No. 597 "On implementing government social policy." NOK UOD is also regulated by federal law, in part by the federal law of December 29, 2012 No. 273-FZ "On education in the Russian Federation" (articles 95, 95.1, and 95.2), and others.

Criteria and indicators for assessing education have been established at the national level for all types of education institutions. The core methodologies involved in the NOK UOD programs use expert opinions based on publicly available data and population surveys. These assessments are coordinated by the Ministry of Labor and Social Protection. The results are published on the GMU site.

By the start of 2019, NOK UOD protocols were conducted at 91,220 education organizations (Fig. 6.5).

Fig. 6.5. The number of education organizations participating in the independent quality assessment procedure, and their distribution by final grade, February 25, 2019



Source: GMU site.

The key goals of NOK UOD are related to creating a body of data to aid in making management decisions and providing consumers with information on the quality of education services. However, the desire to unify these procedures, with all education institutions from kindergartens to universities being assessed under a single rubric, led to the diminishment of the quality of data provided by NOK UOD. The data displayed on the GMU site does not meet the needs of potential users. There is no way to select several organizations that are of interest, or compare them to each other using one or more parameters. This presentation of the data from this protocol cannot be utilized effectively, neither by education professionals nor by students.

The Russian independent assessment system was given low marks during a joint meeting of the State Council and a committee for monitoring the achievement of socioeconomic development targets. This resulted in the development of a new version of the law. In the new version (see: federal law of December 5, 2017 No. 392-FZ "On amendments to Russian laws regarding independent assessment of the quality of services provided by organizations in the areas of culture, healthcare, education, social services and federal institutions of medico-social examination"), NOK UOD results were slated to be used for assessing the work of regional governors. In a situation where NOK UOD is conducted by the regions themselves, using the results in such a way will inevitably lead to falsification.

The development of the education quality assessment system over the past few years is the outcome of increasing demand for effective, objective, and quality results on the part of the government, the economy, and society. Improvements to the system, in Russia and in many other countries, come not only from increasing the variety of assessment tools and the quality of research. Approaches to the assessment process are themselves changing.

For example, in Russia, as in the majority of OECD countries [Synergies for Better Learning..., 2013], assessment strategies are moving towards a more multivalent approach. In earlier models, the focus was on students and their level of preparation. Today, assessment includes evaluating teachers and school administrators as well as the quality of equipment and infrastructure. It takes into account the opinions of students and their parents, and many other elements. The number of criteria and indicators, as well as the volume of data for assessing various aspects of education, is quickly growing.

These developments help to overcome certain administrative challenges, but also create new ones. First and foremost, organizations must be able to effectively use all this data for improving education quality. No less important is the process of removing redundancy in the gathering of information from teachers and school administrators.

External independent education quality assessments. Education quality assessment is carried out not only by official government entities. Interest in information on school quality has generated a number of other procedures that are independent of the education system and government assessment procedures.

Important sets of data covering different aspects of education quality are collected and published by the *Rossiia Segodnia* news agency's Social Navigator service: "Ranking Special-status Schools" (2011–2013); "Ranking the Information Openness of Russian School Websites" (2013); "National Navigator for Children's Recreation" (2011–2017); "Ranking the Best Russian Schools: Top 25, Top 500 Best Russian Schools, Top 300 Best Rural Schools, Top 200 Best Russian Schools for Developing Talent (based on VOS Olympiad results), lists of schools with a high level of preparation within a specialized track" (2013–2017).

In addition, the following organizations also produce rankings of Russian schools:

- The RAEX (Expert RA) ratings agency, which ranks the top 200 Russian schools based on admissions to top universities in Russia.
- The Russian New University (ROSNOU) and the *Prosveschenie* publishing house rate the websites of Russian schools.

- The “Russian Textbook” Corporation, in association with the HSE’s Institute of Education, have created an index of education infrastructure in Russian regions.

These studies tend to gather information from open sources: publicly available statistics, official monitoring efforts, and official sites, including school websites. This points to the need for high levels of openness and data quality on the part of the education system’s official reporting processes.

6.2. Transparency and accountability of primary and secondary schools

Issues of accountability and transparency have been in the forefront of discussions in the system of education administration, oversight, and quality control [Valdman, 2013]. International experts have highlighted the important role such mechanisms play in reforms of social services, including education [Barber, 2011; Barber…]. They view autonomy and independence as being among the key forces driving education institutions towards accountability and transparency. In Western countries, accountability tends to be seen in terms of being accountable to the society and to the consumers of education services.

The UNESCO report “Accountability in Education: Meeting Our Commitments” [Global Education Monitoring] highlights systems of regular reporting on the actions being undertaken to develop the education system. This is an important tool in education accountability. According to the report, in 2010 there was at least one national report on education monitoring published in 108 out of 209 countries. However, only one in six countries do this on a regular basis, Russia being among them. It is important to note that such reports are prepared with different audiences in mind. Clearly, the documents created for scholars and experts in the field of education should be different than ones whose target audience is civil society — to which all governments should be accountable.

In many countries, schools must submit reports to the families of their students. Each such report is designed to clearly and thoroughly answer questions that arise among the interested groups in civil society. In international practice, there are several formats for reporting, from statistical data and info-graphics (including data from specific tests) to fully detailed reports covering such topics as the socioeconomic conditions of the student body, school finances, or teacher qualifications.

The means by which accountability documents are distributed include:

- The education organization's website. In Great Britain, for example, reports from the Office for Standards in Education (Ofsted) are displayed in this way, and are also sent out to parents.
- The websites of government offices involved in education administration. An example of this is the Illinois Interactive Report Card Website (http://iirc.niu.edu/), which posts interactive school reports.
- Specialized sites. In Australia, for example, publicly available information about schools is posted on the "My School" website (www.myschool.edu.au).
- Mass media. For example, the England School League Tables (BBC), the School League Tables (The Times), and others.

The Russian school system has also taken a big leap forward in recent years in terms of implementing standards of openness and creating services to support them. The federal law "On education in the Russian Federation" mandated the informational openness of the education system, required that public opinion be taken into account, and affirmed the nature of education governance to be fundamentally social as well as governmental. The law established requirements for education organizations to display certain information on their websites (article 29) and for regional and local education authorities to provide transparency (article 97). It was mandated that all education organizations, including schools, must post an annual report analyzing their own activities during the previous school year and a table of basic statistical data as outlined by the Ministry of Education and Science[2].

Assertive policymaking was able to achieve good results in this field in a short time.

Today, about 90% of schools have an official website (Fig. 6.6). All of these sites fully comply with the requirements of article 29 of the current federal law "On education in the Russian Federation" and related regulations.

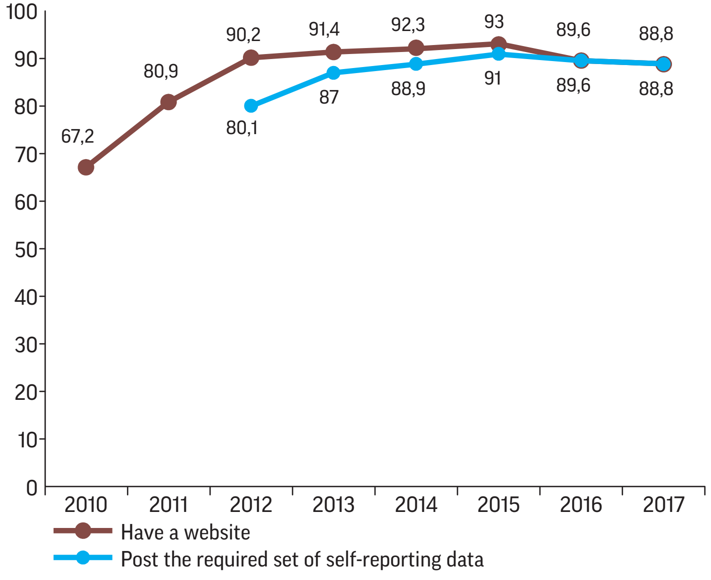
Parents of school students are more and more often adopting electronic student journals, which are now used in three quarters of Russian schools. This tool provides informational transparency, but the situation in different regions varies dramatically, with less than 10% adoption in the Republic of Crimea and up to 98–99% in Vladimir and Omsk Oblasts and the Nenets Autonomous Okrug.

Parents are almost completely satisfied with the level of school transparency, independent of the actual quality of the school websites (Fig. 6.7). This is partially explained by the fact that everyone has their own requirements of information from the school, and the number of different ways to communicate with the school and gather information is enough to satisfy all needs and questions.

This is confirmed by the fact that in answering a question about their involvement in their child's schooling, 78.5% of parents answered: "I keep track of news and events taking place in my child's class," while 63.9% of parents say they keep track of news and events at the school as a whole.

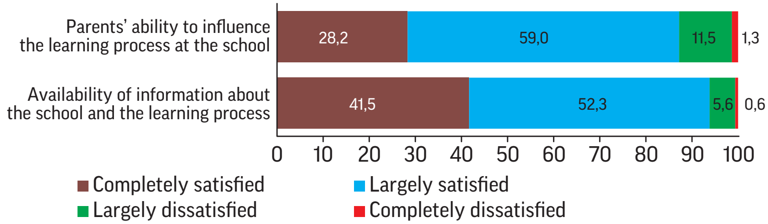
[2] For more detail see the orders of the Ministry of Education and Science: of June 14, 2013 No. 462 "On establishing self-reporting procedures for schools," of December 10, 2013 No. 1324 "On establishing indicators for the activities of education institutions to be included in self reporting," of December 14, 2017 No. 1218 "On amending the protocol for the self-reporting of organizational institutions established by the order of the Ministry of Education and Science of June 14, 2013 No. 462."

Fig. 6.6. The share of schools with active official websites which comply with regulatory requirements (%)



Source: Rosstat, Ministry of Education and Science.

Fig. 6.7. School students' parents' answers to a question about their level of satisfaction with the openness of information and their ability to influence the learning process at the school, 2016 (%)



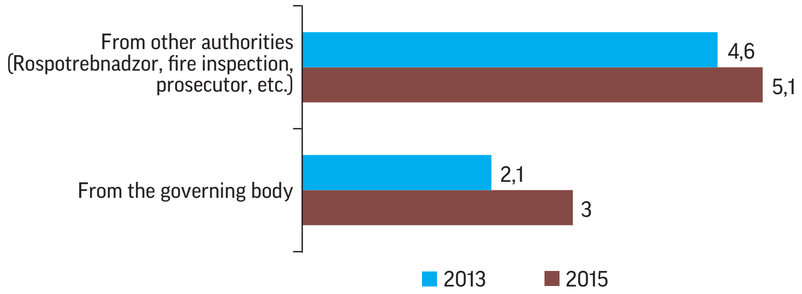
Source: MEMO.

International experts highlight two types of accountability: the first type, which is called functional accountability, occurs when those who receive reports also have the power to sanction; the second type, in which no consequences are mandated, is called formal accountability. This distinction points to the basic challenge facing the system of accountability in Russian education, in which there is no mechanism by which the public can impose consequences.

The accountability of educational institutions is carried out primarily in relation to government oversight structures. The primary impetus for this system is concern for the safety and well-being of students. In addition, in establishing accountability for student learning, the government seeks to guarantee that the education services being provided are in line with public education standards. Furthermore, it is logical that organizations funded by public money should be subject to financial oversight. The system also includes a mechanism of unscheduled evaluations which can be triggered by complaints or requests from parents.

According to school principals, the number of external audits by various authorities that schools are subject to increased in the period from 2013 to 2015 (Fig. 6.8).

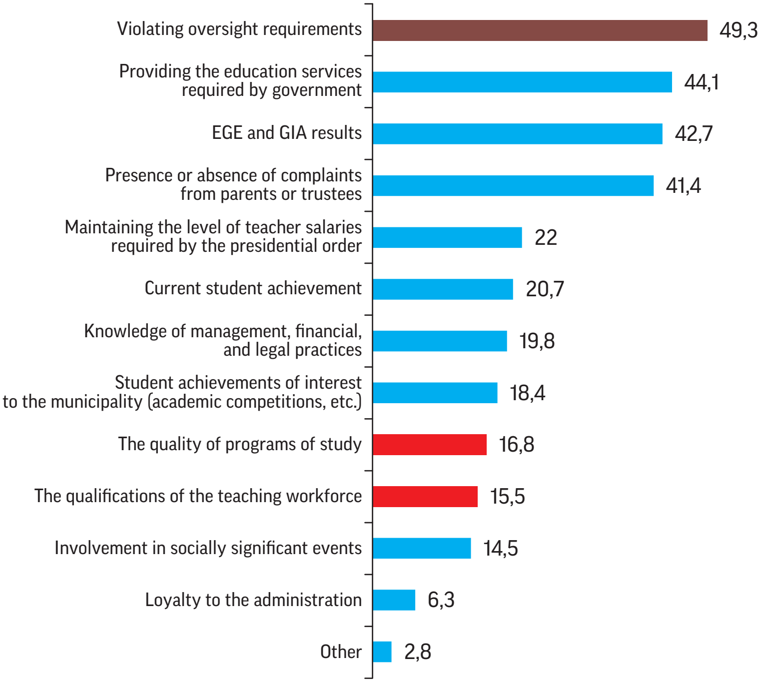
Fig. 6.8. School principals' answers to the question: "How many audits was your school subject to in the last 12 months?" (average number of audits)



Source: MEMO.

The survey also reveals that these audits can have serious consequences for the school principals themselves. Half of those surveyed felt that contract extensions and firings of school principals in their city or district are most dependent on their ability to comply with the demands of oversight (Fig. 6.9).

Fig. 6.9. School principals' answers to the question: "What is the main factor in contract extensions or firings of school principals in your city/district?", 2015 (%)

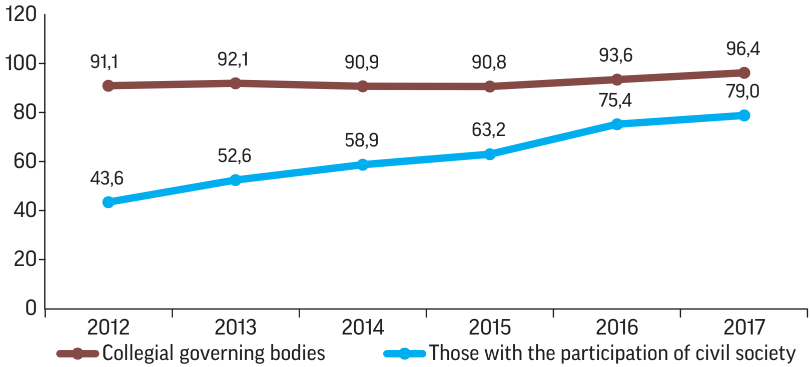


Source: MEMO.

Another lens through which we can look at transparency and accountability in the school system is the set of administrative and legal mechanisms that can allow civil society to participate in school governance.

Article 26 of the federal law "On education in the Russian Federation" established the requirement for collegiality in education governance. According to this law, a school's pedagogical council is required to be a collegial body of governance. A governing council with the participation of the parent community can also be a collegial governing body. According to education statistics from 2017, more than 96% of schools had collegial governing bodies, with 79% of those being open to members of civil society (Fig. 6.10). This figure increased significantly from 2012.

Fig. 6.10. Share of schools with collegial governing bodies (%)



Source: Rosstat, Ministry of Education and Science.

The ways in which civil society participates in these collegial bodies can differ. The most effective model of such participation is the governing council or steering committee.

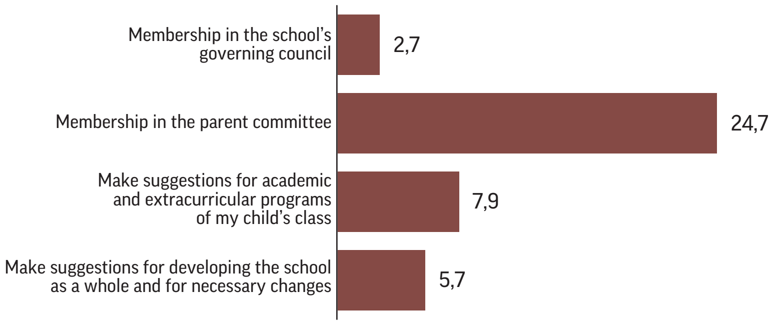
A federal pilot program for the governing council model was conducted between 2004 and 2006. In the period of the KPMO education modernization project, this model became widespread in 1/3 of Russian regions. National and regional contests for school councils are held, as are training programs for representatives of civil society. Information portals and magazines have been created to facilitate this work. A major contribution to supporting the spread of programs for civic participation in school governance was made by the FCPRO initiative of 2011–2015. The share of schools with governing councils was 45.9% in 2017.

Nevertheless, real civic participation in the life of schools remains limited mainly to issues external to academics, such as youth development and material support for the education process. Only very few regions have delegated wide-ranging authority to the governing councils.

This is partially due to the relatively low level of school autonomy that continues to prevail despite regulatory declarations. On many important issues, governing councils are forced to enter into dialogue with government overseers rather than the school administration. Government oversight authorities often ignore the principle of school autonomy by applying their own rules and norms, which don't always correspond to the services that schools are required to provide.

One in four parents surveyed in the 2016 MEMO study participated in a parent committee, while only 2.7% sat on school governing councils (Fig. 6.11). The share of parents who take initiative in

Fig. 6.11. Parents' answers to the question: "Do you participate in your child's schooling, and if so, how?", 2016 (%)

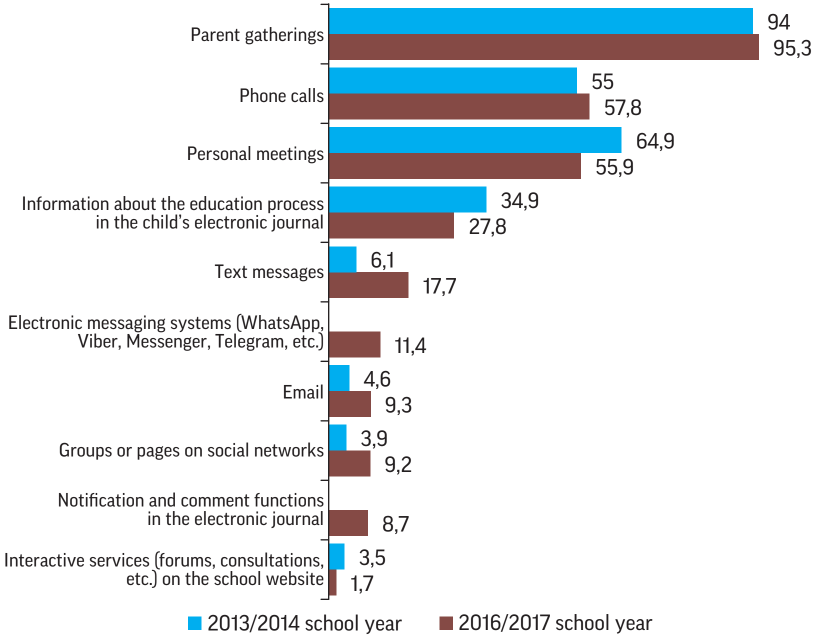


Source: MEMO.

the form of submitting suggestions on school development or student life is also very low, 5.7 and 7.9% respectively.

More than half of parents continue to make use of traditional avenues of communication with the school such as phone calls and personal meetings. Less than 10% of parents make use of social media, forums, and other interactive services (Fig. 6.12).

Fig. 6.12. Parents' answers to the question: "What avenues of communication do you use to interact with administrators and teachers at your school?"



Source: MEMO.

The majority of parents are satisfied with the conditions and processes involved in their child's education, while one in eight indicate some level of dissatisfaction.

Findings

The primary obstacles still standing in the way of implementing the OSOKO system are: the task of developing fine-grained assessments at the school and class level; training experts in the field of education assessment (testing and analysis); developing skills among teachers and administrators for applying assessment results; finding a balance between oversight and support by creating channels for feedback based on analysis of the data.

The new era of education also poses challenges to the OSOKO system, such as the need to create tools and protocols for assessing 21st-century skills and new forms of literacy. Early attempts to do so within the framework of the NIKO project need to be improved significantly, strengthening the data-based groundwork and broadening the set of use cases.

The task of modernizing the EGE test is also important, especially making it more consistent and comparable from year to year.

The market for education quality assessment is growing, and there is a demand for new players to emerge who are independent of the education establishment. At the same time, such assessment organizations should go through a process of certification, which needs to be developed.

Families should have the opportunity to initiate assessments of education quality by independent experts; this right was established in article 95.1 of the federal law "On education in the Russian Federation."

A more and more pressing problem is the lack of assessments that allow for tracing individual trajectories of student progress, which is critically important for personalizing education and helping students who lag behind. Another issue is assessing the extracurricular accomplishments of students. There should be a way to register these activities and create an individual portfolio that can be used in the college admissions process.

Solving this multifaceted challenge can be aided by digitizing the assessment system and creating information platforms that integrate assessment data from various providers. Such a system could bridge the deficit of socioeconomic data about students, and provide for the collection of such data. This information is important for accurately assessing student outcomes and comparing the work of different education institutions.

The system of oversight for education institutions and their governing bodies also demands improvement. The highly formal and non-specific nature of reporting should be replaced with a system of open information about the quality of the education process and the conditions in which it is carried out. This data should be presented in a unified, machine-readable format. Under current conditions, it is impossible for either administrators or teachers to make good use of the education assessment data. Nor can the consumers of education services, or independent experts, analysts, and civic organizations take advantage of these datasets. It is especially important to open up access to the EGE, OGE, and NIKO datasets so that analysts can learn about the current state of the education system.

We have outlined the increasingly demanding attitude of citizens vis-à-vis education outcomes and conditions. Parents are motivated to make use of their rights, which are established by law, to participate in school governance. In this situation, institutions of joint government and civic management, independent assessment, and civic oversight can evolve from being merely formal structures to being a constructive alternative. This can reduce the risk of potential conflicts between different stakeholders in the education system, which may be detrimental to both sides and lead to disputes being taken into the courts.

Chapter 7

Policies for Supporting Talented and Highly Motivated Students

Talent plays a key role in a country's human capital. The capacity for identifying gifted and highly motivated students at an early stage and effectively developing their abilities and interests is one of the most important traits of an effective national education system today.

Russia inherited successful Soviet mechanisms for identifying and supporting such children and young people in the arts, sports, mathematics, and sciences. Talent development has been a primary focus of Russian education policy throughout the post-Soviet era.

In this chapter, we look at the evolution of these policies and the ways in which the current system of working with talented young people functions. We also discuss its limitations and future challenges.

7.1. Policy evolution

The evolution of government policy for identifying and supporting talented students in the 21st century can be broken down into several stages. From 1999 to 2010 the targeted federal program called

"Russia's Children" was in place, which included the "Gifted Children" program. It was involved in supporting a variety of contests as well as the activities of centers for working with gifted children. Consultation was provided for parents and teachers working with gifted children. Information databases were created and technologies for identifying, developing, and providing targeted aid to gifted children were developed. This included outreach to children living in rural areas and remote territories.

This program played a valuable role in supporting gifted children and teachers in various parts of the country, though it was insufficiently systematic and somewhat poorly directed.

The "Government Support for Talented Youth" program of 2006 became one of the most large-scale vectors of the national priority project "Education" (PNPO). This project differed from previous programs in that it emphasized personal material support for talented children and youth by awarding prizes to the winners of national and regional academic contests.

The national education initiative "Our New School" was launched in 2010 and continued the work of PNPO while also introducing new measures for talent development. "Our New School" emphasized the importance of mixed and distance-learning approaches and summer schools. It also asserted the need for creating a per-student funding model that responded to the needs of different school students. It created mechanisms for taking into account individual accomplishments in the college admission process as well as incentive bonuses for teachers who helped their students achieve excellence. This initiative was the first to highlight the need for opening the system for supporting talented students not only to those who show exceptional ability, but also to a wider population of highly motivated students.

In 2012, a document outlining the conception for a national system for developing young talent was approved, along with initiatives for implementation. The conception broadened the spectrum of vectors, target groups, and instruments of support. It also sought to fundamentally change the organizational structure of the national policy for working with talented youth. A national coordinating council for supporting talented Russian youth was assembled, and channels for cooperation between the public and private sectors were created. This conception led to regulatory changes. In the federal law of 29 December 2012 No. 273-FZ "On education in the Russian Federation," article 77 "Organizing the education process for persons with exceptional abilities" created a regulatory environment for academic competitions. It established monetary incentives as well as the potential for creating specialized offices and unique educational organizations to support talented youth. It must be said, however, that the law also dismantled a category of schools that provided advanced programs of study. In its stead a system for financing gifted programs of different levels and categories was established, but failed to gain wide acceptance.

The mechanism by which the "Our New School" project as well as the conception for a national system for developing young talent were implemented was the targeted federal program for education development. Between 2011 and 2015, it established centers of support for talented youth at universities, as well as creating online schools at national research universities. Such schools and centers continue to be established. The program also created a unified federal database of winners and medalists of national education competitions, international contests, etc. The program also involved the development and implementation of a funding allotment for supporting talented children and youth. Between 2016 and 2018, priority was given to supporting competitions related to technological innovation and to organizing summer schools under the auspices of vocational and higher-education institutions.

A new approach to working with talented youth was attempted in the national technology initiative (NTI), which launched in 2015. It included a specialized program called "Talents," and launched a number of innovative programs, including the NTI Olympiad and a system of clubs that help to identify young people with scientific talent and support their development within the NTI ecosystem.

Latest phase of government policy related to supporting talented young people is the launch of the 2016 priority project "Accessible Extracurricular Education." This initiative aims to create a center for working with talented students in each region, modeled on the "Sirius" education center. It also seeks to create a system of academic competitions, including team-based ones. These are designed to stimulate skills related to carrying out projects in a team context. The programs are also linked to a system of identifying highly capable students and supporting their academic development. Another fundamental initiative is aimed at uncovering each student's talents, whatever their abilities and needs may be.

In 2018, an initiative spearheaded by the Agency for Strategic Initiatives (ASI) unveiled a new vector of working with talented youth called "Mentorship." This is a program for recruiting professionals in various aspects of education, where they can assist in professional and social adaptation and help students think about their career paths.

The diversity of conceptions and projects for working with talented youth speaks to the high level of priority given to this policy area today. At the same time, it reveals a lack of consensus and continuity among the different initiatives. There is a sense that the different projects lack serious forethought, and many of them have not been brought to full fruition.

The main vectors of policy evolution in this area are clustered around the movement from eclectic projects to the creation of a unified system of working with talented youth. We must transition from focusing on children with evident signs of giftedness to including a wider range of students who may have the potential for talent. The role of extracurricular programs must also be brought to the forefront.

7.2. Talent and motivation: two paths to high achievement

The national education initiative “Our New School” broadened the scope of work from only talented students to those who are highly motivated. However, a precise distinction between the two groups was not established, and no distinction was made between the methods for working with the two groups. All the methodologies outlined in the program documents were directed towards both groups, whereas it is important to create different programs for working with each of them.

In order to accomplish this, a mechanism must be established to distinguish between talented and highly motivated children and young people.

Talented or gifted children and young people are those who show exceptional ability in some field: science, sports, arts, etc. These are rare cases that require individual support and special conditions for development. The key challenges in dealing with this category of student are identifying talented individuals and providing for individualized programs of study, given that each of them is totally unique.

Motivated students are those who are willing to spend their time and resources on gaining additional knowledge. They may have a variety of motives: curiosity, a consistent interest in some field of knowledge, the desire to better themselves, etc. The outcome of a high level of motivation is an elevated work ethic in the chosen field, which eventually leads to skill development and high achievement in that field.

A high level of motivation is more common than talent, and it must be supported and encouraged.

Based on these definitions, we will analyze the mechanisms for working with each category.

Working with talented (gifted) students

The first challenge in working with talented students is to identify them as early as possible. It is inadmissible to adhere to the folk wisdom that talent will always find a way, and that self-taught geniuses will emerge in all areas of the country. Systematic and large-scale work must be done to identify gifted students and help them develop.

The main mechanism for identifying talented students in the Russian education system are the various types of academic contests: subject-based olympiads, athletic competitions, creative contests, festivals, and exhibitions. Recently, meta-subject competitions have been gaining popularity, as have applied scientific conferences for children and youth.

Traditionally, schools are focused on subject-based knowledge, but recently they have been shifting towards meta-subject areas. Extracurricular programs play a key role in supporting talent in the arts, sports, and applied skills. These programs deserve special attention within the framework of this book.

Students being identified via academic competitions as being gifted in certain subject areas is a standard process in Russian education. The first academic olympiads were held in the 1930s. Today, academic olympiads in various subject areas are administered by the Ministry of Education, as well as the Russian Council for School Olympiads (RSOSh).

The olympiad system includes both single-subject and multisubject competitions. The most famous multisubject competition in Russia is the National School Olympiad (VSOSh), which is conducted in four phases: school, municipal, regional, and national.

The VSOSh is administered in 18 subject areas and 6 languages: mathematics, Russian, foreign languages (English, German, French, Spanish, Chinese, Italian), computer science, physics, chemistry, biology, ecology, geography, astronomy, literature, history, social studies, economics, law, arts (global artistic culture), physical education, technology, and safety. Students who medal in the VSOSh are eligible to participate in international competitions.

In 2018, 2284 diplomas were awarded to participants in the national olympiad, which is about 1.55 diplomas per 100,000 people.

Moscow leads the way in terms of national olympiad winners. However, when calculated per 100,000 residents, the Republic of Mordovia comes close to catching up, behind by only 0.15 (Table 7.1). Only eight Russian regions are completely devoid of VSOSh winners (in 2017 there were six). On one hand, this speaks to the effective-

Table 7.1. Number of national olympiad diplomas awarded to students by region (top 20) (per 100,000 in population)

Rank	Region	2015	2016	2017	2018
1 (=)	Moscow	4,78	5,67	6,60	7,24
2 (=)	Mordovia, Republic of	4,20	5,57	5,94	6,09
3 (=)	Udmurt Republic	3,16	3,49	4,61	5,95
4 (+1)	Tatarstan, Republic of	2,83	3,64	3,60	3,57
5 (+10)	Magadan Oblast	2,03	2,05	1,37	3,47
6 (−2)	St. Petersburg	4,22	3,90	3,77	3,40
7 (−1)	Kirov Oblast	3,37	3,78	3,02	3,04
8 (+5)	Vologda Oblast	2,27	2,10	1,69	2,12
9 (−2)	Chelyabinsk Oblast	1,92	2,14	2,06	1,95
10 (−2)	Chuvash Republic	3,47	3,40	2,02	1,71
11 (=)	Yaroslav Oblast	1,65	1,81	1,89	1,66
12 (+2)	Lipetsk Oblast	1,04	1,73	1,64	1,65
13 (−3)	Novosibirsk Oblast	1,89	1,99	1,94	1,54
14 (+22)	Kaliningrad Oblast	1,24	0,51	0,71	1,51
15 (+6)	Arkhangelsk Oblast	1,32	1,15	1,03	1,39
16 (+4)	Ulyanovsk Oblast	1,27	1,19	1,04	1,36
17 (+26)	Kurgan Oblast	1,03	0,81	0,59	1,30
18 (+11)	Khabarovsk Krai	0,45	0,45	0,90	1,28
19 (+15)	Novgorod Oblast	1,62	1,79	0,82	1,15
20 (+15)	Penza Oblast	0,59	0,96	0,75	1,13

Source: <https://olimpiada.ru/article/822>.

ness of this large-scale system of identifying talented students. On the other hand, it presents a major challenge to regions that find themselves on the low end of the rankings.

In addition to the VSOSh, other academic competitions for school students are conducted under the auspices of the Russian Council for School Olympiads. The Ministry of Education and Science annually updates the list of olympiads and other intellectual or creative competitions and events directed towards developing intellectual and creative capabilities, as well as promoting scientific knowledge and creative achievement.

88 academic competitions were held in the 2016/2017 school year under the auspices of the RSOSh, involving 2.03 million students. Of those, 177,834 became medalists[1]. In the 2017/2018 school year, the official Ministry of Education and Science list contained 97 academic competitions (Fig. 7.1), and in 2018/2019 the number dropped to 76.

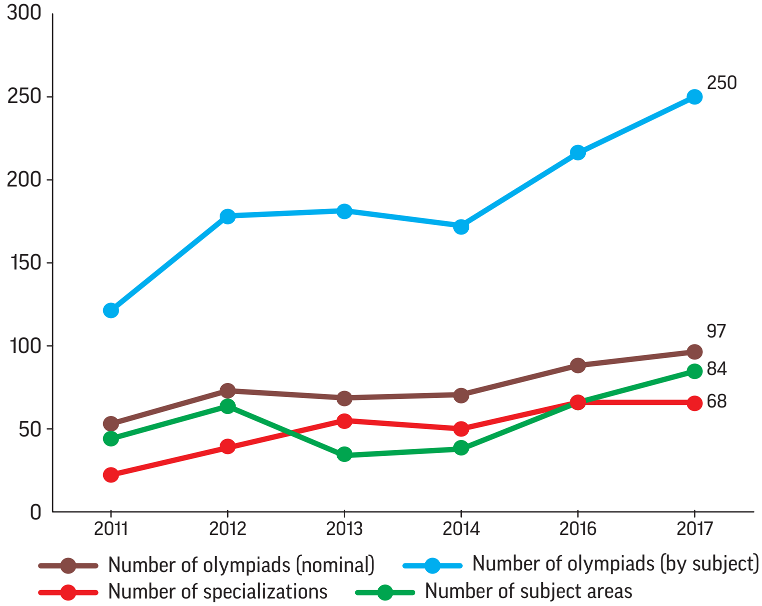
In the past few years, the total number of competitions has increased and the structure has changed somewhat. The share of competitions related to technology, social science, and foreign language has increased.

Leading Russian institutions have an interest in identifying gifted young people, and organize their own competitions to accomplish this. Well-known academic competitions in Russia include the "Lomonosov" olympiad run by Moscow State University, the "Higher Tests" conducted by HSE, MIPT's "Phystech," and "Step into the Future" at the Bauman Moscow State Technical University. Some of the university-based competitions have been ongoing for more than 10 years, and their popularity has grown significantly over that time.

Extracurricular programs in the field of technology, which have garnered greater attention in recent years, have led to new competitions that help to identify and support talent in this area: "Ladder to

[1] See:<http://static.government.ru/media/files/i6yH0TiCpoJ6dcd0zebKp>.

Fig. 7.1. Number of olympiads in the RSOSh list and their subject areas



Source: http://www.rsr-olymp.ru/.

the Future," Junior Skills, NTI's "Robofest/Profest," the "Quantoriade," and others. In addition to extracurricular programs, schools have also begun to participate in these events.

Gifted students who receive high marks in national contests are selected to participate in international ones. Students can apply themselves or be nominated by teachers, schools, etc.

Russian students have gone far in international contests in chemistry, physics, mathematics, programming, and others. In the 2017 season, 38 members of the Russian team won 38 medals, including 18 gold, 14 silver, and six bronze (table 7.2). Each member of the team medaled at the international level.

The Russian squad has been moving up in the rankings of the IPhO international physics olympiad. All five of the medals won by

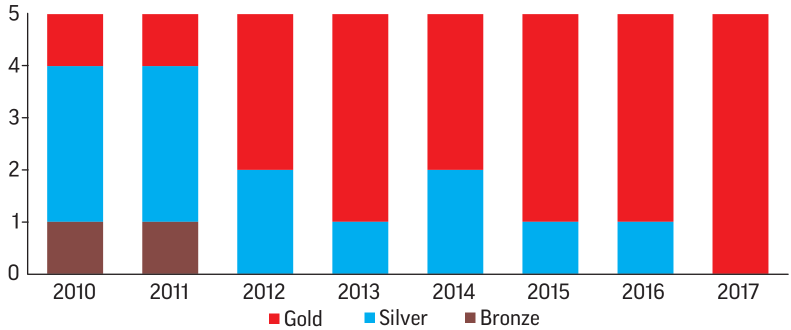
Table 7.2. Number of medals earned by Russian teams in international competitions in school subjects

Subject	2012			2013			2014			2015			2016			2017		
	Gold	Silver	Bronze	Gold	Silver	Bronze	Gold	Silver	Bronze	Gold	Silver	Bronze	Gold	Silver	Bronze	Gold	Silver	Bronze
Mathematics	4	2	–	4	2	–	3	3	–	–	6	–	4	1	1	1	3	2
Chemistry	3	1	–	2	2	–	3	1	–	2	2	–	3	1	–	2	2	–
Physics	3	2	–	4	1	–	3	2	–	4	1	–	4	1	–	5	–	–
Biology	2	2		2	2	–	1	3	–	2	1	1	1	2	1	2	1	1
Computer science	4	–	–	3	1	–	2	2	–	3	1	–	3	1	–	1	3	–
Geography	–	1	1	–	–	1	–	2	2	1	1	1	1	2	1	–	3	1
Astronomy	2	2	1	3	1	1	2	2	1	1	1	4	1	3	1	1	2	2
Science (juniors)	5	1	–	3	3	–	5	1	–	4	2	–	2	4	–	6	–	–
Total	23	11	2	21	12	2	19	16	3	17	15	6	19	15	4	18	14	6
Medal count	36			35			38			38			38			38		

Source: <http://vserosolymp.rudn.ru/>.

Russia in 2017 were gold. Fig. 7.2 illustrates how the Russian team has been moving towards such a result over several years.

Fig. 7.2. Number of medals won by the Russian team in the IPhO international physics olympiad



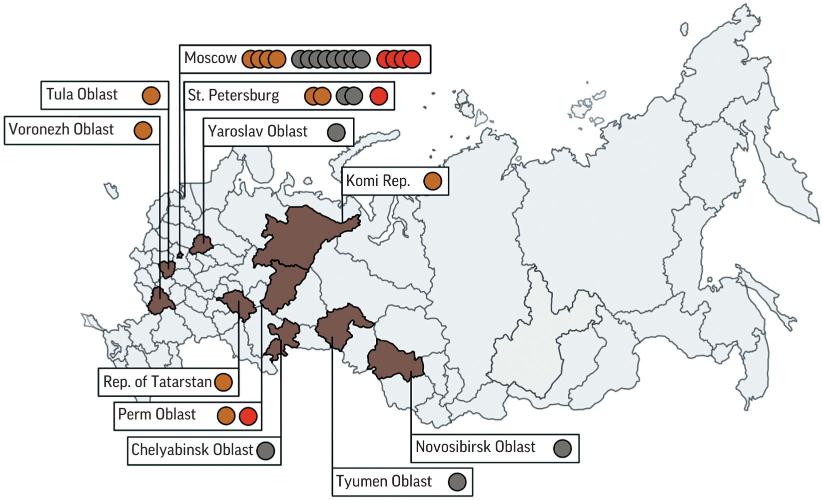
Sources: <http://4ipho.ru/, http://vserosolymp.rudn.ru/>.

Russian regions outside of Moscow and St. Petersburg have sent students who earn medals at international competitions, but the limited number of these leaves open the question of improving the system for working with gifted students in more remote regions of the Russian Federation.

The decreasing results of Russian school students participating in international contests in certain subjects, including mathematics, as well as the limited list of regions from which the participants hail, signal a need to better identify talent at a young age and design programs of study to support and develop it.

It is clear that the system for identifying talented young people exclusively through contests and olympiads has a number of limitations. Despite the fact that the contest system casts a wide net, bringing in a large number of school students, there is a risk of missing out on talented young people that for one reason or another do not participate in the contest system or find themselves participating in the wrong contest.

Fig. 7.3. Home regions of medalists at international summer olympiads in seven subjects (computer science, geography, biology, linguistics, mathematics, chemistry, physics), 2017



Source: Ministry of Education and Science.

Historically, volunteers were recruited to visit remote regions of the country and hand select gifted children in artistic and athletic fields. It's possible that these practices continue to this day. Unfortunately, such a system is impossible within the schooling context. Today, we have recourse to digital technologies and means of communication that allow for school students to display their achievements online. In these conditions, it is important to find the right methods and tools for using the internet to identify talented children and youth. One idea would be to create a single portal for talented students to create a portfolio of their work and achievements, including their rankings at olympiads and other events.

Targeted support for talented students within the frameworks of the projects and programs mentioned above is given in the form of monetary incentives (prizes, stipends, and grants). Financial support for talented students has played an important role since the PNPO. This mechanism was launched on the federal level by the presidential order of April 6, 2006 No. 325 “On measures of government support for talented youth” and by the government resolution of May 27, 2006 No. 311 “On prizes for supporting talented youth.” Each year winners of academic contests receive more than 5000 prizes for supportive talented youth between the ages of 14 and 25.

One September 1, 2015 the system of grants for talented youth was launched. In accordance with the presidential order of December 7, 2015 No. 607 “On measures of government support for persons exhibiting exceptional ability” 5000 grants for students enrolled in institutions of vocational training and higher education were created. Recipients get a stipend of 20,000 rubles per month throughout the period of enrollment. Winners and medalists at the National Olympiad and RSOSh receive presidential stipends of 60,000 and 30,000 rubles, respectively. However, this order expired in 2016. In 2017 there was a break in the funding for VSOSh winners, which came to the attention of the president. From 2019, winners of international academic competitions will receive up to 1 million rubles for a gold medal.

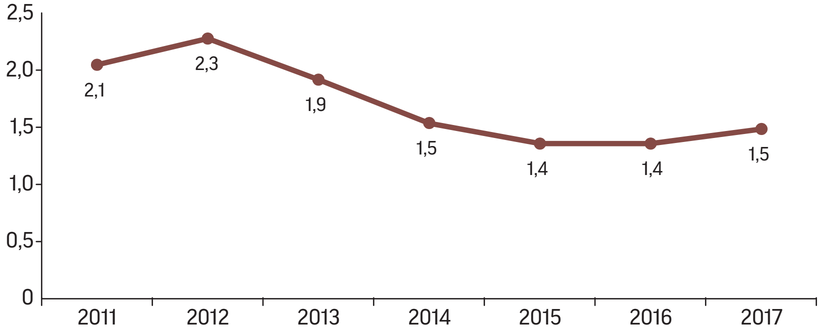
Stipend programs currently active in Russia include: presidential stipends, government stipends, and personal stipends named after notable figures in science and politics, the A.L. Shtiglits stipends. Many regions also offer governors’ stipends (Yaroslav Oblast, Khabarovsk Krai, Yakutia, and others.)

Various university programs to support prize-winning enrollees and matriculating students are also active, sometimes carrying out grant initiatives on behalf of philanthropic foundations.

An important factor in supporting talented youth is the potential for preferential admission to Russian universities. Winners and medalists at the upper level of VSOSh can be admitted to universities without having to take entrance exams if their chosen program corresponds to their olympiad subject; if their program does not match their olympiad track, the medal counts for 100 extra points on the corresponding EGE test. The quota of winners and medalists at the top level of the VSOSh was increased by 45%. Preferential treatment is also given to RSOSh winners, depending on competition level and the status of the winner. They may be able to enroll in any university with an additional 100 points on a specialized EGE test.

In recent years, the share of students being admitted using olympiad results was slowly diminishing until 2014, after which that figure began to grow by 1.5% (Fig. 7.4).

Fig. 7.4. Share of students admitted to scholarship spots at universities based on success at academic competitions (%)



Source: Monitoring of college admissions quality.

Individual achievement in any of the academic or creative competitions on the officially approved list qualifies students for extra points on the EGE. The points coming from this program are known as contest points. Each university determines its own policies on how many contest points to award. In 2017, no more than 10 such points could be awarded. Additional points can also be earned by writing a thesis, having a high GPA, succeeding in sports, and winning academic competitions or creative contests.

Throughout its life, the system for awarding such special privileges has been debated in terms of the mechanisms and principles used. On one hand, there are objections as to the objectivity of contest results. Statistically, the number of winners and medalists of Russian contests in the post-Soviet era has multiplied compared to the Soviet system. In 2014, there were more than 20 times as many; in 2015, the difference was a factor of 14, a factor of 12 in 2016, and a factor of 13 in 2017. This raises questions about possible violations of the rules for conducting these competitions and assessing student work. Measures for tightening controls are being discussed. Additionally, the limitations of both the EGE system and the multisubject olympiad format, in terms of their ability to assess and identify talent, have also been noted. There is now a need to design and develop a system for tracking skills, both universal as well as specialized. Skills should be given greater weight in the admissions process for higher education and vocational institutions.

An alternative approach to providing preferential conditions for talented youth would be a multifaceted system of continued supervision from the moment they are identified to the point where they can start their professional life. Such an approach has long been used effectively in cultural and athletic fields, such as when a musically gifted student receives pre-professional training at a music school under the auspices of a musical academy or conservatory. As the student gets older, he or she moves from one level of education to another, taking into account the individual's specific talents.

In academic fields, such continuous support for talented students is nonexistent. A mathematically gifted young person finds themselves in the same classroom with the rest of the population upon entering university. This can lead to a loss of focus and motivation on the part of the more gifted students. To solve this problem, we must create a system for individually supporting talented children and young people at all levels of their journey towards the chosen profession.

Given the small amount of talented people and the unique nature of the talents, the key mechanism for developing them is individual support, tutoring, and mentorship. In Russia, such continuous support for gifted students is widely used in extracurricular fields such as sports, music, dance, visual art, and other arts. Currently there are no such programs at schools for continuous support of gifted mathematicians and biologists.

From this point of view, the previously mentioned ASI "Mentor" project appears promising. It includes "mentorship in education and extracurricular clubs." However, this program is currently geared towards extracurricular education. Expanding it to include academic subjects would demand additional development work.

ASI has launched a national competition called "Best Mentorship Practices." The competition involves five categories, one of which is "Mentorship in education and extracurricular clubs." This category encompasses practices for supporting the trajectories of personal and academic growth of children and teens, fostering motivation and creative activity, and encouraging them to find unique solutions. Mentorship is a way to inspire new endeavors and participate in the journey, whether at the planning stage or by filling in gaps of skills and knowledge within the team.

A key role in academic mentorship for school students could be played by tutors. Tutors are able to create the conditions for designing and implementing individual academic trajectories. However, continuous support for talented students requires specialized training, and there are few such experts working at schools today.

A more widespread practice for supporting talented students in Russian schools is creating special "greenhouse" conditions for learning and practice. Such formats emerged in the Soviet era, when specialized boarding schools were created.

The post-Soviet continuation of these schools is the system of specialized educational/scientific centers (SUNC) operated by Moscow State University, Ural Federal University, Novosibirsk State University, and Bauman State Technical University. Gaining admission to these centers involves a highly selective process.

Specialized schools for talented youth in extracurricular fields have also existed since the Soviet era. These include schools attached to conservatories and dance academies, schools run by the Olympics program, and others. Russian education today is undergoing a process of increasing integration between academic and extracurricular education for children and young people. This includes a transfer of knowledge about working with gifted individuals. For example, a type of school is emerging in which the basic academic program is offered, but which positions itself as an "olympiad reserve" school, offering additional training. For these schools, their students' success in academic competitions is a fundamental priority. They create a flexible system of preparation in all subject areas that are included in the academic olympiads. Throughout the school year students work in mixed-age groups, then transition to individual study as the date of the competition approaches.

Moscow State University's A.N. Komarov specialized educational/scientific center (boarding school) carries out high-school academic programs with advanced courses in mathematics, physics, chemistry, biology, and computer science. The school's academic structure is made up of departments for specialized disciplines as well as departments for basic academic subjects. The learning process is modeled on the university system. The Komarov School admits school students from around the country. It is one of the leading Russian schools in terms of student achievement level, with many students participating in scientific conferences and medaling in academic olympiads in mathematics, computer science, physics, astronomy, chemistry, and biology as well as other competitions.

Another vector for the school system to work with talented students involves the creation of extracurricular education centers for working with school students that have shown advanced abilities in the standard academic subject areas.

The Sirius education center in the city of Sochi, which was established by a presidential initiative in 2014, is an example of this.

The center offers short educational programs for students between the ages of 10 and 17 who have shown high achievement in science, mathematics, sports, or the arts.

The teaching staff is made up of top teachers from specialized schools and highly-regarded Russian artists.

The Sirius education center was created in Sochi using Olympics infrastructure. The project is managed by the Board of Trustees of the “Talent and Success” foundation.

The center’s mission is to identify and support the development of gifted students from across Russia and assist them in building relationships with potential employers. The center is active year-round. Each month 800 students between the ages of 10 and 17 arrive at Sirius from all regions of Russia. They work with a team of over 100 teachers and coaches, who are also engaging in their own professional development at the center. Admission to Sirius is highly selective.

The Russian president has mandated the creation of regional centers for working with talented youth modeled on the organizational and methodological approaches used at Sirius. They will also enter into a partnership with Sirius. This will allow a greater number of talented young people to participate in this model of education.

Working with highly motivated students

The primary task in working with highly motivated students is to develop and support consistent interest in an endeavor, field of inquiry, or academic subject related to the school curriculum.

In the document outlining the conception for developing mathematical education in the Russian Federation, approved by the government order of December 24, 2013 No. 2506-r, it is stated that motivation is one of the key issues in developing mathematical education. Problems of low motivation are universal, negatively impacting the development of schooling in all subjects.

The early stages of academic competitions, which involve large numbers of students, are a strong motivating factor for bringing students into a deeper and broader study of school subjects.

In the 2016/2017 school year, about 6.1 million 4–11th graders participated in the school-based stage of the National Olympiad. 2231 of them were awarded first-place or other certificates. In 2016, the average participant competed in three subjects. This number has remained steady throughout the past decade.

The Russian National Tournament of Young Physicists includes individual and team-based competitions for students from standard and specialized schools, testing their abilities to solve complex research-based and experimental challenges. They must convincingly present their results and defend them in scientific discussions and physics "battles." The tournament is organized by the Ural Federal University, Moscow State University, and Novosibirsk State University.

In addition to contests run by public institutions, there are also those initiated by Russian state-owned corporations such as Rosatom and Rusnano, by nonprofit and private organizations, by scientific associations (Young Physicists Tournament) and by foundations (The Vladimir Potanin Foundation, the Sistema Foundation, and others).

There are also a variety of international academic competitions for school students not mentioned previously. Russian students participate in international competitions such as the Tournament of Towns mathematics competition. In 2017, almost 160 cities representing North America, Europe, Asia, in South America took part. 88 cities represented Russia, from Moscow and St. Petersburg to small towns in far-flung territories.

The Tournament of Towns is an international mathematics olympiad for 8–11th graders. The tournament is uniquely oriented towards in-depth work and complex problems, helping develop the qualities needed to carry out successful research.

The many events outside of the contest format are also important for increasing motivation. These include science fairs, scientific/applied conferences, socially oriented forums, etc.

Another important motivational format is that of subject-based competitions such as "Kangaroo" (mathematics), "Russian Bear Cub" (language arts), "CIT" (computers and information technology) and "British Bulldog" (English language). Such contests are open to all comers without any selection process. Participants must pay a fee, but it is minimal (70 or 80 rubles). The materials used in these competitions are worth looking at. They are designed in such a way as to make the process interesting for participants while also requiring the demonstration of knowledge, thinking skills, logic, and even creative thought.

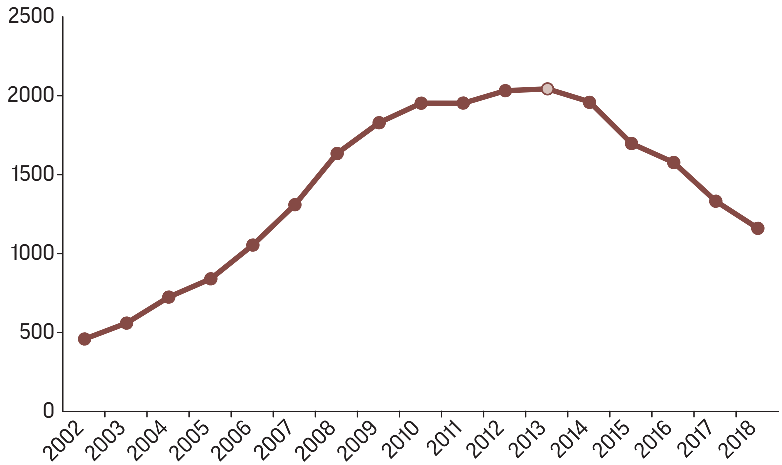
"Kangaroo" is a large-scale international mathematics competition, which uses the slogan "Mathematics for all." The main goal of the competition is to attract the greatest possible number of young people to engage with mathematical challenges and to show each student that thinking about math can be lively, interesting, and even fun!

Widespread interest in these contests is shown in the statistics. However, judging by the "Kangaroo" numbers (Fig. 7.5), their popularity has already passed its peak. Students at higher grade levels are most likely to lose interest. In 2018, three times fewer 10th graders participated in "Kangaroo" than at the peak in 2013. For comparison, the number of second graders diminished only by one fourth, while the number of sixth graders was halved.

Formats that attempt to make science engaging are valuable for increasing school students' interest in subjects and meta-subject endeavors, including research and invention. Today we see a deficit in the number of books in the category of "fun and engaging math and science." It is important to develop informative texts and study materials in this category using digital formats, with special emphasis on interactivity.

Interacting with peers who are also engaged in a given subject, whether in person or online, is among the most powerful motivating forces for continuing to develop and to reach new frontiers of knowledge and skill.

Fig. 7.5. Number of participants in the "Kangaroo" competition (thousands)



Source: <http://mathkang.ru/>.

In this regard, the Russian school system has long included formats such as summer schools, in which summer camp life is combined with academics presented in an engaging and deep way. Such institutions continue to function and develop today, including:

- Traveling schools organized by Moscow State University's Department of Mechanics and Mathematics, which offers programs for elementary school and even preschool age six-year-old kids;
- "Foxford" education camps, where classes are led by leading instructors from the Moscow Institute of Physics and Technology, Moscow State University, and HSE; participants "strengthen knowledge and skills, fill in gaps, and learn to love what they study;" and
- A multisubject summer school run by the Moscow Center for Continuous Mathematical Education, where classes are taught by students and PhD candidates from leading universities.

Unfortunately, far from all school students who express interest in broadening and deepening their knowledge in a certain subject have access to such programs. Residents of far-flung territories, small towns, and rural areas have no such opportunities. There is an urgent need to overcome this inequality. In part, this can be done by creating new internet portals for this purpose, as well as by supporting existing ones. Special attention should be paid to identifying, studying, and supporting popular internet platforms created by teachers or students on their own initiative.

For examples of this vector of development we can look to mixed-format or distance-learning schools that offer students the opportunity to engage in in-depth study of a subject and to interact with like-minded young people.

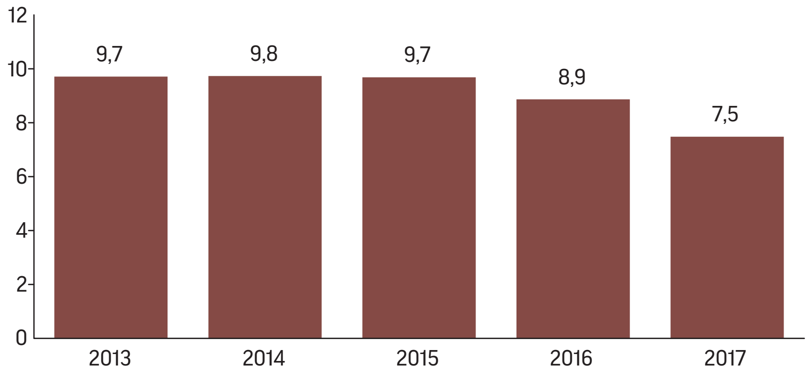
Another potent tool for motivating students to learn and to develop skills is social acknowledgment of their achievements and efforts. They need the opportunity to demonstrate their achievements to a wide audience. The internet is a good platform for this, but it is difficult to find communities where teenagers can find people who appreciate their work. This is another area in which the primary challenge is to develop the right kinds of internet resources. Aside from wanting to show their work to the public, teenagers also need official recognition. This may include some record of their achievements at competitions, such as transcripts within the college admissions process. Here we are talking about not only high-achieving students but also about all those who are motivated to learn and develop. These students need some form of recognition for the hard work that they have put in. The majority of motivated young people need some sort of portfolio of their participation in extracurricular educational programs, contests, and events.

Student motivation will not be long-lasting if students who are ready to spend time and energy on mastering a skill or subject are not supported with the right conditions for pursuing their interest.

Traditionally, a key role in supporting motivated students was played by specialized schools and programs of study.

The Russian school system provides fairly large-scale opportunities for motivated students to delve deeper into subjects, professions, or sciences. This is accomplished via the availability of in-depth programs of study for various subjects. In 2017, the total number of students participating in in-depth programs in at least one subject was 7.5% of the school student population. This figure has been decreasing in recent years (Fig. 7.6).

Fig. 7.6. Percentage of school students engaged in in-depth study of certain subjects (%)

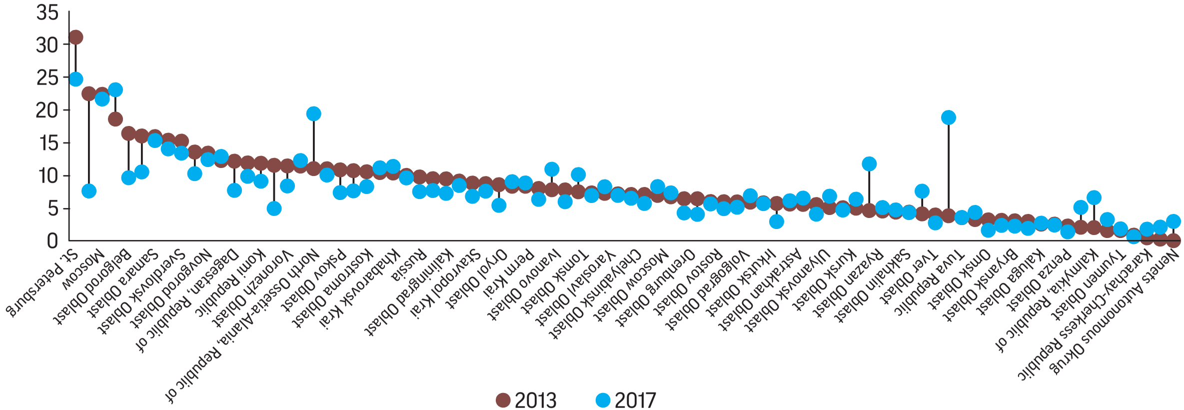


Sources: 2013–2016 — MSO; 2017 — Ministry of Education and Science.

Opportunities for school students who are motivated to study a given subject in-depth vary widely from region to region in Russia (Fig. 7.7).

Unfortunately, the amendments to the federal law "On education in the Russian Federation" and the implementation of per-student funding models led to a number of Russian regions having to reduce their offerings of unique educational programs, programs for the in-depth study of disciplines, and specialized education programs. The

Fig. 7.7. Share of Russian school students enrolled in advanced programs in one or more subjects, by region (%)

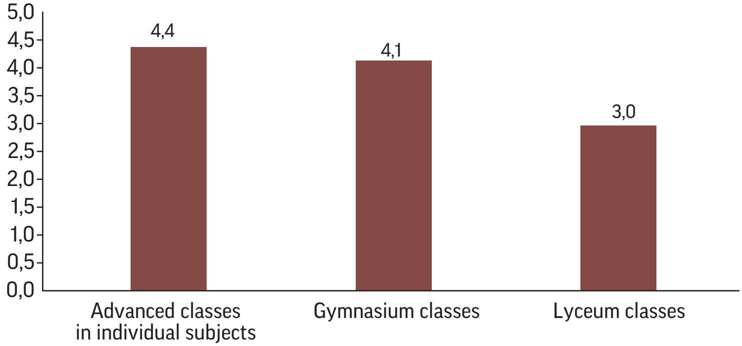


Source: Ministry of Education and Science.

difference between lyceums, gymnasiums, and standard schools have begun to erode. This is justified in cases where gymnasiums merely act as instruments of social segregation, but not in cases where they provide opportunity for advanced learning for highly motivated and gifted children.

Standard schools can also provide separate classes for highly motivated students. In some regions (Novosibirsk Oblast, Krasnoyarsk Krai), special projects for creating advanced classes in math, physics, and chemistry have been launched. In the 2017/2018 school year, 5.5% of school students were enrolled in advanced programs in various subjects (in at least one subject). Specialized classes comprised more than 11.5% of the total number of classes (Fig. 7.8).

Fig. 7.8. Percentage of specialized classes for gifted and highly motivated school students



Sources: Rosstat, Ministry of Education and Science.

It is important to note that simply labeling something as an advanced class or a special-status school does not guarantee actual education quality. Studies undertaken under the auspices of the RIA News "Social Navigator," in collaboration with the not-for-profit partnership "Interregional Association for Education Monitoring and Statistics" (MAMSO) in 2013 showed that not all special-status schools can actually claim to offer an elite level of education. The average EGE score in math at 30% of specialized physics/mathematics schools is below 60 points, and 5% of such schools have average scores of under 50. One can also find schools that specialize in the humanities that have average EGE scores in Russian language that are below 50 points.

Specialized schools traditionally have some sort of partnership with universities. A number of regions have created pathways for highly motivated students to engage in distance learning with university instructors (Moscow State University, the Moscow Engineering Physics Institute, the Siberian Federal University, and others). Some students are also afforded the opportunity to participate in private projects such as "Rosatom School" and the "Rusnano School League, etc." Such opportunities are especially important for those who live in remote territories and rural areas.

Universities work with such students using distance learning and mixed formats.

Some of the most prominent schools offering distance learning include: Moscow State University's multisubject distance-learning school, MEPHI's school for physics and technology, the distance-learning schools at the specialized educational/scientific centers run by MSU and NGU, the physics/mathematics school at Tomsk State University, and the remote scientific school at the Siberian Federal University (ZENSh). Mixed-format schools for gifted students that include distance learning have been created at leading Russian universities in many regions (republics of Karelia, Mordovia, Mari-El; the Chuvash Republic; Arkhangelsk, Belgorod, Ivanov, and Orlov regions; Perm, Krasnodar, and Stavropol Krais; the Khanty-Mansi Autonomous Okrug — Yugra; and others).

With the development of information technology, universities today have increased capabilities for conducting such programs. However, new learning formats and educational technologies are being included in these programs at a slow rate. The interactive potential of digital technologies is rarely taken advantage of.

An important innovation has been the creation of specialized 10th and 11th grade programs at universities. These programs were launched after the passage of the new version of the law "On education in the Russian Federation." A number of Russian regions use their per-student allotment funds to finance these programs. Moscow was the pioneer of this format; today, lyceums under the auspices of HSE and MEPHI enroll more than 2000 upperclassmen.

Another interesting case is a joint project of the Department of Education and the Russian Academy of Sciences (RAN) for creating standard schools under the auspices of the RAN (in accordance with the presidential order of 28 December 2018 No. PR-2543). The RAN schools are intended to be opened on the basis of municipal schools that have demonstrated high student outcomes. These schools will be supported by the resources of RAN research institutes, large universities, and scientific centers. These schools will have access to a rich set of potential instructors and will have deep experience in organizing specialized programs of study. They will also be empowered to cooperate with other educational institutions.

The RAN schools will be administered using different models: schools organized by universities; schools as networked hubs; specialized schools; schools with advanced programs in specific subjects. The design of this project is not completely new, since it leans on the experience of Soviet schools created under the auspices of the Academy of Sciences. More recent endeavors are also informative for this project, such as resource centers, specialized schools, etc.

The pilot program phase of the project has selected 110 municipal schools from 32 Russian regions (Fig. 7.9). The emergence of this network should amount to a significant contribution to the Russian education system's ability to work with both highly motivated and gifted students.

The system of extracurricular education plays as great a role in motivating students as the school system itself. This includes the aforementioned summer schools, organized on the basis of summer

Fig. 7.9. Locations of schools under the auspices of the Russian Academy of Sciences

Source: <http://www.sbras.ru/files/news/docs/hohlov_shkoly_ran_26_02>.

camps, which act as supplemental extracurricular programs for students.

Another form of extracurricular education that is effective in motivating students is the "Minor Academy of Sciences" format, which has been adopted by many Russian regions. A Minor Academy of Sciences is an association which aims to attract young people to research and development activities, creativity, and innovation.

Another standout project aimed at motivating youth is a network of extracurricular centers, or "children's technoparks" known as "Kvantorium." These centers offer a project-based form of learning, which takes young students straight from theory into practice. The Kvantorium model specializes in cutting-edge fields of technological innovation. The centers partner with universities and companies involved in research, development, and manufacturing. They recruit mentors and seek out technical assignments from companies.

Kvantorium children's technoparks are zones equipped with cutting-edge technologies, designed to train the next generation of highly qualified engineers. Students are able to participate in development, testing, and implementing innovative technologies and ideas. The mission is to promote the development of technical skills among young people and fulfill the scientific/technological potential of Russian youth. Kvantorium centers implement new, effective education models that can be duplicated in all regions of the country.

According to ASI data from late 2018, 89 Kvantorium centers have been opened in 62 regions of Russia. In some regions, there are several such centers: Moscow, Khanty-Mansi Autonomous Okrug — Yurga, and the Tatarstan Republic each have three. Over 80,000 school students are enrolled in these programs, and more than 600,000 participate in events conducted by the Kvantorium network.

In addition to providing opportunities for motivated school students to enroll in programs where they can study their chosen subject at an advanced level, it is important to provide them with informational support that may help them and their families more effectively make use of their internal resources. This would involve the creation of guides and other electronic services that would allow interested families to choose the best possible education programs, competitions, mentors, or peer communities for their children. Such an effort would require not only information on the content of a given subject at the needed level of mastery, but also information about the cost of participation in special programs.

Examples of such services can be found in the navigation guides for extracurricular education that are currently being published. However, there is a major blind spot in the current publications: special attention should be paid to orienting students in the system of web-based education resources and communities.

If provided with the right conditions, motivated students can exhibit signs of exceptional ability. Therefore, programs for promoting and maintaining motivation should be supported. Conditions should be created to take advantage of the interests of highly motivated school students. This work must be directed towards developing the talents of a large cohort of young people who are ready to work hard and have the capacity for developing high-level skills.

Findings

Working with talented and highly motivated young people remains a key priority for national education policy. The current Russian system continues the work of projects established in the Soviet era for identifying and supporting gifted students and students interested in studying at an advanced level. There are also new approaches created through experimental programs in the last decade.

In order to work more effectively with these categories of promising students, it is important to build a more targeted system for supporting students who have exhibited exceptional ability in one or more fields. A wide spectrum of conditions must be created to support highly motivated students who are ready to spend their time and resources on acquiring new knowledge.

Among the mechanisms for finding and identifying talent, the traditional olympiad system, which is based on competition, has been supplemented with various contests that are open to a broader range of subjects and formats. Team-based events are becoming more prominent, as are meta-subject skills and forms of knowledge. The trend towards skills-based assessment should be supported by researching and developing new types of assessments.

The system for identifying talented young people via academic olympiads and other competitions should be supplemented with other procedures, including the use of digital technologies and internet portals.

Financial rewards for talented young people have become an important instrument of government policy at the federal and regional levels, with awards given to winners of olympiads and other competitions.

The legacy system of special privileges for university admission has been maintained and developed. This remains a topic of debate, but it is clear that the importance of developing 21st-century skills makes it necessary to pay more attention to student achievement outside of the framework of school curricula and EGE subjects. More and more urgent is the need to ensure the objectivity of grading procedures at the most meaningful academic contests, especially the VSOSh.

An alternative system for awarding preferential status to successful students could be a path towards continuous support for an individualized education trajectory for gifted students from grade school to university. In order to fully implement this model, a system must be created that allows for continuous support for talented students from personal mentors and tutors. The first steps towards creating such a system have already been taken.

The positive Soviet experience in terms of creating unique educational organizations for talented young people remains in place, and has continued to be improved upon in contemporary Russia. New, all-inclusive school programs that position themselves as "olympiad reserve schools" have appeared, and extracurricular programs have emerged along the same lines.

The system of extracurricular education, which has historically played a key role in working with talented young people, has produced new, promising vectors of development, such as the Sirius center in the city of Sochi. The methodologies developed at Sirius will allow for a more large-scale system for working with gifted students and highly qualified teachers.

The massive scaling of the olympiad movement, which now includes a large number of the nation's students, plays a major role in motivating young people. An important aspect of this is the set of events that aim to popularize academic competitions, including team-based formats and noncompetitive programs. Science fairs, scientific/applied conferences, and socially oriented forums have an important role to play.

The development of materials that attempt to engage young audiences in scientific endeavors, including interactive digital platforms and teaching materials, is another important step forward. The network of Kvantorium youth technoparks will be a key player in achieving this goal.

Leveraging internet-based methods for establishing communities of like-minded students in specific fields of sciences or humanities is important for working with highly motivated students today. Traditional formats of distance learning or mixed education may serve as prototypes for digital networks of this type.

Meanwhile, students remain interested in having in-person interactions with like-minded peers. Summer schools, which have seen success in certain regions, combine summer recreation with serious but interesting academic programs. Such programs are effective in bringing together students of common interest. New stakeholders have entered the system of working with highly motivated and talented young people: state-run corporations, private organizations, and foundations. These institutions have gotten involved in funding various contests that allow students to gain scholarships and enroll in specialized classes.

It is imperative to build upon these experiences in all Russian regions. Grants should be provided to organizations and research communities that aim to draw young people into innovation. Students should be supported in their path through educational institutions and entering the labor market.

Young people are motivated by the opportunity to demonstrate their effort and achievement. Official recognition of achievement also stimulates student motivation. Highly motivated young people need the opportunity to create a portfolio of their extracurricular endeavors and participation in competitions. This portfolio should be taken into account in the university admissions process.

When a student exhibits interest in a certain subject, the school system offers a wide spectrum of opportunities for pursuing this interest. A strong network of special schools with advanced programs of study and programs for in-depth learning is available. However, when a school claims to be specialized, this does not necessarily mean that the quality of education is high. Work must be done to improve the process of school assessment and train teachers to carry out these specialized programs.

In order to more effectively support highly motivated students, it is necessary to create a system of informational support that can help them and their families orient themselves among the various opportunities available to them. They must be able to choose from a number of programs, projects, and events in order to help their child spend their resources wisely.

It is important to create an effective system for identifying and supporting highly capable and talented young people in various endeavors. All of them should have a fair opportunity for self-realization and professional growth. The Russian president has highlighted this as a key priority of education policy in the near term.

In analyzing the limitations and deficits of the current system, we may point to the fact that the path towards expanding the field of working with talented young people by also including highly motivated students who don't demonstrate exceptional innate talent is a sound approach. This idea is embedded in the "Our New School" initiative, as well as the conception document for a national system of identifying and developing talented young people. However, the approach has not yet been backed by organizational and methodological infrastructure. Insufficient attention has been paid to supporting motivated students and identifying talent among those from families of low socioeconomic status and those living in rural areas or remote territories.

A system of targeted support for the educational ambitions of students from low-income families can be an effective tool for overcoming inequality. This would include scholarships for attending supplemental courses to help master the school curriculum, summer schools, and programs at leading youth education centers.

The majority of initiatives directed towards working with talented youth are limited to the period between fifth grade and graduation from university. There are practically no systems for early identification and support of talented children. There is an incongruity between programs at schools, extracurricular centers, and vocational institutions that support talented students and the demand coming from industry. Talented young people are not provided with support in the job search process after graduation. No special conditions are created for their social self-actualization.

Human resources remain a problem area in the system of working with talented and motivated young people. While there have been a number of interesting experiments, a countrywide model for effectively training educators for work with this category of students has not emerged.

There is also a deficit of content. Traditional academic approaches continue to dominate, as do traditional forms of art and sport. This deficit is felt in such critically important fields as social sciences and humanities, applied arts (design, craftsmanship, visual media, programming), innovative social practices, and leadership.

The challenge of creating a unified information database for tracking talented and highly motivated young people still needs to be overcome. Such a database would allow for monitoring the personal and professional growth of such students. There should also be systems of informational support for students, parents, teachers, and organizations to navigate the variety of opportunities for identifying and supporting talented youth.

A unified national platform for identifying and supporting highly motivated and talented students must be created that would record their participation in extracurricular programs, projects, and events, including those outside of the competition format, and provide a record of achievement at competitions. This could then be used in the admissions process for vocational programs and universities, as well as in the job placement process. A blockchain environment may be the most effective technology for such a system. This resource should include services for student self-assessment to reveal interests and abilities, as well as services for publicizing and promoting youth initiatives, creating communities, and gathering resources.

CONCLUSION

The statistical and monitoring data presented in this book, together with the findings of specialized studies and analytical works, allow us to formulate the following fundamental challenges facing the Russian school system. We will also offer policy proposals for overcoming these challenges by 2024, with a longer-term perspective up to 2035.

1. Russia has successfully provided universal access to schooling, including the provision of basic infrastructure. However, there is still work to be done to create an effective mechanism for ensuring a high level of education quality for students from families of low socioeconomic status. Support for students experiencing difficulties with school must also be improved.

The correlation between education outcomes and socioeconomic status, as well as school segregation, do not appear to be critically high, but are greater than in many leading countries. Russian education today does not fulfill its full potential as a path for upward mobility. This is partially reflected in the low level of academic resilience. This creates the risk of the emergence of deprived, socially excluded groups, in which people find themselves in an educational and social dead end. These risks are exacerbated in a situation of increasing poverty in the population. Families with children are a large and vulnerable part of the population living in poverty. Unfortunately, this area of policy has not entered the public discourse in a noticeable way, and has not become a priority for public education, philanthropic foundations, and socially oriented nonprofits.

We suggest the following measures for overcoming this challenge.

Targeted aid to support the educational ambitions of school students from families of low socioeconomic status:

- creating a regulatory framework for establishing systems for identifying young people from families with low socioeconomic status within the education system;
- offering free supplemental classes to help in mastering the school curriculum based on individuals' gaps in preparation; support for developing skills related to independent learning, scheduling, time management, and setting and achieving individual goals;
- setting aside spots (quotas) in school programs that offer in-depth study, as well as in preparatory programs at universities and centers for gifted youth;
- compensating parents of this category of student for tuition at extracurricular education centers, including centers for standardized test preparation and online courses, using rebates, credits, or coupons; and
- organizing summer schools and specialized sessions.

Providing for the educational success of all students:

- implementing multivalent monitoring tools at the school level; creating a new position at schools for an educator responsible for identifying students who are falling behind or those who are at high risk of doing so; designing programs of individual support and direct assistance with the involvement of all teachers;
- offering remedial classes to help students catch up to the curriculum and prepare for exams, including online classes, under the auspices of schools and universities;
- targeted financial assistance (certificates) for students at risk of falling behind:
  - for accessing supplemental education programs, including in areas such as robotics, programming (including at children's technoparks), and arts (including at museums);
  - for participating in quality summer programs for education, socialization, and health;

- organizing special courses in summer schools, with the involvement of leading schools and universities;
- developing organizational and time management skills, learning ability, and the ability to set goals and achieve them;
- providing special programs for students at risk of falling behind, including working with psychologists and special-needs teachers, based out of schools or specialized centers;
- creating innovative digital services for supporting students at risk of falling behind which provide a personalized learning environment using adaptive learning, training programs, and AI tutors;
- training teachers in specialized strategies for working with students who are falling behind;
- incentive bonuses and grants for teachers who show good results in working with kids at risk for falling behind;
- recruiting mentors to work with school students who are at risk of falling behind (successful professionals in various fields);
- developing infrastructure for extracurricular education in territories identified as having a high risk of students falling behind the school curriculum, as well as infrastructure for additional psychological, medical and social support, as well as family counseling; creating a pilot project for centers of educational opportunity.

Targeted support for schools working in difficult social conditions:

- increasing the school per-student funding allotment for students from families of low socioeconomic status and increased risk of educational failure or social disadaptation (25% of Russian school students), for the purposes of:
  - hiring psychologists, tutors, counselors, social pedagogs, special-needs teachers, and school mediators (the set of such staff members needed at each school varies and should be determined by a single methodology);

  - expanding school curricula to include programs of professional orientation and additional education in in-demand fields to increase their attractiveness to families; combating and reducing the level of social segregation;
  - setting up "all day education" programs to help students properly structure their afterschool activities and free time;
  - creating programs for the integration and social adaptation of immigrant children and children for whom Russian is not the native language;
  - developing school infrastructure and equipment for quality physical education and student health;
- providing grants to schools that work in difficult conditions and demonstrate low education outcomes, as well as subsidies to regions with high concentrations of such schools:
  - for carrying out programs for improving education outcomes;
  - for recruiting and training staff for working with students who are falling behind academically or exhibiting behavioral problems, as well as the children of immigrants;
  - providing schools that work in territories that are difficult to access with buses, high-speed internet, and access to the most modern distance learning platforms;
- providing grants to schools that work in difficult social conditions and achieve high education outcomes;
- providing grants to teachers who achieve improved educational outcomes for students from groups that are at high risk for academic underachievement or social difficulty; funding for targeted programs of professional development, including training sessions, internships, and paid courses.

Creating infrastructure in small towns and rural areas (organizations and services) for integrating the resources of government departments (education, culture, sport, youth policy, healthcare, social programs) in order to provide for the development of human capital for the whole population (children, youth, adults), and strengthen social ties, including across generations:

- creating integrated organizations providing preschool education, schooling, afterschool education, and professional training, as well as culture and sports, which serve children, youth, and adults;
- creating education opportunity centers that carry out extracurricular education programs for youth and adults, including those that aid in achieving 21st-century forms of literacy; centers for professional training that provide access to digital education resources and support the design of individualized programs of study; and
- creating clubs that offer programs for families and different generations to socialize with each other and engage in productive recreation, learning, and healthy living.

2. The Russian education system has not yet completed the process of modernizing education content and education technologies.

Programs of study and textbooks continue to be focused primarily on retaining and reproducing knowledge and are not conducive to developing higher-order skills (critical thinking, problem solving, understanding, etc.) or the basic ability to learn. Without these skills, it is impossible to take effective action in society and in the workplace. Such skills are required for personal well-being in our world, which is embarking upon the Fourth Industrial Revolution and entering an age of increasing uncertainty.

The schooling process is insufficiently oriented towards independence, creativity, and supporting the innate interests of school students. It does not fully meet the needs of families vis-à-vis the individualization of education trajectories, and is insufficiently sensitive to the sociocultural situation in which teenagers today are growing up. All this leads to a decrease in the overall level of motivation to learn among all school students, and stands in the way of highly motivated students reaching their full potential.

Overcoming these negative trends and meeting the challenge of developing the country's human capital in a changing world will involve the following vectors of action:

Transforming the content, *organizational structure*, *and educational technologies of primary and secondary education*. Stimulating teenagers to be more engaged in and responsible for their own education can be accomplished by instituting a more open program of study. This involves providing for student choice in programs of study, as well as in the formats used. Interactive and gaming technologies that encourage independent decision-making should also be used. School students should be presented with a wide and varied selection of high-quality extracurricular programs, including those that take place during the summer and winter breaks. The integration of school-based learning and other forms of gaining knowledge and experience will be helpful in overcoming some of the current obstacles.

Schools should offer opportunities for students to test themselves in social, professional, and sports endeavors. Conditions for stimulating the interest of young people in civic initiatives for improving the lives of other members of their community should be created. This can be done effectively using project-based formats. Teenagers should be offered the opportunity to help others, including their peers, children, the elderly, people with special needs, and people who have found themselves in difficult situations. A large-scale effort should be made to facilitate the self-governance of school students and engage teenagers in making decisions involving the life of the school, assessment, teaching, and day-to-day operations.

In the middle term, the following approaches can be taken to accomplish this:

- using the FGOS framework to create large-scale examples of school curricula and nonlinear programs of study for contemporary teenagers which provide for an open curriculum

and create vectors of open engagement between the school, the local community, business, and government;
- providing grants to schools that successfully implement individualized curricula for primary and secondary school students;
- developing tutoring programs (training staff; grant support for consulting services for parents outside of the school, including online);
- organizing grant competitions for developing and implementing integrated (hybrid, multi-departmental) education programs for schools and extracurricular institutions which are successful in motivating and engaging young people in learning; and
- providing grants for innovative summer school programs for teenagers which help them successfully manage the risks of teenage life and achieve self-actualization.

Contemporary literacy and universal skills for all. Modernizing education content and the format of educational programs at all levels requires a multivalent approach, which will lead to a number of improvements vis-à-vis professional preparation and social engagement. This includes supporting and stimulating independent learning, which allows young people to form moral positions and a positive social outlook. Students who engage with this process acquire a new form of literacy involving a fundamental understanding of contemporary society. This allows them to take action and respond to changing socioeconomic conditions (financial, legal, medical, and ecological literacy). Other important areas for development include digital literacy and universal competencies relevant to the 21st century such as communication, cooperation, critical thinking, creativity, and self-driven work.

Developing 21st-century skills and literacies within the framework of a formal education system requires Russian educators to think outside of their traditional understanding of school subjects, which tends to be highly formalized and specialized. The FGOS have established a multivalent approach targeting subject-based, meta-subject, and personal outcomes for education. These principles must be reflected in practice and in the corpus of teaching methodologies. The sample school curriculum must be supplemented with a clear connection between expected results and fundamental concepts from various fields of knowledge.

The key teaching methodologies for developing contemporary skills and literacies involve research projects and project-based teaching. These methods develop critical thinking skills, communication skills, and habits of self-direction. They also demand engaging and broadening one's set of literacies. The implementation of such approaches must be accompanied by new approaches to assessment in which assessment is seen as a tool for teaching.

Such methods can be used not only in knowledge-based disciplines, but also in physical education and the arts. Physical education can be a platform for developing communicative skills and learning how to solve problems as a team. Physical education class can also be used to encourage healthy lifestyles and teach medical literacy. The arts, including music, visual arts, and theater, expand students' repertoire of communication and self-expression, as well as developing skills that are useful in solving technical and social problems.

The new generation of Russians demands designing and implementing new avenues for personal growth and social praxis. Personal growth, rather than education as such, is the venue in which key competencies, traits, and values that are important for self-actualization, well-being, and activity in the society are formed. Such traits include responsibility, self-motivation, empathy, initiative, conscientiousness, and respect for cultural differences.

Special attention should be paid to developing leadership and entrepreneurial traits, with an emphasis on applying them to socially important challenges. These include social challenges, problems of ecologically sound development, and aid to vulnerable groups.

An essential element of education programs at all levels must be social practices such as volunteerism. Time spent volunteering should be required for reaching the next level of education. This will require actively developing partnerships between organizational institutions, socially oriented NGOs, and social entrepreneurs.

Reforming education content will require developing a functional system for assessing the outcomes of programs for teaching new forms of literacy and 21st-century skills. This system must be skills-oriented and cover all education levels. The new assessment system should include:

- Additional skills-based assignments in national standardized tests (OGE, EGE, the independent system for assessing qualifications) in all subjects.
- A national system of certification for 21st-century skills and contemporary literacies. This system should be based around both educational and noneducational institutions, including companies, national licensing agencies, workers' coalitions, employers' unions, professional associations, and olympiad-style contests such as NTI, World Junior Skills, and others.
- Universal adoption of contemporary assessment tools on the level of classes and schools. These include assessments that are used as input for modifying curricula, criteria-based assessments, peer assessment, and assessment of group projects.

Implementing new education content and methodologies can only be done in a step-by-step process. These steps may include:

- Perfecting educational pilot programs in which personal and meta-subject outcomes are distributed among subject areas; linking education outcomes to "big ideas".
- Pioneering new types of content in cutting-edge extracurricular institutions. This includes both publicly funded ones, such as the Kvantorium technoparks, as well as private organizations, socially oriented nonprofits, and networks of in-

novative schools. Such institutions should be supported through local initiatives.

- New requirements for education outcomes involving the participation of multiple governmental departments and the input of industry and employers.
- Developing a system of civic education, with the support of the government, which will include courses and assessment (certification) systems for modern forms of literacy among the population. This system should include government-sponsored courses which develop new forms of literacy among the population, organized by public and private educational institutions such as libraries, museums, and athletic clubs. Such programs should serve no less than 200,000 people per year.
- Setting up flagship master's programs (3–5 at each leading pedagogical university) for professional development and certification of educators at the preschool and school level, aimed at teaching new forms of literacy and 21st-century skills.
- Creating methodological materials to support cutting-edge teaching practices (research-based learning, project-based learning, assessment for learning, and "big ideas" in various fields of knowledge.) A centralized digital platform should also be created to distribute such new materials.
- Training teachers to take leadership roles in providing for the formation of positive social values, modern literacies, and 21st-century skills within the school context.
- Perfecting education standards and pilot programs in basic subjects; creating teaching guides (including digital ones) and methodologies oriented towards developing positive social outlooks, new literacies, and 21st-century skills across all subjects. A priority for the next several years should be improving education assessment (modernizing the OGE, EGE, and the national system of skills certification).

- Creating independent monitoring systems in key areas of new literacies (financial, legal, digital, etc.) and 21st-century skills. This should include regular, independent monitoring of the quality of human capital, using internationally tested tools for assessing in-demand forms of literacy and key competencies among the population. Such systems were developed in the framework of the international PIAAC project. The studies should be conducted no less than every two years.
- Widespread integration of modules and courses aimed at developing new competencies and 21st-century skills. These should be accessible to the whole Russian population via online and off-line formats, with special emphasis on those enrolled in vocational and university programs. Special programs should also be created for the elderly, migrants, the unemployed, and other high-risk categories. Such programs should involve healthcare, cultural, and sports institutions.
- Grant funding for informal media projects in the humanities (history, literature, arts, economics) aimed at developing key competencies and positive social values. These include projects run by schools, extracurricular centers, and socially oriented nonprofits that seek to implement contemporary education practices.

Support for motivated and talented students at all levels by integrating the standard curriculum with extracurricular programs and increasing the diversity of subjects and technologies:

- Creating a wide-ranging network of platforms for showcasing talent and displaying and supporting youth initiatives. This may include a process for featuring such accomplishments and initiatives in positive social practices that are in the interest of the local community. Such projects can also be involved in regional development initiatives as well as industry challenges, and include various government departments and other stakeholders. The platforms can be internet-based and make use of crowdsourcing and crowdfunding strategies.

- Developing an informational environment that includes computer analysis of the personal and educational trajectories of young people, including identification of talented individuals and recommendations for children, families, and teachers.
- Wide-ranging and personalized support for highly motivated and talented young people, including communities for research and project-based activities. Support for teams should be provided in the form of grants and stipends, including funding for participation in cultural and developmental activities together with parents and other family members.
- Stipends for highly advanced and needy students, which should be no less than the poverty level.
- Providing grants to government institutions, nonprofits, and youth organizations for carrying out projects and events for highly motivated and talented young people (specialized summer programs, contests, conventions, etc.). Such projects may include new fields of social sciences, humanities, technology, art, design, craftsmanship, visual media, and social praxis.
- Developing existing regional centers, as well as forming new ones, for work with talented and highly motivated students. This includes using the SUNC model (specialized education/research centers) developed by Moscow State University, as well as the Sirius center and Artek.
- Supporting youth initiatives and projects, communication networks, project-based associations, youth-adult collaborations and self-organizing structures in the field of technology, entrepreneurialism, cultural initiatives, socially-oriented projects, etc. Such initiatives should be supported by the collaboration of various government agencies.

- Creating support mechanisms for educational mobility for highly motivated and talented students; providing access to competitions and interregional exchange programs.
- Expanding and modernizing professional development programs for teachers working with talented students.

3. In all of the challenges listed above, there remains a critical question of training the teaching workforce and providing the conditions and incentives for them to work effectively.

The transition to the effective contract system, as well as the implementation of a professional standard and the modernization of teacher training, have yet to lead to a wide-ranging modernization of teaching skills. New teaching competencies are required to carry out contemporary educational technologies and to interact with students with unique educational needs.

The 21st century has changed the set of skills needed to be a successful teacher. Skills related to organizing project-based and research-based activities have moved to the forefront. The teacher must also play the role of consultant, researcher, project manager, and navigator for helping students work with the knowledge gained. The new model of teacher is a “master of learning” who demonstrates an exemplary approach to gaining knowledge and applying it in practice.

Today, teachers at all levels of education face limitations in modeling the most relevant contemporary skills. These include: working in the digital environment; organizing project-based and research-based activities and social practices; teaching that develops critical thinking; working with special-needs students; working with the children of immigrant families; working with children who have behavioral or learning issues; organizing effective communication with partners in the learning process.

Unfortunately, incentives for acquiring these skills are minimal. The system of assessing teacher qualification is dominated by formal methods of oversight and self-reporting procedures that are extremely time-consuming. This should be replaced by a system of objective feedback and support. The potential impact of professional teachers' organizations and independent assessments are left on the wayside in terms of supporting professional development.

Assessing the professional skills of teachers is not included in the systems of regulation offered by the government or civil society. There is a lack of a good system for incentivizing professional development among teachers. In developed countries, there are professional standards that serve to stimulate skill development and draw people into the profession.

We offer the following set of solutions in this area:

- Reducing teacher workload to no more than 12 to 14 hours, and including additional hours (up to 18) for working on designing the education process, planning lessons, extracurricular activities, etc.
- Creating a legal framework for professional pedagogical communities that may be a factor in stimulating innovation in the teaching field.
- Creating mentorship programs in schools.
- Reforming the system of professional standards for teachers.
- Creating a single, formula-based system for teacher compensation, based on the following principles: differentiated pay based on level of qualification and/or mastery, as well as on the makeup of the student body and number of students; pay scales based on the success of education programs and student progress; bonuses for reaching education goals; pay grades based on the nature of work; salaries that take into account average regional income; bonuses for quality work.
- Creating examples of ethical incentives for moral approaches to teaching, awarded by members of civil society. This would include prizes or special recognition for teachers given by NGOs or highly placed citizens.

- Transforming models of certifying teachers, increasing objectivity, increasing the importance of the stimulating role of teachers, and directly assessing skills.
- Identifying, supporting, and publicizing leadership and management practices by engaging education institutions in competitive programs.
- Carrying out high-tech programs for professional development of teachers to aid in developing new technologies and content areas for schooling.
- Creating programs of continual support for young teachers after they graduate from teacher training programs.
- Creating and implementing internship programs for teachers to learn from leading schools and top universities.
- Increasing public funding for training future teachers at the bachelor's and master's levels.
- Providing personal and team-based grants to teachers for implementing high-tech approaches to education and developing contemporary literacies and 21st-century skills. This may include highlighting young teachers as a special category. Such grants would require schools to reform their curricula and apply digital technologies to teaching and youth development.
- Providing grants for creating communities of professional development, organizing conferences, and developing professional networks of teachers and school administrators with the goal of promoting high-tech methods for teaching contemporary literacies and 21st-century skills. In this case, government funds should only be provided as matching funds for private investment.
- Public transparency for the process of hiring school administrators and extending their contracts.

4. Currently, the public education system does not provide optimal conditions for meeting the interests of families in educating

their children. Nor does it meet the needs of business and the non-profit sector. This deficit is filled by extracurricular or informal education.

In order to take full advantage of this sector, major reforms to government regulations must be undertaken, and a truly competitive environment must be supported. However, the real promise of this sector is in integrating it with schools and creating individualized education trajectories for students. This will involve "unpacking" school curricula, which are currently overly burdensome and inflexible. Extracurricular programs also have this flaw. We must provide the opportunity for students to register or certify specific skills and create a record of their accomplishments. Services that provide guidance in navigating various educational offerings and help to design individual education trajectories will also play an important role.

The history of school reform in Russia in the 21st century shows that more attention must be paid to motivating various parties to support the needed changes. All interested groups must be engaged in the process of reform and work towards a productive collaboration. New managerial approaches to oversight, as well as increasing government regulation and direct administration, have failed to have a positive effect. Both the overall process of reform and specific projects in the next wave of initiatives must support collaboration among parents, teachers, administrators, and employers.

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The major part of this book was prepared before the national project "Education" was approved by the Russian president. The editors and authors are pleased to see that many of the above suggestions were incorporated in the framework of this national project. At the same time, we feel that the full set of measures suggested in the conclusion of this book can help to bring the Russian school system into the top 10 school systems internationally.

BIBLIOGRAPHY

Sources in Russian

Adrian J. et al. Belaya kniga rossiyskogo obrazovaniya. M., 2000. <http://ecsocman.hse.ru/text/19153933>.

Agranovich M.L., *Kozhevnikova O.N.* Sostoyanie i razvitie sistemy obshchego srednego obrazovaniya v Rossiyskoy Federatsii. M., 2006.

Analiticheskaya zapiska po rezultatam electronnogo monitoringa FGOS NOO v 2011 g. Institut obrazovatelnoi politiki "Evrika." <http://eurekanet.ru/res_ru/0_hfile_3232_1.doc>.

Barannikov K.A., *Remorenko I.M.* Semantika standartov: kak raznye strany formuliruyut smysly soderzhaniya obrazovaniya // Otechestvennaya i zarubezhnaya pedagogika. 2017. Vol. 2. No. 5 (44). P. 45–56.

Barannikov K.A. et al. O regulirovanii soderzhaniya obrazovaniya na sovremennom etape obnovleniya sistemy obrazovaniya v Rossiyskoy Federatsii // Vestnik obrazovaniya. 2016. No. 14. P. 69–80.

Barber M. Prikazano dobitsa rezultata. Kak byla obespechena realizatsiya reform v sfere gosudarstvennykh uslug Velikobritanii. M.: HSE Univ., 2011.

Barber M. Preimushchestva sistemy otvetstvennosti i otchetnosti. Inauguratsionnaya lektsiya v chest Edvina Delattra. <http://www.mhs548.ru/2/10/barber.pdf>.

Blonsky P.P. Izbrannye pedagogicheskie proizvedeniya / red. B.P. Esipov, F.F. Korolev, S.A. Frumov; sost. N.I. Blonskaya, A.D. Sergeeva. M., 1961.

Boguslavsky M.V. Modernizatsiya soderzhaniya obshchego obrazovaniya v otechestvennoy pedagogike XX veka // Otechestvennaya i zarubezhnaya pedagogika. 2012. No. 5 (8). <http://cyberleninka.ru/article/n/modernizatsiya-soderzhaniya-obschego-obrazovaniya-v-otechestvennoy-pedagogike-hh-veka>.

Derbishir N.S., *Pinskaya M.A.* Upravlencheskie strategii direktorov effektivnykh shkol // Voprosy obrazovaniya. 2016. № 3. P. 110–129.

Doklad o chelovecheskom razvitii, 2016. <http://hdr.undp.org/sites/default/files/hdr_2016_report_russian_web.pdf>.

Federalnaya tselevaya programma razvitiya obrazovaniya na 2011–2015. Utverzhdena postanovleniem Pravitelstva RF ot 07.02.2011 No. 61.

Federalnyi zakon ot 29.12.2012 No. 273-FZ "Ob obrazovanii v Rossiyskoy Federatsii."

Federalnyi zakon ot 05.12.2017 No. 392-FZ "O vnesenii izmeneniy v otdelnye zakonodatelnye akty Rossiyskoy Federatsii po voprosam sovershenstvovaniya provedeniya nezavisimoy otsenki kachestva usloviy okazaniya uslug organizatsiyami v sfere kultury, okhrany zdorovya, obrazovaniya, sotsialnogo obsluzhivaniya i federalnymi uchrezhdeniyami medico-sotsialnoy ekspertizy."

Gordeeva T.O. Psikhologiya motivatsii dostizheniya. M., 2006.

Gordeeva T.O., *Gizhitsky V.V.*, *Sychev O.A.*, *Gavrichenkova T.* Motivatsiya samouvazheniya i uvazheniya drugimi kak factory akademicheskikh dostizheniy i nastoychivosti v uchebnoy deyatelnosti // Psikhologicheskiy zhurnal. 2016. No. 37 (2). P. 57–68.

Kapuza A.V., *Kersha Yu.D.*, *Zakharov A.B.*, *Khavenson T.E.* Obrazovatelnye rezultaty i sotsialnoe neravenstvo v Rossii: dinamika i svyaz s obrazovatelnoy politikoy // Voprosy obrazovaniya. 2017. No. 4.

Kasprzak A.G. et al. Standart obrazovaniya: istoriya razrabotki i itogi // Voprosy obrazovaniya. 2004. No. 3. <http://cyberleninka.ru/article/n/standart-obrazovaniya-istoriya-razrabotki-i-itog>.

Kasprzak A.G. et al. Pochemu nashi shkolniki provalili test PISA // Direktor shkoly. 2005. No. 4. P. 4–13.

Klyuchevye voprosy razvitiya natsionalnykh i regionalnykh sistem otsenki kachestva obrazovaniya (ekspertnyi obzor) / V.A. Bolotov, I.A. Valdman, R.V. Gorbovsky et al. M.: HSE Univ., 2016.

Konstantinovsky D.L., *Voznesenskaya E.D.*, *Cherednichenko G.A.* Molodezh Rossii na rubezhe XX–XXI vekov: obrazovanie, trud, sotsialnoe samochuvstvie. M., 2014.

Konstantinovsky D.L., *Kurakin D.Yu.*, *Vakhshtayn V.S.* Dostupnost kachestvennogo srednego obrazovaniya v Rossii: vozmozhnosti i ogranicheniya. M., 2006.

Kontseptsiya obshcherossiskoy sistemy otsenki kachestva obrazovaniya / pod red. A.N. Leibovicha. M.: Rosobrnadzor, 2006.

Kosyakova Yu., *Yastrebov G.*, *Yanbarisova D.*, *Kurakin D.* Vosproizvodstvo sotsialnogo neravenstva v rossiyskoy obrazovatelnoy sisteme // Zhurnal sotsiologii i sotsialnoy antropologii. 2016. No. 19 (5). P. 76–97.

Kuznetsova M.I. Mezhdunarodnye sravnitelnye issledovaniya kak element sistemy otsenki kachestva obrazovaniya // Spravochnik zamestitelya direktora shkoly. 2014. No. 7. P. 16–29. <https://www.menobr.ru/article/59448-qqe-14-m07-mejdunarodnyesravnitelnye-issledovaniya-kak-element>.

Lazarev V.S. FGOS obshchego obrazovaniya: blesk deklaratsiy i perspektivy realizatsii // Pedagogika. 2015. No. 4. P. 10–19.

Lunacharsky A.V. O narodnom obrazovanii. M.: APN, 1958.

Monitoring effektivnosti shkoly. Formirovanie obrazovatelnykh strategiy uchashchikhsya: plany semey i rol shkoly (2014–2017) / pod red. T.L. Klyachko. M.: RANEPA, 2018.

Monitoring normativnogo podushevogo finansirovaniya obrazovaniya v regionakh Rossii / I.V. Abankina et al. M.: HSE Univ., 2016.

Monitoring "Zarplata i nagruzka uchitelya — 2018." <https://onf.ru>.

Monitoringovoe issledovanie "Traektorii v obrazovanii i professii." <https://trec.hse.ru/>.

Nikitaev V.V. Subyekty i tipologiya sotsiokulturnykh izmeneniy // Organizatsiya samorazvivayushchikhsya innovatsionnykh sred / pod red. V.E. Lepskogo. M., 2012.

Opros ONF, 2018. <https://onf.ru/2017/12/15/opros-onf-pokazal-chtoshkolniki-ne-udovletvoreny-kachestvom-svoih-znaniy-i/>.

Perechen porucheniy po itogam zasedaniya Gosudarstvennogo soveta po voprosam sovershenstvovaniya sistemy obshchego obrazovaniya, 23.12.2015. <http://kremlin.ru/events/state-council/51143>.

Petrenko E.S., *Galitskaya E.G.* Resursnyi potentsial semyi i obrazovatelnye traektorii detey i vzroslykh // Voprosy obrazovaniya. 2007. No. 3. P. 240–254.

Pinskaya M.A., *Froumin I.D.*, *Kosaretsky S.G.* Shkoly, rabotayushchie v slozhnykh sotsialnykh kontekstakh // Vyravnivanie shansov detey na kachestvennoye obrazovanie. M.: HSE Univ., 2012. P. 9–36.

Plan meropriyatiy "Izmeneniya v otraslyakh sotsialnoy sfery, napravlennye na povyshenie effektivnosti obrazovaniya i nauki." Utverzhden rasporyazheniem Pravitelstva RF 30.04.2014 No. 722-r. <http://government.ru/docs/12229/>.

Platonova D.P., *Zhitkov K.V.*, *Demin P.V.*, *Pilipenko S.G.* Obrazovanie i pedagogicheskie nauki: obshchie trendy v vysshem pedagogicheskom obrazovanii. M.: HSE Univ., 2017.

Postanovlenie Pravitelstva RF ot 15.04.2014 No. 295 “Ob utverzhdenii gosudarstvennoy programmy Rossiyskoy Federatsii “Razvitie obrazovaniya” na 2013–2020 gody.” <http://gov.garant.ru/SESSION/PILOT/main.htm>.

Prakhov I.A. Dinamika investitsiy i otdacha ot dopolnitelnoy podgotovki k postupleniyu v vuz // Prikladnaya ekonometrika. 2015. No. 1. P. 107–124.

Prakhov I.A., *Yudkevich M.M.* Vliyanie dokhoda domokhozyaystv na rezultaty EGE i vybor vuza // Voprosy obrazovaniya. 2012. No. 1. P. 126–147.

Prikaz Minobrnauki Rossii ot 06.10.2009 No. 373 “Ob utverzhdenii i vvedenii v deystvie federalnogo gosudarstvennogo obrazovatelnogo standarta nachalnogo obshchego obrazovaniya.” <http://ivo.garant.ru/#/document/197127/paragraph/2644:4>.

Prikaz Minobrnauki Rossii ot 17.12.2010 No. 1897 “Ob utverzhdenii i vvedenii v deystvie federalnogo gosudarstvennogo obrazovatelnogo standarta osnovnogo obshchego obrazovaniya.” <http://ivo.
garant.ru/#/document/55170507/paragraph/1:6>.

Prikaz Minobrnauki Rossii ot 17.05.2012. No. 413 “Ob utverzhdenii i vvedenii v deystvie federalnogo gosudarstvennogo obrazovatelnogo standarta srednego obshchego obrazovaniya.” <http://ivo.garant.ru/#/document/70188902/paragraph/2034:8>.

Prikaz Minobrnauki Rossii ot 17.10.2013 No. 1155 “Ob utverzhdenii federalnogo gosudarstvennogo obrazovatelnogo standarta doshkolnogo obrazovaniya.” <http://ivo.garant.ru/#/document/70512244/paragraph/1:11>.

Prikaz Minobrnauki Rossii ot 19.12.2014 No. 1598 “Ob utverzhdenii federalnogo gosudarstvennogo obrazovatelnogo standarta nachalnogo obshchego obrazovaniya obuchayushchikhsya s ogranichennymi vozmozhnostyami zdorovya.”

Prikaz Minobrnauki Rossii ot 19.12.2014 No. 1599 “Ob utverzhdenii federalnogo gosudarstvennogo obrazovatelnogo standarta obrazovaniya obuchayushchikhsya s umstvennoy otstalostyu (intellektualnymi narusheniyami).”

Prikaz Minobrnauki Rossii ot 31.12.2015 No. 1576 “O vnesenii izmeneniy v federalnyi gosudarstvennyi obrazovatelnyi standart nachalnogo obshchego obrazovaniya, utverzhdennyi prikazom Ministerstva obrazovaniya i nauki Rossiyskoy Federatsii ot 06.10.2009 No. 373.”

Primernaya osnovnaya obrazovatelnaya programma nachalnogo obshchego obrazovaniya. <http://fgosreestr.ru/registry/primernaya-osnovnaya-obrazovatelnaya-programma-nachalnogo-obshhego-obrazovaniya-2/>.

Primernaya osnovnaya obrazovatelnaya programma osnovnogo obshchego obrazovaniya. <http://fgosreestr.ru/registry/primernaya-osnovnayaobrazovatelnaya-programma-osnovnogo-obshhego-obrazovaniya-3/>.

Primernaya osnovnaya obrazovatelnaya programma srednego obshchego obrazovaniya. <http://fgosreestr.ru/registry/primernaya-osnovnayaobrazovatelnaya-programma-srednego-obshhego-obrazovaniya/>.

Putin V.V. Stroitelstvo spravedlivosti. Sotsialnaya politika dlya Rossii // Komsomolskaya pravda. 13.02.2012. <http://www.kp.ru/daily/25833/2807793/>.

Rasporyazhenie Pravitelstva RF ot 29.12.2001 No. 1756-r “O Kontseptsii modernizatsii rossiyskogo obrazovaniya na period do 2010 goda” // Byulleten Minobrazovaniya Rossii. 2002. No. 2.

Rasporyazhenie Pravitelstva RF ot 29.12.2014 No. 2765-r, utverzhdayushchee Kontseptsiyu federalnoy tselevoy programmy razvitiya obrazovaniya na 2016–2020 gody. <http://xn-80abucjiibhv9a.xn-p1ai/%D0%B4%D0%BE%D0%BA%D1%83%D0%BC%D0%B5%D0%BD%D1%82%D1%8B/4952>.

Remorenko I.M. Chemu uchit v shkole? // Uchitelskaya gazeta. 2017. No. 36. <http://www.ug.ru/archive/71415>.

Roshchina Ya.M. Semeynyi kapital kak faktor obrazovatelnykh vozmozhnostey rossiyskikh shkolnikov // Voprosy obrazovaniya. 2012. No. 1. P. 257–271.

Tsukerman G.A. Perekhod iz nachalnoy shkoly v srednyuyu kak psikhologicheskaya problema // Voprosy psikhologii. 2001. No. 5. P. 19–34.

Ukaz Prezidenta RF ot 07.05.2012 No. 597 “O meropriyatiyakh po realizatsii gosudarstvennoy sotsialnoy politiki” // Rossiyskaya gazeta. 2012. No. 102.

Ukaz Prezidenta RF ot 07.05.2012 No. 599 "O merakh po realizatsii gosudarstvennoy politiki v oblasti obrazovaniya i nauki" // Rossiyskaya gazeta. 2012. No. 102.

Universalnye kompetentnosti i novaya gramotnost: chemu uchit segodnya dlya uspekha zavtra. Predvaritelnye vyvody mezhdunarodnogo doklada o tendentsiyakh transformatsii shkolnogo obrazovaniya / I.D. Froumin, M.S. Dobryakova, K.A. Barannikov, I.M. Remorenko // Sovremennaya analitika obrazovaniya. 2018. No. 2 (19). <https://ioe.hse.ru/sovaobr>.

Valdman I.A. Kak obespechit informatsionnuju otkrytost shkoly pered obshchestvom: neskolko urokov iz mezhdunarodnogo opyta // Otkrytost obrazovaniya: raznye vzglyady — obshchie tsennosti. M., 2013.

Yastrebov G.A., *Bessudnov A.R.*, *Pinskaya M.A.*, *Kosaretsky S.G.* Problema kontekstualizatsii obrazovatelnykh rezultatov: shkoly, sotsialnyi sostav uchashchikhsya i uroven deprivatsii territoriy // Voprosy obrazovaniya. 2013. No. 4. P. 188–246.

Yastrebov G.A., *Bessudnov A.R.*, *Pinskaya M.A.*, *Kosaretsky S.G.* Ispolzovanie kontekstnykh dannykh v sisteme otsenki kachestva obrazovaniya: opyt razrabotki i aprobatsiya instrumentariya // Voprosy obrazovaniya. 2014. No. 4. P. 58–95.

Zakon Rossiyskoy Federatsii ot 10.07.1992 № 3266–1 (red. ot 12.11.2012) "Ob obrazovanii."

Sources in English

Agasisti T., *Avvisati F.*, *Borgonovi F.*, *Longobardi S.* Academic Resilience. OECD Education Working Papers No. 167. Paris: OECD, 2018.

Agasisti T., *Longobardi S.* Equality of Educational Opportunities, Schools' Characteristics and Resilient Students: An Empirical Study of EU-15 Countries Using OECD-PISA 2009 Data // Social Indicators Research. 2017. Vol. 134. No. 3. P. 917–953.

Anderman E.M., *Midgley C.* Changes in Achievement Goal Orientations, Perceived Academic Competence, and Grades Across the Transition to Middle-Level Schools // Contemporary Educational Psychology. 1997. Vol. 22. No. 3. P. 269–298.

Anderson L.W., *Krathwohl D.* (eds). A Taxonomy for Learning, Teaching and Assessing: A Revision of Bloom's Taxonomy of Educational Objectives. N.Y.: Longman, 2001.

Ball S. The Teacher's Soul and the Terrors of Performativity // Journal of Education Policy. 2003. Vol. 18. No. 2.

Berliner D.C. Simple Views of Effective Teaching and a Simple Theory of Classroom Instruction. Talks to Teachers. N.Y.: Random House, 1987. P. 93–110.

Boe E.E., *May H.*, *Boruch R.F.* Student Task Persistence in the Third International Mathematics and Science Study: A Major Source of Acheievement Differences at the National, Classroom, and Student Levels, 2002.

Borman G.D., *Dowling M.* Schools and Inequality: A Multilevel Analysis of Coleman's Equality of Educational Opportunity Data // Teachers College Record. 2010. Vol. 112. No. 5. P. 1201–1246.

Bourdieu P., *Passeron J.* Reproduction in Education, Society and Culture. L.: Sage, 1997.

Bray M. The Shadow Education System: Private Tutoring and Its Implications for Planners. UNESCO, 2012.

Breen R., *Jonsson J.O.* Inequality of Opportunity in Comparative Perspective: Recent Research on Educational Attainment and Social Mobility // Annual Review of Sociology. 2005. Vol. 31. P. 223–243.

Building a High-Quality Teaching Profession. Lessons from around the World. Paris: OECD, 2011.

Carnoy M., *Khavenson T.*, *Ivanova A.* Using TIMSS and PISA Results to Inform Educational Policy: A Study of Russia and Its Neighbours // Compare: A Journal of Comparative and International Education. Vol. 45. No. 2. P. 248–271. <DOI: 10.1080/03057925.2013.855002>.

Carter C.P. et al. Measuring Student Engagement Among Elementary Students: Pilot of the Student Engagement Instrument — Elementary Version // School Psychology Quarterly. 2012. Vol. 27. No. 2.

Chirkov V.I., *Ryan R.M.* Parent and Teacher Autonomy-Support in Russian and US Adolescents: Common Effects on Well-Being and Academic Motivation // Journal of Cross-Cultural Psychology. 2001. Vol. 32. No. 5. P. 618–635.

Cohen D.K. (ed.). Teaching for Understanding: Challenges for Policy and Practice. San Francisco: Jossey Bass, 1993.

Coleman J.S. Equality of Educational Opportunity (COLEMAN) Study (EEOS). Ann Arbor, MI. 1966.

Cree A., Kay A., Steward J. The Economic & Social Cost of Illiteracy: A Snapshot of Illiteracy in a Global Context. Melbourne: The World Literacy Foundation, 2012.

Danielson C., McGreal T.L. Teacher Evaluation to Enhance Professional Practice. ASDC Education, 2000.

Darling-Hammond L. The Right to Learn and the Advancement of Teaching: Research, Policy, and Practice for Democratic Education // Educational Research. 1996. Vol. 25. No. 6. P. 5–17.

Darling-Hammond L. Teacher Education and the American Future // Journal of Teacher Education. 2010. Vol. 61. No. 1–2. P. 35–47.

Darling-Hammond L. The Right Start: Creating a Strong Foundation for the Teaching Career // Phi Delta Kappan. 2012. Vol. 94. No. 3. P. 8–13.

Darling-Hammond L., Ancess J., Ort S.W. Reinventing High School: Outcomes of the Coalition Campus Schools Project // American Educational Research Journal. 2002. Vol. 39. No. 3. P. 639–673.

Darling-Hammond L., Rothman R. Teacher and Leader Effectiveness in High-Performing Education Systems. Washington, DC: Alliance for Excellent Education, 2011.

Duckworth A.L. et al. Self-Regulation Strategies Improve Self-Discipline in Adolescents: Benefits of Mental Contrasting and Implementation Intentions // Educational Psychology. 2011. Vol. 31. No. 1. P. 17–26.

Duncan O D., Duncan B. A Methodological Analysis of Segregation Indexes // American Sociological Review. 1955. Vol. 20. No. 2. P. 210–217.

Dworkin A., Tobe P. The Effects of Standards Based School Accountability on Teacher Burnout and Trust Relationships: A Longitudinal Analysis // D. van Maele, P.B. Forsyth, M. van Houtte (eds). Trust and School Life. Dordrecht: Springer, 2014. P. 121–143.

Dworkin A.G., Townsend M. Teacher Burnout in the Face of Reform: Some Caveats in Breaking the Mold // B.A. Jones, K.M. Borman (eds). Investing in United States Schools: Directions for Educational Policy. Norwood, NJ: Ablex, 1994. P. 68–86.

Eccles J.S., Wigfield A., Schiefele U. Motivation to Succeed // W. Damon (series ed.), N. Eisenberg (vol. ed.). Handbook of Child Psychology. Vol. 3: Social, Emotional, and Personality Development. 5th ed. N.Y.: Wiley, 1998. P. 1017–1095.

Education for All. Literacy for Life. Paris: UNESCO Publishing, 2006.

Education at a Glance: OECD Indicators. Paris: OECD Publishing, 2018. <http://dx.doi.org/10.1787/eag-2018-en>.

Education Policy Outlook 2018. Putting Student Learning at the Centre, Paris: OECD Publishing, 2018.

Effective Teacher Policies: Insights from PISA. Paris: OECD Publishing, 2018. <http://dx.doi.org/10.1787/9789264301603-en>.

Eme E. Cognitive and Psycholinguistic Skills of Adults Who Are Functionally Illiterate: Current State of Research and Implications for Adult Education // Applied Cognitive. Psychology. 2011. No. 25. P. 753–762.

Epstein J.L., *McPartland J.M.* The Concept and Measurement of the Quality of School Life // American Educational Research Journal. 1976. Vol. 13. No. 1. P. 15–30.

Equity in Education: Breaking Down Barriers to Social Mobility, PISA. Paris: OECD Publishing, 2018.

Erberber E. et al. Socioeconomically Disadvantaged Students Who Are Academically Successful: Examining Academic Resilience Cross-Nationally No. 5. IEA'S Policy Brief Series, 2015.

Field S., *Kuczera M.*, *Pont B.* No More Failures. Ten Steps to Equity in Education. Summary and Policy Recommendations. Paris: OECD, 2007.

Flaxman G. A Status Quo of Segregation: Racial and Economic Imbalance in New Jersey Schools, 1989–2010. Civil Rights Project-Proyecto Derechos Civiles, 2013. <http://eric.ed.gov/?id=ED558804>.

Fraillon J. et al. Preparing for Life in a Digital Age. The IEA International Computer and Information Literacy Study International Report. Cham, Switzerland: Springer, 2014.

Fraillon J., *Schulz W.*, *Ainley J.* International Computer and Information Literacy Study Assessment Framework. Amsterdam: International Association for the Evaluation of Educational Achievement (IEA), 2013.

Fredricks J.A., *Eccles J.S.* Children's Competence and Value Beliefs from Childhood through Adolescence: Growth Trajectories in Two Male-Sex-Typed Domains // Developmental Psychology. 2002. Vol. 38. No. 4.

Ginsburg G.S., *Bronstein P*. Family Factors Related to Children's Intrinsic/Extrinsic Motivational Orientation and Academic Performance // Child Development. 1993. Vol. 64. No. 5. P. 1461–1474.

Global Education Monitoring Report Summary 2017/2018: Accountability in Education: Meeting our Commitments. <en.unesco.org/gem-report/2017/accounbility-edication>.

Gorard S. Does the Index of Segregation Matter? The Composition of Secondary Schools in England Since 1996 // British Educational Research Journal. 2009. Vol. 35. No. 4. P. 639–652.

Gorard S., *Taylor C*. A Comparison of Segregation Indices Used for Assessing the Socio-Economic Composition of Schools. Working Paper 37. Cardiff: School of Social Sciences, 2000.

Gottfried A.E., *Fleming J.S*., *Gottfried A.W*. Role of Parental Motivational Practices in Children's Academic Intrinsic Motivation and Achievement // Journal of Educational Psychology. 1994. Vol. 86. No. 1.

Hausler P., *Hoffmann L*. Qualitative Differences in Student's Interest in Physics and the Dependence on Gender and Age // L. Hoffmann et al. Interest and learning. Proceedings of the Seeon conference on interest and gender. Kiel, 1998. P. 280–289.

Hedges L., *Laine R*., *Greenwald R*. Does Money Matter? A Meta-Analysis of Studies of the Effects of Differential School Inputs on Student Outcomes // Educational Researcher. 1994. Vol. 23. No. 3. P. 5–14.

How Do Some Students Overcome Their Socio-Economic Background? // Pisa in Focus. 2011. No. 5. <https://doi.org/http://dx.doi.org/10.1787/5jm5fb7cq0zp-en>.

Hudson G. Instructor's Book: Answers to End-of-Chapter Practice of Essential Introductory Linguistics. Blackwell, 2000.

Jacobs J.E. et al. Changes in Children's Self-Competence and Values: Gender and Domain Differences Across Grades One Through Twelve // Child Development. 2002. Vol. 73. No. 2. P. 509–527.

Katz D.C. Growth Models and Teacher Evaluation: What Teachers Need to Know and Do // Kappa Delta Pi Record. 2016. Vol. 52. No. 1. P. 11–16.

Koretz D. The Testing Charade: Pretending to Make Schools Better. Chicago: University of Chicago Press, 2017.

Kuzmina Yu. Can Teacher Practices Reduce the Gender Gap in Mathematics Interest for Students with Different Achievements? National Research University Higher School of Economics, 2016.

Levin B. How to Change 5000 Schools. Cambridge, MA: Harvard Education Press, 2008.

Literacy Rates Continue to Rise from One Generation to the Next. Montreal: UNESCO-UIS, 2017.

Ma X., *Xu J*. Determining the Causal Ordering between Attitude Toward Mathematics and Achievement in Mathematics // American Journal of Education. 2004. Vol. 110. No. 3. P. 256–280.

Martinez R., *Fernandez P*. The Social and Economic Impact of Illiteracy: Analytical Model and Pilot Study. UNESCO, 2010.

Massey D.S., *Denton N.A*. Trends in the Residential Segregation of Blacks, Hispanics, and Asians: 1970–1980 // American Sociological Review. 1987. Vol. 52. No. 6. P. 802–825.

Minina E. et al. Transnational policy borrowing and national interpretations of educational quality in Russia, China, and Brazil // I. Silova, M. Chankseliani (eds). Comparing Post-Socialist Transformations: Education in Eastern Europe and Former Soviet Union. Oxford Studies in Comparative Education. Oxford, U.K.: Symposium Books, 2018.

Monitoring Report Summary 2017/2018: Accountability in Education: Meeting Our Commitments.

Mueller C.W., *Parcel T.L*. Measures of Socioeconomic Status: Alternatives and Recommendations // Child Development. 1981. Vol. 52. No. 1. P. 13–30.

Nichols S.L., *Berliner D*. Collateral Damage: How High-Stakes Testing Corrupts America’s Schools. Cambridge, MA: Harvard Education Press, 2007.

Nikolaev D., *Chugunov D*. The Education System in the Russian Federation: Education Brief 2012. A World Bank Study. Washington, DC: World Bank, 2012.

Nye P., *Thomson D*. Who’s Left 2018. Pt 1: The Main Findings. FFT Education Data Lab. Retrieved September, 2018. <https://ffteducationdatalab.org.uk/2018/06/whos-left-2018-part-one-themainfindings/>.

OECD and Statistics Canada. Literacy in the Information Age: Final Report of the International Adult Literacy Survey. Paris; Ottawa: OECD Publishing, 2000.

Perry L.B. Causes and Effects of School Socio-Economic Composition? // A Review of the Literature, Education and Society. 2012. Vol. 30. No. 1. P. 19–35. <https://doi.org/10.7459/es/30.1.03>.

PISA 2009. Results: Overcoming Social Background — Equity in Learning Opportunities and Outcomes. OECD, 2010. Vol. II. <doi.org/10.1787/9789264091504-en>.

PISA 2015. Assessment and Analytical Framework: Science, Reading, Mathematics, Financial Literacy and Collaborative Problem Solving. Paris: OECD Publishing, 2017.

PISA 2015. Results. Vol. I: Excellence and Equity in Education. Paris: OECD Publishing, 2016.

Rivkin S.G., *Hanushek E.A.*, *Kain J.F.* Teachers, Schools, and Academic Achievement // Econometrica. 2005. Vol. 73. No. 2.

Ryan R.M., *Deci E.L.* Self-Determination Theory and the Facilitation of Intrinsic Motivation, Social Development, and Well-Being // American Psychologist. 2000. Vol. 55. No. 1.

Shmis T., *Parandekar S.D.* Education Equity in the Russian Federation: Summary Report (English). Washington, DC: World Bank Group, 2018. <http://documents.worldbank.org/curated/en/139291530189329351/Education-Equity-in-the-Russian-Federation-Summary-Report>.

Singh K., *Granville M.*, *Dika S.* Mathematics and Science Achievement: Effects of Motivation, Interest, and Academic Engagement // The Journal of Educational Research. 2002. Vol. 95. No. 6. P. 323–332.

Sirin S.R. Socioeconomic Status and Academic Achievement: A Meta-Analytic Review of Research // Review of Educational Research. 2005. Vol. 75. No. 3. P. 417–453.

Stipek D., *Givvin K.B.*, *Salmon J.M.*, *MacGyvers V.L.* Can a Teacher Intervention Improve Classroom Practices and Student Motivation in Mathematics? // The Journal of Experimental Education. 1998. Vol. 66. No. 4. P. 319–337.

Students, Computers and Learning: Making the Connection, PISA. Paris: OECD Publishing, 2015.

Synergies for Better Learning: An International Perspective on Evaluation and Assessment. OECD, 2013. UNESCO. EAtlas of Literacy. <http://on.uis.unesco.org/literacy-map>.

Urdan T., *Schoenfelder E.* Classroom Effects on Student Motivation: Goal Structures, Social Relationships, and Competence Beliefs // Journal of School Psychology. 2006. Vol. 44. No. 5. P. 331–349.

Usher A., *Kober N.* Student Motivation: An Overlooked Piece of School Reform. Summary. Center on Education Policy, 2012.

Vagvolgyi R. et al. A Review about Functional Illiteracy: Definition, Cognitive, Linguistic, and Numerical Aspects // Frontiers in Psychology. 2016. No. 7.

Watt H.M. Development of Adolescents' Self-Perceptions, Values, and Task Perceptions According to Gender and Domain in 7th Through 11th Grade Australian Students // Child Development. 2004. Vol. 75. No. 5. P. 1556–1574.

What Matters Most in Teacher Policies? A Framework for Building a More Effective Teaching Profession. The World Bank, 2012.

White K.R. The Relation between Socioeconomic Status and Academic Achievement // Psychological Bulletin. 1982. Vol. 91. No. 3.

White S.B., *Reynolds P.D.*, *Thomas M.M.*, *Gitzlaff N.J*. Socioeconomic Status and Achievement Revisited // Urban Education. 1993. Vol. 28. No. 3. P. 328–343.

Wilson W.J. The Truly Disadvantaged: The Inner City, the Underclass and Public Policy. Chicago: University of Chicago Press, 1987.

World Development Report 2018: Learning to Realize Education's Promise. Washington, DC: World Bank, 2018.

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This report contains an unprecedented number of diverse datasets, which make it possible to see the system of school education from all angles: infrastructure, curricula, funding, accessibility, and quality of services. International comparisons are used throughout.

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