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Scientific Parenting?

What Parents Worry about and What Sources of Information They Use

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Abstract. Scientists note that the dominant ideology for raising children today is intensive parenting. One of the key prerequisites underlying this ideology is that in child-rearing a parent should be guided by expert knowledge. In this context, educational programs for parents and parental self-education are being actively developed. However, the informational inquiries of parents have not been sufficiently studied. What sources do parents use? At which points is information about the upbringing of children most needed? In this paper we look at what sources of information related to children (education, health, etc.) parents use and what questions they are concerned about. The paper is based on an online survey of mothers and fathers of children aged from one to 12 years. We show that the intensity of use of different sources of information is related to the age of a child: one can single out peaks of "confusion" associated with certain stages in a child's life: the first six months of her or his life and the 6–7 year old age (preparation for school), with a relatively calm period (when a child is 4–5 years old) between them.

Keywords: scientific parenting, intensive parenting, informational inquiries of parents, educational programs for parents.

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Recently, the number of various educational resources for parents has been growing: educational programs and courses for parents, including those financed by the state [Polivanova et al. 2015]. The amount of experts in the child rearing and development process is also actively increasing [Strelnik 2015; Mayofis, Kukulin 2010], in particular in new areas of expertise (for example, babywearing, breastfeeding techniques etc.).

Researchers consider the orientation toward expert knowledge regarding the child rearing process as one of the imperatives of intensive motherhood—today's dominant ideology of child rearing [Hays 1998;

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Furedi 2001; Lee 2008, Lee et al. 2014, Macvarish 2014]. According to this ideology, "methods of appropriate child-rearing are construed as child-centered, expert-guided, emotionally absorbing, labor-intensive and financially expensive" [Hays, 1998]. The term "intensive parenting" is intensively used in the literature: the influential ideology also begins to spread across fathers [Shirani, Henwood, Coltart 2012; Craig, Powell, Smyth 2014].

According to the intensive parenting model, parents are responsible for everything that happens to the child. Within this ideology framework it is assumed that parents' actions have a decisive influence on the child's development (*parental determinism*) [Bruer 1999; Furedi 2001; Macvarish, Lee, Lowe 2014], and "improper" parenting breeds grounds for many social problems [Faircloth 2014].

It is not the only one, but one of the key requirements of the intensive parenting ideology is the expert knowledge orientation assuming that parents must develop various complex skills and knowledge in the field of child rearing with the help of expert councils [Chernova, Shpakovskaya 2013; Lee et al. 2014] and base their further decisions on scientifically verified facts. This is so called "*scientific parenting*" [Apple 1995; Faircloth 2010; Lee 2014]. The term is already represented in popular scientific literature for parents. For example, the popular pediatrician Eugene Komarovsky draws a line between the "outdated" knowledge of relatives about child care, and the "new", "correct" knowledge of modern doctors: according to his model, the first type of knowledge should be abandoned, while he encourages using the second type as the guideline [Komarovsky 2017].

The intensive parenting ideology has not been studied in Russia yet but some concepts are becoming more widespread [Polivanova et al. 2015; Strelnik 2015; Chernova, Shpakovskaya 2013; Godovannaya, Temkina 2017]. In the media and state discourse, child rearing is designed as a mission parents are fully responsible for and they must develop special competencies for its successful implementation [Chernova, Shpakovskaya 2013]; irresponsible parenting is presented as a source of various social problems [Strelnik 2015].

We conducted a survey among parents to assess to what extent the new parent culture—in particular, its focus on expert knowledge and self-learning programs—has become a part of parental behavior and child rearing practices. How intensively do parents use various educational resources and require expert opinion on the child rearing process? Do they attend special educational programs for parents? Is it possible to talk about scientific parenting while replacing more traditional sources of information such as the advice of relatives or friends with expert opinion? How does the intensity of using different sources of information change depending on the age of the child? What peaks of interest can be distinguished?

1. Survey Methods & Sampling Techniques

Parents' requests for information vary considerably depending on the amount of children in the family and their ages. The sample of the study is parents who have one child between the ages of 1 and 12. Taking into account the limited resources, it was decided to focus on this group of parents.

The online questionnaire survey[1] was conducted in July 2016. More than 2000 people (urban population) were interviewed in total. A specific feature of the survey is the participation both of mothers (1 thousand people) and fathers (1 thousand people), who are generally much less likely than mothers to be surveyed.

There were quotas for the age of the child in the final sample to ensure a representation of parents with children of different ages: a roughly 50–50 split between the proportion of parents of 1 to 6-year-old children and parents of 7 to 12-year-olds. .

The sample was designed in such a way that the distribution of respondents by type of urban settlement (Moscow, other cities with more than 1 million inhabitants, cities with less than 1 million inhabitants) was proportional to the distribution of the urban population of the Russian Federation, since the sources of information on the child rearing and development available for parents may vary according to the size of the city.

The final distribution of respondents by type of locality practically coincides with the target data (Table 1). Figures 1–3 show the final sample characteristics in comparison with the total population of the Russian Federation: age, level of income and education. The average age mothers have their first child coincides within our sample with the average age for Russia—25 years old [Zakharov 2016: 122]. Unfortunately, due to the lack of relevant open data on the Russian Population Census, we cannot compare our sample in terms of income and education level with one-child families across the Russian Federation to estimate the bias more accurately.

2. Survey results

2.1. Questions parents have about their child: when, and what kind

Parents were asked an open-ended question requiring them to formulate their own questions and to code the answers afterwards. Respondents were asked to specify several issues related to child rear-

[1] In 2016, 70% of households in Russia had Internet access (using materials of the Russian Public Opinion Research Centre (VCIOM): http://wciom.ru/news/ratings/polzovanie_internetom/), so we assumed that it is available to the majority of parents. To conduct the online questionnaire survey, an online panel developed by *OMI (Online Market Research)* company was used (the database of potential respondents of different sex, age, living in different regions of Russia). The online panel quality was confirmed by independent audit, which proved the highest standards of participants' integrity: the database represents the lowest percentage rate in Russia of those respondents who fill out questionnaires too quickly or fall for the trick questions: http://www.omirussia.ru/ru/online_panels/panel_quality/

Table 1. **Study participant distribution by cities with different population sizes** (%)

	Urbanization rate in Russian Federation	Response rate
Moscow	12	10
Other cities with more than 1 million inhabitants	19	15
Cities with less than 1 million inhabitants	68	75
Total (person)	2047	

Fig. 1. **Study participant distribution by age**

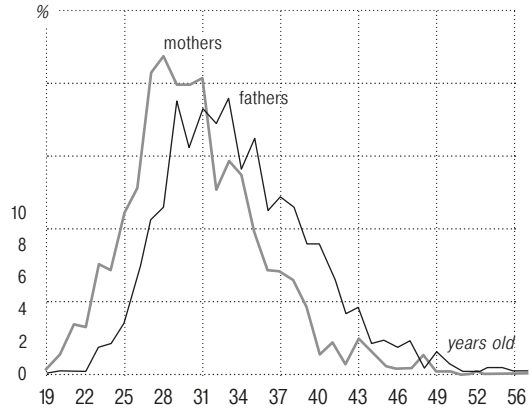


Fig. 2. **Study participant distribution by income level** (average monthly income per person during the last six months) in comparison with the total population of the Russian Federation, according to Federal State Statistics Service (Rosstat) data for 2016 (% of respondents, thousand rubles)

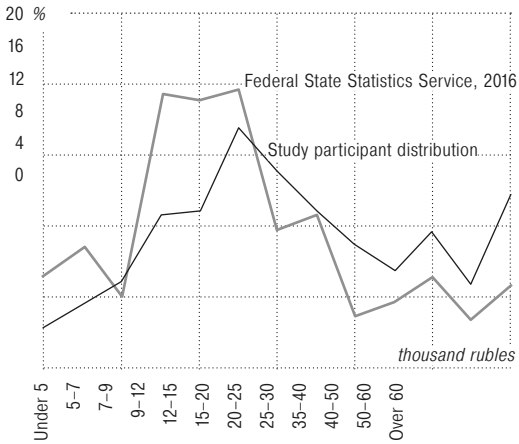
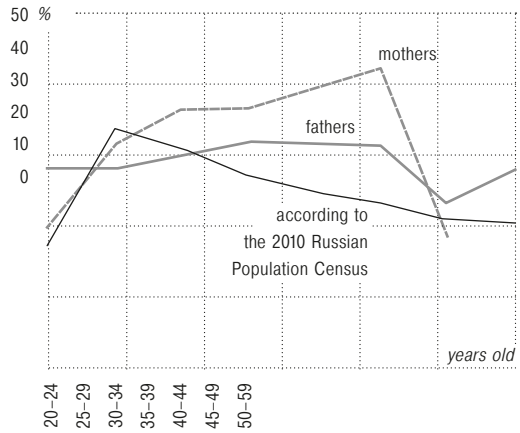


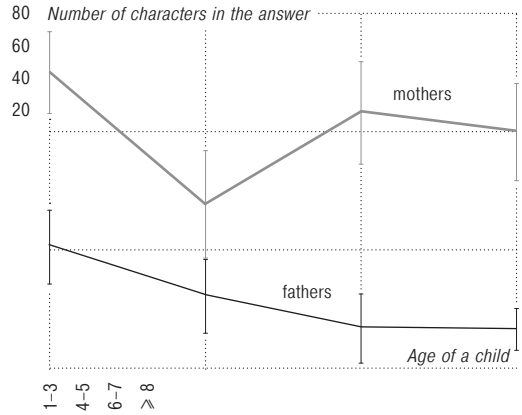
Fig. 3. **Study participant distribution by level of education** (higher education,% of respondents) in comparison with the total population of the Russian Federation, according to the 2010 Russian Population Census



ing that they had worried about in the past year. Mothers formulated on average more questions than fathers (2.6 and 2 questions, respectively, the differences are statistically significant, $p < 0,05$).

The range of topics parents are concerned about is very wide. Firstly, there are a lot of questions about a child's body and how to care for it: health care, bad habits, hygiene, disease prevention strategies,

Fig. 4. **Question length correlation depending on the age of a child**



physiology developmental milestones, first aid, and how to search for qualified medical care. Secondly, there are questions about the child development stages, deviations from mental health, addictions (for example, of computer), and supporting physical and psychological development (search for a speech therapist, a defectologist). Thirdly, parents want to learn how to build relationships within the family (between parents after divorce, with grandparents) and at school (conflicts with peers). In more than half of the cases, parents are interested in techniques to shape the child's behavior: how to rouse a love for learning, how to deal with laziness, how to discipline children, etc. Another group of questions is devoted to the organization of education—access to the system of general and supplementary education, the choice of kindergarten, school, hobby groups and sports groups, and the general academic success of the child.

The number of questions asked by the parent is related to his or her involvement in the child rearing process: the more often the mother or father does some activities together with the child (read out loud, tell stories, do sports, sing songs, and discuss something), the more questions they came up with (correlation coefficient 0.1, $p < 0{,}01$).

The request for further information clearly changes depending on the age of the child (Figure 4). The older the child is, the less questions the parent formulates (correlation coefficient –0.1, $p < 0{,}001$). There is also a negative correlation between the number of questions and the age of the parent indicated in the questionnaire (correlation coefficient is also –0.1, $p < 0{,}001$).

Since the parents' issues can be either very general (how to play with the child) or, conversely, narrow (how to stop a runny nose), we used as an indicator of parent interest not only the number of ques-

tions they have, but also the text length when answering the question (the total number of signs), assuming that the more interested the parent is, the more detailed answers he or she will write.

On average, fathers give less detailed information than mothers in terms of the length of the text. The dynamics of this indicator also differs among mothers and fathers. While the length of the text gradually decreases among fathers, it increases among mothers, depending on the age of the child. Thus, concerns about child rearing issues are not as universal as is represented in several key papers on intensive parenting (for example, F. Fouredi uses the term *paranoid parenting* to describe parents who are constantly concerned about child rearing issues [Furedi 2001]). The degree and content of this concern varies among mothers and fathers, as well as among parents of children of different ages.

2.2. Sources of information used by parents

There were some questions in the questionnaire designed to specify the sources of information on child rearing and the frequency of use: with whom do parents discuss the issues related to the child?; do they read popular scientific literature or/and watch TV programs, etc? Parents were also asked to evaluate the listed sources of information on the degree of trust. There were also questions on psychologist visiting practices and on participation in online forums and communities in the questionnaire designed only for mothers.

The intensity of using the certain sources of information by parents depends on many factors (Table 1 in the appendices). Parents living together, as well as parents demonstrating involvement at home by reading the bedtime stories, hugging, etc., on average, use more various sources of information on child development. It is relevant both for parents of preschoolers and of school students. The higher the cultural capital level[2] is, the greater is the probability the mother has used the psychological counselling services on issues related to the child rearing. At the same time, parents living outside of Moscow, as well as fathers who do not have steady work and are characterized by a relatively low cultural capital level, demonstrate the activity decline in using sources of information on child rearing, which significantly reduces as the child grows older.

The vast majority of the respondents have discussed issues related to their child during the last month with the child's mother or father, with acquaintances or friends, with their own parents (Table 2). About half of the parents have not consulted any professionals during the last month—doctors, early years teachers, school teachers. Forums or Internet communities are less popular among parents to discuss child-related issues. It is also worth mentioning that this source

[2] The cultural capital level was assessed using several questions: reading literature in foreign languages and theaters, museums, concerts visit frequency.

Table 2. **Child-related issues discussed by parents last month**
(% of respondents, bold indicates the most popular answers)

	Mothers		Fathers	
	1–6-year-old child	7–12-year-old child	1–6-year-old child	7–12-year-old child
With friends and acquaintances	94%	94%	78%	77%
With own parents	92%	85%	87%	84%
With child's mother/father	85%	71%	96%	94%
With doctors	65%	45%	62%	45%
With parents of child's mother/father	53%	37%	59%	53%
With early years teachers and school teachers	45%	42%	49%	50%
Within Internet communities or with forum participants	42%	33%	19%	19%
Average number of selected options	5	4	4	4
Total (person)	519	514	500	498

of information is used more often by parents who live in cities with more than 1 million inhabitants (9.6% of parents are from Moscow, 8.2% of parents are from other cities with more than 1 million inhabitants, 7.6% are from other cities, the differences are statistically significant, $p < 0,05$).

At the same time, the older the child is, the less mothers seek advice from relatives or experts (teachers, doctors) (the differences are statistically significant, $p < 0,05$). The average number of sources mothers refer to also decreases as the child grows older: mothers who have a 1 to 6-year-old child, chose five options on average, while mothers of school students chose four. The discussion of child-related issues with friends and acquaintances is most popular option among mothers (more than 90%) and its popularity doesn't depend on the age of the child. As for the fathers, the child's mother is the TOP- interlocutor (more than 90%).

As well as discussions with professionals and people parents trust, there are other sources of information on child rearing that parents refer to: 83% of mothers and 60% of fathers have read printed or online articles about child rearing, development and care at least once in the last month, 67% of mothers and 60% of fathers have watched TV programs on related issues, and 87% of mothers of children under the age of 6 have read at least three times in the last month (the differences are statistically significant, $p < 0,05$), which is the highest result among the respondents.

As for online forums and communities for parents, the majority of the interviewed mothers (75%) spend at least 10 minutes per day on them (for example, social networks, LiveJournal, *babyblog.ru* Internet-community). However, only 8% of parents (11% of mothers and 4% of fathers) actively participate in online communities: they have consulted community members or have commented on posts of other participants 3 times or more in the last month. The older the child is, the lower the likelihood of its mother following parental Internet communities or forums: on the one hand, 87% of mothers who have a 1-year-old child follow such sites, while on the other hand only 57% of mothers who have children between the ages 11 and 12 are followers.

The inner circle was assessed (primarily by fathers) as the most reliable source of information on child rearing and development. Even in the case of medical treatment, disease prevention and vaccination, a large number of parents trust non-professionals—their parents, friends and acquaintances, and their spouse. As for the treatment decisions, 70% of mothers trust doctors and 41% trust their parents, while 66% of the fathers trust doctors and 61% trust the child's mother (Table 2–5 in the appendices). The amount of mothers who trust early years teachers, school teachers, psychologists, and popular science literature for parents regarding child rearing and development issues is only half that of those who trust the child's father or their own parents (the difference is even greater among the fathers).

Thus, our research has represented that expert opinion and expert literature are not the most important sources of information for parents. Parents tend to use a wide variety of sources of information and do not always trust experts more than their husband/wife or their own parents. At the same time, the higher the cultural capital level of parents is and the stronger the family ties are (parents live together, interact regularly with the child), the wider the variety of sources of information used by parents is. The increasing frequency of use of these sources also depends on these factors, regardless of the age of the child.

2.3. Attending educational programs for parents

The proportion of parents who wish to attend educational programs for parents does not change, regardless of the age of the child: it is more than 50% among mothers and more than 40% among fathers before the child reaches the age of 12 years. However, they do attend educational programs before the birth of the child, during pregnancy (Figure 5).

There are a large number of women willing to join educational programs among those who have already attended such programs (Figure 6). About a third of the women and about half of the men who participated at the survey have never attended such programs and are not going to. Those parents who would like to attend educational programs, on average, possess more books about child rearing and care. There are 28% of parents willing to attend educational pro-

Fig. 5. **Response rate of parents attending educational programs** (%)

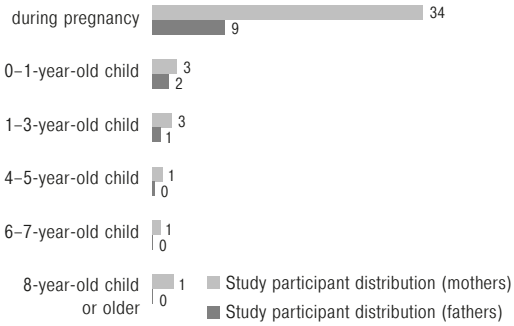
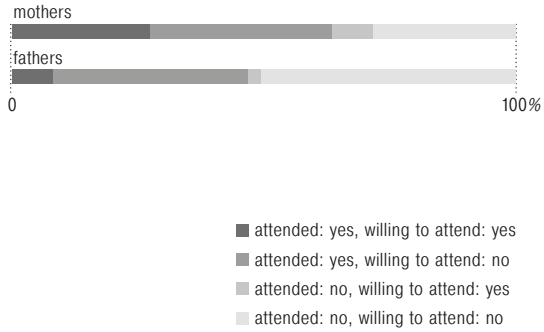


Fig. 6. **Response rate of parents attending educational programs and willing to attend them in future** (%)



grams among those who are the participants of some Internet forums or communities, while there are 14% of parents among those who do not follow any of them. Parents who would like to attend educational programs discuss issues related to the child more often with the early years teachers and school teachers, with doctors and other parents via forums and online communities, they read books, articles and watch TV programs about child rearing, development and care more often.

Thus, the parents who educate themselves about child rearing are more interested in educational programs for parents.

3. Conclusions

Our research represents how the vast majority of parents are in search of information on child-related issues and can refer to different sources: professionals, relatives, acquaintances, books about child rearing and development, online forums and communities, and TV programs. Most parents use the particular set of sources of information they trust in.

The intensity of using different sources of information as well as the desire to attend educational programs for parents, decreases as the child grows older. The number of child-related issues significant for parents also reduces. But there is the exception when children are going on to enroll at school (6–7 years): during this period parents have many questions and the quest for information is greater. As for educational programs for parents, they are attended mainly before the birth of the child. We assume that the lack of free time and financial resources which may take place after the birth of the child are not the only reason parents quit attending educational programs. It can be assumed that before the birth of a child parents were interested in general information about infants (there are prenatal courses for future

parents to answer such questions), while after the birth of the child parents are more interested in specific issues concerning their own child, their family situation etc. It means that educational programs with general information become less relevant to them.

When designing some educational activities for parents, as well as when developing information content for them, it is necessary to take into account some important features of their requests for information on child rearing and development. Firstly, the most common sources of information for most parents, especially for fathers, are people from their inner circle: their own parents, a spouse, friends and acquaintances. Even in case of medical treatment, a large number of parents trust their closest relatives, which is comparable to the percentage rate of those parents who trust professionals. Other sources (psychologists, popular science literature, online forums or communities for parents, TV programs about child rearing, development and care) are used more often by parents with higher education and those who live in large cities. Secondly, there are more parents willing to attend educational programs among those one who have already used some sources of information about child-related issues. A third of all parents would like to attend educational programs have already attended such programs previously. So, the parents educating themselves about child rearing are more interested in educational programs. Thirdly, parents who live together, interact regularly with the child and who have a steady work, use information sources on child-related issues more actively than others. In particular, the percentage rate of those parents who have attended educational programs or willing to attend them is higher among this group of parents.

The collected data do not allow us to draw conclusions concerning the use of knowledge from different sources: for example, do parents put into practice the advice of relatives in the same way as recommendations from popular science literature? In addition, we do not know the content of the advice of relatives? It is likely that they share the information received from popular science literature, medical articles, etc.

Thus, the conducted study allowed us to assume that such fundamental requirements of the intensive parenting ideology as the expert knowledge orientation and professional support in raising children are underrepresented among child rearing practices among different groups of parents in Russia.

There is also a challenge for educational programs' design and curriculum for those parents who actively educate themselves: what kind of information are they interested in apart from the information they can find by themselves? Another challenge is to draw less active and less "advantaged" parents' attention (assuming that each modern parent is required to have a high level of parental competence) and to remove barriers (economic, geographical, etc.) to educational programs. One of the possible solutions to this is the focus shift from

"translating" information to being more diversified in terms of format and content solutions, allowing interaction with such a heterogeneous group as parents (see, for example, [Polivanova et al. 2015]).

Appendices

Table **1. Books or articles about child's development and education read by parents per last month** (%)

	Mothers, response rate		Fathers, response rate	
	1–6-year-old child	7–12-year-old child	1–6-year-old child	7–12-year-old child
3 times or more	41	24	17	10
1–2 times	46	56	48	44
Never	14	21	35	46

Table 2. **Trust in different sources of information on treatment decisions regarding children** (%)

	Mothers, response rate	Fathers, response rate
Child's mother or father	21	61
Parents of the child's mother or father	17	19
Own parents	42	28
Doctors	70	66
Acquaintances or friends	23	12
Psychologists	5	5
Internet communities or forum participants	7	4
Early years teachers and school teachers	2	4
Popular science literature for parents (books, articles on the Internet, magazines and newspapers)	14	10
TV programs about the child rearing, care and education	8	6

Table 3. **Trust in different sources of information on child rearing and development** (%)

	Mothers, response rate	Fathers, response rate
Child's mother or father	47	70
Parents of the child's mother or father	19	27
Own parents	49	42
Doctors	17	11
Acquaintances or friends	10	7
Psychologists	14	8
Internet communities or forum participants	18	17
Early years teachers and school teachers	23	25
Popular science literature for parents (books, articles on the Internet, magazines and newspapers)	21	14
TV programs about the child rearing, care and education	10	8
Other	1	0
I do not trust any sources	4	3

Table 4. **Trust in different sources of information on peer relationships** (%)

	Mothers, response rate	Fathers, response rate
Child's mother or father	42	56
Parents of the child's mother or father	18	22
Own parents	39	29
Doctors	27	18
Acquaintances or friends	5	5
Psychologists	13	8
Internet communities or forum participants	22	19
Early years teachers and school teachers	26	27
Popular science literature for parents (books, articles on the Internet, magazines and newspapers)	17	9
TV programs about the child rearing, care and education	8	6
Other	1	0
I do not trust any sources	4	6

Table 5. **Trust in different sources of information on learning and education** (%)

	Mothers, response rate	Fathers, response rate
Child's mother or father	42	56
Parents of the child's mother or father	16	17
Own parents	39	29
Doctors	27	18
Acquaintances or friends	5	4
Psychologists	11	8
Internet communities or forum participants	12	11
Early years teachers and school teachers	39	37
Popular science literature for parents (books, articles on the Internet, magazines and newspapers)	20	16
TV programs about the child rearing, care and education	10	10
Other	1	1
I do not trust any sources	5	6

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The Infrastructure of Reading: Reader's Experience Perspective

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Abstract

Professional teacher community describes the current situation in literary education as a deep crisis and finds it necessary to update the objectives of teaching literature at school and review the education system as a whole by changing its participants fundamentally: education cannot and should not be regarded as a closed school system anymore. Expansion of citizens' educational and cultural opportunities dictates the need for analyzing the outcomes of education through the prism of its needs. The infrastructure of reading is described as a system of components which provide for meeting needs and demands of the infrastructure subjects, i. e. citizens who read. The sociocultural approach as a way of determining the key urban environment prerequisites to promote the development of reading motivation and reading competencies in children and adolescents appears to be the most adequate and productive method of investigating and designing the infrastructure of reading.

Keywords

infrastructure of reading, sociocultural approach, reading motivation, reading environment, reading accessibility, space-time characteristics of reading, readers' communications.

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The Association between Sport Activities and Educational Achievements:

Evidence from Russian Longitudinal Data

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Abstract. This paper empirically studies the association between the sport activities and educational achievements of school students from 1st to 11th grade. The sample used included observations over the period 2010–2015 taken from the Russia Longitudinal Monitoring Survey (waves 19–24), which is a unique nationally representative survey. The method consisted of logit regressions with panel data, which allows for controlling time-invariant explanatory variables. The empirical analysis was divided into sport activities at school (in class) and out-of-school (before or after classes). Furthermore, the regression analysis examined the effect of three large groups of sport activities: 1) Combat sports, such as karate, judo, self-defense, wrestling, and boxing, 2) Ball sports, such as tennis, soccer, basketball, and volleyball, 3) Athletic sports, such as track and field, skiing, and skating. General speaking, the findings indicated that sport activities at school do not have significant associations with educational achievements. On the other hand, sport activities out-of-school showed some positive relationships. Specifically, participation in athletic and combat sports increases the probabilities of boys and girls, respectively, being classified as high-performing students. Moreover, male students practicing ball sports out-of-school are less likely to be classified as low-performing students. The time that students spent on these sports does not influence these probabilities. However, male students spending more than 10 hours per week on sports (high-performance sportsmen) are more likely than other students to be linked to the group of low-performing students.

Keywords: sport activities; physical education; educational achievement; Russia; logit regression; panel data.

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1. Motivation

James Coleman was a prominent sociologist who developed our understanding on the relationship between social capital and educational outcomes, and also one of the first scholars suggesting an inverse relationship between sports and educational outcomes [Eitle, Eitle 2002; Troutman, Dufur 2007]. Note that, sometimes, sports generate

distraction, make students too tired or nervous to study or to concentrate in class [Lamborn et al. 1992]. Furthermore, sports have been associated with risky behavior, for instance, drinking alcohol [Eccles, Barber 1999] and alcohol use has been associated with lower levels of educational attainment [Bailey 2016].

Nonetheless, sport activities have also been positively linked to educational aspirations, school grades, attendance, engagement, and other positive educational outcomes [Bailey, 2016]. Sports provide educational experiences that cannot be reached in the classroom, and this has positive impacts not only on educational outcomes, but also on occupational outcomes. In other words, sports provide training [Barron, Ewing, Waddell 2000; Lunn, Kelly 2015], for example, discipline to achieve goals and strategies for interacting with others in the settings.

Barron et al. [2000] noted that the academic differences between athletes and non-athletes can be explained by background factors. In general, American football and basketball, usually classified as revenue sports and associated with black men, are time consuming and are unrelated or negatively related to educational outcomes [Eitle, Eitle,2002; Rettig, Hu 2016]. Troutman and Dufur [2007] found that females participating in interscholastic sports are more likely to graduate from college than female non-participants. This additional benefit of sport participation for women has also been found in Germany. It seems that sports allow girls to reach higher levels of competitiveness. As a result, the positive impacts of sports are even larger for women than for men [Pfeifer, Cornelißen 2010].

Peers also play an important role in school success and aspirations, and this is particularly relevant for students participating in sports. In the sport milieu, it is possible to find new friends. For maintaining status and reputation with them many times it is also necessary to keep good notes and high educational aspirations [DeMeulenaere 2010]. In general, this milieu allows new contacts and networks, that is, social capital. Moreover, instructors, mentors, coaches, and trainers many times are key factors not only for school success.

In short, the literature suggests two opposite hypothesis. First, sports distract and divert energies away from academic activities; therefore, sports correlate with low educational outcomes (the zero-sum hypothesis). Second, sports encourage a series of biological and psychosocial factors supporting and favoring academic activities; therefore, sports correlate with high educational outcomes (the developmental hypothesis). There should be a threshold level, which may depend on individual characteristics, yet much time spent on sports may not allow students to achieve high educational outcomes. This is the case for high-performance sportsmen who usually begin their sport careers at an early age and need specific school programs for academic success [Emrich et al. 2009; Gayles, Hu 2009; Rettig, Hu 2016].

Actually, the claim that sport activities are important for educational outcomes was noted by physicians, neurologists, psychologists and physical educators more than 100 years ago [Park, 2014]. After all, nowadays, sport activities (physical education classes) are part of the school curriculum in the majority of countries, due to proof of their educational worth [Van Deventer 2014].

It is important to note that the empirical literature is centered on high school students and intramural or interscholastic sports in the American context. Consequently, the above mentioned findings cannot simply be generalized to other countries, with different institutional settings and infrastructure. In Russia, as in many other countries, sport activities are mainly practiced in sport clubs or public sport sites. Sometimes schools provide spaces for practicing sports, not only for their students, but these activities are not managed by schools and are not part of their responsibilities. In addition, schools rarely have school teams and formal schedules for sports as extracurricular school activities. In the USA, school sports are well established, are the first stages for professionalism, and participation in school teams is conditioned to average grades on school subjects. This is not the case in Russia, where typically there is a physical education class without high requirements. Given this, the present research addressed the following questions: what is the relationship between sport activities at school and out-of-school and the educational achievements of school students in Russia? And what is the specific relationship by type of sport?

To address these questions the analysis drew on data from the Russia Longitudinal Monitoring Survey (RLMS-HSE). The data set allowed the use of logit regressions with panel data, controlling for time-invariant explanatory variables and allowing better estimations of the specific effect of sport activities, which has been a challenge for previous studies as noted by DeMeulenaere [2010]. Subsequently, this research contributes to the literature in three ways. First, in contrast to most of the previous studies, which focused on high school students and school sports, here the sample included students in all levels of school training (11 years of schooling) and participation in sport activities out-of-school. Second, this study included time estimations, in hours and minutes, dedicated to sport activities, and not only dummy or ordinal variables on sport participation. Finally, note that for the Russian case there are several studies with a focus on the relationship between educational outcomes and socioeconomic status, cultural capital, social capital, school resources, and psychological factors [Popov, Tyumeneva, Kuzmina 2010, 2012; Roshchina 2010, 2012; Tovar-García 2013, 2014]. It is also possible to find studies with a focus on specific groups, for instance, on migrants [Alexandrov, Baranova, Ivaniushina 2012; Tovar-García 2017], and even on the role of language [Alòs i Font 2016; Tovar-García, Alòs i Font 2017], yet there are no studies with a focus on the nexus between sport and educational outcomes.

2. Method

The present research used data from six waves of the Russia Longitudinal Monitoring Survey (RLMS-HSE), conducted by the National Research University Higher School of Economics (HSE) and ZAO "Demoscope" together with Carolina Population Center, University of North Carolina at Chapel Hill and the Institute of Sociology, Russian Academy of Sciences (RAS). RLMS-HSE is a nationally representative study that collects information to monitor the effects of Russian reforms on the health and economic welfare of households and individuals. The first wave of the survey was conducted in 1992 but the information required for this research (from the questionnaire for children) is only available for the period 2010–2015, that is, from round 19 to round 24.[1] The baseline sample consists of 11243 observations from 3753 school students.

2.1. Dependent variables

The variables on educational achievements were operationalized by what the respondent, usually the father or mother, believed was the educational progress of his or her children. The item is "How would you estimate (his/ her) progress?" The response categories are: 1 = Almost all the grades are five, 2 = Basically all five and four, 3 = Basically all four, 4 = Basically all four and three, 5 = Basically all three, 6 = Basically all three and often two, 96 = Marks are not given, 97 = Doesn't know, 98 = Refuses to answer. From option 1 to 6 the variable was reverse coded to use it in an ordinal manner so that higher scores were reflective of higher educational progress and all other responses and missing data were not included. Note that the grading system in Russian schools, in practice, only uses marks from 2 to 5, where the minimal mark to pass is 3.

After this stage, the variable was re-coded to obtain two dummy variables. First, school students whose grades are almost all five were coded 1, and 0 otherwise (HIGH-PERFORMING STUDENTS). Second, school students whose grades are basically all three and whose grades are basically all three and often two were coded 1 (LOW-PERFORMING STUDENTS). About 11% of the students are classified as high-performing students and 5% are classified as low-performing (see Table 1).

TABLE1

2.2. Independent variables

Participation in sport activities was measured by several items allowing a division in the analysis between activities in class at school and

[1] Details about the design of the survey are well described in the official website of RLMS-HSE. Note that respondents, usually the parents of children, are advised on the research motives of the survey and the surveyors are highly qualified. Nevertheless, it is possible to expect a bias in the answers given to the questions used to operationalize the key variables of this research. This is a limitation of the study, which is minimized due to the longitudinal nature of the survey and the method.

activities before or after classes (out-of-school), measuring the degree of this participation and by type of sport. Note that these activities may take place within the school facilities, but they are not part of the school curriculum.

First, the question "Does (he/she) attend physical education classes at school?" was used. The response categories are: 1 = Yes, 2 = No, 7 = Doesn't know, 8 = Refuse to answer. A dummy variable coded 1 for positive answers (97%) and 0 for negative answers (3%) was built (SPORT AT SCHOOL). Therefore, practically all students have a physical education class, as expected because of the school curriculum in Russia. Exceptions correspond to specific cases where students are unable to practice sports or due to temporal difficulties to practice sports at the school grounds. Note that this is a very high figure in comparison with the USA where participation in physical education classes has been decreasing from the 70's; around 30% of American students attended such classes in 2006 (Park, 2014).

Second, an ordinal variable (OFTEN SPORT AT SCHOOL) was built using the question "How often does (he/she) engage in physical activities during school, in class?" with response categories: 1 = 1–3 times a month, 2 = 1 time a week, 3 = 2 times a week, 4 = 3–4 times a week, 5 = Every day, 7 = Doesn't know, 8 = Refuse to answer. Only options 1 to 5 were used, and responses 7 and 8, and missing data, were not included. On average, students practice sports 2 times per week, which agrees with the school curriculum of the majority of regular public schools.

Third, four dummy variables by type of sport and four continuous variables on time spent by type of sport were built using the item "Now I will list various kinds of physical activities and ask you to tell me in which of them (he/she) participates during class, and if so, for how many hours and minutes per week". The response categories are:[2]

1) "Karate, judo, self-defense, wrestling, boxing, gymnastics". A dummy variable (COMBAT SPORTS AT SCHOOL) was built, coded 1 for positive answers. Then, the time spent on these kinds of sports was measured only in hours (adding the reported minutes) and the variable HOURS COMBAT SPORTS AT SCHOOL was built.

2) "Active sports: badminton, tennis, soccer, basketball, volleyball, hockey, or swimming". A dummy variable (BALL SPORTS AT SCHOOL) was built, coded 1 for positive answers. Then, the time spent on these kinds of sports was measured in hours and the variable HOURS BALL SPORTS AT SCHOOL was built.

3) "Track and field, skiing, skating". As in previous cases, a dummy variable (ATHLETIC SPORTS AT SCHOOL) and a continuous variable (HOURS ATHLETIC SPORTS AT SCHOOL) were built.

[2] Gymnastics is not a combat sport, swimming is not a ball sport, and skiing is not a type of athletics. The reason to be included in their respective items is unknown. Therefore, this is another limitation of the survey.

4) “Other kinds of physical activity”. Similarly, a dummy variable (OTHER SPORTS AT SCHOOL) and a continuous variable (HOURS OTHER SPORTS AT SCHOOL) were built.

In the survey, very similar questions and response categories are used to measure participation in sport activities and the degree of this participation before or after classes. Thus, the same dummy variables and continuous variables were built using the words OUT SCHOOL to distinguish them from activities AT SCHOOL. Subsequently, the dummy variable SPORT OUT SCHOOL corresponds to the question “Does (he/she) engage in physical activities and sports before or after classes? Bearing in mind training sessions with a coach as well as simply active games outdoors, soccer, tag, hopscotch, hide and seek, riding a bicycle, roller skating, etc.” The ordinal variable OFTEN SPORT OUT SCHOOL corresponds to the question “How often does (he/she) engage in physical activities and sports, including outdoor games, before or after classes?”. The rest of the dummy and continuous variables by type of sport OUT SCHOOL correspond to the item “I will list various physical activities and ask you to tell me in which (he/she) engages before or after classes, and for how many hours and minutes per week”.

On average, 60% of students practice sports out-of-school (68% of boys and 52% of girls), 3–4 times per week, that is, with a frequency of almost 2 times more than at school. These figures are similar to those reported in Germany, where 64% of men and 44% of women participated in sports activities out-of-school (Pfeifer & Cornelißen, 2010). Besides, on average, Russian schoolchildren spent more hours out-of-school than at school in all type of sports. This makes sense because some of the sports undertaken do not require expensive or very specific equipment, and also because in Russia sports are mainly practiced in sport clubs or public sport sites (see Table 1).

2.3. Control variables

This research in operationalizing control variables is borrowed from Tovar-García (2017): socioeconomic status, regular schools, health issues, the largest cities of Russia, age, and gender.

The following three items operationalized socioeconomic status (SES): “Does he/she have his/her personal (1) Tablet PC, (2) Mobile PC, notebook, laptop, netbook, and (3) Smartphone, Communicator, i-Phone”. The response categories are: 1 = Yes, 2 = No, 6 = used by several family members, 7 = Doesn’t know, 8 = Refuse to answer. Positive answers obtained 1 point and 0.5 points were given for the use of the device by other family members. Then, these points were added to obtain the ordinal variable SES, which can take values from 0 to 3. Note that socioeconomic status will not substantially change over time and the method is already controlling for this variable, as stated in the following section. However, it is adequate to include this proxy of SES to obtain more accurate estimations and because SES has impacts on the selection effect into sports.

Table 1. **Descriptive statistics**

Variable	Obs	Mean	Std. Dev.	Min	Max	Mean Male	Mean Female
Educational Achievements							
HIGH-PERFORMING STUDENTS	10466	0.11	0.31	0	1	0.08	0.14
LOW-PERFORMING STUDENTS	10466	0.05	0.22	0	1	0.08	0.03
Sport activities in class at school							
SPORT AT SCHOOL	10009	0.97	0.18	0	1	0.97	0.96
OFTEN SPORT AT SCHOOL	9642	3.43	0.66	1	5	3.44	3.41
COMBAT SPORTS AT SCHOOL	9644	0.22	0.41	0	1	0.22	0.22
BALL SPORTS AT SCHOOL	9640	0.63	0.48	0	1	0.69	0.57
ATHLETIC SPORTS AT SCHOOL	9640	0.46	0.50	0	1	0.45	0.47
OTHER SPORTS AT SCHOOL	9643	0.63	0.48	0	1	0.63	0.64
HOURS COMBAT SPORTS AT SCHOOL	9505	0.20	0.60	0	10	0.22	0.18
HOURS BALL SPORTS AT SCHOOL	9224	0.79	1.10	0	20	0.92	0.67
HOURS ATHLETIC SPORTS AT SCHOOL	9317	0.45	0.72	0	14	0.44	0.46
HOURS OTHER SPORTS AT SCHOOL	9124	0.75	0.94	0	20	0.73	0.77
Sport activities before or after classes (out-of-school)							
SPORT OUT SCHOOL	9996	0.60	0.49	0	1	0.68	0.52
OFTEN SPORT OUT SCHOOL	5903	4.00	0.97	1	5	4.04	3.95
COMBAT SPORTS OUT SCHOOL	5948	0.16	0.37	0	1	0.21	0.11
BALL SPORTS OUT SCHOOL	5946	0.47	0.50	0	1	0.58	0.33
ATHLETIC SPORTS OUT SCHOOL	5943	0.25	0.43	0	1	0.22	0.29
OTHER SPORTS OUT SCHOOL	5947	0.68	0.47	0	1	0.62	0.75
HOURS COMBAT SPORTS OUT SCHOOL	5936	0.66	1.93	0	20	0.85	0.43
HOURS BALL SPORTS OUT SCHOOL	5870	1.67	2.81	0	35	2.18	1.04
HOURS ATHLETIC SPORTS OUT SCHOOL	5863	0.70	1.85	0	28	0.63	0.79
HOURS OTHER SPORTS OUT SCHOOL	5680	3.44	4.72	0	42	3.23	3.70
Control variables							
SES	11243	0.37	0.57	0	3	0.38	0.37
HEALTH ISSUES	11215	3.76	0.55	1	5	3.77	3.75
REGULAR SCHOOLS	11238	0.77	0.42	0	1	0.79	0.76
MOSCOW & SAINT PETERSBURG	11243	0.15	0.36	0	1	0.15	0.14
AGE	11243	10.54	2.61	6	19	10.57	10.50
MALE	11243	0.49	0.50	0	1		
HIGH-PERFORMANCE SPORTSMAN	11243	0.05	0.22	0	1	0.06	0.05

Source: Author's calculation

A dummy variable coded 1 for REGULAR SCHOOLS was built using the question "Is (he/she) studying in…?" with response categories: 1 = Gymnasium or school with gymnasium classes, 2 = School specialized in profile education of subjects, 3 = Comprehensive college, lycee, 4 = Non-residency school, 5 = Regular school, 6 = Another type of school, 7 = Doesn't know, 8 = Refuse to answer. About 77% of students are in regular schools.

The variable HEALTH ISSUES is operationalized using the question "How would you evaluate (his/her) health?" with response categories: 1 = very good, 2 = good, 3 = Average-not good, not bad, 4 = bad, 5 = very bad, 7 = Doesn't know, 8 = Refuse to answer. This variable was reverse coded so that higher scores were reflective of better health, which should also allow the practice of sports.

School students from Moscow and Saint Petersburg were coded 1 (15%), these are the largest cities of Russia, and it is expected a concentration of clubs and sport facilities. In the sample, students are 6 to 19 years old, and the student's age (AGE) is also included as a control variable. Actually, there are very few students of 18 and 19 years old. Usually school students are 17 years old in the last year of post-secondary education (11th grade) and children are usually 7 years old in first grade of the elementary school. Therefore, AGE also allows control for school years.

Male students were coded 1 (49%) creating the dummy variable MALE. As mentioned in the literature review, most of the studies from the 70's to the 90's did not included females in the analysis of the relationship between sport and educational outcomes due to the small percentage of women participating in sport. Yet, recent studies suggest that females obtain more benefits from sports than males (Pfeifer & Cornelißen, 2010; Troutman & Dufur, 2007). In addition, a gender gap has been found in Russia; girls perform better at school than boys (Tovar-García, 2013, 2014). This is also noted in Table 1, where a higher percentage of girls are classified as high-performing students, and a higher percentage of boys are classified as low-performing students.

It is well known that high-performance sportsmen consider their sport activities as a priority, performing poorly at school and/or studying in special school programs (Gayles & Hu, 2009; Rettig & Hu, 2016). Therefore, as a final control variable, students reporting participation in sport activities for more than 10 hours per week (5%) were coded 1 (HIGH-PERFORMANCE SPORTSMAN).

The correlation matrix of the major variables of this study was also analyzed (not shown here). In general, there are low correlation coefficients between independent variables, excluding the dummy variables by type of sport and the corresponding variable on number of hours spent by type of sport. Thus, in the following section several regressions are analyzed to account for possible multicollinearity concerns.

3. Results

Data analysis was conducted using regression analysis, mainly logit regressions with panel data. This empirical strategy differs from previous empirical studies using longitudinal data, but cross-sectional regression models. Note that panel data have several advantages because they are more informative, show more variability, present less collinearity concerns, give more degrees of freedom and offer more efficiency [Baltagi 2005].

It is possible to recognize a large list of explanatory variables of educational achievements, yet most of them will not change (gender, ethnicity, race, and so on) or will slowly change over time. The core components of cultural capital, social capital and the students' socioeconomic status, usually measured by parental education, parental professional status and family income, are variables that will hardly change over time. Even variables affecting the selection effect into sport participation (for example, sport facilities and parental involvement in sports) will not substantially change over the period under study. Therefore, in this analysis of educational achievements, it is particularly relevant that regressions with panel data allow control measures for time-invariant explanatory variables [Tovar-García 2017].

It is easier to identify these advantages in a panel data model with two time periods (before-after comparisons). This is also a model in first-differences, comparing values of the dependent variable in the second period with values in the first period. In Equation (1), let Z_i be a variable that determines educational achievements in the case of the *i*th school student, but does not change over time (so the $_t$ subscript is absent). On the contrary, let X_{it} be a variable that changes over time and determines educational achievements (sport activities in this research).

(1) $\text{Educational achievements}_{it} = \beta_0 + \beta_1 X_{it} + \beta_2 Z_i + u_{it}$.

Because Z_i does not change over time, in the regression model in Equation (1) it will not produce any change in the educational achievements between the first period and the second period. Thus, in this regression model the influence of Z_i can be eliminated by analyzing the change in educational achievements between the two periods. Consider Equation (2) for the first period and Equation (3) for the second period.

(2) $\text{Educational achievements}_{i1} = \beta_0 + \beta_1 X_{i1} + \beta_2 Z_i + u_{i1}$.

(3) $\text{Educational achievements}_{i2} = \beta_0 + \beta_1 X_{i2} + \beta_2 Z_i + u_{i2}$.

Subtracting Equation (2) from Equation (3) eliminates the effect of $Z_{i,}$ as it is showed in Equation (4).

(4) $\text{Educational achievements}_{i2} - \text{Educational achievements}_{i1} = \beta_0 + \beta_1(X_{i2} - X_{i1}) + u_{i2} - u_{i1}$.

Thus, Equation (4) eliminates the effects of the unobserved variables Zi that are constant over time. This result is clearly extended to panel data models with fixed effects, and the flexible effects models can even consider the information from time-invariant variables. Therefore, here the baseline model is given by Equation (5), estimated using logit regressions on panel data with robust standard errors and random effects, allowing the inclusion of time-invariant independent variables (in opposition to fixed effects).

(5) $$\text{Educational achievements}_{it} = \beta_0 + \beta_1 \text{SPORT AT SCHOOL}_{it-1} + \beta_2 \text{OFTEN SPORT AT SCHOOL}_{it-1} + \text{TYPE OF SPORT AT SCHOOLS}'\alpha_{it-1} + \text{HOURS TYPE OF SPORT AT SCHOOL}'\gamma_{it-1} + \beta_3 \text{SPORT OUT SCHOOL}_{it-1} + \beta_4 \text{OFTEN SPORT OUT SCHOOL}_{it-1} + \text{TYPE OF SPORT OUT SCHOOLS}'\delta_{it-1} + \text{HOURS TYPE OF SPORT OUT SCHOOL}'\theta_{it-1} + \text{CONTROL VARIABLES}'\rho_{it} + \mu_i + u_{it},$$

Where educational achievements include two dependent dummy variables: HIGH or LOW PERFORMING STUDENTS as explained in the previous section. Note that the variables on sport activities are included with one lag to account for reverse causality. Endogeneity concerns have been already noted in the literature, but the majority of studies only warned readers about this concern. A few studies used instrumental variables, which is an excellent strategy. However, because of data limitations, it was impossible to find adequate instrumental variables for the present research.

Table 2 provides the major results for the dependent variable HIGH-PERFORMING STUDENTS. Column 1 shows the estimated coefficients for the simplest specification and column 5 shows results for the most multifaceted model (given collinearity restrictions). Columns 6 and 7 replicate the regression model of column 5 by subsamples of males and females, respectively. In fact, many different specifications were estimated with different combinations of the independent variables. Here, only the most substantial results are reported in tables. In addition, the software (Stata 13) automatically removed variables due to collinearity.

The results indicate that the dummy variables for sport participation at school and out-of-school are positively signed. Yet, only participation out-of-school is statistically significant, increasing the probability of being classified as a high-performing student (see column 1). Moreover, this positive association is due to participation in combat sports and athletic sports (see column 3). Participation out-of-school in athletic sports has a specific positive association with boys (see column 6) and combat sports have a specific positive association with girls (see column 7); it is possible to assume that gymnas-

tics is the sport practiced by girls. The coefficients of ball sports and other sports are not statistically significant. In addition, the frequency of this participation and the number of hours spent on these sports will not increase the probability of being classified as a high-performing student, these variables are not statistically significant (see columns 2, 4, and 5).

Sport participation at school, its frequency, and the type of sport practiced at school and time spent on it have no statistically significant effects for becoming high-performing students. There are a few statistically significant coefficients of these variables, yet they do not show robustness, losing statistically significance in the majority of specifications. However, it is interesting to note that participation in combat sports at school has a statistically positive coefficient in the female subsample, supporting the above mentioned specific effect of these types of sports out-of-school for girls.

In general, the control variables show the expected sign and statistical significance. The proxy of SES is positively signed and is statistically significant in all specifications, excluding the male subsample (column 6). Therefore, this variable has a particular effect for girls, increasing their likelihoods of being classified as high-performing students. For their part, the coefficients of public regular schools are negatively signed and are statistically significant in all specifications, excluding the male subsample (column 6). Therefore, the probability of being classified as a high-performing student decreases, particularly for girls studying in regular public schools. However, in general, girls outperform boys in educational achievements; the dummy MALE is negative and statistically significant in all regressions. AGE is also negative and statistically significant in all regressions; this result has been already noted in the literature (Tovar-García, 2017), suggesting a puberty effect, lower grades as subjects become more difficult in the last years of education, or in RLMS-HSE survey parents are stricter on the reported grades as their children get older. The rest of the control variables have no statistically significant effects.

The results reported in Table 3 regarding low-performing students indicate that, in particular, male students practicing ball sports out-of-school are less likely to be classified as low-performing students (see columns 3, 5, and 6). However, the time that they spend on these sports does not reduce this probability.

The other independent variables on sports out-of-school do not show robust effects. Nevertheless, there are two other interesting results. First, participation in athletic sports out-of-school and time spent on these sports are negatively signed and statistically significant in the specifications of columns 3 and 4, but their coefficients lose significance in other regressions (columns 5 to 7), thinly suggesting a decrease in the probability of being a low-performing student. Second, the time spent on other sports out-of-school has positive signs and is statistically significant, particularly, in the case of girls (see columns

Table 2. **Regression coefficients of sport activities on educational achievements (HIGH_PERFORMING)**

	(1)	(2)	(3)	(4)	(5)	Male (6)	Female (7)
Sport activities in class at school							
SPORT AT SCHOOL	0.30						
OFTEN SPORT AT SCHOOL		-0.03					
COMBAT SPORTS AT SCHOOL			0.04		0.23	-0.48	0.88*
BALL SPORTS AT SCHOOL			0.10		0.06	0.88*	-0.51
ATHLETIC SPORTS AT SCHOOL			0.04		-0.18	-0.51	-0.06
OTHER SPORTS AT SCHOOL			-0.06		-0.06	-0.10	-0.12
HOURS COMBAT SPORTS AT SCHOOL				-0.004	-0.20	0.09	-0.55
HOURS BALL SPORTS AT SCHOOL				-0.02	-0.02	-0.18	0.06
HOURS ATHLETIC SPORTS AT SCHOOL				0.25***	0.29*	0.27	0.36
HOURS OTHER SPORTS AT SCHOOL				-0.10	-0.07	-0.08	-0.07
Sport activities before or after classes (out-of-school)							
SPORT OUT SCHOOL	0.30**						
OFTEN SPORT OUT SCHOOL		0.001					
COMBAT SPORTS OUT SCHOOL			0.70***		1.17***	0.77	1.85***
BALL SPORTS OUT SCHOOL			-0.01		0.11	0.56	-0.18
ATHLETIC SPORTS OUT SCHOOL			0.39*		0.73***	1.33***	0.42
OTHER SPORTS OUT SCHOOL			0.16		0.27	0.10	0.55
HOURS COMBAT SPORTS OUT SCHOOL				0.06	-0.09	-0.14	-0.05
HOURS BALL SPORTS OUT SCHOOL				-0.05	-0.05	-0.08	-0.05
HOURS ATHLETIC SPORTS OUT SCHOOL				-0.01	-0.14	-0.13	-0.16
HOURS OTHER SPORTS OUT SCHOOL				0.01	0.01	-0.04	0.04
Control variables							
SES	0.34***	0.47***	0.44***	0.32*	0.31*	0.09	0.51***
HEALTH ISSUES	0.06	-0.07	-0.07	0.06	0.06	0.14	0.05
REGULAR SCHOOLS	-0.53***	-0.65***	-0.66***	-0.76***	-0.74***	-0.45	-0.98***
MOSCOW & SAINT PETERSBURG	0.12	-0.05	-0.10	-0.06	-0.10	0.70	-0.88
AGE	-0.32***	-0.34***	-0.35***	-0.36***	-0.36***	-0.39***	-0.30***
MALE	-1.07***	-1.12***	-1.18***	-1.13***	-1.16***		
HIGH-PERFORMANCE SPORTSMAN	-0.64*	-0.53	-0.51	-0.66	-0.64	-0.53	-0.61
Constant	-1.02	0.43	0.11	-0.13	-0.56	-2.12	-1.01
Observations	6425	3777	3782	3415	3415	1845	1570
Pseudo R2 (a)	0.45	0.65	0.66	0.69	0.70	0.66	0.72

(a) The scale the log-likelihood value of the model to the log likelihood of the constant-only model.
* significant at 10% level; ** significant at 5% level; *** significant at 1% level

4, 5 and 7), but the dummy variable on participation in other sports out-of-school does not show statistical significance in all regressions. Thus, these results are thinly suggesting that girls spending more time on other sports raise their probabilities of being classified as low-performing students.

The results also indicate that participation in combat sports at school reduces the chances of being a low-performing student, for both boys and girls (see columns 3, 5, 6 and 7). However, the time spent on these sports is statistically insignificant, excluding the female case, suggesting that girls spending more hours on these sports are more likely to be classified as low-performing students (column 7). On the contrary, participation in other sports at school increases the chances of being a low-performing student, for both boys and girls (see columns 3, 5, 6 and 7). Nevertheless, boys spending more time on other sports at school are less likely to be classified as low-performing students (see columns 5 and 6). Therefore, generally speaking, there is not any clear effect of sports at school.

The control variables present slightly different results in comparison with those reported in Table 2 regarding high-performing students. The variables AGE and MALE support previous findings, their coefficients are positive and statistically significant in all regressions. This indicates that older students and boys are more likely than younger students and girls, respectively, to be classified as low-performing students. Now, the proxy of SES is statistically insignificant in the majority of regressions and there is only weak evidence suggesting that regular public schools increase the chances of being a low-performing student.

The most interesting result given by control variables is the positive sign and statistical significance of HIGH-PERFORMANCE SPORTSMEN. This indicates that students spending more than 10 hours per week on sports are more likely than the rest of the students to be classified as low-performing students, yet this claim is valid only in the case of boys (see columns 6 and 7). The rest of the control variables have no statistically significant effects.

As an additional robustness check, Equation (5) was also estimated using the population-averaged estimator instead of random effects, assuming pooled data, and using probit regressions (not shown). The main findings remain qualitatively the same.

4. Discussion and final remarks

As in many other countries, for instance, Germany [Pfeifer, Cornelißen 2010], in Russia sports are mostly practiced in sport clubs or public sport facilities. According to this institutional framework, the results of this research suggest a positive association between sports out-of-school and educational achievements, supporting the developmental hypothesis. As expected, the participation of boys in sports out-of-school is higher than for girls, but the results do not suggest that one

Table **3. Regression coefficients of sport activities on educational achievements (LOW_PERFORMING)**

	(1)	(2)	(3)	(4)	(5)	Male (6)	Female (7)
Sport activities in class at school							
SPORT AT SCHOOL	-0.76*						
OFTEN SPORT AT SCHOOL		-0.02					
COMBAT SPORTS AT SCHOOL			-0.47*		-1.01**	-0.84*	-1.47*
BALL SPORTS AT SCHOOL			-0.16		-0.03	-0.03	-0.14
ATHLETIC SPORTS AT SCHOOL			0.004		-0.33	-0.35	-0.33
OTHER SPORTS AT SCHOOL			0.43*		1.09***	1.06**	1.41*
HOURS COMBAT SPORTS AT SCHOOL				-0.15	0.32	0.08	0.93*
HOURS BALL SPORTS AT SCHOOL				-0.17	-0.11	-0.10	-0.10
HOURS ATHLETIC SPORTS AT SCHOOL				-0.20	-0.01	0.01	-0.03
HOURS OTHER SPORTS AT SCHOOL				0.04	-0.38*	-0.47*	-0.27
Sport activities before or after classes (out-of-school)							
SPORT OUT SCHOOL	0.16						
OFTEN SPORT OUT SCHOOL		0.11					
COMBAT SPORTS OUT SCHOOL			-0.53		-0.84	-1.16	-0.02
BALL SPORTS OUT SCHOOL			-0.52**		-0.80**	-0.86**	-0.29
ATHLETIC SPORTS OUT SCHOOL			-0.77***		-0.16	-0.40	0.25
OTHER SPORTS OUT SCHOOL			0.07		-0.23	-0.07	-0.50
HOURS COMBAT SPORTS OUT SCHOOL				-0.04	0.02	0.08	-0.21
HOURS BALL SPORTS OUT SCHOOL				-0.02	0.05	0.07	-0.07
HOURS ATHLETIC SPORTS OUT SCHOOL				-0.20**	-0.17	-0.16	-0.21
HOURS OTHER SPORTS OUT SCHOOL				0.06***	0.06**	0.03	0.10**
Control variables							
SES	-0.43***	-0.24	-0.32	-0.30	-0.31	-0.27	-0.40
HEALTH ISSUES	-0.36**	-0.28	-0.22	-0.30	-0.28	-0.13	-0.60
REGULAR SCHOOLS	0.55**	0.63**	0.53*	0.57*	0.52	0.50	0.52
MOSCOW & SAINT PETERSBURG	0.48	0.06	0.25	0.42	0.54	0.56	0.46
AGE	0.31***	0.29***	0.32***	0.37***	0.40***	0.37***	0.43***
MALE	1.37***	1.23***	1.36***	1.33***	1.46***		
HIGH-PERFORMANCE SPORTSMAN	0.74**	0.73**	0.80**	0.77**	0.79**	0.88**	0.55
Constant	-7.94***	-8.74***	-8.54***	-9.04***	-9.26***	-7.82***	-9.19***
Observations	6425	3777	3782	3415	3415	1845	1570
Pseudo R^2 (a)	0.39	0.62	0.62	0.67	0.67	0.66	0.68

(a) The scale the log-likelihood value of the model to the log likelihood of the constant-only model.
* significant at 10% level; ** significant at 5% level; *** significant at 1% level

gender obtains more benefits than other, as suggested in previous studies [Pfeifer, Cornelißen 2010; Shifrer et al. 2015]. Here, the emphasis should be on the type of sport practiced by gender. For boys, participation in athletic sports has particular positive effects on their chances of becoming high-performing students. For girls, the practice of combat sports increases these chances.

The impact of martial arts, such as karate and taekwondo, on educational outcomes has been investigated in previous studies, suggesting no effects [Bird, Tripney, Newman 2013]. Here, the effect of these types of sports is particularly relevant for girls. In all probability, these sports predominantly encourage their competitiveness and this allows girls to compete and outperform non-participant students, as was observed in the case of German girls [Pfeifer, Cornelißen 2010].

In the USA, revenue sports, such as basketball and American football, have been negatively associated with educational outcomes [Eitle, Eitle 2002; Rettig, Hu 2016). In this research, ball sports are the closest category to revenue sports, and the findings do not suggest a negative association. On the contrary, the practice of ball sports out-of-school reduces the probability of being classified as a low-performing student in the case of boys.

In contrast to the USA, where many sport activities take place at school as extracurricular activities, in Russia sport activities at school mostly consist of physical education classes, but an increase in extracurricular sport activities at school has recently been observed. Although, Russian schools allow the practice of different types of sports, the findings of this research suggest that these activities have no significant effects on educational achievement. There are no negative impacts, there is no support for the zero-sum hypothesis, and this lack of significant effects should be a result of Russia's institutional framework.

The role of physical education classes in school curriculums has been widely discussed in the literature [Van Deventer, 2014]. One major concern is the seriousness of these classes as often the requirements to pass these classes are very low, and the activities consist of simple tasks without a clear syllabus, program, process, or proceedings. The findings suggest that this is the case in Russia, and consequently there is no evidence of positive associations between sports at school and educational achievements.

Therefore, the findings of this research are a wake-up call for education policy makers, who should reevaluate the role of physical education classes, reconsidering its status, seriously. This demand for the restitution of quality physical education has been underlined many times in the American literature [Park, 2014]. In Russia, not only should policy makers be aware of the relevance of sport activities, but also teachers and parents, encouraging children to participate in sports.

The main method of this research, logit regressions with panel data, allowed control for time-invariant explanatory variables. More-

over, the inclusion of the key independent variables with one lag allowed control for reverse causality concerns, which had been a major concern in previous literature [DeMeulenaere, 2010]. However, it is important to acknowledge two major limitations of this study. First, the data used were not collected from an experimental design, consequently, it is not possible to stipulate causality. Second, due to data limitations some variables influencing the selection effect into sports were not controlled, for instance, preferences and aptitudes for sport activities. However, the above mentioned findings were robust to several specifications and other econometric methods.

Finally, it is noteworthy that the major concern is not about the type of sport, revenue or non-revenue, as stated in the American literature. The key condition to observe positive associations between sports and educational achievements is the time spent on sports. First, the findings suggest that the benefits derived from sports will not increase if students spend more time on them. The simple practice of sports is what matters (in the Russian context, out-of-school). Each student can decide how much time to spend on sports, there is not any negative association between time spent on sports and educational achievements. Yet, if a lot of time is spent on sports, this will be negatively linked to educational achievements. In this research, it was found that male students spending more than 10 hours per week on sport activities are more likely to be classified as low-performing students. Consequently, the findings indicate a conditional support for the zero-sum hypothesis: either you are studying or you are playing sports. Too much of the latter will negatively affect your educational achievements. Thus, sport participation should be moderate in order to observe positive links, unless of course you wish to be a professional sportsman.

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Educational Strategemes in the Design of Supplementary Professional Teacher Education Programs: Setting the Priorities

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Abstract

A survey of 436 young teachers from 18 federal subjects of the Russian Federation who started their teaching careers between 2015 and 2017, 72 school principals, 96 deputy headmasters for curriculum and discipline, and 64 experts from regional and municipal methodological agencies has revealed the most essential downsides of teacher education. Young teachers reported first of all to be lacking soft skills and practical knowledge in psychology as well as being unprepared for classroom realities; they also complained about the lack of practice and variety in teacher training programs. School principals believe that new teachers lack subject-specific knowledge, have gaps in their knowledge of practical teaching methods, and find themselves unprepared for teacher's routine obligations (filling out gradebooks, making lesson plans, etc.). Methodologists point out the lack of knowledge of children's age characteristics, poorly-developed didactic competencies, and an inability to work with components of learning and teaching support kits among young teachers. The data obtained is used to develop a number of promising avenues for the design of supplementary professional education programs as tools to increase teachers' levels of expertise, i. e. the strategemes of humanities education, lifelong learning, and personification.

Keywords

school teachers, young teachers, soft skills, didactic competencies, supplementary professional education, lifelong learning.

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Literature in Language Education

Evolving Language Pedagogies and Text Preferences in Contemporary Russia

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Abstract. The use of authentic texts, including literature, as an English as a Foreign Language (EFL) resource has gained wider currency in classrooms, notably in Europe and Asia, where this integration is being encouraged as linguists acknowledge the vital importance of lexical knowledge to foreign language acquisition. The adoption of communicative language teaching (CLT) methods, pointing to a shift away from teacher-centric models of language pedagogy, has also led to a greater emphasis being placed on the use of authentic texts, including literature, which has, in turn, given rise to debates regarding appropriate teaching techniques, methodology and text selection. In terms of foreign language education in Russia, literature has a storied history of use, although relatively few empirical studies exist on contemporary teacher practices and how these have evolved in the post-Soviet era. Indeed, as teaching practices evolve to incorporate authentic texts in EFL education in Russia, it is important for all stakeholders to understand what texts are actually being used in classrooms and in what way. To address this gap, data, as part of an exploratory study, was collected from 152 Russian EFL teachers via a semi-structured questionnaire. The results show that while Soviet teaching practices continue to influence, to some extent, teaching approaches and text selection with regard to literature in language education (LLE), there are notable shifts in teachers' attitudes towards learner interest and ability that reveal evolving teacher priorities and motivation.

Keywords: language education, EFL, text selection, language skills, literary texts, communicative competence, teaching methods.

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1. Introduction

The use of literature in the foreign language (FL) education context has been attracting growing attention over the last few decades, as evidenced by the publication of numerous resources for teachers [McKay, 1982; Collie, Slater, 1987; Duff, Maley, 1990; Carter, Long, 1991; Lazar, 1993; Carter, McRae, 1996; Kennedy, Falvey, 1999; Inan, Yüksel, 2013] and state-of-the-art papers [Lott, 1988; Gilroy, Parkinson, 1996;

Paran, 2008; Tatsuki, 2015]. Tatsuki [2015] refers to this trend when she notes that literature has been reintroduced into English language programs in Singapore, Malaysia and across Europe. According to Carter [2007, p. 6], this renewed interest in literature in language education (LLE) is linked to the rise of communicative language teaching (CLT), which, in contrast to more traditional teaching methods, focuses on improving learners' communicative ability through the use of authentic situations and texts. CLT uses grammar, phonology and lexis as tools to overcome the language barrier, and not as objects of study, a fact that differentiates it from the more traditional grammar-translation method (GTM) of language education. Literature, as an authentic source of language, is viewed positively within the CLT framework in the sense that it can contribute to improving not only learners' vocabulary knowledge, but also their reading and critical thinking skills through its more creative and "authentic" use of language. In Russia, too, literature in language education is being revisited in the CLT context due to its ability to contribute to learners ' understanding of different cultures [Ter-Minasova, 2000; Zagraiskaya, 2009; Anosova, 2013; Belkina, Stetsenko, 2015, Zagryadskaya, 2017], their personal development and critical thinking skills [Shevchik, 2008; Klementsova, 2012; Eryomina, 2013; Belkova, Chubak, 2016], as well as improving their communicative ability and language skills [Zhuvikina, Feoktistova, 2011; Rogacheva, 2015; Zhirkova, 2016]. According to Davidenko [2003, p. 90], for example, literary texts help develop creative thinking skills in learners because they encourage them to consider an imaginary situation from the point of view of another person. Nevertheless, while LLE has been attracting greater attention recently, there are relatively few empirical studies on how contemporary English as a Foreign Language (EFL) teachers actually approach the use of literary texts in language education in Russia. Most studies to date focus on teachers' personal accounts or LLE's theoretical benefits, while not always providing concrete comparisons with regard to how the current state of LLE differs from its previous incarnation during Russia's Soviet years. Indeed, while there appears to be a renewed focus, to some extent, on LLE (in the wider context of authentic texts) within a CLT framework in Russia, the use of literary texts and materials in EFL education in Russia has a long, if not always fondly remembered, history.

2. Literature Review

2.1. A history of LLE in Russia

According to Lazaretnaya [2012], English education in Russia in the modern era can be divided into three periods: the Cold War era (1947–1991), Perestroika (1992–1999), and the New Russia period (2000-present). During the Cold War era, the teaching of English was mainly limited to schools, where the children began English lessons in secondary school at the age of 10 or 11 [Lazaretnaya, 2012, p. 11]. Lesson content was strictly controlled and teaching materials were edited by Soviet authors who had inadequate experience with authentic English,

with many of them never having lived in countries where English was the native language [Ter-Minasova, 2005]. In terms of text selection, Russian EFL teachers during this period often used works by Jerome K. Jerome (the novel "Three men in a boat" was especially popular), Jack London, O. Henry, Ernest Hemingway, Somerset Maugham, and John Galsworthy [Ter-Minasova, 2005; McCaughey, 2005; Ustinova, 2005; Lazaretnaya, 2012]. Their approach to teaching English was decidedly "grammar-translation" in terms of method, i. e. memorizing grammatical rules, repetition and translation. As a result, although authentic works were used in English lessons, the language itself was studied as if it were a dead language, with a focus on grammar rather than on learners' communicative ability [Davydova, 2012]. Ter-Minasova [2014], referring to the state of LLE in higher education at the time, writes how students read outdated texts because it was believed that literary texts, in order to be considered classics, were required to have stood the test of time. The situation changed markedly during Perestroika. An abundance of textbooks and teaching materials of questionable quality, the content of which was often poorly understood by students [Ter-Minasova, 2005], replaced the erstwhile shortage of English language teaching materials. During this period, some teachers decided to continue using Soviet-era teaching materials, while others experimented with new materials and techniques, albeit in ways that caused confusion among students [Lazaretnaya, 2012]. This suggests that in the 1990s, a segment of Russian English teachers experimented with new language materials and approaches, although there are no specific details or examples provided as to how they actually did this. Currently, English is an important part of the curriculum in Russian schools and universities. In universities, for example, proficiency in a foreign language is often required for those studying the Humanities and the Social Sciences, although students are not always provided with the means to develop their foreign language abilities in order to interact in broader contexts [Lazaretnaya, 2012]. With regard to the teaching of English in schools, lessons usually start from the second grade and the curriculum is mainly aimed at improving communicative competence and language use in terms of interpersonal and intercultural interaction. The profile of the contemporary English teacher in Russia, meanwhile, has also undergone some noticeable changes. Ter-Minasova [2005], for example, writes that many people have left their jobs to teach English, despite their lack of relevant qualifications; in her opinion, this trend is due to how financially rewarding and prestigious the teaching of English has become. Consequently, the "contemporary teacher of English in Russia is less educated theoretically and more pragmatically oriented" [p. 453].

2.2. What does literature mean in terms of text selection?

Text selection in the LLE context is a multi-stage process that is ultimately determined by how teachers and educationists perceive the nature of literature [Zagryadskaya, 2017]. For example, some believe

that only those great authors, whose works have not only stood the test of time, but who have also won plaudits for their serious study of the human condition, represent literature. Others might feel that literature is a relative concept whose value is determined by societal mores [Carter, 2007]. The literature shows that texts can be selected based on several different criteria. For example, when asking teachers about the texts they use, it is important to know how they relate to literary texts, i. e. whether as works of enduring value or as texts with more functional properties, their value tightly linked to learners' needs [Paran, 2000; Hall, 2015; Luukka, 2017]. There are also issues of lexical complexity and student ability [Zagryadskaya, 2017], as well as how interaction occurs between the text, situation and reader [Luukka, 2017]. Collie and Slater [1987] discuss the importance of the text's cultural significance, as well as student interest. They place particular emphasis on the ability of the text to communicate with students on a personal level. Maley [2001], similarly, strongly recommends that the interests of students be taken into account when selecting texts. In terms of literary periods, Zagryadskaya [2017, p. 22] writes that it is possible to use works from different eras, although she feels that those from the 20th and 21st centuries are more effective because they are "chronologically closer to our time era, are of great interest to students and encourage them to participate in discussions, expressing their attitudes towards the described events". Indeed, given all these different criteria, it is not surprising that the process of selecting texts does not always go smoothly. For example, Morozova [2012], referring to the situation in Russia, writes that teachers face serious problems when choosing appropriate texts because their personal tastes may significantly differ from those of their students. She recommends using a "trial and error" approach to selecting texts [p. 327] alongside frequent consultations with colleagues, arguing that such an approach more effectively takes into account the abilities and interests of students, while also ensuring that the linguistic and cultural content of the text is in line with curriculum requirements at schools and universities. The literature also suggests that literary works that were popular during Soviet times continue to be used. McCaughey [2005, p. 456], for example, says that every Russian student knows the names of W. Somerset Maugham and Jerome K. Jerome, although contemporary American students might not know them. In his opinion, the popularity of these authors in Russia is likely a product of them having been liked by some high-ranking official in the Soviet publishing industry, and not because of the apolitical nature of their works. Nevertheless, while these insights are useful, little empirical evidence is provided as to how widely used these texts really are in today's Russia, in what teaching contexts they are normally used, and how they are incorporated into lessons. Other writers, by contrast, have pointed to changes in the types of texts used by English teachers in Russia. For example, Pitina [2015, p. 565], in her study of English language

teachers at Chelyabinsk State University, mentions the names of several contemporary works of literature, such as “Magpie” (1998), “The House in Norham Gardens” (1974), “Black Swan Green” (2006), “Portobello” (2008) and “Waterland” (1983). Belkina and Stetsenko [2015] also write about the use of more contemporary works in English language education at a Russian university. They mention using “Digital Fortress” by Dan Brown, “Annie” by Linda Page, “Shopaholic takes Manhattan” by Sophie Kinsella, and “If Tomorrow Comes” by Sidney Sheldon. All of these texts belong to the 20th and 21st centuries, allowing us to conclude that, at least at Russian universities, some teachers are currently using modern literary texts to teach English.

2.3. Approaches to Teaching Literature

2.3.1 Language-based Approach

The language-based approach seeks to closely integrate language and literature by fostering an activity-oriented, language-sensitive, student-centered classroom environment [Carter, Long, 1990; Van, 2009]. The reasoning is that, by studying the language of literature, learners will not only improve their English language ability, but also develop critical thinking and interpretative skills [Carter and Long, 1990; Lazar, 1993; Van, 2009]. Activities associated with a language-based approach can be summarizing story plots, cloze procedures, debates, making predictions, and rewriting the ending of a story [Van, 2009], as well as role-play and reading comprehension activities like choosing the appropriate title or summary for a text [Lazar, 1993]. Extensive reading and “mining a text for its language” are other interpretations of this approach [Bloemert; Jansen and van de Grift, 2016, p. 176]. The approach is rather broad, and proponents might have different goals: some might use literature as purely a language resource, or they might focus on studying the literary text itself, often employing stylistic analysis, where the text’s linguistic features are closely studied so as to gain a deeper understanding of the text [Lazar, 1993]. In the Russian context, there have been a handful of studies on how Russian EFL teachers use the language-based approach in the LLE context. For example, Pitina [2015] discovered that the English teachers she surveyed favored a discursive approach to teaching English through literary texts. In their opinion, this approach, which is language-based, was very suitable for developing the four language skills, i. e. reading, writing, speaking and listening, since it combined the study of authentic examples of spoken and written discourses. Bekisheva and Gasparyan [2014], likewise, in their account of teachers at Tomsk Polytechnic University, revealed that they used several language-based activities like creative writing and role-play when using literary texts in their English language lessons.

2.3.2. The Cultural Approach

The cultural approach is described as a more traditional approach to literature by Lazar (1993) and Savvidou (2004), where, unlike the language-based approach, learners explore a text’s historical and socio-political background, learning about different ideologies, cul-

tures, writers, literary movements, philosophies, and religious movements. The text might be discussed in the learners' L1, and it might also be translated from the L2 into the L1 (Lazar, 1993). The literature contained a few personal accounts, in the Russian context, where teachers discuss their own approaches to integrating literature into language education. Belkova and Chubak [2016, p. 1664], for example, discuss using several activities connected with this approach, e. g. discussing the author's biography, providing an explanation of the main features of relevant literary trends, showing the students a portrait of the author, although they also discuss activities connected with the language-based approach. Anosova [2013, pp. 16–17] similarly recommends using the cultural approach when using literary texts in EFL education. She prefers using poetical works, including sonnets by Shakespeare, and designing activities that familiarize her students with the era in which the piece was written. It should be noted that not everyone considers this approach to be effective. Savvidou (2004) contends that this approach is generally not used in Teaching of English as a Foreign Language (TEFL) because it is considered teacher-centered, providing fewer opportunities to practice language. However, studies by Akyel and Yalçin [1990], Ainy [2007], Rashid, Vethamani and Rahman [2010] and Divsar [2014] show that EFL teachers in several countries continue to use this approach. Teachers who participated in Ainy's [2007] study, for example, justified their preferences by claiming that the cultural approach contributed to their students ' understanding of the text.

2.3.3. Personal-response and Reader-response approaches

The personal-response approach, as the name implies, encourages learners to use their personal and cultural experiences to interpret the text and construct meaning [Carter and Long, 1991; Lazar, 1993; Savvidou, 2004]. Activities can be both stylistic and interpretative, but learners are encouraged to express their own opinions [Hirvela, 1996]. The reader-response approach similarly encourages learners to engage in independent mean making [Bloemert, et al., 2016]. The two approaches appear to be very similar, although Hirvela [1996, p. 128] argues that, in terms of the interpretative process, the text occupies a position of authority vis-à-vis the learner in the personal-response approach, while the learner plays a more equal role in the reader-response approach. In the Russian context, Belkina and Stetsenko [2015] discuss their use of this approach at Syktyvkar State University when teaching English (they both actively use literature), stating that teachers need to encourage their students to express their opinions and views, and that suitable texts need to be selected so that they reflect learners' needs.

2.3.4. Comprehensive Approach to Literature in Foreign Language Education

Bloemert, et al. [2016] propose a Comprehensive Approach to teaching literature that incorporates four different approaches: language-based, context, reader and text approaches. The text and con-

text approaches are concerned with the study of literature: the text approach promotes the study of formal literary elements via close reading and familiarization with theoretical literary discourse, while the context approach, which appears very similar, if not identical, to the cultural approach, concerns itself with a text's historical and cultural contexts [p. 174]. The language and reader approaches, on the other hand, employ literature as a resource. The Comprehensive Approach is located at the point where these four approaches overlap. Such an approach could ensure that the benefits provided by all four approaches are unified under one approach, although the four approaches are not necessarily accorded equal weight. For example, in their study of secondary school students in the Netherlands, Bloemert, Paran, Jansen and van de Grift [2017] discovered that a majority of students (74%) perceived the language approach as being the most beneficial for EFL literature education, followed by the context approach (56%). The reader (33%) and text (12%) approaches were mentioned by significantly fewer respondents. One possible interpretation of these results could be the need to use a comprehensive approach that focused mostly on the language-based approach, while also incorporating some elements (to a lesser degree) from the other three approaches.

2.3.5. Summary

In general, the literature revealed that there are relatively few studies, in the Russian context, that provide empirical data with regard to the approaches used by Russian EFL teachers when using literature in their lessons or their text selection criteria. The lack of studies also makes it difficult to ascertain what changes have taken place post-Perestroika with regard to how contemporary teachers incorporate authentic texts, specifically literature, into their lessons. Unlike the Russian context, there are many systematic studies on this topic internationally [Fogal, 2010; Ganapathy and Seetharam, 2016; Bloemert et al., 2017; Freyn, 2017; Duncan and Paran, 2017; Luukka, 2017, Syuhada, 2017]. However, while there is a dearth of empirical research on Russia, this does not detract from the fact that there are a number of teaching manuals in Russian [Kutsenko, 2006; Goldman, 2014; Alexandrovich, 2016; Valkovskaya and Ilyushkina, 2016; Vasilenko, 2016] that include strategies and advice on how to use literary texts when teaching English. It is, nevertheless, unclear if teachers actually use these books. Moreover, the literature that does exist on the use of literature in foreign language education in Russia [Zagornaya, 1992; Semenyuk, 2004; Barinova, 2009; Loseva, Kuznetsova and Igeysinova, 2016] is generally theoretical in nature, often without any practical and empirical insights that could reflect the attitudes and experiences of actual foreign language teachers in Russia. This is not to say that studies do not exist. For example, some studies suggest that Russian teachers of English continue to rely on traditional TEFL methods, focusing unduly on writing skills and grammar [Rasskazova, Guzikova and

Green, 2017], as well as translation [Ivanova and Tivyaeva, 2015]. However, these studies refer to general EFL practices, and do not look at teachers' use of authentic texts, including literature, in their lessons. There are some exceptions to this, notably Bekisheva and Gasparyan [2014], Pitina [2015] and Belkina and Stetsenko [2015], whose works specifically discuss the approaches and texts used by English teachers in the LLE context. Yet, while these studies are informative, they focus solely on the situation at universities and do not offer any insights in terms of what is happening in schools and other teaching contexts in Russia, e. g. language institutes.

3. Methodology

3.1. Research Questions

After taking into account the gaps in information that were identified during the literature review, the following research questions were explored as part of the study:

- What factors do teachers consider to be important when selecting literary texts?
- What teaching approaches do teachers employ when using literary texts?

3.2. Sampling

The study was carried out using a combination of convenience and snowball sampling methods. A total of 158 Russian English teachers participated in the study. The data presented below, however, contains the responses of the 152 participants (117 women, 31 men; 4 teachers chose not to disclose this information) who reported using literary texts in the classroom (30 teachers reported "rarely" using literary texts, with 45 reporting "sometimes", 39 "often" and 38 "almost always"). Participants ranged in age from 21 to 69 years, with the mean age (standard deviation) and median age being 37.39 (10.33) and 35.5 respectively. Teachers who participated in the study reported working in Moscow and other Russian cities. In terms of teaching context, 8 teachers were from primary schools, 28 from secondary schools, 67 from universities, 30 from language institutes, 3 from vocational schools and 14 were private tutors; 2 teachers chose not to reveal where they taught.

3.3 Methods and Instruments

Data was collected via a semi-structured questionnaire, which was presented to the participating teachers in electronic format. After the initial design of the research questions, a draft questionnaire was piloted with a group of 16 Russian EFL teachers from two Moscow schools. Together with several Likert-scale batteries, the final questionnaire included one open-ended question on the titles of literary works (and authors) used by EFL teachers for language education purposes. A link to the questionnaire was emailed to different schools, universities, language schools, teacher associations and forums, as well as tutoring centers, explaining the scope of the study and requesting teacher

participation. The questionnaire remained accessible for participating teachers for 50 days in the summer of 2017. The research data that was subsequently obtained was analyzed using SPSS22 statistical analysis software. A reliability analysis of the relevant questionnaire items indicated a Cronbach's Alpha of .729.

4. Results

Descriptive statistics for text selection criteria can be seen in Table 1. From the data, students' English language ability appears to be the most important criterion for respondents, closely followed by the text's ability to hold the students' interest and age-appropriateness. Vocabulary also appears to be a more critical factor than grammar content in text selection. Genre and the teacher's interests do not appear to be as important to respondents when selecting texts.

Table 2 shows the descriptive statistics which literary forms participants considered appropriate to teach EFL. The novella received fewer responses than other genres. This might suggest that some respondents do not differentiate between a novel and novella, or that they do not know what a novella is. Participants considered short stories to be the most appropriate form, while the novel was the least popular.

In terms of preferences for literary periods, respondents appeared to overwhelmingly prefer 20th and 21st century literary texts, as can be seen from the descriptive statistics in Table 3.

Table 4 lists respondents' coded responses to the open-ended question on what literary texts (and authors) they prefer when teaching English. Teachers cited a total of 51 authors, including Frank Baum, Gerald Durrell, H. Rider Haggard, Helen Fielding, J. Barnes, J. R. R. Tolkien, James Thurber, Jane Austen, John Fowles, John Green, John Irving, John Steinbeck, John Updike, Jonathan Safran Foer, Kate Chopin, Louis de Bernieres, Mark Haddon, Peter Ackroyd, Richmal Crompton, Truman Capote, Terry Pratchett, Virginia Woolf, William Faulkner, William Golding, Zora Neale Hurston, A. A. Milne, Aldous Huxley, Agatha Christie, George Bernard Shaw, C. S. Lewis and Charles Dickens (each of these was only cited once). Only those authors have been included in Table 4 whose names were mentioned by at least two respondents. A total of 74 respondents opted to answer the question. 42 specifically gave the names of authors, while 38 specifically cited the names of titles. Many respondents gave the names of both authors and titles. As a result, their responses underwent multiple instances of coding. As the data shows, the most frequently cited author appears to be W. Somerset Maugham. He is also cited in a variety of teaching contexts. The data also indicates that participants overwhelmingly prefer 20th and 21st century authors, as well as some authors who started writing at the turn of the 19th century.

Table 5 provides the names of the titles mentioned by teachers in response to the open-ended question. *Harry Potter* by J. K. Rowling

Table 1. **The importance of different criteria during text selection as ranked by participants**

	N	Mean [SD*]	Mdn
Students' English ability	150	4.77 [.58]	5.00
Text's social and cultural context	148	4.28 [.91]	5.00
Ability to hold students' interest	149	4.66 [.63]	5.00
Ability to hold teachers' interest	149	3.83 [1.1]	4.00
Genre	147	3.77 [1.14]	4.00
Grammar content	148	3.85 [.99]	4.00
Vocabulary content	149	4.37 [.81]	5.00
Age-appropriateness	149	4.56 [.75]	5.00
Length	149	4.34 [.88]	5.00

* Standard deviation
Note. 1=Not important; 2=Slightly unimportant; 3=Slightly important; 4=Moderately Important; 5=Very important

Table 2. **The appropriateness of different literary forms as ranked by participants**

	N	Mean [SD]	Mdn
Short Story	150	4.70 [.69]	5.00
Novella	131	3.62 [1.11]	4.00
Novel	149	3.26 [1.21]	3.00
Poetry	141	3.51 [1.2]	4.00
Drama	141	3.36 [1.32]	4.00

Note. 1=Inappropriate; 2=Slightly inappropriate; 3=Slightly appropriate; 4=Moderately appropriate; 5=Very appropriate

Table 3. **The appropriateness of different literary periods as ranked by participants**

	N	Mean [SD]	Mdn
Classical and Medieval	139	2.62 [1.34]	2.00
16th-19th Century	139	3.02 [1.19]	3.00
20th Century	147	4.44 [.80]	5.00
21st Century	145	4.53 [.76]	5.00

Note. 1=Inappropriate; 2=Slightly inappropriate; 3=Slightly appropriate; 4=Moderately appropriate; 5=Very appropriate

Table 4. **Authors cited based on number of participants**

	N	Context	Period
W. Somerset Maugham	14	U, L, S, I	20th Century
O. Henry	8	I, L, S, U	19th-20th Century
William Shakespeare	6	I, P, S, U	16th-17th Century
Ernest Hemingway	5	I, S, U	20th Century
Edgar Allen Poe	4	L, U	19th Century
J. K. Rowling	4	U, L, P	20th-21st Century
Oscar Wilde	4	U, L, P, S	19th Century
Ray Bradbury	4	U	20th-21st Century
Roald Dahl	4	I, Pm, S	20th Century
Arthur Conan Doyle	3	U, P, S	19th-20th Century
F. S. Fitzgerald	3	U, S	20th Century
J. D. Salinger	3	U	20th Century
J. K. Jerome	3	U, L	19th-20th Century
Jack London	3	I, U	19th-20th Century
Rudyard Kipling	3	I, L, Pm	20th Century
Alice Munro	2	U	20th-21st Century
H. G. Wells	2	U	19th-20th Century
Isaac Asimov	2	U	20th Century
John Galsworthy	2	L	19th-20th Century

Note. U=University; P=Professional School; I=Independent Contractor; Pm=Primary School; S=Secondary School; L=Language Institute

is by far the most frequently cited title (the individual books in the series were not cited by anyone), followed by *Three Men in a Boat* by J. K. Jerome.

Table 6 provides descriptive statistics for how frequently respondents use various activities with literary texts when teaching English. The data shows that summarizing the text appears to be the most frequently used activity by respondents, followed very closely by debate.

Table 7 provides descriptive statistics for participants' responses regarding the appropriateness of several different approaches to using literature in EFL education. The data indicates that teachers most strongly favor encouraging students to find a personal connection with the themes found in the text, as well as getting them to use their lin-

Table 5. **Works cited based on number of participants**

	N	Context		N	Context
Harry Potter	5	S, I, L, U	Jack and the Beanstalk	1	Pm
Three Men in a Boat	3	U, L	Jaws	1	L
Peter Pan	2	I, Pm	Just So Stories	1	Pm
Sherlock Holmes	2	I, S	Limericks	1	I
The Great Gatsby	2	U, S	Little Red Riding Hood	1	Pm
The Picture of Dorian Gray	2	U, L	Lord of the Rings	1	S
Theatre	2	S, L	Matilda	1	Pm
Alice's Adventures in Wonderland	1	Pm	Robin Hood	1	Pm
English Fairy Tales	1	Pm	Romeo & Juliet	1	U
Fahrenheit 451	1	U	The Firm	1	U
Forsyte Saga	1	L	The Secret Garden	1	I
Howl's Moving Castle	1	U	Winnie-the-Pooh	1	Pm
Illustrated Man	1	Pm	The Wizard of Oz	1	Pm

Note. U=University; P=Professional School; I=Independent Contractor; Pm=Primary School; S=Secondary School; L=Language Institute

Table 6. **Frequency of use of different activities by participants when using literature in EFL lessons**

	N	Mean [SD]	Mdn
Cloze test (or gap-fill exercise)	145	3.14 [1.13]	3.00
Dictation	146	2.33 [1.22]	2.00
Rewrite the ending	144	2.82 [1.15]	3.00
Summarizing the text	147	4.02 [1.13]	4.00
Multiple-choice questions (MCQs)	148	3.40 [1.27]	4.00
Keeping a reading diary or journal	145	2.65 [1.46]	3.00
Role-play	147	3.11 [1.26]	3.00
Debate	148	4.01 [1.13]	4.00
Recital	146	2.68 [1.32]	3.00

Note. 1=Never; 2=Rarely; 3=Sometimes; 4=Often; 5=Regularly

Table 7. **Participants' opinions regarding the appropriateness of different approaches to LLE**

	N	Mean [SD]	Mdn
Encourage students to find a personal connection (personal experience, feelings and opinions) with the topics found in the literary texts	146	4.48 [.84]	5.00
Provide historical/political/cultural context and background to the literary texts used in the class	147	4.25 [.91]	4.00
Encourage students to use their linguistic knowledge to make personal judgements and interpretations of the literary text	146	4.51 [.69]	5.00
Pre-teach all the difficult words in the literary text	148	3.91 [1.2]	4.00
Translate parts of the literary text from English to Russian	145	3.54 [1.27]	4.00
Enjoy the story as a whole and not specific details	146	3.9 [1.06]	4.00
Focus on reading comprehension of the text	146	3.96 [.89]	4.00
Focus on discussion about the text	146	4.49 [.71]	5.00

Note. 1=Strongly Disagree; 2=Somewhat Disagree; 3=Undecided; 4= Somewhat Agree; 5=Strongly Agree

guistic knowledge to make personal judgments and interpretations. Translating parts of the text to Russian appears to be the least popular approach.

5. Discussion & Conclusion

In general, while the data indicated some interesting parallels with Soviet pedagogies with regard to LLE, there was also clear evidence of a shift in teaching approaches and methodologies, most likely because of a greater focus on CLT, which requires greater engagement with authentic texts [Svalberg, 2012]. For example, with regard to text selection criteria, participating teachers appeared to attach great importance to the language ability and interests of their students, which is similarly reflected in Maley's [2001, p.184] contention that, when selecting texts, priority should be given to learners' interests. Indeed, English teachers in studies by Tasneen [2010], Belkina and Stetsenko [2015] and Luukka [2017] have similarly written about the importance of prioritizing learners' interests during the text selection process. The data also shows that Russian EFL teachers prefer to use literary texts to improve learners' knowledge of vocabulary as opposed to grammar (see Table 1). One possible reason for this may be that, as mentioned in Brumfit and Carter [1986], literary language is 'distorted' and may present difficulties when organizing grammar lessons. Another possible reason is that, as McNeill [2017] has pointed out, linguists have begun to understand the importance of lexis to language acquisition,

perhaps much more so than grammar. In a CLT context, teachers' use of literary texts as vehicles for vocabulary development as opposed to grammar development might suggest that some EFL teachers have begun placing more emphasis on vocabulary development through the use of authentic texts than in the past, when grammar-translation methods were more popular. In addition, the data indicates that participants prefer short stories to other literary forms. This is not surprising, since short stories have been described as more practical in terms of length, they are less time-consuming, are suitable for different types of lesson, are easy to understand and, unlike novels, their themes can be much more diverse; they are, as a result, more capable of holding students' interest [Collie and Slater, 1987]. EFL teachers surveyed by Ainy [2007] and Baba [2008], for example, said that they used short stories because these not only motivated their students and kept them interested, but their format was also suitable for different types of lessons, and they contained diverse themes.

The study also revealed something quite fascinating. Ter-Minasova [2005], McCaughey [2005], Ustinova [2005] and Lazaretnaya [2012] specifically mention several authors who were very popular among Soviet English teachers, e. g., W. Somerset Maugham, Jerome K. Jerome, Jack London, O. Henry and Ernest Hemingway. Lazaretnaya [2012] and McCaughey [2005] also mention the novel "Three Men in a Boat" by Jerome K. Jerome. It was, therefore, interesting that these were among the most frequently cited names when teachers were asked to list the literary texts (and authors) they preferred to use when teaching English [see tables 4 and 5]. Teachers also mentioned several authors from the 21st century, but the fact that some very popular authors from the Soviet era continue to be used for TEFL purposes suggests that contemporary Russian EFL teachers are still somewhat influenced by Soviet pedagogical preferences. This tendency on the part of teachers might be due to the "apprenticeship of observation", where future teachers, having already spent thousands of hours observing their teachers during their student years, sometimes end up teaching as they were taught (Borg, 2004). Nonetheless, while Soviet influences might affect text selection, teachers overwhelmingly expressed a preference for authors from the 20th and 21st centuries. This suggests that they are selecting literary texts that they feel will not only engage students, but also contain language that meets their communicative requirements in the present. Zagryadskaya [2017] has similarly written in support of works from the 20th and 21st centuries, arguing that these are best suited for language education, while Pitina [2015] and Belkina and Stetsenko [2015] are examples of research in a Russian context where texts chosen by teachers are from the 20th and 21st centuries.

In terms of methods, the teachers surveyed showed a strong preference for the language-based approach to LLE, with some cultural approach influences as well. Indeed, their preference for summariz-

ing, debate and multiple-choice questions, all language-based activities [Van, 2009, p.7], are evidence of this tendency. One reason for the popularity of the language-based approach among teachers may be due to the perception that it is considered accessible and motivating for students and meets both their language learning and their literature needs [Van, 2009]. The continued use of some activities tied to the cultural approach, meanwhile, suggests that traditional Soviet pedagogical influences play a tangible, albeit reduced role. Of course, there might be another reason for the continued use of elements connected with the cultural approach in the Russian context. Several writers [Ter-Minasova, 2000; Zagraiskaya, 2009; Belkina, Stetsenko, 2015, Zagryadskaya, 2017] have stressed the need to focus on the cultural aspects of language education, especially when using authentic (including literary) texts, in order to better acquaint learners with other cultures and ways of life. Their approach to LLE focuses, in part, on providing learners with a more comprehensive education, which reflects Paran's observation [2008] that teaching foreign languages is not only a matter of linguistics, but also of education. Consequently, the reason for teachers' use of tasks associated with the cultural approach may be because they consider it necessary to improve the cultural knowledge and intercultural competence of Russian citizens who have to integrate into a globalized world, especially taking into account Russia's erstwhile isolation during the Soviet era.

In conclusion, the data obtained during the study indicates that LLE in the Russian EFL context has notably evolved after the collapse of the Soviet Union, although some influences from the Soviet era have clearly survived, albeit in a weakened state. Indeed, Russian EFL teachers who participated in the study appeared to focus their attention on the interests of their students and approached LLE within a framework that accords priority to more practical language use. As language education, including TEFL, evolves to focus more and more on the study of diverse authentic text [Carter, 2015], empirical studies that analyze teachers' text choices and approaches will become increasingly more important. In the Russian context, where foreign language education is gaining in importance, more empirical studies on LLE, as a subset of authentic text use in second and foreign language acquisition, would help provide a more complete picture of current practices in this field.

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Dual Education in Regions of Russia:
Models, Best Practices, Growth Prospects

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Abstract. The paper analyzes the results of the systems project Training Workers to Comply with the Requirements of High-Tech Industries Using Dual Education, organized by the Agency for Strategic Initiatives in 13 subjects of the Russian Federation. Dual education implies "dual" institutional consolidation of knowledge obtained in vocational education programs: theory is normally learned at a vocational school, while an apprenticeship is taken within a company, in a real-life working environment. It is shown that the best practices of dual education can be found in the growing sectors. The most successful implementation of the dual model is observed in the regions of Russia that have seen their investment climates improved, their barriers for businesses reduced, and the quality of their public administration increased. Effectiveness of the dual model is largely contingent on the economic motivations of employers investing in a staff training system within the framework of large-scale investment and technology upgrade projects. As employers' associations are weak, the decisive role in the coordination of efforts between businesses and professional educational institutions is played by regional authorities and governor's councils, which have virtually grown into substitutes for German chambers of industry and commerce. Nationwide vocational education projects have promoted further development of the dual model due to organizational and financial support from study and career clusters. The best dual education practices should only be spread to regional industries that have the necessary economic and infrastructure premises for companies to invest in such a staff training system.

Keywords: vocational education, dual education, public–private partnership, quality of vocational education.

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Dual education is probably the most famous global brand in vocational education. Conceived in Germany, Austria and Switzerland, dual education implies "dual" institutional consolidation of vocational education programs: theory is normally learned at a vocational school, while an apprenticeship is taken within a company, in a real-life working environment [Solga et al. 2014]. By developing and improving the dual model, Germany has achieved universally acknowledged success in workforce education. The 2008 financial crisis, which Germany survived with minimal losses, confirmed once again the efficiency of this vocational education model. Many advanced and emerging economies have adopted the German experience, adjusting dual education principles to their national contexts. So far, the model has been applied in Greece, Italy, Spain, China, Sweden, Romania, South Korea, and some African countries [Eisenmann 2017].

At the end of the 2010s, dual education came to Russia, too. One of the first convincing examples of using the dual education model in the Russian context was provided in Kaluga Oblast. A mechatronics dual education program was launched by OOO Volkswagen Group Rus in September 2010. It was designed to train workers and process engineers for an automotive manufacturing plant that was being constructed near Kaluga. Similar projects were launched in the Republic of Tatarstan, Sverdlovsk Oblast, and other regions. All those initiatives were assigned the status of a national pilot project in 2013 thanks to the Agency for Strategic Initiatives. The project originally involved ten subjects of the Russian Federation, but their number increased to thirteen in 2015[1]. The project's main goals were to develop and integrate a dual education system, spread it around the pilot regions, elaborate advanced models and formats of network cooperation between educational institutions and businesses joining their efforts to train the workforce, and promote participation of employers in funding staff training programs[2].

As the systems project was underway, quite a few studies analyzed and tried to make sense of Russia's dual education experience. Examining regions' best practices, researchers interpreted dual education in its narrow and broad senses. Using the "narrow" interpretation, authors focused on analyzing the dual model as a way of organizing

[1] The systems project Training Workers to Comply with the Requirements of High-Tech Industries Using Dual Education was approved by the resolution of the Supervisory Council of the autonomous nonprofit organization Agency for Strategic Initiatives to Promote New Projects on November 14, 2013: http://asi.ru/upload/medialibrary/1ba/%D0%94%D0%9F.pdf

[2] Agency for Strategic Initiatives, Ministry of Education and Science of the Russian Federation, Federal Institute of Education Development (2015) *Metodicheskie rekomendatsii po realizatsii dual'noy modeli podgotovki vysokokvalifitsirovannykh rabochikh kadrov* [Methodological Recommendations on Applying the Dual Education Model in Training Highly Skilled Workers], Moscow: http://asi.ru/upload/0b6/Metod_dualeducation_full.pdf

the educational process where learning theory in an educational institution is combined with an apprenticeship in a company. In particular, some zeroed in on the principles of dual education program design in German vocational schools and assessed the advantages of this model for students and employers [Solovyeva 2013; Tereshchenkova 2014; Polyakova 2016]. Following the same logic, others used sociological instruments to analyze student and teacher expectations associated with the introduction of dual education [Matveev 2015]. Still others discussed the opportunities for improving the quality of vocational training and developing the mechanism of professional and public accreditation associated with the implementation of the dual model [Faktorovich 2014]. Some researchers investigated the possibility of integrating components of dual education into higher education in Russia [Grigoryeva, Shvets 2016]. A number of authors examined the experience of dual education and the best practices adopted in particular subjects of the Russian Federation: the Republic of Tatarstan [Ovsienko, Zimina, Yesenina 2014], Omsk Oblast [Shumakova et al. 2016], Sverdlovsk Oblast [Islamgaliev 2016; Yugsfeld 2014], and Krasnoyarsk Krai [Kolga, Shuvalova 2015].

The "broad" interpretation of the problem of dual education and its integration into the Russian context implies analyzing the institutional environment in which human capital is reproduced in Germany and Russia. As Thomas F. Remington and Israel Marques point out, the German model of dual education exists in a "coordinated market economy", where employers cooperate with trade unions and are willing to invest in personnel development. The authority of employer associations (chambers of industry and commerce) and some specific aspects of the labor laws in Germany reduce the risk of employee poaching, thus protecting investments in human capital made by German enterprises [Remington, Marques 2014].

However, Russia's labor market is characterized by high turnover rates, which keeps employers from investing in the education of young workers, as employee loyalty cannot be guaranteed. Vladimir Gimpelson and Rostislav Kapelyushnikov emphasize that this institutional feature of the Russian labor market even prevents enterprises from investing in firm-specific human capital, let alone universal skills, which can be capitalized more effectively after quitting. Investment in them simply becomes economically unviable [Gimpelson, Kapelyushnikov 2011].

In assessing the situation regarding vocational education and training in Russia, researchers detect a classical collective action dilemma: all the participants—enterprises, employees, educational institutions, and the State—would benefit from creating an efficient system of personnel training that would balance the supply and demand in the market of contemporary skills. At the same time, none of the parties is ready to make the first step and assume the risks associated with investing in vocational education [Remington, Marques 2014].

Therefore, expansion of dual education is only possible if businesses, educational institutions and authorities can overcome their disagreements and join their efforts to promote vocational education and worker training.

In Russia, where employer associations and trade unions have little influence, regional authorities often act as coordinators in personnel training. Analyzing the successful experience of implementing the dual system in Perm Krai, Kaluga Oblast, Belgorod Oblast and Nizhny Novgorod Oblast, researchers stress the significance of the "subjective factor", i. e. the role of individual governors who approached the development of regional vocational education systems not just as a duty but as their governance priority. In addition, dual education was actively supported through the initiatives launched by the Ministry of Education and Science and the Agency for Strategic Initiatives (ASI) [Remington 2016]. It does not make the Russian experience unique, however, as the decisive role of public institutions in building social partnerships in personnel training is typical of most economies in transition [Green et al. 1999].

"Introduction of a practice-oriented (dual) model of vocational education and worker training in trades consistent with the industrial and innovative development strategy of the subject of the Russian Federation" is one of the key measures stipulated in the Regional Standard for Industrial Growth Staffing, spearheaded by the ASI[3]. The respective resolution of the Government of the Russian Federation, published even before the ASI project was formally completed, also suggested "consistent integration of a practice-oriented (dual) education model in vocational education"[4]. Consequently, on the agenda today is the question about further promoting regions' best dual education practices and making them ubiquitous in vocational education.

Our study aims to analyze the opportunities and constraints in promoting the model of dual education in subjects of the Russian Federation. As numerous education projects have shown, spread of the best practices is one of the most challenging stages in the integration of any educational innovation. Educational technology implemented under experimental conditions may prove efficient very convincingly, but as soon as it has to be spread, entirely new circumstances emerge, for which no allowance is normally made at the initial stage. Such circumstances may impede proliferation of the innovation or reduce its implementation effects dramatically. On top of that, the risk of model distortion and emasculation is growing multifold as long as

[3] Regional Standard for Industrial Growth Staffing, 2016: https://asi. ru/upload_docs/staffing/Standart_KPR_upd.pdf

[4] Series of Measures to Improve the System of Vocational Education for 2015–2020, approved by the Resolution of the Government of the Russian Federation No. 349-r of March 3, 2015: http://static.government.ru/media/files/cWukCnDBv5U.pdf

the pilot project results are being spread, which can eventually discredit the original idea.

What does it mean in terms of analyzing the results of the systems project for introducing dual education in Russia?

The project implemented in 2013–2016 under the auspices of the Agency for Strategic Initiatives was designed to integrate the German model of dual education in worker training programs in 13 preselected subjects of the Russian Federation. As of today, the relevant practices have been developed; a few cohorts of vocational students participated in dual education programs; and the regions have elaborated the management, organization and financial mechanisms to sustain the model. It appears appropriate to ask *the first range of questions* about these regional practices with a view to analyzing and assessing the results of integrating the dual model in contrast to the borrowed German prototype. These are the questions that have to be answered by executives and experts in any country integrating the dual education system.

Which essential elements of dual education have been integrated successfully and which ones have not? What are the factors that promoted the successful integration of the model?

What is the "range of coverage" attained by the newly integrated model? Has the model been distributed ubiquitously yet or only at the local level?

Since we cannot borrow the institutional environment of Germany, Austria or Switzerland—the countries where the model was originally conceived—it is vital to understand what helps the new model take root and survive in a "hostile" institutional context.

The second range of questions seek to evaluate the prospects of further distribution of the dual model to other subjects of the Russian Federation. Obviously, this evaluation will be largely contingent on the results obtained at the first stage of analysis.

The article will be further structured in accordance with the logic presented above. Sections 1.1–1.3 are devoted to analysis and assessment of the factors that determined successful implementation and performance of the 2013–2016 pilot project in the regions which won the ASI's grants for integrating the dual model. Section 2 seeks to assess the effects and application rates of dual education practices in the participating regions. The conclusion makes inferences about the opportunities and constraints of spreading the dual education practices to other subjects of the Russian Federation.

1. Factors that Determined the Success of the 2013–2016 Systems Project for Integration of the Dual Education Model

1.1. Participating Regions: Growing Economies and Conducive Investment Climates

Dual education in Germany is deeply integrated in the innovation-driven economy. "New industrialization", which became the standard of the German economy during the crisis years, has been impregnated with the principles of dual education. A hypothetical German firm controlling 20% of the global silicon solar cell market invests in worker

training and engages in dual education because this is an integral part of its business strategy along with research and development and production technology upgrades. It was critical to consider this innovational context when borrowing dual education practices. The regions of Russia which responded to the ASI's initiative were ready to introduce the dual model. All of them complied with the requirements, i. e. had hi-tech enterprises, conducive investment climates, high-quality administration, and responsible expenditure policies.

The project for design, integration and distribution of a dual education system involved 13 subjects of the Russian Federation: the Republic of Tatarstan, Krasnoyarsk Krai, Perm Krai, Belgorod Oblast, Volgograd Oblast, Kaluga Oblast, Moscow Oblast, Nizhny Novgorod Oblast, Samara Oblast, Sverdlovsk Oblast, Tambov Oblast, Ulyanovsk Oblast, and Yaroslavl Oblast. All of the regions are characterized by diversified economies, diverse natural resources, and developed transport infrastructures. Most of them are favorably situated close to megalopolises. Their competitive advantages also include well-educated and relatively inexpensive workforces.

The regions mentioned above have attracted heavy investments over the last 15–20 years. The Republic of Tatarstan has seen a particularly rapid development in oil refining, petrochemistry, and the automotive industry. Aerospace engineering, instrument making, machine tool building and nuclear power have become centers of innovative development in Ulyanovsk Oblast. Tambov and Belgorod Oblasts have been traditionally focused on hi-tech agriculture and farming. The investment attractiveness of Moscow and Kaluga Oblasts has been determined by their proximity to Moscow, Russia's largest market, financial and transport hub. Metallurgy and mechanical engineering have been drivers of technology innovations in Krasnoyarsk Krai, Volgograd Oblast and Sverdlovsk Oblast; chemical and petrochemical industry, mechanical engineering and metalworking—in Perm Oblast. Yaroslavl and Nizhny Novgorod Oblasts have prioritized mechanical engineering and the military–industrial complex.

Most of the participating regions have managed to turn the political situation into an advantage and attract considerable funds allocated under federal assistance programs. Regions with developed agribusiness industries—Tambov, Belgorod and Moscow Oblasts—have ramped up agricultural production in the context of retaliatory sanctions. Tatarstan's economy was growing together with the demand for petrochemicals; in addition, the local authorities attracted large-scale investments during preparation for the Universiade and other international events. Since the program for rearmament of the Russian Army and Navy was adopted in 2011, investment in the military–industrial complex has become an important factor of regional economic development. The major beneficiaries to this investment program include Perm and Krasnoyarsk Krais, Sverdlovsk, Nizhny Novgorod and Yaroslavl Oblasts.

Table 1. **Regions participating in the project for integration of dual education in investment climate rankings, 2012–2016**

Subject of the Russian Federation	2012	2013	2014	2015	2016
Belgorod Oblast	2A	2A	2A	2A	2A
Volgograd Oblast	3B1	3B1	3B1	3B1	3B1
Kaluga Oblast	3B1	3B1	3B1	3B1	3B1
Krasnoyarsk Krai	2B	2B	2B	2B	2B
Moscow Oblast	1A	1A	1A	1A	1A
Nizhny Novgorod Oblast	2B	2B	2B	2B	2A
Perm Krai	2B	2B	2B	2B	2B
Republic of Tatarstan	1A	1A	2A	2A	2A
Samara Oblast	2B	2B	2B	2B	2B
Sverdlovsk Oblast	1B	1B	1B	1B	1B
Tambov Oblast	3A1	3A1	3A1	3A1	3A1
Ulyanovsk Oblast	3B1	3B1	3B1	3B1	3B1
Yaroslavl Oblast	3B1	3B1	3B1	3B1	3B1

1A—highest potential, minimum risk; 2A—average potential, minimum risk; 3A1—low potential, minimum risk; 1B—high potential, moderate risk
Source: Expert RA Investment Attractiveness Ranking of Regions, 2012–2016.

The funds attracted hit fertile ground, as most participating regions had pursued efficient investment policies. The authorities in the Republic of Tatarstan, Belgorod Oblast, Kaluga Oblast, Moscow Oblast and other regions have consistently invested in infrastructure development, improved transport accessibility, reduced bureaucratic barriers, established special economic zones, and granted tax preferences to SEZ residents. The regions' efforts have resulted in their high positions in investment climate rankings (Table 1).

As a result, the project involved the regions with the most conducive investment climates (Belgorod Oblast, Moscow Oblast, Nizhny Novgorod Oblast, Krasnoyarsk Krai, Perm Krai, the Republic of Tatarstan, Samara Oblast, and Sverdlovsk Oblast) and those with low investment risks (Volgograd Oblast, Kaluga Oblast, Tambov Oblast, Ulyanovsk Oblast, Yaroslavl Oblast). Despite all the socioeconomic differences among these subjects of the Russian Federation, it could be safely said that dual education was introduced in regions that had attracted investments successfully and laid solid foundations for the development of hi-tech manufacturing.

1.2. Dual Education "Injection Points": Large-Scale Investment Projects and Efficient Public–Private Partnerships

Compliance with external requirements opened up every opportunity for full-fledged public–private partnership in the field of worker training. Implementation of large-scale projects necessitated heavy spending on the education of personnel and newly-employed workers. Having spent 60 bln rubles on the construction of modern metallurgical facilities in Sverdlovsk Oblast, the shareholders spent 1 bln more on worker training. This decision was based on good judgment: effective and safe operation of complex process systems is impossible without newly-trained workers, engineers, and engineering technologists. This was a situation where all the key components of dual education started making economic sense to employers: strategic planning of staffing needs and development of long-term recruiting strategies; update of the content of education programs as a response to new job requirements; on-the-job training and mentorship; independent assessment of competencies; investment in vocational education—all the elements of the dual model became integral parts of any investment project implemented in the participating regions.

A good example of how this strategy works is The Future of White Metallurgy project, implemented jointly by ChelPipe Group (Chelyabinsk Pipe-Rolling Plant), the government of Sverdlovsk Oblast, and Pervouralsk Metallurgical College. About 1,100 students annually enroll in dual education programs in 30 metallurgy and mechanical engineering majors. Total expenditure per student amounts to 1 mln rubles for three years of studies. The company has deployed about 100 units of expensive modern equipment in a specially constructed educational center. The overwhelming majority (over 80%) of program graduates are employed by ChelPipe Group enterprises[5].

A similar initiative has been implemented in the Republic of Tatarstan since 2013. The College of the Future of Tatarstan educational project was launched by Rimera Group, the Ministry of Education and Science of Tatarstan, and Almetyevsk Vocational College. The company provided premises for the construction of study and laboratory facilities on the site of Alnas Plant, renovated the classrooms, and supplied necessary furniture and equipment. The Ministry procured laboratories for the CAD/CAM technology, mechatronics, hydraulic machines, pneumatic control, lathe and milling machines. Alnas Plant experts in cooperation with vocational school teachers designed practice-oriented education programs and organized a student apprenticeship. The project keeps evolving: the regional authorities intend to allocate 130 mln rubles for its further implementation in 2017–2019, and Rimera Group is going to invest over 100 mln rubles.[6]

Consortiums of enterprises and vocational schools providing joint dual education programs were formed in all the participating regions.

[5] http://www.chelpipe.ru/about/investment_projects/college/

[6] http://kazan.bezformata.ru/listnews/tatarstan-i-gruppa-kompanij-rimera/54191766/

OOO Volkswagen Group Rus and Kalugaenergo in Kaluga Oblast, OOO Rusagro-Tambov in Tambov Oblast, ZAO Kapital-Agro in Belgorod Oblast, Titan Central Design Bureau in Volgograd, OAO Krasmash in Krasnoyarsk Krai, PAO NPO Saturn and ZAO R-Farm in Yaroslavl Oblast, OAO Pervouralsk New Pipe Plant in Sverdlovsk Oblast—every region had one or more "anchor companies" around which vocational education institutions were clustered. Regional governments coordinated the participants' efforts and provided all the necessary organizational and financial assistance[7].

In 2013–2016, the participating regions developed truly exemplary dual vocational education practices, approaching the original German prototype. Availability of all the economic prerequisites (growing regional economies, investment projects in hi-tech sectors), a system of incentives for business structures (economic feasibility of investing in personnel development), engagement of regional authorities, and the ability of vocational schools to reorganize their educational processes to comply with employers' requirements—all the factors providing efficiency of dual education as a globally recognized model of vocational training were present when dual education programs were launched in the 13 subjects of the Russian Federation. Dual education was borrowed in its full-fledged version: purely educational and methodological elements of the model (revised education programs and curricula, mentorship, etc.) were integrated seamlessly into relevant economic and business contexts, being oriented towards training employees for hi-tech sectors of the Russian economy.

1.3. Government Support for Dual Education Programs

In the Russian context, the government is often the "third force" that makes efficient public–private partnership in vocational education possible. Participation in the ASI's pilot project did not directly involve receiving additional funds from the federal budget by the participating regions. At the same time, the Ministry of Education and Science of Russia initiated a few parallel projects designed to foster public–private partnership in vocational education and motivate enterprises to engage in co-funding of vocational education infrastructure. Study and career clusters were used as an organizational model for public–private partnership and joined by vocational schools along with manufacturers and suppliers of products, services and equipment as well as research establishments [Perevertaylo 2015].

Using the resources of the Federal State Target Program for Education Development, the federal Ministry funded study and career clusters in petrochemistry (the Republics of Komi and Tatarstan), life sciences and the pharmaceutical industry (Yaroslavl Oblast, Penza Oblast, Kaluga Oblast, and the Republic of Mordovia), aerospace

[7] Regional Standard for Industrial Growth Staffing, 2016: https://asi. ru/upload_docs/staffing/Standart_KPR_upd.pdf

engineering (Irkutsk Oblast, Novosibirsk Oblast, Tambov Oblast, Khabarovsk Krai, and Udmurtia), the energy industry (Krasnodar and Primorsky Krais), mining (Zabaykalsky Krai, Sakhalin Oblast, Belgorod Oblast, Sakha Republic (Yakutia), and Jewish Autonomous Oblast), the nuclear–industrial complex (Ulyanovsk Oblast), nanotechnology (Vladimir Oblast), metallurgy (Lipetsk Oblast, Sverdlovsk Oblast, Vologda Oblast, and Krasnoyarsk Krai), mechanical engineering (Republic of Khakassia, Voronezh Oblast, Kaluga Oblast, Smolensk Oblast, Nizhny Novgorod Oblast, and Kurgan Oblast), and other industries. The key significant components of the dual education model—planning of staffing needs, update of the content of education programs, independent assessment of competencies, and funding of vocational education infrastructure by employers—were integral parts of the study and career cluster development programs.

Those programs obtained a total funding of 18,622 mln rubles, including 1,918.4 mln from the federal budget, 11,143.1 mln from regional budgets, 4,054.1 mln from employers, and 1,506.6 mln from vocational education institutions. As a result, 57 subjects of the Russian Federation became beneficiaries of federal government grants. The competition for federal grants was not selective. The program little involved the most well-off regions and the federal cities of Moscow and Saint Petersburg, which possess enough resources of their own to promote personnel development; it also left out the republics of the Northern Caucasus, whose budgets are largely formed by federal grants. However, most of Russia's regions gained access to the federal program funds, including all the dual education pilot project participants. This was in line with the federal government's priority of ensuring maximum possible distribution of the public–private partnership model in vocational education.

2. Dual Education Model: Provisional Results of Integration in Subjects of the Russian Federation

Integration of dual education in subjects of the Russian Federation has yielded promising results. While summarizing the results of implementing the pilot project in 13 regions in 2016, international experts cheered on the prospects of further implementation of the dual model in Russia: "Most participants gave positive answers to the question about the future of the dual education system, which indicates a high level of support for this initiative and confidence in its ability to "survive" in the Russian context"[8].

[8] Agency for Strategic Initiatives, Ministry of Education and Science of the Russian Federation, Federal Institute for Education Development (2016) *Metodicheskie rekomendatsii po realizatsii dual'noy modeli podgotovki vysokokvalifitsirovannykh rabochikh kadrov. Versiya 2.0* [Methodological Recommendations on Applying the Dual Education Model in Training Highly Skilled Workers. Version 2.0], Moscow: http://asi.ru/staffing/dualeducation/docs/Metod_Recommendation_2.0.pdf

Table 2. **The percentage of vocational education institutions applying dual education in the subjects of the Russian Federation involved in the experiment**

Subject of the Russian Federation	The percentage of vocational education institutions applying dual education (%)
Belgorod Oblast	85.7
Nizhny Novgorod Oblast	63.0
Tambov Oblast	51.3
Samara Oblast	50.0
Moscow Oblast	23.2
Volgograd Oblast	18.9
Kaluga Oblast	17.1
Republic of Tatarstan	16.9
Perm Krai	16.2
Krasnoyarsk Krai	15.4
Yaroslavl Oblast	11.1
Ulyanovsk Oblast	10.8
Sverdlovsk Oblast	7.1

Source: Monitoring of Staff Training Quality in the Russian Federation, 2016.

Analyzing the experience of the pilot project participants, the experts agree that each of the regions has integrated the cluster model with varying degrees of completeness and created effective employer–educational institution links, which have ensured considerable progress in integrating practice-oriented, including dual, vocational education. As for the reach and the rate of distribution of the dual model within the regional vocational education systems, the experts find the process to be rather slow and protracted: "In most cases, the best interaction practices are translated to the whole cluster very slowly, if at all"[9]. The same follows on from the Monitoring of Staff Training Quality: only four of the regions that took part in the dual education pilot project spread their practices to more than half of their vocational education institutions (Table 2).

The difference in the rate of distribution of the dual education model between the regions is determined, first of all, by different capacities. The subjects of the Russian Federation ranking at the top of Ta-

[9] Ibid.

ble 2 provided all the necessary conditions for introducing the dual system long before the pilot project was launched: they reorganized their own networks of vocational education institutions, including vocational schools into industrial clusters, fostering their cooperation with enterprises in every possible way. For instance, Tambov Oblast has established resource centers, competency assessment centers, industry- and region-specific vocational schools since 2007. The strategy for developing the regional system of vocational education relied upon the cluster-based approach, which implied creating clusters in the secondary sector, agriculture, construction, transport, information technology, and social services. Every cluster had a coordination council responsible for managing physical, financial, and staff resources, adding new trades and majors, approving and integrating vocational education programs, and assessing the quality of training in compliance with employers' requirements. The governor's supervisory board undertook to determine the strategy for developing the staff training system, review and approve forecasts on the regional economy's demand for workforce, develop a list of promising trades, and finance the clusters' activities associated with implementing the dual education model. Similar complex models were created in Belgorod Oblast, Nizhny Novgorod Oblast, Samara Oblast, the Republic of Tatarstan, and Perm Krai. Accumulated experience and the rich traditions of public–private partnership allow for smoother integration of the dual model in some of the regions.

Another reason why the dual education distribution rates in the participating regions are far below 100% lies in the economic plane. A number of external conditions are required to ensure full-scale cooperation between companies and vocational schools, including a conducive business environment and a stable demand for the workforce, sustained by long-term public contracts and investment projects. However, few industrial partners of vocational education institutions operate under such conditions. Along with the rapidly growing sectors of the regional economies, there are industries in a systemic crisis. Some enterprises find resources to update their technology, others find themselves unable to solve this problem. All of these factors affect the motivation of company leaders to engage in dual education programs and their willingness to invest in vocational education at all.

Nowadays, the regional systems of vocational education feature three distinct categories of educational institutions that differ greatly in their involvement in the context of regional economy staffing as well as in the ways they normally interact with employers. *The first category* is represented by vocational education institutions that are part of hi-tech clusters in metallurgy, oil and gas, petrochemistry, the defense industry, transport, and agriculture. Vocational schools that share clusters with the top companies engage in implementing the long-term recruiting strategies of those companies. Employers are in-

volved in the process of school management, exerting immediate influence on the structure and content of education programs as well as on assessment of the quality of graduates. Businesses' investments in vocational schools' resource base exceed dramatically the relevant expenditure of the founders. This is where the model of dual education is implemented in its full-fledged form, in line with the original German paradigm, where training expenditure per employee amounts to EUR4,000–6,000, the ratio of government and employer funding being 50:50. Such educational institutions have become the "display window" of the vocational education system in Russia, and every subject of the Russian Federation has a few exemplary vocational schools.

Vocational schools of *the second category*, which are part of territorial clusters, have more constrained resource opportunities. Their partner enterprises usually have to plan their staffing needs in the medium term. Cooperation between companies and educational institutions is active and includes the organization of student apprenticeships, in particular under the dual education model, participation in final examinations, and various forms of employer-sponsored education. At the same time, employers in this category rarely initiate large-scale investment projects and have limited opportunities for investing in vocational education infrastructure, their contribution to the revenues of vocational education institutions being as low as 10–20%.

The third category includes multidisciplinary vocational schools preparing workers for the secondary sector as well as small and medium-sized businesses. Their partner companies are often commercially unfeasible, ineffective, technologically backward, and extremely volatile. Partnerships are steady and consistent by virtue of long-standing cooperation, yet the ability of businesses to influence the design and quality of education programs is too low. Their investment in the infrastructure of vocational schools is insignificant, too.

In assessing the effects of the systems project for the integration of dual vocational education, it is vital to make allowance for the inhomogeneity of the partnerships adopting the model. Vocational schools that are part of hi-tech clusters have received a chance to further extend their resource bases. Their interaction with employers is consistent and easy to predict, regardless of whether they will obtain additional government funding in the future or not. Vocational schools of the second category could only take advantage of dual interaction partially. Those which were granted additional funds from the federal government managed to renovate their infrastructure and expand their partnerships with employers. Institutions of the third category, which make up a considerable proportion, have not yet derived any benefit from the dual education integration project. Involvement of such educational institutions in industrial growth staffing programs and renovation of their infrastructures require taking additional measures at the national and regional levels.

3. Conclusion

The systems project Training Workers to Comply with the Requirements of High-Tech Industries Using Dual Education promoted institutional consolidation of dual education practices in the Russian Federation. Introduction of dual education prompted changes in the vocational education system, bringing together the interests of employers, authorities and educational institutions in workforce training. Analysis of dual education practices in the participating regions allows for identifying the opportunities for and constraints of spreading the model to other subjects of the Russian Federation.

When integrating dual education, it is important to consider the transparency of this model and its involvement in the context of technological development. Only secondarily is it a teaching method, the primary characteristic of dual education being orientation towards staffing of investment projects and qualitative growth of regional economies. That is why the best practices of dual education, conformant to the German prototype, have been developed in the industries that attracted heavy investment. The sectors with poor investment climates and no technology upgrade programs cannot motivate employers to engage in dual education. The dual model only works well with the "areas of growth", so dual education distribution plans should be coordinated with projects for providing conducive business and investment environments in the subjects of the Russian Federation and improving the quality of public administration. Attempts to introduce dual education in stagnating and underinvested regions and industries inevitably hollow out the very concept of dual education.

The 2013–2016 experience of integrating the dual model revealed a number of limitations. In particular, the model cannot be spread as-is to education in the social sector. Interaction with employers is equally necessary to train nurses, kindergarten teachers, musicians, etc., yet the economic rules in this industry are different from those adopted in the production sector and agriculture. It is important to define clearly the scope of application and avoid spreading the model to industries where dual education principles are impossible to implement.

Dual education has not yet been duly formalized by Russia's educational laws. The experience of the pilot project participants was documented as methodological recommendations, guidelines on workplace education, sample partnership agreements and agreements on network organization of education programs, etc. Such methods of regulating the relations among the organizations concerned were warranted at the stage of the pilot project. At the next stage, however, when faced with the need to distribute the dual model as widely as possible, a number of issues related to licensing the institutions involved in dual education, defining the status of mentors as participants of the educational process, etc. have to be solved. Dual education practices can hardly spread widely if no relevant changes and amendments are made to the existing laws.

Availability of a coordination center ensuring the cooperation among all the parties to workforce training is a key prerequisite for successful implementation of the dual education model. In Germany and other countries with "coordinated economies", this function is performed by chambers of industry and commerce. In Russia, however, the experience of Perm Chamber of Industry and Commerce remains unique, whereas most federal subjects delegate alignment of parties' interests and coordination of their efforts to regional executive authorities or governors' coordination councils. These are substitutes to promote the dual model in a situation where cooperative relations among employers are weak.

The integration of dual education under the 2013–2016 systems project relied upon methodological assistance provided by German experts, Germany's experience being regarded as the main methodological guidance for implementing the dual model. However, it appears vital that the next stage of integrating the dual model in Russia involves analysis of not only the "exemplary" German experience but also practices adopted in other countries trying to integrate the dual education model with varying degrees of success.

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How Entrepreneurship Education Programs Affect the Development of Small Businesses in Russia:

Empirical Analysis in Regional Contexts

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Abstract. The article presents the results from studying the engagement of Russians in supplementary entrepreneurship and business education programs, and investigates the influence of such engagement on small business development in the socioeconomic contexts of different regions of Russia. The study goes from comparing the number of students enrolled in supplementary entrepreneurship and business education programs of various duration across regions, through analyzing the correlations between the demand for specific types of programs and the development of different subsectors of private entrepreneurship under region-specific socioeconomic conditions, to analyzing entrepreneurship education as a growth driver for particular types of small businesses in specific contexts.
The study tests hypotheses about the engagement of Russians in entrepreneurship education being contingent on the regional context and about the influence of different forms of entrepreneurship education on the development of various types of business ventures. Empirical data on three types of region-specific socioeconomic contexts reveals a significant correlation between engagement in supplementary entrepreneurship and business education programs and the development level of small businesses, microbusinesses, and entrepreneurship (in its traditional and innovative versions). The three clusters of regional units homogeneous in their socioec-

onomic contexts were determined using a multidimensional typology.
The findings allow for evaluating the role of the national education system in promoting entrepreneurship among the population based on reliable and relevant statistical information consistent with the international standards as well as measuring the effectiveness of entrepreneurship education programs and promotion strategies in various regional contexts. The article puts forward recommendations on choosing the types of entrepreneurship education to deliver at different levels of the education system in Russia.
Keywords: innovative entrepreneurship, traditional business, small entrepreneurship, micro entrepreneurship, supplementary professional education, offline entrepreneurship education programs, extramural entrepreneurship education programs, multivariate statistical methods, cross-regional comparison.

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The Logic of Studying the Effects of Participation in Continuing Education on Small Business Development in Specific Socioeconomic Contexts

Studies on the impact of education on entrepreneurial activity have revolved around two major aspects: how the overall level of education attainment affects entrepreneurial activity and its socioeconomic benefits [Lucas 1978; van Praag, Cramer 2001], and how entrepreneurship education—modules of various types and levels designed to develop competencies in leadership, project management, uncertainty management, etc.—affects the success rate of entrepreneurial activity [Walter, Block 2016].

It has been empirically shown that there are no universal ways covering every country and every level of education attainment in which entrepreneurship education affects entrepreneurial activity, yet the level of education attainment has a significantly positive influence on the outcomes of such activity. Education does not always promote or improve the quality of entrepreneurial activity even in entrepreneurship-friendly institutional environments [Ettl, Welter 2010; Giacomin et al. 2011; Sánchez 2011]. Meanwhile, the effect of education on earnings is greater among employees than entrepreneurs in Europe and equal or even greater among entrepreneurs in the United States. It has been established that all measurements of the influence of education on entrepreneurial success are potentially affected by outliers, and, more importantly, most studies detect a correlation but no causal relationship between education and entrepreneurial achievement [van der Sluis, van Praag, Vijverberg 2008]. At the same time, there is ample research devoted to the impact of entrepreneurship education on entrepreneurial intentions and success [Peterman, Kennedy 2003; Hytti, Kuopusjärvi 2004; Moro, Poli, Bernardi 2004; Fayolle 2005; Souitaris, Zerbinati, Al-Laham 2007; Oosterbeek, van Praag, Ijsselstein 2010; Naia et al. 2015]. Although studies on the relationship between entrepreneurship education and entrepreneurial activity conducted in different socioeconomic contexts yield different findings, such a relationship has been confirmed in a number of publications [Raposo, do Paço 2011]. For instance, an international study involving 42 countries has revealed significant correlations between entrepreneurship education and ac-

quisition of relevant components of human capital (rw = 0.217) as well as between entrepreneurship education and entrepreneurial performance (rw = 0.159), the latter correlations being more pronounced for academic degrees than for short-term courses [Martin, McNally, Kay 2013]. Another representative study that covered 32 countries revealed a strong positive effect of entrepreneurship education on entrepreneurial intentions, primarily in entrepreneurship-hostile institutional environments [Walter, Block 2016]. Enterprise education has been found to have a positive impact on the intentions of venture creation in cases where they were weak or absent prior to education, whereas a significant reverse effect was discovered for students with some previous entrepreneurial experience [Fayolle, Gailly 2015]. Entrepreneurship education has proved to be the most effective for students majoring in business, management and engineering [Maresch et al. 2016].

A brief overview of empirical findings demonstrates that the influence of a national education system on entrepreneurial activity should be measured with regard to specific regional contexts. To develop relevant recommendations, it is necessary to obtain detailed, credible and up-to-date statistical information, consistent with the international standards, on correlations between various forms of education, including business programs, as well as on the level and quality of entrepreneurial activity.

This study aims to evaluate the effective engagement of Russians in continuing education programs, including those in entrepreneurship, and to assess the effect of such engagement on the development of small businesses in specific socioeconomic contexts of Russia's regions.

To do this, empirical data was used to find out whether there is a significant relationship between the participation rate in education (continuing education programs and business education programs, in particular) and the level of development of small businesses, microbusinesses and entrepreneurship (in its traditional and innovative versions) for any specific regional socioeconomic context. The three clusters of regions with homogeneous socioeconomic contexts (advantaged or disadvantaged subjects of the Russian Federation, with predominantly social or investment problems, etc.) were identified using a multidimensional typology proposed by Olga Obraztsova and Ekaterina Popovskaya [2017].

The first type of socioeconomic context of entrepreneurship is determined based on high human wellbeing indicators and insignificant variations in the other two latent context variables, innovative activity and sociodemographic characteristics. This type includes only six successful regions: Moscow, Saint Petersburg, Moscow and Tyumen Oblasts, Yamalo-Nenets and Khanty-Mansi Autonomous Okrugs. The rest of Russia's regions are characterized by low values of the "well-being" latent variable, so they cannot be distinguished by this latent factor. The second context type is determined based on high values

of the "investment problems" latent variable: 42 regions demonstrate low levels of investment activity (all with low values on the "wellbeing" axis and a considerable variance of the "social problems" variable). Contexts of the third type are observed in the regions with high values of the "social problems" latent variable: 35 subjects of the Russian Federation experience harsh social conditions, accompanied by low wellbeing indicators and almost average investment activity.

The study goes from comparing the number of students enrolled in continuing education programs (including business programs of varying scopes, both offline and online) of various duration across the regions, through analyzing the correlations between the demand for specific types of continuing education programs and the development of different entrepreneurship subsectors under region-specific socioeconomic conditions, to analyzing business education as a growth driver for particular types of small businesses in specific contexts.

The following hypotheses are tested in the study:

H1.1. The level of participation of Russians in entrepreneurship education is not affected by the type of regional context.
H1.2. Differentiation of Russian regions by the demand for continuing education programs is statistically significant.
H1.3. Differentiation of Russian regions by the demand for entrepreneurship education programs is statistically significant.
H2.1. Development of online learning courses in entrepreneurship drives innovative microbusinesses in the regions with predominantly social problems.
H2.2. Development of offline learning courses in entrepreneurship drives innovative microbusinesses in the disadvantaged regions of all types.
H2.3. Development of online learning courses in entrepreneurship inhibits the development of traditional small and microbusinesses in the disadvantaged regions of both types.
H2.4. Development of offline learning courses in entrepreneurship inhibits the development of sole proprietorship in the regions with predominantly investment problems.

Database and the Methodology of Analyzing the Education System Impact on Entrepreneurial Activity in Russia

To achieve the goal set, it is necessary to build a multidimensional thematic data collection and apply multivariate statistical analysis methods on the basis of universally adopted theories and the international standards of enterprise and entrepreneurship statistics and business demography [Reynolds et al. 2005; Obraztsova 2017]. In order to ensure reliability of the databases used to test the above hypotheses, a complex analysis of the informative value of educational statistics, on the one hand, and small business and enterprise statistics in Russia, on the other hand, was conducted. The analysis revealed that the use of necessary information is essentially limited by the character-

istics of available statistical data: missing values, outdated statistics, impossibility to harmonize data from different sources due to fundamental methodological inconsistencies, low representativeness of microdata of required disaggregation. For this reason, the database was formed by harmonizing the information resources of the Russian Federal State Statistics Service (Rosstat)'s official statistics and the Ministry of Education and Science's administrative statistics for 2013–2016, including:

1) Current enterprise and entrepreneurship statistics[1], Rosstat small business continuous surveys;
2) Administrative statistics of the Ministry of Education and Science of the Russian Federation (open national and region-specific data on education and science in machine-readable formats of the portal http://xn-80abucjiibhv9a.xn — p1ai/opendata[2]);
3) Current administrative statistics on school and postsecondary education, statistical reports on public program performance benchmarks;
4) Results of classifying Russia's regions by their socioeconomic contexts based on a multivariate analysis of Rosstat's regional statistics [Obraztsova, Popovskaya 2017].

The system of thematic data collection indicators based on the above sources of official statistics as well as labels of those indicators' values used for analysis and modeling in SPSS-21 are presented in the Supplement.

When doing cross-regional comparisons, disaggregation of the thematic data collection on small business, microbusiness and sole proprietorship as well as on the role of continuing education programs of various types and duration in entrepreneurship development was performed and justified with due regard for the availability of up-to-date official (national and administrative) statistics micro- and macrodata, the extent to which the information sources go into detail, the coverage and representativeness in terms of specific regions, and the

[1] Rosstat official business demography statistics is currently under implementation (see http://www.gks.ru/wps/wcm/connect/rosstat_main/rosstat/ru/statistics/enterprise/reform/#); the full range of indicators is available for 12 subjects of the Russian Federation, in seven of them being based on pilot estimates produced by regional Rosstat offices in 2014, and in the other five on experimental estimates performed as part of research on the formation of business demography indicators in compliance with the OECD standards in the context of data incompleteness in 2013 and 2014 [Obraztsova 2017; Dukhon 2013].

[2] The portal data is available for a limited period of time (beginning with 2013) and characterized by low quality and numerous errors, so it needs to be seriously improved by the responsible persons in the Ministry of Education and Science.

possibility of ensuring methodological consistence in both spatial and temporal aspects (including compliance with the international statistical standards).

The system of indicators for the developed thematic data collection was built using the method of statistical concretization of target and factor categories in accordance with the determined analytical goals and formulated hypotheses through analyzing the economic content of an indicator depending on its measurement or calculation method and its availability in open sources of information. Harmonization of data obtained from different information resources, statistical concretization of the determined analytical goals and calculation of the derived statistical indicators have resulted in a thematic data collection. This is a logically consistent system of target indicators of the development of small businesses (small and microenterprises in the case of legal entities; innovative businesses, which include enterprises classified as pursuing the "research and development" economic activity, are treated as an isolated category, according to the statistical methodology standard—see Section 2 of the Supplement Table) and factor indicators of the development of education programs (including continuing education programs of varying duration—see Section 3 of the Supplement Table) in Russia and its federal subjects. The innovative small business category was identified pursuant to the international statistical standard for classifying economic activities, so it includes institutionalized small businesses (legal entities of the market sector with fewer than 100 employees) with primary economic activities in at least one of the three fields of research and development in life sciences, technology, social sciences or humanities:

1) Fundamental research, i. e. experimental or theoretical research designed to obtain new knowledge about the key mechanisms in the human body, society and nature;
2) Applied research, i. e. research designed mostly to apply new knowledge to achieve practical goals and solve particular problems (excluding market research);
3) Experimental development, i. e. activity based on research findings or practical experience and designed to protect human life and health, and create and upgrade materials, products, processes, devices, services, systems or methods.

The number of students in entrepreneurship education programs was calculated based on Section 3 of the administrative form of the Ministry of Education and Science's statistical report Information on Continuing Education of Specialists by Types of Education, Fields of Study and Specializations. Eurostat data[3] was used as a methodological ba-

[3] CODED (Eurostat's Concepts and Definitions Database) and other online

sis to estimate the thematic data collection variables describing the number of students in entrepreneurship education programs, both with regard to the system of definitions and concepts characterizing the level[4] and career structure of education[5] in Russia and for the purpose of determining the participation rate in business education in Russia based on the Ministry's data mentioned above. According to the SDMX Metadata Common Vocabulary, business education included the following fields of study: crisis management; accounting, analysis and audit; land and property relations; innovation studies, marketing; management; occupational safety; quality management; human resource management; banking and finance; and taxation. The level of education attainment was measured by the most advanced education program successfully completed by an individual. Career categories of the education programs were identified based on the fields of study stipulated by the Ministry of Education and Science of the Russian Federation. Regrouping allowed for harmonizing the estimated indicators with Eurostat's SCL–ISCED Fields of Education and Training.

In order to enable cross-regional and temporal comparisons, the system of absolute thematic collection values was standardized. Data on the number of students in continuing and business education programs and that of small and micro businesses and sole proprietors was standardized by the size of the economically active population, while data on the number of people employed in small business subsectors, revenues of small businesses and sole proprietors and professional educational institutions' expenditure and funding was standardized by the number of relevant enterprises and organizations. In addition, a system of growth rates (chain-linked with a short-term lag of one year and fixed-based with medium-term lags of two, three and four years) for the target indicators of small business development in regions of Russia (available in Section 2 of the Supplement Table) was estimated in order to make dynamic comparisons possible.

The resulting thematic data collection includes factor and target indicators that are harmonized by the basic concepts and definitions, compliant with the international statistical standards and cleared of the size effect on both spatial and temporal scales, i. e. they allow for not only conducting cross-regional comparisons of participation in continuing education (and business education in particular) but also analyzing the role of continuing education programs of various types (classified by fields of study with entrepreneurship education

glossaries relating to survey statistics // SDMX Content-Oriented Guidelines (COG), annex 4 "Metadata Common Vocabulary" (MCV). SDMX Glossary, 2016. Eurostat, 2016.

[4] International Standard Classification of Education. Eurostat Metadata, 2011 (ISCED2011).

[5] SCL–ISCED Fields of education and training. Eurostat Metadata, 2013 (ISCED-F 2013).

programs as an isolated category and by duration: under 72 hours, 72–100 hours, 100–500 hours, professional conversion programs of 500 hours and longer, additional qualification courses of at least 1,000 hours, and apprenticeship programs as an independent type of training) in the development of the entrepreneurship sector—see Section 3 of the Supplement Table.

Empirical analysis and hypothesis testing were performed stage by stage using the thematic data collection variables.

At the first stage, the distribution of the subjects of Russia by the factor and target thematic data collection variables was analyzed. The findings served as a basis for testing hypotheses H1.1 and H1.2 as well as evaluating the distribution for normality in order to choose adequate methods for analyzing dependencies and modelling the impact of education programs on small business development in regions of Russia. Nonparametric tests and research methods had to be applied as statistically significant deviations from normal distribution were observed at the first stage.

At the second stage, k-means clustering of the regions made it possible to translate the target and factor relative indicators of the data collection into an ordinal scale which is not affected by normal distribution requirements or by the presence of outliers and extreme observations. As a result of clustering, a stable three-cluster structure of regions was obtained for each variable by the fifth iteration. This structure was interpreted as a set of spatial clusters with low, medium or high indicator values.

The third stage involved correlation analysis of the impact of entrepreneurship education programs of various types and duration on the development of traditional and innovative small business in the country (for the small and micro business subsector) designed to test hypotheses H2.1, H2.2 and H2.3. The structure of the official statistics used as an information basis inevitably results in a temporal lag between the variation series tested for relationships:

- The Ministry of Education and Science's administrative reporting forms Nos. 1FSN, 2FSN and 4FSN on continuing education delivered in Russia's institutions of vocational, higher professional and continuing education, which contain information on the factor variables of the number of students, are developed and published at the end of the academic year;
- Rosstat's reporting forms on the number and key performance indicators of enterprises are developed and published at the end of the accounting year (to show the results of the previous calendar year).

For example, the data obtained from the Ministry's 2013 statistics reflects the demand for education programs in the 2011/12 academic year, while the Rosstat 2013 statistics contain data on companies'

2013 accounting and their resources at the end of 2013. Therefore, there is a short-term time lag of 6 to 27 months between the two systems of 2013 reporting indicators. Consequently, correlations between the education and small business development variables should always be measured with a lag, whether short-term (6 to 12 months) or medium-term (two or three years). This is why the direction of the "cause—effect" relationship and, hence, the factor and target values in the models are uniquely defined and beyond doubt: only earlier facts can cause later ones, not vice versa. Nonparametric criteria were used to measure the strength of the relationship between the factor variables of participation in continuing education programs and the target variables of small business development in Russia, as statistically significant deviations from normal distribution had been confirmed.

Correlation analysis and transition to an ordinal measurement scale allowed for identifying at the fourth stage the factors of development of traditional and innovative small business and sole proprietorship in a region by using the Fisher's Linear Discriminant Analysis (FLDA) model. This method of multivariate statistical analysis is less sensitive to outliers and extreme values as it deals with ordinal scale variables. Thus, it can be applied to model distributions that are significantly different from normal. Being nonparametric, the FLDA model can be used to identify the factors that determine with a pretty high degree of probability whether classification units belong to one of the predesigned clusters, i. e. the regions with low, medium or high level of small business development [Fisher 1936; McLachlan 2004]. Therefore, discriminant analysis is built around constructing discriminant function d, which describes in an n-dimensional attribute space a required plane dividing the designed clusters in the best possible way in terms of probability distribution. This function is interpreted as a complex latent factor that determines belonging to a cluster based on the target attribute value, as it takes the following form:

$$d = b_1 \cdot x_1 + b_2 \cdot x_2 + \ldots + b_n \cdot x_n + a,$$

where: $(x_1, x_2, \ldots, x_n)$ are values of the variables corresponding to the units analyzed;
$(b_n, b_n, \ldots, b_n)$ are coefficients evaluated in the FLDA model; and a is a constant.

The general concept of FLDA is that for a particular number of observation units whose assignment to a specific cluster is already known (this is a training sample), a discriminant function is constructed based on the values of their predictor variables. Next, the model is verified using a control sample. Stratified cross-validation was used to verify the constructed models so as to reduce dispersion and thus obtain more stable and prognostically reliable models [McLachlan 2004; Efron 1988]. The significance of the differences identified (p-val-

ue < 0.05) confirms that the differences between the group means in the variables describing the development of traditional and innovative small and micro businesses and sole proprietorship in regions of Russia are not random.

Prognostic significance of the constructed FLDA models for specific regional socioeconomic contexts was assessed based on the proportion of classification units of the control sample for which belonging to a specific group had been predicted correctly based on the Fisher's discriminant function values (with the help of accuracy, sensitivity and specificity coefficients as well as predictability indicators) [Fawcett 2006; Powers 2011].

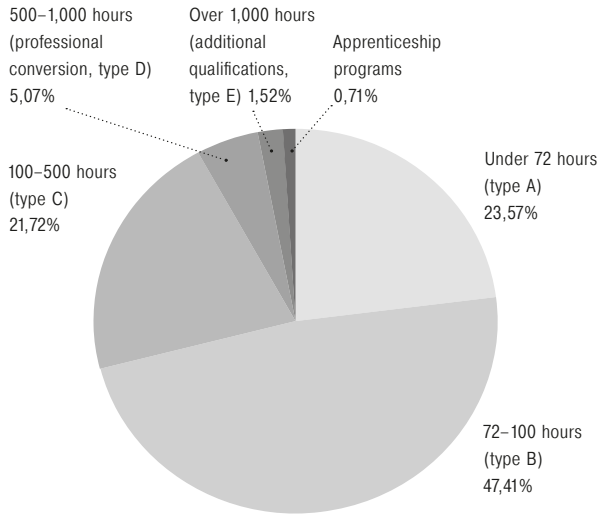
All the analytic operations were carried out in SPSS-21.

Participation in Entrepreneurship Education in the Socioeconomic Contexts of the Subjects of Russia

Participation of Russians in continuing education as such and entrepreneurship education in particular remains abnormally low today, the annual enrollment rate in continuing education programs of all forms, types and specializations being less than 1.7 million, including a little over 800,000 in entrepreneurship education programs (about 274,000 offline and nearly twice as many online students). Analysis of the Ministry of Education and Science's empirical data demonstrates that the structure of students enrolled in continuing education programs of various duration (Fig. 1) has not undergone any statistically significant change since 2013 (assessed on the basis of the skewness coefficient). Short cycles (under 100 academic hours) prevail among continuing education programs, those of 72–100 hours being the most popular. Satisfied demand of the Russian population for additional qualification and professional conversion programs does not exceed 2 and 5 percent of the total student population, respectively. Apprenticeship programs as an independent type of continuing education involve less than 1 percent of all students.

The number of students in entrepreneurship education programs (per 10,000 of the economically active population) differs across subjects of the Russian Federation, the distribution being statistically significantly different from normal. Variations are the greatest in those regions with investment problems that achieve the highest results in their socioeconomic contexts. Figure 2 shows the number of students in offline and online entrepreneurship education programs in different socioeconomic contexts (1st cluster—advantaged regions, 2nd cluster—regions with predominantly social problems, and 3rd cluster—regions with predominantly investment problems). High values in both offline and online programs are observed in Khabarovsk Krai and Jewish Autonomous Oblast (about 70 and 135 per 10,000 of the economically active population, respectively), Tomsk Oblast showing a remarkably high result (90 and 175) and the Republic of Tyva breaking the record with its extremely high participation rates. Socioeconomic contexts of all those regions are characterized by a prevalence of investment

Fig. 1. **Structure of students by duration of popular continuing education programs**



problems. Among the advantaged regions, the highest participation rates in entrepreneurship education (especially in online programs) are provided in Moscow (80 and 130) and Saint Petersburg (55 and 100). The lowest participation rates are observed in the regions with predominantly social problems.

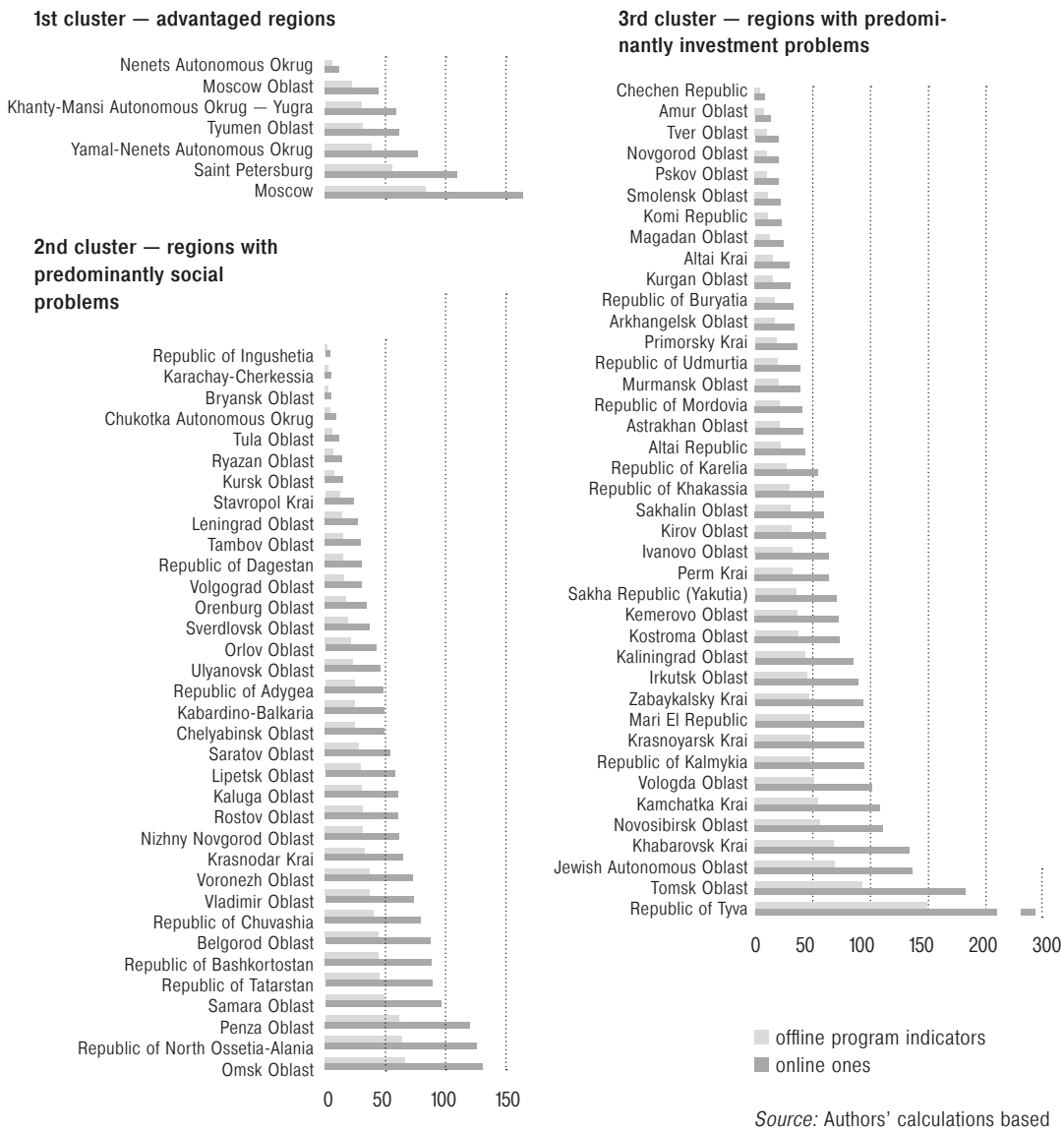
Distributions of the subjects of Russia by the number of offline and online programs are closely interrelated (Spearman's Rho 0.907, p-value⩽0.000), the average indicator ratio being 1:2 for both entrepreneurship education programs and continuing education as a whole.

However, the analysis found no statistically significant differences between the median values and the distributions of participation in entrepreneurship education programs across regions of various contexts for either offline or online programs (the median test and the Kruskal–Wallis *H* test, respectively). Therefore, hypothesis H1.1. stating that the level of participation of Russians in entrepreneurship education is not affected by the type of regional context has been confirmed, so all the regions will be treated as a homogenous group at the subsequent stages of analysis.

Table 1 presents the results of analyzing the distribution of the regions of Russia by the level of participation in continuing education programs of various types and fields of study.

As the distribution indicators presented in the table demonstrate, all the distributions analyzed significantly differ statistically from nor-

Fig. 2. **Number of students in entrepreneurship education programs in the subjects of the Russian Federation with different contexts**



Source: Authors' calculations based on the Ministry of Education and Science's 2013–2016 administrative statistics.

Table 1. **The distribution of the subjects of the Russian Federation by the level of participation in continuing education programs of various types and fields of study***

Indicator		Type A	Type B	Type C	Type D	Type E	Type F	Business education, offline programs	Business education, online programs
Mean		51.73	86.96	46.23	9.63	2.86	1.92	31.49	62.04
Standard error of the mean		7.60	7.40	4.15	0.86	0.33	0.44	2.58	5.08
Median		30.40	72.81	38.14	7.43	1.97	0.73	27.70	54.59
Standard deviation		68.79	67.39	37.82	7.83	2.69	3.49	23.78	46.86
RSD,%		132.97	77.49	81.81	81.24	94.15	181.45	75.53	75.53
Asymmetry		3.07	2.31	0.94	1.51	2.30	3.65	1.84	1.84
Standard asymmetric error		0.27	0.26	0.26	0.27	0.29	0.30	0.26	0.26
Excess		13.00	8.33	1.15	3.18	6.62	14.86	6.10	6.10
Standard excess error		0.53	0.52	0.52	0.53	0.57	0.59	0.52	0.52
Minimum		0.04	5.42	0.18	0.24	0.19	0.02	0.00	0.00
Maximum		441.48	436.23	186.45	42.54	14.01	19.67	148.56	292.69
Quantiles	10	2.24	25.04	4.51	1.38	0.58	0.06	6.59	12.99
	20	7.03	39.82	8.54	2.70	1.09	0.11	12.40	24.43
	25	10.05	41.83	11.45	3.76	1.18	0.16	15.35	30.24
	50	30.40	72.81	38.14	7.43	1.97	0.73	27.70	54.59
	75	64.66	106.37	74.19	13.37	3.52	2.39	44.53	87.74
	80	87.02	118.05	78.25	15.44	4.55	3.03	47.67	93.92
	90	117.94	182.84	94.86	21.13	5.89	4.03	62.18	122.51
DDC		52.67	7.30	21.01	15.34	10.12	68.55	9.43	9.55
IQR		54.61	64.54	62.74	9.61	2.34	2.23	29.19	57.51

* The level of participation is measured as a number of students per 10,000 of the economically active population.
Source: Authors' calculations based on the Ministry of Education and Science's 2013–2016 administrative statistics.

mal by their asymmetry characteristics, the excess particularly, and indicator variations are significantly high for all the types of programs (variation coefficient RSD varying from 75 to over 180 percent). That is, nonparametric methods and models have to be used to measure and model the relationship between participation in business education programs and small business development in a region. The level of cross-regional differentiation is very high too. Decile differentiation coefficients (DDC) show that the gap in the participation in continuing education programs between the 10 percent most active and the 10

percent least active regions is from seven-fold (for type B short-term programs) to 70-fold (for type F programs). Differentiation is somewhat lower for business education programs, but there is still an almost ten-fold gap between the extreme decile groups. The interquartile range (IQR) is also very high (as relative to the distribution median) for programs of all the types and fields of study, i. e. the central 50 percent of the regions demonstrate a statistically significant differentiation for continuing education as such and business education in particular. Therefore, hypotheses H1.2 and H1.3 have been confirmed.

Types and Forms of Continuing Education Programs Determining the Level of Small Business Development and Changes in its Quality Structure

At the stage of analyzing the actual impact of participation in continuing education, it was reliably established that this indicator is a moderately powerful factor of differences in not only the number of economic agents in the small business sector but also the key indicators of their activity, i. e. revenues and the number of employees. The greatest impact of the consolidated indicators of participation in continuing education on the number of people employed in small business (for all its forms in total) is observed with a lag of 2–3 years (Spearman's correlation coefficient $\rho \approx 0.5$, $p < 0.01$), and on the number and revenues of small and micro businesses with a lag of 1–2 years ($\rho \approx 0.7$, $p < 0.01$). When measuring the greatest effect of the cumulative demand for continuing education programs on the number and revenues of entrepreneurs, the lag is increased to 3 years and the relationship becomes weaker and less significant ($\rho \approx 0.4$, $p < 0.05$). As the lag grows further, the described relationship becomes insignificant for all the specified target indicators of business development. Therefore, it is not only the system of teaching to start and manage a small business, whether new or growing, but also the whole system of continuing education and basic professional training that contribute to small business development in a region.

A more detailed analysis with a breakdown by institutional types and quality structure of small enterprises also confirmed that the education system can be a significant driver of development and innovation in the small and microbusiness sector. An increase in the number of educational institutions as well as in institutions' and public expenditure on education has been found almost certain to determine consistent development of the entrepreneurship sector for all career fields and types of business entities. The correlation is a little weaker for the number of microbusinesses in "research and development" than for those pursuing traditional economic activities ($\rho \approx 0.71$ and $\rho \approx 0.84$, respectively), yet still indicative of a nearly reliable statistical relationship ($p < 0.01$). The most powerful and significant relationship is observed with a time lag of 2–3 years for traditional economic activities and 5–6 years for innovative ones. It appears that a greater lag in innovative entrepreneurship is conditioned by the need to obtain edu-

cation of a higher quality, which is more time-consuming, and longer average time to profitability for capital-intensive venture businesses.

Participation in professional training and continuing education programs at the stages of vocational, higher and postgraduate education appears to be a no less powerful factor ($\rho \approx 0.802$, $p < 0.01$), the closest relationship between the number and size of small and medium-sized businesses and the participation rate being observed with a lag of 2–3 years.

Empirical analysis of data on the distribution of students among continuing education programs of various duration revealed a situation similar to what can be observed today in Western business schools. First, it was established that continuing education programs exert a strong and statistically significant influence on the expansion of the entrepreneurship sector, i. e. on business survival rates ($\rho \approx 0.728$, $p < .01$). Second, short-term programs (from 72 to 100 hours—they are usually practice-oriented) are in higher demand among consumers of educational services, especially those with a gainful business or employment, and are closer related to the entrepreneurship indicators. Programs of 500 to 1,000 hours (the so-called leadership programs) have a much weaker effect on small and microbusiness activity indicators ($\rho \approx 0.32$, $p < 0.05$). However, such programs turn out to be the most powerful and significant driver for entrepreneurship development when analysis includes the unemployed sent to education programs by employment agencies (the most significant relationship of $\rho \approx 0.603$, $p = 0.000$ is observed with a one-year time lag). Third, correlation analysis confirmed that education and short-term training for teachers and specialists in the form of practice-oriented apprenticeships also play an essential role in improving the entrepreneurial landscape ($\rho \approx 0.369$ with a one-year lag and $\rho \approx 0.384$ with a two-year lag, $p < 0.01$). That is why continuing education programs at the influence of education and business—apprenticeship that combines traditional classroom-based teaching methods with participation in real-life projects—appear to be an effective way of promoting successful entrepreneurship and transfer of skills, knowledge and technology (*spin-off*).

The regularities revealed are observed for each type of small entrepreneurship unit. Meanwhile, the strength of relationship grows as the size of the entrepreneurship unit decreases. The described effects of education reveal themselves most prominently for sole proprietorship and a little less for microenterprises. For small businesses, the relationship is sometimes rendered weak or even completely insignificant due to heterogeneous employee structure. In the medium-sized business sector, only the effects of short-term continuing education programs and online education participation rates remain statistically significant ($\rho \geqslant 0.271$, $p \leqslant 0.021$). Obviously, this has to do with medium-sized businesses having less interest in individual employees (employers find it easier to hire a trained person than to train their own staff).

Allocation of public funds for lab equipment as part of initiatives to modernize schools and provide vocational schools with technology equipment has no impact on the development of entrepreneurship or its individual segments in the regions of Russia. There may be two reasons for this. First, such equipment is used by school and vocational school students, i. e. minors who will study or work as employees for some years before their cumulative level of general and field-specific knowledge and social capital will allow them to start a business of their own, let alone propel it to success and steady growth. Second, technical and technology skills that they acquire by learning on this equipment are obviously not sustained by an adequate amount of knowledge required to start and develop a business. Time lags are logical and inevitable here, so effort should be made to continue engaging school and vocational school students in various forms of business education and to build potent hubs on the basis of entrepreneurship universities or private companies willing to invest in the development of dual education and attract this cohort of youth to the industrial and entrepreneurship projects on their basis.

Entrepreneurship Education Programs as a Factor of Small Business Development in Regional Contexts

As the prepared database was disaggregated by the type of regional context for each of the two clusters of disadvantaged regions, grouping was performed by the classifying variable of small business development. Following this, the differences in the mean values of the suggested predictors between the three types of classification units—low, medium and high level of small business development—were assessed. As it was established, the differences among the groups cannot be treated as random in terms of either the small business and entrepreneurship categories or the entrepreneurship education indicators (see Section 3 of the Supplement Table).

Thus, the tuple of variables for which the differences between the group means are not random affects the number of small businesses, microenterprises and sole proprietors in traditional or innovative business with a probability near 1 (p-value < 0.05) in a region of a specific context type. Meanwhile, the λw value does not indicate a statistically significant contribution of relevant cross-group differences to the overall dispersion of discriminant function scores in any given controlled variable. Comparisons of the statistical structure of the tuple of variables varying significantly between the groups of classification units confirm that a specific type of socioeconomic context determines the specific set of development factors in each of the small business subsectors.

Therefore, the next FLDA stage suggested modelling complex latent factors for each type of socioeconomic entrepreneurship context. Such factors are in fact discriminant functions allowing us to predict the level of development of a specific small business segment that will be achieved in the region depending on the level of satisfied popula-

tion's demand for entrepreneurship education programs. Seven of the constructed FLDA models are significant (p-value $\leqslant 0.003$). For them, the standardized discriminant function predictor coefficients, which evaluate the vector and influence of a specific predictor on the probability of achieving low, medium or high values of the target variable of traditional or innovative business development in the region, allow for the following interpretation:

1) Development of both offline and online business education programs is an equally significant driver of innovative micro business development in the regions with predominantly social problems;
2) Development of offline business education programs is a significant driver of innovative micro business development in the regions with predominantly investment problems;
3) Development of offline business education programs is a significant negative factor for the development of traditional microbusinesses in the regions with predominantly social problems;
4) Development of offline business education programs and the growth in expenditure on continuing education institutions are significant negative factors for the development of traditional small enterprises in the regions with predominantly social problems;
5) Development of offline business education programs is a powerful negative factor and the development of apprenticeship programs is a weak yet significant positive factor for the development of traditional microbusinesses in the regions with predominantly investment problems;
6) Development of offline business education programs is a significant negative factor for traditional small entrepreneurship development in the regions with predominantly investment problems;
7) Development of offline business education programs is a negative factor for sole proprietorship development in the regions with predominantly investment problems.

Predictive efficiency of the models is pretty high: the minimum classification accuracy (AR—the proportion of correctly classified observations) is 77.1 percent; the effective sensitivity level (TPR—the proportion of true positive classification results) is at least 10 percent; the specificity level (TNR—the proportion of true negative classification results) in all the seven significant models is above 69 percent.

Hypotheses H2.1—H2.4 formulated in this study have been confirmed in the FLDA models. Thus, the results obtained appear satisfactory in the context of the goal set, as they are essential for developing a differentiated approach towards creating and sustaining entrepreneurship education programs in specific socioeconomic contexts of the subjects of the Russian Federation.

Conclusion and Suggestions on Enhancing Russia's Continuing Education System to Promote Small Business Development and Innovation

In the short term, it appears rational to promote investment in entrepreneurship education programs of innovative forms and content so as to increase their number and participation rates among students of various majors. Preference should be given to shorter continuing education programs and modules of university programs (from 72 to 100 hours), since students enrolling in these are very likely considering or creating startups already and such educational support will help them act faster and more cost-efficiently.

We suggest designing initiatives to invite active entrepreneurs as coaches or mentors for university students. This will be a win-win cooperation: entrepreneurs will regard the most promising teams as a venture investment opportunity, gradually shifting from mentorship to angel financing, and universities will acquire valuable human resources that will act not only as guest lecturers but also as consultants and coaches, thus encouraging a faster and more efficient building of startup teams.

In the long term, it makes sense for universities to develop, along with traditional business education, programs teaching innovation skills and promoting growth-oriented entrepreneurship. Focus should be placed on the "soft" factors of business creation and growth, the ability to recognize breakthrough technology and products, hedging, financial and organizational innovations.

It also appears productive to include the skills of creative thinking, turning ideas into projects and starting a business in the elementary, middle and high school education programs so as to develop entrepreneurial competencies and encourage the entrepreneurial intentions of school students, improve the status of entrepreneur and entrepreneurial careers in society, and create a system of social and cultural norms conducive to entrepreneurship.

While modernizing the education system, it is vital to take into account that business education in regions with challenging socioeconomic contexts will rather inhibit entrepreneurship development by increasing the drain of people with entrepreneurial intentions to more advantaged regions. A more productive strategy will be to promote the best practices by popularizing the most successful entrepreneurs through mass media and to organize student competitions in business plans, etc. with a view to providing intensive learning courses, grants and other types of support to target groups. Naturally, this should be coupled with measures to improve regional socioeconomic contexts encumbering engagement of the population in entrepreneurial activity.

In the face of the revealed positive effects of public servants' business education on the population's entrepreneurial activity in the context of the national policy designed to encourage the regions of Russia to develop the flagship universities, innovation infrastructure and children's technology education, it could be rational to introduce entrepreneurship education programs for public servants. The most effective formats will be short-term apprenticeships for government

executives of regional and national authorities in charge of entrepreneurship and innovative economy issues and innovative short-term advanced training courses (of no more than 70 academic hours) for mid-level public officials.

Timely and adequate assessment (monitoring) of resources spent and results obtained is required to ensure the efficiency of educational modernization incentives designed to promote entrepreneurship in the regions. For this purpose, it is crucial to make universities and education authorities disclose relevant open data and evaluate the performance of the education system and educational policy with due regard for a delayed start of business by university graduates. It would also be of use if Russian universities participated in the international comparative studies of students' entrepreneurial engagement (GUESS and others).

Supplement The List of Thematic Data Collection (TDC) Variables Used in the Study to Analyze the Effects of the Education System on Entrepreneurship Development

Nos. of variables in TDC	Name and type of variable, unit of measurement, and observation period covered in the study	Abbreviated name and example of variable labeling in TDC*
1. Territorial indices used to form regional TDC breakdowns		
1	Russian National Classifier of Municipal Territories (two digits)	region
2	FEDERAL DISTRICT	FO
2. Target indicators of entrepreneurship in Russia and subjects of the Russian Federation		
3–8	Gross regional product (annual gross value added, at basic prices) in 2010–2015	GRP10
9–14	Economically active population in 2010–2015, annual average	EAN10
15–20	Number of medium-sized enterprises in 2010–2015	ME10
21–26	Number of small enterprises in 2010–2015	SE10
27–31	Number of microenterprises in 2010–2014	MICROE10
32–36	Number of active sole proprietors in 2010–2014, thousand people	PE10
37–42	Revenues of medium-sized enterprises in 2010–2015, billion rubles	T_ME10
43–48	Revenues of small enterprises in 2010–2015, billion rubles	T_SE10
49–53	Revenues of microenterprises in 2010–2014, billion rubles	T_MICROE10
54–58	Revenues of sole proprietors in 2010–2014 (taxes and other obligatory payments included), million rubles	E_PE10
59–63	Average number of people employed on the payroll in medium-sized enterprises in 2010–2014 (thousand people)	EMPL_ME10

Nos. of variables in TDC	Name and type of variable, unit of measurement, and observation period covered in the study	Abbreviated name and example of variable labeling in TDC*
64–69	Average number of people employed on the payroll in small enterprises in 2010–2015 (thousand people)	EMPL_SE10
70–74	Average number of people employed on the payroll in microenterprises in 2010–2014 (thousand people)	EMICRE10
75–79	Number of people employed in the sole proprietorship sector in 2010–2014, thousand people	EMPL_PE10
80–84	Number of medium-sized enterprises pursuing the “research” economic activity in 2010–2014 (at the end of the year)	SCIENCE_ME10
85–89	Number of small enterprises pursuing the “research” economic activity in 2010–2014 (at the end of the year)	SCIENCE_SE10
90–94	Number of microenterprises pursuing the “research” economic activity in 2010–2014 (at the end of the year)	SCIENCE_MICROE10
95–99	Revenues of medium-sized enterprises pursuing the “research” economic activity in 2010–2014 (billion rubles)	T_SCIENCE_ME10
100–104	Revenues of small enterprises pursuing the “research” economic activity in 2010–2014 (billion rubles)	T_SCIENCE_SE10
105–109	Revenues of microenterprises pursuing the “research” economic activity in 2010–2014 (billion rubles)	T_SCIENCE_MICROE10
110–114	Average number of people (excluding external part-timers) employed in medium-sized enterprises pursuing the “research” economic activity in 2010–2014 (thousand people)	EMPL_SC_ME10
115–119	Average number of people (excluding external part-timers) employed in small enterprises pursuing the “research” economic activity in 2010–2014 (thousand people)	EMPL_SC_SE10
120–124	Average number of people (excluding external part-timers) employed in microenterprises pursuing the “research” economic activity in 2010–2014 (thousand people)	EMICRE_SC10
3. Factor variables of the impact of Russia’s education system on the level and quality of the Russian population’s entrepreneurial potential		
1	Expenditure of professional educational institutions preparing mid-level specialists in 2013 (thousand rubles)	EXP_SPO_2013
2	Size of federal grants received by professional educational institutions preparing mid-level specialists in 2013 (thousand rubles)	FINANS_SPO_2013
3–4	Number of business incubators in 2013–2014 (annual average)	BI_2013
5–6	Total surface area occupied by business incubators in 2013–2014 (sq. m, annual average)	SQ_BI_2013
7–8	Number of small businesses—residents of business incubators in 2013–2014 (annual average)	NUM_BI_2013

Nos. of variables in TDC	Name and type of variable, unit of measurement, and observation period covered in the study	Abbreviated name and example of variable labeling in TDC*
9–10	Total number of people employed in small businesses—residents of business incubators in 2013–2014 (annual average)	EMPL_BI_2013
11–19	Total number of students enrolled in general education institutions in 2004–2012 (annual average)	STUD_G_ED_2004
20–31	Total number of general education institutions in 2004–2015 (annual average)	ORG_G_ED_2004
32–38	Total public expenditure of general education institutions in 2009–2015 (thousand rubles)	EXP_ORG_G_ ED_2009
39	Federal spending on lab equipment for vocational schools under the modernization program in 2013 (thousand rubles)	uch_lab_obor
40	Federal spending on technology equipment for vocational schools under the modernization program in 2013 (thousand rubles)	uch_proizv_obor
41	Number of students in offline business education programs as part of the continuing education system in 2013	A_F_all_stud_ BUSINESS_FULLday
42	Number of students in online business education programs as part of the continuing education system in 2013	A_F_all_stud_BUSI-NESS_PARTtime
43	Total number of students in business education programs in 2013	A_F_all_stud_BUSI-NESS
44	Total number of students in continuing education programs in 2013	A_F_all_stud
45	Total number of students in continuing education programs of less than 72 hours (type A) in 2013, including:	A_all_stud
47	Executives	A_all_stud_head
48	Executives and specialists	A_spec
49	Executives and specialists** (including executives)	A_spec_head
50	Teachers employed in educational institutions of professional education (total)	A_prep
51	Teachers employed in educational institutions of professional education (including executives)	A_prep_head
52	Public officials (total)	A_official
53	Public officials (including executives)	A_official_head
54	Discharged from military service	A_military_service
55	Unemployed, sent by employment agencies	A_placement_service
56	Total students in continuing education programs of 72–100 hours (type B) in 2013, including:	B_all_stud
58	Executives	B_all_stud_head
59	Executives and specialists (total)	B_spec
60	Executives and specialists (including executives)	B_spec_head

Nos. of variables in TDC	Name and type of variable, unit of measurement, and observation period covered in the study	Abbreviated name and example of variable labeling in TDC*
61	Teachers employed in educational institutions of professional education (total)	B_prep
62	Teachers employed in educational institutions of professional education (including executives)	B_prep_head
63	Public officials (total)	B_official
64	Public officials (including executives)	B_official_head
65	Discharged from military service	B_military_service
66	Unemployed, sent by employment agencies	B_placement_service
67	Total students in continuing education programs of 100–500 hours (type C) in 2013, including:	C_all_stud
69	Executives	C_all_stud_head
70	Executives and specialists (total)	C_spec
71	Executives and specialists (including executives)	C_spec_head
72	Teachers employed in educational institutions of professional education (total)	C_prep
73	Teachers employed in educational institutions of professional education (including executives)	C_prep_head
74	Public officials (total)	C_official
75	Public officials (including executives)	C_official_head
76	Discharged from military service	C_military_service
77	Unemployed, sent by employment agencies	C_placement_service
78	Total students in professional conversion programs of 500 hours and longer (type D) in 2013, including:	D_all_stud
80	Executives	D_all_stud_head
81	Executives and specialists (total)	D_spec
82	Executives and specialists (including executives)	D_spec_head
83	Teachers employed in educational institutions of professional education (total)	D_prep
84	Teachers employed in educational institutions of professional education (including executives)	D_prep_head
85	Public officials (total)	D_official
86	Public officials (including executives)	D_official_head
87	Discharged from military service	D_military_service
88	Unemployed, sent by employment agencies	D_placement_service
89	Total students in professional conversion programs of at least 1,000 hours (type E) acquiring additional qualifications, including:	all_stud_E

Nos. of variables in TDC	Name and type of variable, unit of measurement, and observation period covered in the study	Abbreviated name and example of variable labeling in TDC*
91	Executives	E_all_stud_head
92	Executives and specialists (total)	E_spec
93	Executives and specialists (including executives)	E_spec_head
94	Teachers employed in educational institutions of professional education (total)	E_prep
95	Teachers employed in educational institutions of professional education (including executives)	E_prep_head
96	Public officials (total)	E_official
97	Public officials (including executives)	E_official_head
98	Discharged from military service	E_military_service
99	Unemployed, sent by employment agencies	E_placement_service
100	Total students in apprenticeship programs as an independent type of training (type F) in 2013, including:	F_all_stud
102	Executives	F_all_stud_head
103	Executives and specialists (total)	F_spec
104	Executives and specialists (including executives)	F_spec_head
105	Teachers employed in educational institutions of professional education (total)	F_prep
106	Teachers employed in educational institutions of professional education (including executives)	F_prep_head
107	Public officials (total)	F_official
108	Public officials (including executives)	F_official_head
109	Discharged from military service	F_military_service
110	Unemployed, sent by employment agencies	F_placement_service

* Numbers in abbreviated names of the variables denote the observation year if the period of observation exceeded one year. The table gives examples of labeling the variables of the initial observation year.

** Analysis involved the student population and structure indicators obtained from the Ministry of Education and Science's official reports and using Russia's National Classifier of Worker Occupations, Public Service Positions and Tariff Ranks OK 016–94 (OKPDTR) with amendments and additions as a basis for (dis)aggregating data on the demand for continuing education programs. The OKPDTR discriminates between the workers (total) and public servants (total), depending on the functions performed; subcategories of specialists and executives are identified among the latter.

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The MOOC Market: Prospects for Russia

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Abstract. As massive open online courses (MOOC) rapidly invaded the education services market at the beginning of the 21st century, a new trend emerged in global education. In the era of globalization and digitization, MOOC acts as an efficient tool to promote universities in the international educational arena, popularize national cultures, and raise additional funds. This is why a lot of countries, including Russia, have entered the race for online courses. Despite all the focus on MOOC in global education, the proportion of studies analyzing the MOOC market and the prospects for MOOCs in the Russian context is rather small. This article mainly seeks to describe the MOOC market and behavioral patterns of MOOC providers in the international and national online education markets as well as to classify MOOC players based on open source data collected from online platforms. As a conclusion, platform data analysis findings are used to identify vacant niches in the MOOC market, and possible avenues of Russian providers' development in the international segment are assessed. Several data sources are utilized to solve the study objectives: articles, reports, official MOOC-related documents, information from online platform websites, a body of quantitative data collected from two leading online platforms, and a base of quantitative data from the Class Central aggregator, which contains information on MOOCs offered by several major online platforms.

Keywords: online education, massive open online courses (MOOC), online platform, promotion strategy.

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Since 2012, which *The New York Times* declared the year of massive open online courses (MOOCs)[1], the number of MOOCs and new MOOC learners has been on the rise, with more and more online plat-

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[1] http://www.nytimes.com/2012/11/04/education/edlife/massive-open-online-courses-are-multiplying-at-a-rapid-pace.html /

forms being created. There are nearly 10,000 MOOCs in various fields of knowledge available to Internet users today. Over 700 universities from all over the world have entered the race to build MOOCs of their own. The total number of MOOC learners was about 81 million in 2017[2]. MOOC certificates of achievement have also been multiplying consistently since 2012 [Chuang, Ho 2016]. The most popular MOOC providers include Coursera, edX and Udacity in the United States and FutureLearn in Great Britain. National online platforms have emerged in a number of countries too: XuetangX in China, MiriadaX in Latin America, France Université Numérique (FUN) in France, EduOpen in Italy, SWAYAM in India, the National Open Education Platform (NOEP) in Russia, etc. The Chinese MOOC platform XuetangX ranked third in the number of users (9.3 million) in 2017, outdoing FutureLearn (7.1 million).

Originally, online courses were offered via platforms to reach a social goal of providing free access to quality higher education as well as to solve institutions' internal problems, allowing them to use their own MOOCs or those of other universities in their educational process [Hollands, Tirthali 2014; Kizilcec et al. 2017]. It was at the beginning of 2014 that the demand for entirely MOOC-based online education programs began to develop. In addition, offering MOOCs via international platforms becomes a means of popularizing cultural diversity and improving the status of national education systems around the world. A number of countries, primarily Asian ones, such as China, South Korea and Malaysia, approach the building and promotion of MOOCs on international online platforms as their major national strategic mission, hoping to eventually create a system of tertiary education that will be highly appreciated by the international community and able to compete with the world's best education systems [Fadzil, Latif, Munira 2015].

MOOCs have been proliferating not only because universities seek recognition in the global education industry but also due to the monetization opportunities in no small part. Online platforms like Coursera and edX cooperate with universities to offer additional credentials and personal assistant services. Not only do MOOC suppliers try to recoup their production costs, which may sometimes amount to $150,000 per course[3], but they also seek to make a profit. The existing MOOC monetization models are constantly being enhanced, and more and more new ones are being created. The MOOC market was worth $1.13 billion in 2014 and is expected to grow to $7.69 billion in 2019[4]. Besides, as universities fiercely compete globally, MOOCs have

[2] https://www.class-central.com/moocs-year-in-review-2017

[3] https://raccoongang.com/blog/how-much-does-it-cost-create-online-course/

[4] https://www.technavio.com/blog/how-do-moocs-make-money

become a new tool to promote university brands among potential applicants (including those from abroad) and a source of certificates for individuals as well as businesses that can order a series of tailored courses to develop necessary competencies in their employees.

Russian universities have been actively designing and using online courses. However, few studies touch upon the Russian MOOC market and its prospects. One of these, conducted by Netology Group in 2017[5], explores Russia's online education market and educational technology but it deals with the development of online education as a whole and does not describe the global MOOC market in detail. Other works by Russian researchers focus on the history of MOOC creation and development but ignore Russia's role and prospects in the international MOOC market [Aynutdinova, Aynutdinova 2017; Krokhmal 2017].

This study pursues the following objectives: (i) describe the prevailing behavior strategies in the global MOOC market; (ii) analyze the presence of different countries in the international MOOC market; (iii) evaluate how various topics are represented in the global MOOC market to identify vacant niches; and (iv) suggest possible avenues of development for Russian MOOC providers in the international MOOC market. The following sources of data were used for research: (i) articles, reports, official MOOC-related documents, information from online platform websites; (ii) a body of quantitative data collected from two leading online platforms; and (iii) a base of quantitative data from the Class Central aggregator, which contains information on MOOCs offered by several major online platforms.

1. Global and Domestic MOOC Markets

The MOOC market has been splitting into international/global and domestic/national dimensions since 2015. The global MOOC market involves universities and other institutions from all over the world, which produce online courses in a variety of languages. Global market participants are thus MOOC providers and learners from different countries. Contrastingly, domestic MOOC markets are restricted to providers of MOOCs in national languages, e. g. in Spanish on MiríadaX[6], in French on FUN[7], in Chinese on XuetangX[8], in Russian on NOEP, etc. Domestic market participants include producers of online courses from one or more countries speaking the same language and MOOC users who are native speakers of that language. National MOOC platforms are normally created and developed to achieve local goals, e. g.

[5] http://edumarket.digital

[6] https://miriadax.net/cursos

[7] https://www.fun-mooc.fr/about

[8] http://www.xuetangx.com/global

FUN is designed, among other things, to distribute educational products for French producers.

Two major behavioral strategies can be identified in MOOC creation and promotion depending on whether MOOC providers operate in the international or domestic market. The following sources were used to assess market behavior:

- Official websites of the leading platforms (to assess behavioral strategies of the country in the MOOC market via its MOOC providers);
- Official websites of the countries' domestic MOOC platforms;
- Articles and reports describing the behavior of the country's online course providers in the MOOC market (search queries contained such keywords as "MOOC", "online course", "platform", "emerging economy", "advanced economy" as well as country names);
- Official documents regulating the country's (its MOOC providers') behavior in the MOOC market.

The first strategy implies that a country presents and promotes itself in the global MOOC market by building and adding online courses to platforms used by people from different countries. The world's top MOOC providers include edX and Coursera—they are huge American platforms that collaborate with companies and universities from other countries[9] and have the highest number of learners from all over the world[10]. The second strategy is promoting online education in the domestic market to tackle local problems. National platforms and/or leading providers' resources can be utilized to implement this strategy. In Europe, for instance, MOOCs are used to foster social inclusion, inculcate language skills and entrepreneurial competencies[11], special focus being placed on teaching immigrants skills necessary to access the labor market[12].

The first strategy is mostly applied by Asian countries (Malaysia, South Korea, Japan), a number of European countries (Denmark, Sweden, the Netherlands, Italy), and some Arab countries (Egypt and Saudi Arabia). In particular, this strategy is behind the teaching of online courses in English (as an international language) in various subjects, including disciplines from education programs, as well as

[9] For example, Coursera partners with some 164 educational institutions from 29 countries: https://www.coursera.org/about/partners

[10] As of the end of 2017, the cumulative number of registered users on Coursera and edX reached 44 million: https://www.class-central.com/report/moocs-stats-and-trends-2017/

[11] https://eadtu.eu/about-eadtu/about-eadtu

[12] https://moonliteproject.eu/

MOOCs dedicated to the history of the country, its cultural aspects, and language acquisition. For example, South Korean universities use international platforms to offer Korean language courses in English for beginners (*Learn to Speak Korean-1*) and MOOCs covering Korea's history and politics (*Modern Korean History: Liberation, War and Nuclear Ambitions*)[13]. Japanese universities have designed MOOCs to inculcate Japanese culture (*An Introduction to Japanese Subcultures*; *Visualizing Postwar Tokyo*) and a course about enrolling at Japanese universities and studying in them (*Studying in Japanese Universities*)[14].

A country's strategy for developing its national education system by creating and distributing its universities' online courses on the top MOOC platforms is sometimes coordinated by the government. For instance, the Malaysian Ministry of Higher Education elaborated a MOOC creation and support strategy in order to increase brand awareness in the global landscape [Al-Atabi 2013; Fadzil, Latif, Munira 2015]. The strategy covers a ten-year period (from 2015 to 2025) that should be used to build a necessary infrastructure, train staff, and design activity models required to successfully enter the international market of online education. The first stage under this strategy involves defining the key areas in which to build high-quality MOOCs, establishing partnership with the leading platforms, identifying vacant niches, and organizing a national e-learning center to coordinate the creation and promotion of MOOCs [Ministry of Education of Malaysia 2015]. Besides, this stage is also used to design staff training programs needed to support MOOC creation and maintenance and to elaborate credit transfer procedures to integrate MOOCs in the curricula. At the second stage, MOOCs are built in the preselected key areas. Malaysia's government requests that each university supplies at least 15 online courses for the top MOOC platforms [Ibid.]. Nowadays, users of OpenLearning[15] have access to such narrowly specialized courses in English offered by Malaysian universities as *Malaysian Taxation*, *Naval Architecture and Ship Building*[16], etc. At the third stage, progress is measured and adjustments are made to the strategy, if needed. The Ministry of Higher Education of Malaysia hopes that the creation of specialized MOOCs and the filling of vacant niches on the leading platforms will allow them (i) to increase the proportion of foreign students among Malaysian MOOC participants to 30 percent by 2022 and, (ii) to have the Malaysian higher education system globally recognized and ranked among the top 200 in the Webo-

[13] https://www.mooc-list.com/tags/korea

[14] https://www.mooc-list.com/tags/japan

[15] OpenLearning is an Australian provider of MOOCs, mostly offering courses produced by Australian and Malaysian universities.

[16] https://www.openlearning.com/malaysiamoocs

metrics Ranking[17], and (iii) to reduce the costs of MOOC production and obtain financial support from MOOC providers [Ibid.].

The second MOOC market behavior strategy is designed to solve domestic issues. However, leading providers' resources can also be used in the absence of financial and technology opportunities to keep the domestic platforms up and running. Creation of a national platform does not lead to the disappearance of online courses produced by the country's universities from the leading platforms—the universities remain in the international arena and keep developing courses in a foreign language for learners from abroad. Great Britain, France, China, India and Russia, in particular, have offered their MOOCs through both international and domestic platforms. National platforms feature, primarily, MOOCs taught in official languages and compliant with the specific topic and format requirements. MOOC topics are normally determined by the national labor market needs and the demand among college students and applicants. For instance, most online courses available on XuetangX[18] in the Chinese language are related to engineering [Shen et al. 2016], as engineering majors are in highest demand among Chinese university students [Hong 2015].

Some countries elaborate national strategies to create and develop domestic MOOC platforms. A good example is the unified strategy for producing and delivering MOOCs on the Indian platform SWAYAM[19], developed by the Department of Higher Education of the Ministry of Human Resource Development of India in 2017. Its distinctive feature is the Academic Advisory Council that examines and approves MOOC proposals. The Ministry appoints National Coordinators responsible for creating MOOCs at different levels of education. For instance, the Consortium for Educational Communication is in charge of undergraduate degree programs, while the National Council of Educational Research and Training is involved in providing MOOCs for school students. SWAYAM includes mandatory MOOCs that are part of education programs as well as optional courses designed to develop supplementary professional skills and available to anyone interested.

Countries that have no resources for creating and managing national platforms use the leading platforms where universities offer MOOCs in their national languages. This strategy is pursued by Latin American countries (Brazil, Chile, Colombia, Argentina and Mexico), Norway, and Turkey. Norwegian universities mostly promote their MOOCs by using the English provider FutureLearn[20]. The Norwegian government only funds local requests for MOOCs from universities

17 http://www.webometrics.info/

18 https://www.xuetangx.com/

19 https://swayam.gov.in/

20 https://www.mooc-list.com/countries/norway

and students, so all MOOCs produced by Norwegian universities are taught in Norwegian, offered to students free of charge, and transferable to university credits upon successful completion [Kjeldstad et al. 2014]. Therefore, the country uses MOOCs in the educational process of its universities, avoiding investing in a national platform.

Russian universities and companies use both leading and domestic platforms to deliver their MOOCs. The NOEP offered 259 courses at the beginning of 2018. The leading platforms—Coursera and edX—feature 256 MOOCs produced by Russian institutions, of which only 25% are taught in a foreign language. The number of online courses offered by Russian providers on the leading platforms is constantly growing. Sixty-three MOOCs were available to Coursera and edX users at the beginning of 2018, as compared to 48 in 2017.

The next step will be to analyze the MOOC market from two perspectives, that of the country's presence in the international market and that of the scope of offer, i. e. the topic landscape of this market. Two bases of data collected from publicly available sources on the leading platforms and Class Central will be used for analysis.

2. Country's Presence in the International MOOC Market

A database premised on a few key objective characteristics of MOOCs was created using publicly available data from Coursera and edX (as of the beginning of 2018) to assess the level of a country's presence in the international MOOC market. The database was built around the following parameters: the company or educational institution that has produced the MOOCs; the country they belong to; the number of MOOCs per company/university; the number of MOOCs in a non-official language; the number of courses in literature, culture and history; and the number of specializations and MicroMaster programs. In this case, the level of a country's presence in the global MOOC market is assessed through the behavior of its companies or universities that offer courses on the top MOOC platforms. The database included 234 companies and educational institutions from 33 countries and four international organizations: Amnesty International, the Open Education Consortium, the World Bank, and the International Monetary Fund. The overall number of MOOCs totaled 4,209. There are on average seven companies or educational institutions in every country offering their MOOCs on the top online platforms. The highest number of companies/universities involved in building online courses for the international platforms (95) is observed in the United States, and the lowest (1) in seven countries (Turkey, South Africa, Iceland, Egypt, Guatemala, Saudi Arabia, and New Zealand). Universities are engaged in MOOC production more than private companies in all of the countries. For example, 185 educational institutions and 43 companies offer their own MOOCs on Coursera and edX. Along with universities, Russian MOOC suppliers on Coursera also include such companies as Yandex and Sberbank Corporate University. Companies usually

produce MOOCs in the field they specialize in (e. g. *Banking and Finance* from Sberbank Corporate University) or create courses jointly with educational institutions (e. g. *Machine Learning and Data Science* from Yandex and Moscow Institute of Physics and Technology).

The average number of MOOCs per country is 127. The United States tops the list with over 2,000 courses, which account for 52% of all the MOOCs globally. Russia and China rank second and third, respectively, each producing nearly ten times fewer courses than the United States. Iceland has been the smallest producer of MOOCs, offering one online course only.

Russia's closest competitors in the global MOOC market are China, Australia, the Netherlands, and Spain. Russia is ahead of all four by the total number of courses (256 MOOCs) and MOOC producers (13 companies/universities) but behind China, Australia and the Netherlands by the number of MOOCs taught in English. Russian MOOCs delivered in foreign languages account for 25 percent of all courses, as compared to 42 percent in China, for instance.

The overwhelming majority of countries mostly produce MOOCs in their official language: 79 percent of all the online courses available are designed for native speakers. Latin American countries offer MOOCs in Spanish (Argentine, Chile, Mexico) and Portuguese (Brazil). English-speaking countries (England, Canada, India, Australia, South Africa) do not produce online courses in any language other than English. In addition to educational courses, these countries also create MOOCs for studying their own culture and history (e. g. *Indigenous Canada* from the University of Alberta, *Understanding the Australian Health Care System* from the University of Queensland) as well as those of other nations (e. g. *Mao to Now: On Chinese Marxism* from the University of Newcastle, Australia).

Some countries, including China, Russia and the United States, use not only their official language but also foreign ones when producing MOOCs. China and Russia usually opt for English as a foreign MOOC language. Most English-based courses created in China are devoted to Chinese culture and traditions as well as to learning Chinese. Russian companies and universities do not cover those subjects in their English-language segment of MOOCs. Online courses on the history of Russia (e. g. *Saint Petersburg, the Capital of Peter the Great's Empire* from the Higher School of Economics), literature (*Reading Russian Classical Literary Works Together. The Master and Margarita by Mikhail Bulgakov* from Tomsk State University) and the Russian language (*Sketches of Siberia. Tomsk: A Course of Russian for Foreigners* from Tomsk State University) are delivered exclusively in Russian.

Even though the great majority of MOOCs offered by U.S. providers are taught in English, the United States uses the greatest number of foreign languages in building their online courses. For instance, the Museum of Modern Art, Yale University and the Pennsylvania State

University offer MOOCs in Chinese, the University of California, Irvine in Ukrainian, Northwestern University in Arabic, Doane University in Spanish, etc. U.S. universities actively occupy the vacant niches, creating English-based MOOCs about other countries: *Coexistence in Medieval Spain: Jews, Christians, and Muslims* from the Colorado State University System, *Wonders of Ancient Egypt* from the Pennsylvania State University, *Russian History: From Lenin to Putin* from the University of California, Santa Cruz, etc.

English is the most popular language among European and Asian countries seeking to improve their presence on the international platforms. MOOCs in English are produced by Denmark, Sweden, the Netherlands, Belgium, and Germany as well as Singapore, South Korea, and Japan. These countries create a good deal of MOOCs covering their own history, literature and culture, e. g. *Scandinavian Film and Television* from the University of Copenhagen (Denmark), *Greening the Economy: Lessons from Scandinavia* from Lund University (Sweden), *Understanding Korean Politics* from Yonsei University (South Korea), *Studying at Japanese Universities* from the University of Tokyo (Japan).

The greatest number of MOOCs per company/university is observed in the United States (Table 1), Microsoft being the largest MOOC producer with its 176 courses. Meanwhile, the Higher School of Economics is the most productive producer of MOOCs outside the U.S., offering 81 courses on Coursera, of which 43 percent are taught in English.

A distinctive feature of universities—leaders in the number of MOOCs produced—is that they offer online courses devoted not only to the culture of their own country but also to the history and cultures of other nations. For instance, the Massachusetts Institute of Technology has a course in Japan's history called *Visualizing Japan (1850s-1930s): Westernization, Protest, Modernity*; the Higher School of Economics has developed a course *Religions and Society in China*; Harvard University offers *Stravinsky's Rite of Spring: Modernism, Ballet, and Riots*, etc. As a rule, the top MOOC providers always use the same platform to deliver their courses: Microsoft, the Massachusetts Institute of Technology and Harvard University rely on edX, the Higher School of Economics on Coursera, and only the University of Pennsylvania is present on both.

The countries supplying their own online courses to the global MOOC market were classified according to their level of presence using the data collected from the leading online platforms and the k-means clustering algorithm with a pre-specified number of clusters. The clusters were formed using the following variables: (i) the number of MOOC producers; (ii) the total number of MOOCs; (iii) the number of MOOCs taught in a foreign language; and (iv) the number of specializations and MicroMaster programs. The rest of the variables from the database were not included in the analysis as they contributed lit-

Table 1. **The Largest MOOC Providers**

Provider	Country	Number of MOOCs	Platform
Microsoft	United States	176	edX
Massachusetts Institute of Technology	United States	138	edX
Harvard University	United States	112	edX
University of Pennsylvania	United States	82	Coursera, edX
National Research University Higher School of Economics	Russia	81	Coursera

tle to cluster formation. As a result of the cluster analysis, four groups of countries were determined (the final cluster centers are presented in Table 2). The first cluster is represented by the United States alone as an indisputable leader in the MOOC market with the highest number of MOOCs, MOOC providers, specializations, and MicroMaster programs. There are on average 23 online courses per every US company/university present on the international MOOC platforms, which is comparable to the total number of MOOCs supplied by entire countries like Italy, Guatemala or Chile.

The second cluster includes China, the Netherlands and Russia as countries that engage actively in building MOOCs of their own. Each of the countries has on average 11 MOOC producers and produces around 221 MOOCs each. Their distinctive feature is that they create MOOCs in both their official and foreign languages. It is not only domestic consumers but also the international audience that are the focus of Chinese, Dutch and Russian MOOC producers. Courses taught in a foreign language account for nearly half of all the MOOCs supplied by the three countries (as compared to only 5 percent in the United States, the industry leader).

The third cluster includes six countries: Australia, Canada, France, Mexico, Spain, and Switzerland. Their presence on the international MOOC platforms is smaller than that of the countries in the previous two clusters, with on average 119 MOOCs and 7 providers per country. The third cluster countries are largely oriented towards their domestic markets, the best part of their MOOCs (83 percent) being taught in their official languages.

The fourth cluster encompasses 23 countries: Argentina, Belgium, Brazil, Chile, Colombia, Denmark, Egypt, Germany, Great Britain, Guatemala, Iceland, India, Israel, Italy, Japan, New Zealand, Saudi Arabia, Singapore, South Africa, South Korea, Sweden, Taiwan, and Turkey. What they have in common in terms of their presence on the global MOOC market is low engagement in the production of online courses. Each country in this cluster supplies on average 27 MOOCs

Table 2. **Final centers of the four clusters**

Indicator (average)	Cluster			
	1	2	3	4
Number of MOOC producers	95	11	7	3
Number of MOOCs	2,179	221	119	27
Number of MOOCs taught in a foreign language	111	100	20	14
Number of specializations and MicroMaster programs	159	8	7	1

and one specialization/MicroMaster program, produced by on average three companies/universities. These indicators are way lower than in the previous three clusters, which makes it possible to classify the countries in the fourth cluster as passive participants on the international MOOC market.

3. The Topic Landscape of the International MOOC Market

The topic landscape of the international MOOC market is assessed based on analytical data from Class Central's MOOC reports and the list of online courses offered on such large-scale platforms as Coursera and edX. The 2012–2017 Class Central's reports demonstrate a steady growth of the global MOOC market, in particular, a gradual increase in the number of MOOCs, MOOCs producers and new learners. Only 250 MOOCs were available in 2012 on the online platforms, but their number increased almost 38-fold by the end of 2017 to reach 9,400 (Fig. 1). The peak of the boom was observed in 2016 and 2017 (an increase of 2,650 between 2015 and 2016 and 2,550 between 2016 and 2017).

The overall number of MOOC learners increased 40-fold between 2012 and 2017 (Fig. 2), the growth peak of 48 million users falling again on 2016 and 2017.

Many of the online courses presented on the leading MOOC platforms are devoted to IT technology, computer science, data science, and conduct of business rules (Fig. 3)—they accounted for 38% of all the MOOCs offered in 2017. These four career fields demonstrate accelerated growth; they were unfailing leaders in the number of MOOCs available between 2015 and 2017 (in 2014, courses in humanities prevailed over those in computer science and business). An increase of 615 MOOCs in conduct of business was observed between 2015 and 2016, which was the peak of the boom. For computer science, the peak was in 2017, when the number of relevant MOOCs rose by 669 as compared to the previous year. The prevalence of online courses in these fields of study is easy to explain: first, such courses are easily convertible to an online format [Patru, Balaji 2016]; second, the U. S. Department of Labor classifies the IT industry as dynamically

Fig. 1. **Increase in the number of MOOCs on the international platforms in 2012–2017**

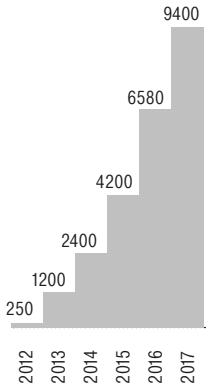
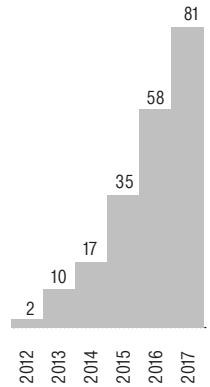


Fig. 2. **Increase in the number of MOOC learners in 2012–2017** (million)

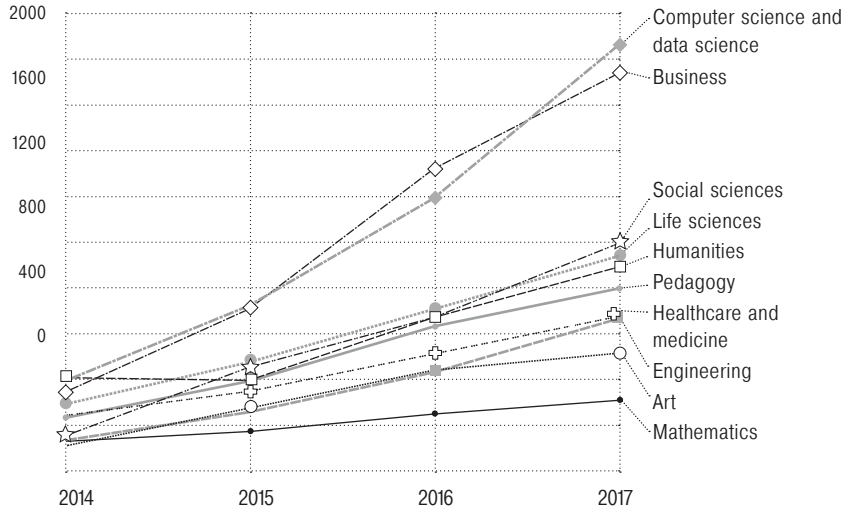


developing[21], with programmers and big data experts being in high demand in the global labor market. Therefore, the needs of the labor market shape the offer in the MOOC market, and the labor market itself requires that employees should be reskilled regularly, particularly in computer science. Online education has made such reskilling less labor-intensive and more universal. Different universities often provide MOOCs similar in content, so online platform users face a high level of market saturation with courses in the topics mentioned. Learners interested in computer science, for example, are offered a range of 40 MOOCs in cybersecurity and 45 in algorithms and data structures.

Courses in mathematics, applied art, pedagogy, healthcare and medicine are the least numerous in the international MOOC market, cumulatively accounting for 25 percent of all MOOCs in 2017. The number of courses in mathematics available in 2017 did not even approach the number of courses in computer science observed in 2014, which increased by over 1,000 between 2014 and 2017, as compared to the increase of only 180 in the number of MOOCs in mathematics. Whereas both mathematics and engineering were presented by 130 courses each in 2014, the increase in engineering MOOCs by 2017 was three times greater than in mathematics. The number of courses in such career fields as art, humanities, healthcare and medicine did not increase by more than 500 each between 2014 and 2017, in contrast to MOOCs in engineering, pedagogy, life sciences, computer science, and business.

[21] https://www.dol.gov/

Fig. 3. **Changes in the number of MOOCS in various fields of study between 2014 and 2017**



MOOCs in humanities accounted for about 9.5 percent of all the MOOCs on international platforms in 2017. The proportion of courses in history, culture and literature of various countries does not exceed 7 percent of all the MOOCs (3 percent of them being delivered in English[22]). Most of them (around 65 percent) cover the culture, literature and history of the course developer's country. The choice of courses in foreign languages remains rather limited. The platforms mostly offer MOOCs for English language learners, from Basic to Advanced level. Besides, there are courses designed to develop particular English-language skills like speaking, listening comprehension, or punctuation rules. The course *English for Career Development* was ranked among the top ten most popular MOOCs in 2017. Some courses are subtitled in Chinese or Spanish, thus raising the demand from audiences with poor English. Chinese is the second most popular foreign language after English to learn in MOOCs. Chinese courses are a few times less numerous than English ones, yet learners can always find one that suits best their attainment level, goals and objectives. Courses for learning other languages—Spanish, Portuguese, French, Italian—also begin to appear on the international MOOC platforms, but

[22] Analysis was performed using a base of data on the number of MOOCs in various subjects across countries and institutions collected by the authors from the two leading online platforms (Coursera and edX) at the beginning of 2018.

their proportion cannot compete with that of MOOCs taught in English. Very few courses are available for learning Russian and Dutch.

According to Class Central's analytics, there are beginner- (introductory) and advanced-level MOOCs in every field of study. Most courses are devoted to cutting-edge scientific and technology industries and the most pressing problems of today. MOOCs in life sciences and technology most often deal with robotics, energy, and nanotechnology. More courses emerge to shed light on climate change, the environment, and common responsibility for the planet's well-being. Medicine and biology courses cover genetics, bioinformatics, and biotechnology. A separate group of MOOCs is designed to develop healthy life skills.

The platforms also offer ever more courses about the "challenges of modernity". For instance, the University of Michigan came up with the course *Fake News, Facts, and Alternative Facts* just after the 2016 U.S. presidential elections[23], aiming to teach learners to distinguish between credible news sources and information biases as well as to be critical consumers of information. *Global Health—The Lessons of Ebola*[24], created by the University of Maryland, Baltimore, informs about current problems in healthcare, the Zika and Ebola viruses, and the role of international organizations in protecting global health.

MOOCs in machine learning, cryptocurrencies and neural networks were named the most popular in 2017[25]. Other courses with the highest number of registered users were designed to develop self-study skills. For example, the course *Learning How to Learn: Powerful Mental Tools to Help You Master Tough Subjects*[26] developed by the University of California, San Diego attracted over a million learners. A great popularity is also enjoyed by MOOCs in which participants can obtain practical recommendations on doing business as well as those that encourage creative thinking and innovation. For instance, *Developing Innovative Ideas for New Companies: The First Step in Entrepreneurship*[27] from the University of Maryland, College Park has become the second most popular MOOC, enrolling over 730,000 learners. The examples cited above demonstrate that the biggest audiences are attracted by one-of-a-kind courses oriented at solving the most pressing problems of today.

The leading MOOC platforms, Coursera and edX, offer over 4,000 courses jointly, and yet there are topics that are obviously underrep-

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23 https://www.edx.org/course/fake-news-facts-alternative-facts-michiganx-teachout-2x

24 https://www.edx.org/course/global-health-lessons-ebola-usmx-umuc-gbh100x

25 https://blog.coursera.org/year-review-10-popular-courses-2017/

26 https://www.coursera.org/learn/learning-how-to-learn

27 https://www.coursera.org/learn/innovative-ideas

resented for foreign learners. This study cannot answer the question why MOOCs in some subjects are way less numerous than in others. Perhaps, this gap can be explained by monetization schemes and the demand for courses in specific subjects. It follows from Class Central's analytics, for example, that the search queries of prospective MOOC learners most often relate to computer sciences, e. g. "machine learning", "data science", "deep learning", "SQL language", "Python", etc. These keywords have remained popular since the Class Central aggregator was created. Queries about learning foreign languages (English, Spanish, French), mathematics (statistics) and art (photography, design) are pretty frequent, too. This allows for identifying the vacant niches on the global MOOC platforms. Very probably, demand for online courses in these subjects will not be as high as for courses in computer science[28]. Such vacant niches include (i) courses in mathematics, healthcare and medicine; (ii) courses in country-specific knowledge (e. g. legislation and taxation, culture and social order); and (iii) foreign language courses.

4. Assessing the Potential Demand for Courses in the Vacant Niches

The potential demand for MOOCs in the vacant niches can be assessed either directly or indirectly, i. e. either by surveying potential MOOC learners or by obtaining information about the popularity of similar MOOCs from other providers and evaluating the number of potential learners based on indirect indicators (e. g. popularity of MOOCs for learning Russian among foreign learners). Potential consumers of Russian MOOCs include international actors (students of foreign universities, citizens of other countries willing to broaden their horizons and/or prepare for a trip) and the Russian State as an agent interested in popularizing its history and culture.

Let us now assess indirectly the potential popularity of Russian MOOCs in the three identified vacant niches on the international MOOC market. The assessment is made using analysis of Russian universities' education programs that are popular among foreign students, information on foreign universities' education programs obtained from available sources, and the range of MOOCs presented on the international platforms. Potential consumers of such courses must be surveyed in the future in order to measure the demand for Russian MOOCs among international actors more accurately.

4.1. MOOCs in Mathematics and Medicine

MOOCs in these subjects can be in demand among foreign students in scientific, mathematical and medical majors (which are most popular among foreign students studying in Russian universities) [National Research University Higher School of Economics 2016]) as well as

[28] In order to assess the demand for such MOOCs, it is necessary to analyze the profiles of participants in similar MOOCs that are already available on the international platforms. However, this information is inaccessible.

universities that can buy those MOOCs for their students. Export of such MOOCs will allow Russian universities not only to increase their sales profit in the international online education segment and their online foreign student audiences but also to attract foreign students to their offline degrees, using MOOCs to promote the quality of education and the teaching methods applied in Russian universities. MOOCs in these subjects can be delivered as specializations (for Coursera) or MicroMaster programs (for edX) that allow users to take their degree partly online and partly in person.

The demand for higher education degrees will grow with the development of science and technology, especially in Asia, researchers predict. In India alone, the number of school leavers is expected to reach 40 million by 2025, and MOOCs can become one of the means of satisfying the growing demand for higher education [Kjeldstad et al. 2014]. Universities in a number of European and Asian countries—Russia, Finland, Germany, Malaysia, India—officially declare the possibility of including foreign universities' MOOCs in their educational plans with subsequent credit transfer. Therefore, integration of MOOCs in the educational process can be regarded as a way of addressing the problem of underfinancing and the lack of quality courses [Klimentyev, Klimentyeva 2015].

4.2. MOOCs in Country-Specific Knowledge

The proportion of MOOCs covering the culture, literature and history of specific countries on the international platforms does not exceed 7 percent (of which 3 percent are in English). Most of them are designed by U.S. universities and devoted to the United States and China. Russian universities could offer series of foreign-language-taught MOOCs on the history of Russia (the Russian Empire, the Soviet Union, and the post-Soviet era), Russian literature (e. g. Russian writers' literary works widely recognized abroad), biographies of famous Russian scientists and composers, or courses about Russia's indigenous peoples. If Russian MOOC providers do not occupy this niche, foreign universities will squeeze in. For instance, U.S. and Australian universities have designed courses in India studies, such as *Importance of India* from the Ohio State University and *Contemporary India* from the University of Melbourne on Coursera.

Russian universities' MOOCs on Russia's culture, literature and history can be in demand among foreign universities and foreign students majoring in Slavic studies. There are at least 37 Master's degrees[29] in this field in the United States; research centers that study Slavic history, literature and philology are available in Great Britain, Austria, Germany, Hungary, and other countries. Despite the potential demand for Slavic and Russian culture studies in the world, this field

[29] American Association of Teachers of Slavic and East European Languages: http://www.aatseel.org/graduate_programs

is only represented by a few MOOCs from the Higher School of Economics and Tomsk State University, most of them being delivered in the Russian language. Online courses in this field from Russian universities could also attract the attention of foreigners of Russian origin or simply those interested in getting to know the culture and history of Russia. In addition, MOOCs about the regions and cities of Russia could be offered by Russian universities to increase tourism and foreign student traffic.

It is vital that foreign students learn not only about the courses provided by Russian universities but also about their enrollment procedure and admission criteria. It is no coincidence that foreign universities use international platforms to offer MOOCs devoted to practical issues and recommendations on entering to institutions of higher education. For instance, Coursera features several courses created in the United States and Japan advising prospective students how to enroll in the U.S. and Japanese universities, choose education programs, and fill out various application forms. The Russian government attracts foreign students to Russian educational institutions under a quota program, but opportunities of the international platforms are not used for this purpose.

4.3. MOOCs for Learning a Foreign Language

Russian Universities could offer courses for learning basic, intermediate and advanced Russian as well as individual aspects of the language, like grammar or stylistics[30]. The demand for such courses can be expected from foreign universities and their students, mostly those majoring in Slavic studies. Interest for MOOCs in Russian can also be expected from Chinese, Polish, American and German students, as the respective countries had the highest absolute number of students learning Russian and the highest number of universities offering Russian learning programs in the 2010/11 academic year [Arefyev 2015]. Besides, such courses may be popular among employees of foreign companies that are affiliated with Russian ones and/or have their business in Russia, as well as anyone willing to learn Russian. Creation and maintenance of MOOCs for learning Russian as a foreign language is crucial for popularizing the Russian language, since the number of its speakers is declining every year. For example, the number of Russian speakers in the world was about 260 million in 2010, which is 10 percent less than in 2004 and 20 percent less than in 1990 [Ibid.].

5. Conclusion

Analysis of the MOOC market reveals a considerable increase in the number of MOOC producers and providers as well as MOOC learners. Millions of people all over the world need high-quality, accessible education and search for career and personal development opportunities,

[30] Today, there are only two courses for learning Russian available on Coursera, both from Tomsk State University and both for advanced level.

so the world's top economies have become active participants in the online education race. By offering foreign-language-taught MOOCs produced by Russian universities in the global MOOC market, Russia will be able to solve a number of cultural, political and economic problems. The international MOOC platforms can be regarded as a way to popularize the national culture and an opportunity to inspire interest in the country's history, its state-of-the-art advances in science and technology. Online courses can also be used to derive economic benefit. Direct profits from creating and offering online courses through the international platforms include those from the sale of MOOC certificates and content licensing, while indirect ones can be an increase in tourism traffic and the attraction of more foreign students to Russian universities. Most MOOCs produced by Russian universities are delivered in Russian today, thus losing their market potential and reducing the opportunity for attracting external consumers who do not speak Russian.

Analysis of the global MOOC market has revealed vacant niches and outlined the prospects for filling them with Russian courses. It is advisable for Russian universities to build the following online courses taught in English:

- MOOCs in mathematics and medicine;
- MOOCs in Russian culture, history, art and literature, about Russian scientists and composers, Russia's peoples and regions/cities;
- MOOCs for learning Russian as a foreign language;
- MOOCs about the enrollment procedures and admission criteria in Russian universities for foreign applicants;
- MOOCs promoting understanding of the current economic and political situation in Russia for foreign companies doing or planning to do business in Russia.

Indirect data was used in this study to determine the potential demand for Russian universities' MOOCs among international actors. In order to obtain objective indicators, additional research into the demand in the MOOC market is required. Such research should imply analyzing the platforms' data on the popularity of courses in the specified subjects, the profiles of learners enrolling in them, the information on profits from certificate sales, and the results from surveys of potential MOOC learners.

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Above Barriers: A Survey of Resilient Schools

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Abstract. A field study was performed by experts from the Institute of Education, National Research University Higher School of Economics, as part of the Monitoring of Education Markets and Organizations conducted by HSE in cooperation with the Levada Center. Interviews and focus groups were organized with school principals, teachers, students and their parents in three schools teaching the most challenging type of students from low socioeconomic and cultural backgrounds, who nevertheless achieve high learning outcomes. This is a follow-up of the 2015 study of environment characteristics, management and education strategies of schools operating in unfavorable social contexts. Such schools are defined as resilient, meaning that they successfully resist the disadvantaged context beyond their control. The schools surveyed differ in the number of students, education programs, and the level of regional deprivation, yet all of them pursue similar strategies that are well-targeted and recognized by all educational process participants. Such strategies include: introducing limited selection and levelling off the student body, imposing high expectations and transparent requirements to learning outcomes, providing individual support and encouragement to students, and developing the skills boosting graduates' chances of successful socialization. Consistent implementation of these strategies will create conditions to promote academic resilience among students. Studying the experience of such schools appears to be crucial for solving the problem of inequality in education.

Keywords: academic resilience, school effectiveness, educational strategies, educational trajectories, physically challenged school students, socioeconomic status.
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1. Academic resilience and the school factors creating conditions for it

The issue of school's ability to overcome the disadvantaged family context influence and to fulfill the social elevator function is critically important: its positive solution opens the way towards equality in access to education and a higher quality of education. Today it is the priority of the state educational policy.

Studies have shown that schools are able to achieve high educational results working in difficult social conditions. To what extent they succeed depends largely on the educational policy—it allows school to be effective in adverse circumstances [Pinskaya, Kosaretsky, Froumin, 2011; Lupton, 2004; Reynolds et al. 2011; Siraj, Taggart 2014; Teddlie, Reynolds 2001]. According to foreign studies, such educational organizations are called *a school that functions well in a context of adversity* [Masten et al. 2008]; *schools performing beyond expectations* [Hargreaves, Harris 2011]. Recently, it has been common practice to talk about resilient schools or about school resilience[1] with a broad understanding of the term and the various contexts of its use [Day, Gu 2013].

The term "resilient" has been used in the international comparative study of education -the PISA[2]- since 2009: students from families of low economic, educational and cultural resources, achieving the highest results in tests [Agasisti et al. 2018; OECD 2010]. The phenomenon of resilience is also investigated in relation to teachers and principals [Day, Gu 2013; Henderson, Milstein 2003; Patterson, Collins, Abbott 2004; Steward 2014]. We use the term "resilient" in a broader sense: relying on series of studies, we transfer it from the individual level to the school level taken as a whole [Masten et al. 2008; Richardson 2002].

Factors promoting students' chances of academic resilience have already been studied for several decades [Henderson, Milstein 2003; Luthar 2003; Ross et al. 2001; Wang, Gordon 1994]. A number of researchers distinguish such school factors of resilience as the teacher and teaching methods effect [Rockoff 2004; Siraj, Taggart 2014], a family-school partnership [Masten et al. 2008]. We can also assume that teachers and principals implement special management and pedagogical strategies at those Russian schools, where children from families of low social status and limited resources achieve high educational results.

[1] https://theresilienceproject.com.au/schools/; https://www.bensonhenryinstitute.org/services-resilient-schools/

[2] http://www.oecd.org/pisa/

The phenomenon of resilience should be considered within the educational effectiveness research and school effectiveness research field regarding the school level [Chapman et al. 2012; Mortimore et al. 1988; Reynolds et al. 2014]. The purpose of these researches is to find out the school processes specific to schools working in the most challenging social conditions, with the most disadvantaged student body [Chapman et al. 2012; Hargreaves, Harris 2011; Harris 2010; Hopkins, Reynolds 2001; Mortimore et al. 1988; Othman, Muijs 2013].

The researches on school effectiveness aim in particular at identifying factors acting at the educational organization level, the community level and the teacher level, and interacting to provide the school with the opportunity to exert a positive influence on students and increase the life chances of children with a disadvantaged family background. It has been proven that there is a set of school characteristics positively associated with the students' academic achievements [Chapman et al. 2012], which was also confirmed for Russia [Pinskaya, Kosaretsky, Froumin 2011]. Such characteristics include, for example, the safe and well-organized learning environment, the students' positive expectation of the school and their involvement in academic and non-academic activities [Rivkin, Hanushek, Kain 2005; Rockoff 2004]. The connection of these school factors with high academic achievements among socially disadvantaged students was verified in our study.

There is also the school promoting power as another school characteristic, which can be seen as evidence of its ability to improve the life chances of students from disadvantaged families. This indicator is taken into account when assessing the quality of school work in the United States. It is based on a comparison of the proportion of students enrolled in high school and educated in secondary school [Borman et al. 2003]. This characteristic was also taken into account within our study. We considered the promoting power applying to the national school as the school ability to provide the longest academic trajectory for its students, i. e. transition to the senior school and to the university. We were interested, to be precise, in the nature of this promoting power, in the schooling strategies that ensure students go through the longest academic trajectory.

The school climate was at the center of our research—a factor closely related to the resilience [Longobardi, Agasisti 2014], the key concept of the school efficiency model [MacNeil, Prater, Busch 2009]. The most important elements of the school climate within our study are the nature of the relationship between teachers, students, parentsand administration; expectations regarding the students' achievements from the school representatives, parents and students themselves; and features of the assessment system.

The teacher's expectations are another focus of the study. The teacher-students interaction and relations are largely determined by

teacher's expectations about the abilities and capabilities of children [Brooks 1994; Wang et al. 2016].

There are ongoing discussions about the results, which may indicate a positive school impact on the student. Non-cognitive skills acquired in school, motivation, and student expectations can be also regarded as sizable achievements in addition to the cognitive skills [Lenkeit 2013; van Landeghem et al. 2002]. The international comparative studies' results, that have significantly deepened the understanding of the reasons for academic resilience, also indicate that self-reliance and motivation are positively related to the ability to achieve academic success among students from families of low socioeconomic status [OECD 2011]. While conducting the field study, therefore, we tried to find various manifestations of the positive school impact on students going beyond the limits of high academic results.

Each school factor that promotes academic resilience found in international studies was verified in this study. At the same time, we relied not only on foreign experience while formulating research issues, but also on the previously conducted analysis of the MEMO, which confirms this experience [Pinskaya et al. 2017a; Pinskaya et al. 2017b]. This analysis has revealed a number of characteristic features of Russian schools working in disadvantaged social conditions, teaching the most challenging student body but achieving high academic results. Primarily, it is the policy of involving the most prepared and promising students when recruiting both in the elementary school and the next educational levels. Such a strategy does not have a selective nature, since it does not involve targeted selection of students, and can be considered to be measures necessary to form a balanced student body. The next key difference of such schools is the high expectations of students and the stimulation of their educational activity. These expectations being the part of the school culture probably do not only extend to the most successful students. Another feature that characterizes the educational policy of such schools is the specific principal's management—the emphasis on providing a diverse educational environment, which creates conditions for the high achievements of students and, possibly, the policy encourages families of students to form expectations of educational process.

The conclusions and assumptions made under the framework of quantitative research were the basis for focus groups' guides and interviews used to collect the field study data. The field study was to answer the question as to whether the schools and educators implement the strategies found during the MEMO and described in the international experience while forming the student body at different educational levels, working with parents, creating a culture of high expectations and how exactly they do it. The received information allowed us to supplement and to deepen the results of earlier conducted quantitative research within the MEMO and to draw firm conclusions about the nature of school processes that create academic resilience conditions.

While conducting the field study, the following was investigated:

- the student recruitment and enrollment processes at different educational levels (elementary school, transition from middle to senior school); whether formal selection procedures are applied; how the 10th grades are formed; the criteria of students' grouping by class, how these procedures are perceived by all educational process participants;
- how and by whom the decision to continue education at school after the 9th grade is made;
- what the academic expectations of all the educational process participants and their claims for higher levels of education are; how actors explain the reasons for students' high achievements or the termination of their journey along the educational trajectory;
- how educational process participants assess the degree of their involvement into the educational process; what strategies schools use to involve parents in the educational process;
- what the reasons are for student's academic success or failure at school as seen by the educational process participants; how responsibility for students' academic achievements and their further educational trajectory is shared between them; how work is organized with groups of students, differing in their levels of academic achievement; what educational strategies are implemented by schools: individual or universal; how educational process participants assess the importance of developing cognitive and non-cognitive skills;
- the attitudes of all the educational process participants regarding the development of cognitive and non-cognitive skills.

2. Methodology

In undertaking the field study, in-depth analysis of the educational strategies' features typical for resilient schools was carried out based on interviews and focus groups with principals, teachers, students and parents to discover those features, which enable schools to take their students to a high educational level.

When selecting schools for the field study, we relied on the data of the MEMO[3] [Derbyshire, Pinskaya 2016] on the characteristics of student body, school resources and the Unified State Exam (USE) results, collected during a survey of more than 1,000 principals of those schools, which made up the nationally representative data. Another selection reason was the results of the Trajectories in Education and Careers Monitoring[4] conducted by the Institute of Education of the

[3] https://memo.hse.ru/

[4] https://trec.hse.ru/

Higher School of Economics, which provided the information on the achievements of the allocated cohort of students in the TIMSS and, later, PISA studies.

Three schools were selected for the field study. Two of these participated in both monitorings and were classified as schools working in a challenging social context, but showing academic resilience. The third school participated in the MEMO and has an average level of well-being, but there are mostly students from families of low socio-economic status among its student body. These students show higher than expected educational achievements; i. e. demonstrate academic resilience at the individual level. In the framework of the study the first two schools were classified as resilient and the third was considered as a *nest of resilience*. We cannot call it actually resilient, because according to the student body characteristics it does not belong to the most disadvantaged group of schools. The schools are located in two different regionsand differ in the number of students, the specifics of the educational programs, the territory deprivation nature and level.

The social welfare index was used to assess the schools' social well-being level—an indicator used in studies on the results of the MEMO [Derbyshire, Pinskaya, 2016] and based on the characteristics of the social and economic student's family status [Yastrebov, Pinskaya, Kosaretsky 2014]. The index makes it possible to differentiate schools on the social composition of the student body. The schools selected for the study refer to 25% of schools with the lowest social welfare index in the sample of the MEMO.

The level of schools' academic achievements was determined on the basis of the single school's average USE results in Russian and mathematics for all three schools, and also based on the school average and individual students' outcomes in the international comparative study TIMSS and PISA (in mathematics) presented in the Trajectories in Education and Careers Monitoring for the two least socially-advantaged schools. Groups of students with high academic achievements were singled out—the top 25% according to the USE results and the top 30% according to the TIMMS results.

Three school principals, 30 teachers, 12 parents and 17 students participated in the study. Parents of two middle or senior students with high educational achievements as well as parents of two middle or senior students with low academic results were invited for interviews at each school. The focus groups included teachers who have worked for at least five years at the school and have experience of being a head teacher or who are head teachers in those classes where the significant proportion of students are children from families of the low social welfare index. Students of middle school (8th and 9th grades) and senior school (10th and 11th grades) both successful and not achieving high educational results were interviewed.

The qualitative content analysis of the data obtained during interviews and focus groups was conducted in the next stage of the study.

Table 1. **The study subject description by groups of participants**

Object	Subject	Technique
Parents	Academic expectations and aspirations; attitudes towards involvement in the educational process and individualization of the learning process; an opinion on the school recruitment and enrollment process and on the reasons for the student's academic success or failure	Individual interviews
Students	Academic expectations and aspirations; attitudes towards the parents' involvement in the educational process and individualization of the learning process as well as their vision of the reasons for academic success or failure in school	Individual interviews
Teachers	Understanding of the student's academic expectations and aspirations; the attitudes towards parent involvement in the educational process, the individualization of the learning process, the work with groups of students differing in their level of academic achievements as well as their vision of the school recruitment and enrollment process, group or class allocation process; an opinion about the reasons for students' academic success or failure; the degree of self-burnout and enthusiasm	Focus groups
Principal	Understanding of student's academic expectations and aspirations; the attitudes towards parent involvement in the educational process, the individualization of the learning process, the work with groups of students differing in their level of academic achievements as well as their vision of the school recruitment and enrollment process, group or class allocation process; an opinion about the reasons for students' academic success or failure	Individual interviews

The *Atlas.ti* program was used for its implementation. The classical techniques of thematic analysis were used at the first stage [Braun, Clarke 2006]:

- Becoming familiar with the text;
- Generating initial codes;
- Searching for themes and coding;
- Critical analysis of results;
- Producing the interim report on the themes.

At the second stage, we referred to the methodology of qualitative content analysis (with the transition to quantitative). In this case, the framework is directional content analysis (i. e., the theory is initial), but additional codes can be added during the encoding process (but in so doing they should be relevant to the original research goals) [Hsieh, Shannon 2005].

The quantitative analysis was carried out after all the data was coded and classified within the named themes according to the following criteria: the frequency of themes in different schools (identified during

focus groups and interviews with the principals); themes, which are common for the interviews; themes, which are common for principals and teachers, and vice versa, themes, which are specific among principals and among teachers only, etc.

This part of the analysis is important for two reasons: 1) the frequency of occurrence relevant to the research objectives specific themes in interviews and focus groups indirectly, but very clearly characterizes the significance of various issues at different schools; 2) the cautious conclusions about the consolidation or, conversely, the gaps between family and school attitude towards the educational process goals and characteristics at different schools can be made based on the analysis of the data.

Table 1 represents the study subject description by groups of participants. The aim of the study was to identify and to describe those aspects of school activities that can be considered as school factors of resilience. Individual factors (intellectual, psychological and any other) remain outside the framework of our study and require further study.

3. Results

3.1. Students' recruitment and enrollment process

Strategies for the student body formation are similar for the three schools. First of all, there is no recruitment by the formation of 1st grades. All children living in the nearby territories are assigned to 1st grade. As the parents say, "the choice of the school is based on the place of residence: we have moved because we are registered here, and that is why we have come here" (mother of the 4th grade student, General Education School № 1).

As for the teachers, they say the following: "We do not choose families. On the contrary, we welcome everybody. We enroll all the children who were ousted from other schools in the neighborhood. And we do not refuse anyone" (General Education School № 1).

The specificity of the territory causes additional problems that complicate the educational process. The school located in the city's industrial area enrolls a significant number of children from families living in dormitories. The social environment of dormitories is always considered as disadvantaged and families that do not have their own place often change their place of residence and, as a result, the school. The school located on the outskirts of the city is surrounded by run-down housing and private houses, which are mostly inhabited by migrants from the countries of Central Asia. Many 1st grade and other elementary school students do not speak Russian well or do not know Russian at all.

Two schools which took part in the study have the reputation of educational organizations teaching children with problems. As the principals as well as the teachers of both schools say, they often face the challenge of students not being able to cope with the general education program because of health problems—usually due to mental and

Table 2. **The recruitment and enrollment process**

Education level	The recruitment and enrollment process
Elementary school	Enrollment of children from the school district Preparing for pre-school education The allocation of groups of students with educational and psychological problems that require psychologist and speech therapist support The allocation of groups of students with disabilities for education on intervention programs based at the school or in special educational organizations
Senior school	Selection of prospective students of the school Enrollment of 9th graders from other schools

speech development disorders. All three schools are compelled to enroll first-graders, who have not studied at the early childhood learning centers.

What do schools do to make it easier for primary school teachers to train "difficult children" with a number of psychological problems and lack of family help? A common strategy for each school is the focused training of future first-graders and their parents. The practice of organizing supplementary education classes for preschool children is common in these schools. These children form the student body of the first grades later. The purpose of the supplementary education classes is not always learning, but rather an adaptation to the upcoming work in the classroom, which makes subsequent education more effective.

Even without conducting any rigid selection in elementary and middle school, the schools, nevertheless, do not transfer each student to the senior school. Schools tend to enroll the most successful and motivated students in the 10th grade, who cope with the program and have the prospect of passing the USE. The rest of the students are recommended to continue education in institutions of vocational education. The most unfavorable scenario at the nine-year program completion stage is related to those students who entered the 10th grade but left school failing the program. If the school groups the student body of 10th grade with the 9th grade graduates of other schools, it usually tries to enroll only relatively bright students. Thus, schools pursue a policy of balanced student body formation and seek to form classes that can achieve an acceptable level of educational outcomes.

The described practice fully confirms the data of the MEMO, received in 2015 and 2016. Table 2 presents the main strategies for the balanced student body formation.

3.2. Reasons for Students' Success or Failure

All the participants of the study admitted that the opportunity to succeed increases drastically if the student receives support from parents and is educated by teachers who can awaken his interest to the

subject. However, representatives of different respondents' categories put the emphasis differently.

Every student considers himself the main source of academic success or failure. According to students' opinions, teachers are the second most important source. Students single out those teachers, who evoke interest in learning, submit material skillfully and attractively and who are ready to help. Even so, students take the primary responsibility for their achievements: "I think it's my doing that I basically study" (9th grade student, General Education School № 1); "I have got a good brain by nature" (9th grade student, General Education School № 3); "My memory is bad, I am not even supposed to be good at physics, biologyand history. The *troika* is also OK for me" (9th grade student, General Education School № 2). All of the interviewed students consider themselves responsible for their own academic successes and failures, regardless of family background—full or single parent families—and academic results.

Parents, especially at those schools where families with low material and educational resources are in the minority, emphasize that a student can only succeed in the situation when his or hers efforts are being supported at both home and school. However, parents view family influence as the most crucial part of the education. "The child's success is not only at kindergarten or only by the parents, but in their entirety, this also applies to school. So, it is only by doing jointly. If only a child is very capable and catches on quick and if he has such innate abilities to catch on fly, to analyze clearly and to apply it in practice, it can be just school. But, you know, there are a few children like that". The following statement can be considered as a vivid example of such a "co-education" strategy: "I drop those household chores that can wait, and even if I do not know something and I cannot help her, we will study together" (mother of 9th grade student, General Education School № 1).

Parents are attentive to schooling issues, and not only in families where students are highly motivated and successful. Families also support children who cannot be called successful students, who find it difficult to learn and to cope with difficult subjects. There were parents among those interviewed who directly participate in the education process of the child: they do not only control the assignment, but also help to understand the complex material. Many parents described their participation in solving crucial issues for the education process of the child, for example, they helped with choosing an educational trajectory after the 9th grade and in the school selection process.

In each of the three schools there were no parents—both of bright students and of children who struggle to cope with the school curriculum—blaming the school, the teachers' improper performance or prejudice for a child's failure. "If he has any problems there, let's say history, it means that he does something wrong himself … The teach-

Table 3. **Reasons for academic success and failure in terms of all of the educational process participants**

Reasons for academic success	Reasons for academic failure
STUDENTS	
Desire to learn and effort	Insufficient ability
Parents' support and control	Insufficient effort, lack of self-organization
High quality education	Priority of other activities, for example sports
PARENTS	
Family support, interest in schooling process and in the education of the child	Insufficient diligence of the student
Assistance on homework and on the study of difficult subjects	
Contribution of the student himself	
TEACHERS AND PRINCIPAL	
Family support, interest in schooling process and in the education of the child	Insufficient ability of the student
Assistance on homework and on the study of difficult subjects	The lack of motivation of the student
Contribution and motivation of the student	Lack of family support and help
High quality education	

er has nothing to do with" (mother of 9th grade student, General Education School № 2).

We would like to see in such coherence of judgments the result of the school cooperation, openness and a parents' full awareness policy. According to teachers' comments during the focus groups held in all three schools, they attach great importance to the family influence. Teachers consider the students' motivationand their willingness to invest in schooling as a very important factor of academic success. "He must himself, not us teachers, not parents, but the child himself must understand what he needs. What the outcome he should get. And we honestly tell them about it: before you realize, none of us will prove it to you and will not be able to explain it for you" (teacher, General Education School № 2).

School principals, more than the other panelists, assign responsibility for the students' achievement to teachers. "First of all, it is effort of the teacher, who can give him the material, explain it in such a way, that he understands" (principal, General Education School № 1).

Therefore, students, parents and teachers were unanimous in assessing the reasons for students' academic successes and failures. Students consider themselves fully responsible for their results, but,

of course, recognize the importance of parental support and the quality of teaching. Thus, there is good reason for teacher-parent cooperation in the interests of students in the surveyed schools. However, the teachers and the principal dissatisfaction stands out because of the parents contribution to the educational processand the lack of family efforts, seen by them to be the reason for the students' poor academic performance. The views of all of the educational process participants are presented in Table 3.

3.3. Parent Involvement in the Educational Process

All of the interviewed students, regardless of age, school they enrolled in, and academic success, pointed out the importance of parents' participation in their educational process and in the non-academic school issues. Most commonly, students expressed an interest in their parents' "moral support", in the expression of their interest and attention. Some students admitted that their parents do not pay attention for some reason, however, thesenumbered only three. As students say, parents should "be interested in how things are going in school after you've come back home, should try to help, if there are some difficulties with homework ..." (9th grade student, General Education School № 3).

While being focused on self-reliance and responsibility for their actions, students nevertheless admit the importance of parents' participation in taking decisions about their education and parent motivation for success. "They, you might say, push me toward a better life: the better you learn, the better you live. If the motivation is lost, if they stop controlling, the student gets lost" (9th grade student, General Education School № 2).

The parental attitude in general is agreed upon with students' expectations. First of all, they consider it necessary to take care and pay attention to the student's daily routine. "A parent should be interested in everything. First of all, has got up, has he eaten, has he come? Not a control, but in general being informed" (mother of 2nd grade student, General Education School № 3).

Some parents are involved in their children's school life to such an extent that they consider themselves full participants of the educational process, although they understand that their main task is to maintain the student's self-confidence and to be his support. "A child asks me for help. For example: here, Mom, I do not understand this task. But I do not remember, it's already hard for me. So, we start with the textbook, start scrolling through the pages together. Sometimes it even turns out this way: we take this book, open the paragraph—and look! She is already beginning to understand. She says: Mom, I have already understood. Sometimes even this or just presence is enough, get it?" (mother of 9th grade student, General Education School № 1).

The answers and comments of all the parents who participated in the interview showed their cooperation with the school, the absence of conflicts, the understanding of their responsibility and the desire to

Table 4. **Assessment of parent involvement in the educational process**

Forms of involvement	Assessment of students	Assessment of parents	Assessment of teachers
Moral support	Sufficient	Sufficient	Insufficient
Assistance on homework	Sufficient	Sufficient	-
Motivation	Sufficient	Sufficient	Insufficient
Control	Sufficient or excess	Sufficient	Insufficient
Understanding child's trouble	-	-	Insufficient

coordinate their actions with educational goals. There was only one exception—the father who left the family and who was not involved in the life of his son who was in the 9th grade. It should be, however, taken into account that we interviewed parents who were ready to comply with the school's research assistance request, i. e. quite actively. We can assume that they do not form a majority.

Both teachers and school principals consider parent involvement in the educational process as one of the main strategies for success. Parental involvement is a very difficult task, requiring ongoing efforts and new approaches. It is common for all schools, regardless of its surroundings, territory, the student body complexity degree and the proportion of disadvantaged families. Here is a typical situation for the school as described by the principal: "Parents very often do not have time. It's much easier to come to the principal's office and say: yes, I surrender my child, take him off my hands, and do whatever you want with him. Well, why should I convince him to study well, if he does not cope, he cannot pass the exams. Take him off our hands, and do whatever you want with him … It happens that the child is forced by a social teacher or head teacher even to the exam, because he sleeps at home and there is nobody to wake him up. And sometimes his mother sleeps, she just does not have time for this" (principal, General Education School № 3). Another principal has pursued parental involvement in the educational process policy for four years of his management and he believes that it is already bearing fruit: "Our teachers have already seen that the parents cooperate, they communicate onan online forum. We have launched the website, if you have seen it, with a good content. Parents watch all the activities at the online forum, teachers give information about all the activities, homework, there are photos named by kids. We motivate, encourage the best ones …" (principal, General Education School № 1).

It is most difficult to engage the parents of disadvantaged students who make a significant part of the student body at the surveyed

schools. “In this class, when we hold parent-teacher meetings, I come in hoping to see the parents of those children who have problems. I never see them” (teacher, General Education School № 2).

So, according to teachers, a significant amount of parents are little involved in their children’s educational process or completely shift responsibility for it onto the school. Involvement of parents does not depend on the student’s achievements and his stage of education. It affects only the forms of assistance that parents give the student, and the degree of independence granted to him. Data on parent involvement in the educational processare presented in Table 4.

3.4. Working with a mixed ability students

Considering that a significant number of students experience serious difficulties with the educational process, have health problems, or come to school in a state of educational neglect, it is extremely important for the school and teachers to organize work with different groups of students differently.

Based on data gathered from the interviews with the principals, students and focus groups with teachers, teachers do not possess methods and pedagogical tools of differentiated teaching in a heterogeneous class. The main form of differentiated teaching in all three schools was the individual work of teachers with slow students: additional help in learning the material students do not cope with during the lessons, and help in preparing for the examinations for graduating class students.

The additional (not only educational) work with slow students, both pedagogically and socially neglected, is seen as a very important part of the mission, not only in schools with the most disadvantaged social composition of students, but also in the most socially advantaged schools. This is one principal’s comment on the subject: “We work with weak children in such a way that we give individual hours to approaching these children… If they skip classes it is absolutely catastrophically, and if they do not attend and parents are not included, here, of course, we have to take exceptional measures, we work with the commission, with the Juvenile Division… These are extremely disadvantaged situations when there are lice at home and so on… Then there are situations of inadequate parenting due to drug addiction, alcoholism, there are two or three moms. Terrible alcoholism in general, beating of children, and children hanging out in garage blocks, there are also one-two children, but we help by our own efforts, we involve grandmothers. We feel the great potential in this child, if he is left unattended during 1st or 2nd grade, he will be lost completely, and no boarding school will help him” (principal, General Education School № 1).

The adaptation to the conditions of teaching children for whom the Russian language is not native was a challenge for teachers at one of the schools. To enable such children to get involved in the development of the general education program, teachers have to work with them additionally, including teaching Russian.

Individual work is also held with students who claim high academic results and are motivated to learn. Preparation for participation in academic competitions is the most common form of additional individual work with bright and motivated students. There is a wide range of electives and an opportunity to study additionally, including preparing for examinations for students with a high education request at the General Education School № 1. "Our teachers are quite strong, they offer both tests and some help after classes, and after school we have electives and so on. Therefore, if you want to work, you do not need private tutors" (11th grade student, General Education School № 1). The school principals consider it necessary to motivate strong students to achieve high educational results and find different forms to do it: "And our retreats—we have retreats in St. Petersburg and in Sochi, we send kids with our colleagues and vocational programs…" (principal, General Education School № 3). Such work goes beyond the usual students' grouping by abilities and the corresponding differentiation of educational programs. In this case, the variety of forms of extracurricular educational activities does not only create the opportunity for choice, but also it is a developmental and motivating environment for all groups of children. It is important that all three school principals have a clear understanding of the difference in educational tasks facing different groups of students and the need to save the school asset—capable students.

All of the schools that took part in the study are united by the desire to build an individual educational program for each student and to fill it with extracurricular activities. "We work according to individual plans, we try to organize additional classes as far as possible. Then, at the middle school, from 5th to 6th grade, we try to involve children in a scientific society, and guys, if possible, attend these classes" (principal, General Education School № 3).

Teachers emphasize the individual approach to the students: "I think, both at classes, and in the real life, the main thing is *to each according to his abilities*. If you are capable of it—go for it, please, achieve the milestone, then there are some more ones opened up for you" (teacher, General Education School № 1).

The field-specific education at senior school and the in-depth study of separate subjects at earlier educational levels are considered as the most effective forms of differentiation of education, taking into account the students' interests and opportunities. But not all schools can afford this kind of education. In our case, two of the three schools were capable of putting it into practice with more than 500 students at each school.

Under regular lesson within the general education program teachers tend to work with a whole class, without differentiating tasks and teaching strategies for different groups and some students. According to parents' opinions, schools are not able to fully satisfy the demand of strong students and their families for education, so they have

Table 5. **Work methods with low- and high- achieving students in terms of all educational process participants**

Low-achieving students	High-achieving students
STUDENTS	
Re-explain the lesson material after or before the beginning of the lesson	Individual consultations on selected topics
Rewriting test works	Performing additional, more complex tests
Less challenging, at the basic level, tasks during the lesson	Preparation for participation in academic competitions
PARENTS	
Additional attention in the lesson	Additional extracurricular activities
	Lack of their interests oriented work in the classroom
TEACHERS AND PRINCIPAL	
Additional classes after lessons explaining the complex material	Preparation for participation in academic competitions and contests
Additional classes with students who miss classes	Individual classes on request
Additional hours teaching Russian tonon native-speakers	Studying at field-specific class
	Extracurricular activities, including project work
	Participation in school scientific societies
	Motivating activities: journeys to partner schools

to look for additional educational opportunities at a higher level outside the school.

The work methods with low- and high- achieving students are presented in Table 5.

3.5. Academic expectations and claims

Judgments made by principals and teachers of all the schools surveyed during the interviews and focus groups indicate high expectations for students, despite the fact that a significant proportion of the children have disabilities and have difficulties in coping with the general education program. Principals and teachers formulate these expectations as academic or give them a broader understanding depending on the student body complexity and the social environment of the children: they do not connect expectations with the further education in senior school and enrollment in university, but with a conscious choice of occupation and the acquisi-

tion of skills, providing independence and the ability to make vital decisions.

Students also see the meaning of education not only in the successful passing of the exam required for another level of education, they consider their goal as knowledge acquisition necessary for life. "To start I'll just try to do everything I can to pass the exams and, first of all, not to get any grades, but knowledge that will help me in future life. Because… even if a person fails a university exam, skills will be useful anyway. And even if you do not enter the university, you should not give up on yourself and get used to being a cashier at McDonald's" (11th grade student, General Education School № 1). It is pleasing that schools manage to reach the goal and prepare students for independent living, self-determination and understanding of their own tasks.

Students believe that the school is reasonably demanding of them, teachers are objective in assessing their knowledge, and the knowledge is quite reliable: "There is no grade inflation, it is difficult in this regard. If you know this much, they will assess according to your level of knowledge. Personal sympathy, namely, is taken into account, but these are rare exceptions" (11th grade student, General Education School № 3). Both students and parents consider the school's requirements to be quite high and the assessment of students' knowledge to be objective. The achievement level being high and one single set of requirements for all students are important for principals: "The assessment approach is usually quite strict, that is, even *troika* must be earned, and you must work to get it. Cheating is strictly forbidden, this is the most terrible sin that can only be" (principal, General Education School № 3).

Families educating children see the children's educational trajectory differently and plan further education in different ways at the three schools surveyed. Regarding the strongest students, based on their parents' requests, the school are highly ambitious: the principals and teachers believe that their graduates receive a good education and are competitive in the struggle for places in the most prestigious universities: "There are, of course, individual cases when students go to study to the Czech Republic and get full-funding there. Sometimes they enter Moscow universities, literally one or two graduates, and Siberian Federal University, which is quite prestigious. As a rule, if there are such expectations and requests to focus upon from the very beginning of educational process, then it is quite real" (principal, General Education School № 3).

For another category of students, schools consider the early transition to a professional trajectory as the most rational scenario and get them ready for institutions of secondary vocational education, making every possible effort to provide vocational guidance to middle school students.

The expectations may vary depending on the families' requests and the students' levels of competence and educational achieve-

ments, but it does not, however, mean a reduction in the school's requirements for students and teachers. The school № 2 principal accurately depicts what the school considers as the necessary result of education and what it prepares its students for: "To be able to reflect and evaluate the situation—this is the task in any situation. Before you commit to some act or action, there must still be some reasoning... So that they understand where they can earn money—this is very important...". The quotes above show that the school sees its mission as teaching students to navigate themselves in the real world, including understanding how they can make a living.

The school takes responsibility not just for entering a particular vocational institution, but for the right life choices. In a broad interpretation of the school's goals including primarily the formation of the students' ability to think independently, the two schools—General Education School № 1 and General Education School № 2—are however very similar, although they differ in terms of student body and resources. This quote is from the General Education School № 1 principal regarding the school's priorities: "The first is to form social skills, the second is to form independent thinking and some cognitive spheres, and the third is the formal confirmation we can see: the Unified State Exam, the Basic State Exam and all kinds of control... I see socialization as the maximum success factor both in class and in life".

This approach is closer to the world trend on the formation of competences and subtle, including non-cognitive, skills than traditional orientation toward knowledge and objective results. Both principals say that the results of the USE are not the main, but the mandatory goal. Both principals show a clear understanding that the ability to think within the subject is the same as the ability to think in life situations.

The educational expectations of the study participants are presented in Table 6.

The diagrams were constructed based on the quantitative analysis of the main themes discussed in the interviews and focus groups, i. e. assessing the differences and similarities of these themes among different categories of respondents and educational process participants at different schools, as well as the frequency and evidence of a theme. They show theme frequencies in interviews and focus groups held with teachers and principals (schools), with students and parents (family), i. e. the frequency analysis. The teacher and principal positions on the one hand and parent and student positions on the other hand were found to be coordinated on most issues, with the exception of two: the parent involvement in the educational process and the results-oriented learning process orientation. Schools are significantly more critical in assessing the parent participation in the education of children and believe that they are not sufficiently or very little involved in the school life. This is most clearly seen in the case of General Education School № 3 (Figure 1).

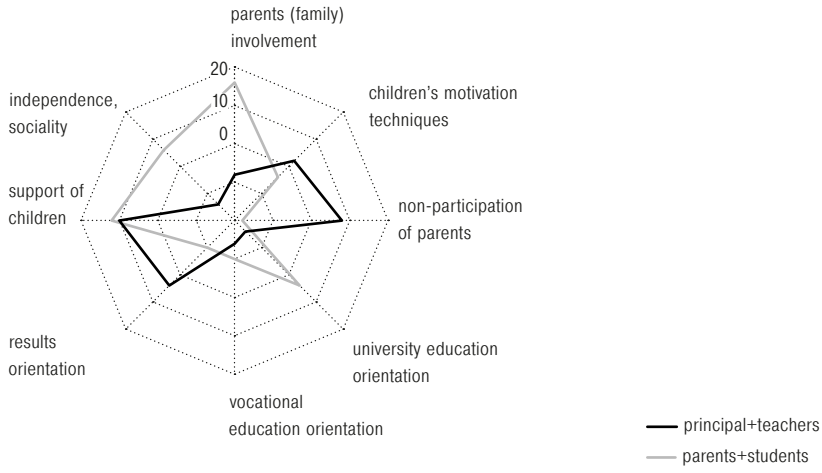
Table 6. **Expectations of the educational process participants—the students and the school**

For students	For school
STUDENTS	
Learn the school subjects	Provide good training in school subjects
To acquire knowledge, important and useful for life	Provide proficient and interesting teaching
Complete 11 grades and enter the university	Make standard requirements and assess achievements objectively
Complete 9 grades and enter a vocational school	
PARENTS	
Enter senior school, graduate and enter university	Provide good training in school subjects
Complete 9 grades and enter a vocational school	Make standard requirements and assess achievements objectively
Make own choice of profession	
TEACHERS AND PRINCIPAL	
Enter senior school, graduate and enter university	Provide good training in school subjects
Complete 9 grades and enter a vocational school	Make standard requirements and assess achievements objectively
Make informed choice of profession	Make the right orientation for choosing a further educational and / or professional trajectory
Learn how to think and how to define yourself	Teach to think independently both in class and in life situations
To acquire socialization skills	Create a motivating environment for maximizing the full realization of interests and abilities

There are the differences of opinion on results-oriented learning process orientation because the teachers are much more focused on achieving higher educational outcomes than families. Schools pursue a policy of high expectations and demands on students, despite their problems and despite the absence of a request for education from some of the parents. The most dramatic mismatch between parents and teachers can be seen in the case of the most disadvantaged school—General Education School № 2 (Figure 2).

The diagrams show that all the educational process participants are as close as possible in assessing how the school motivates and

Fig. 1. **The radar diagram of the frequency code distribution at the General Education School № 3.**



Note. The diagram shows the theme frequency in the interviews held with family (parents and students) and with school (principal and teachers).

Fig. 2. **The radar diagram of the frequency code distribution at the General Education School № 2**

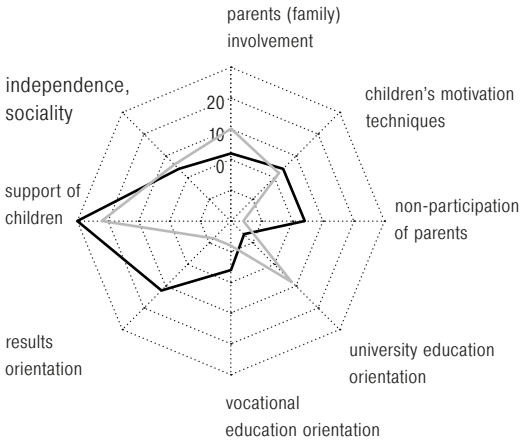
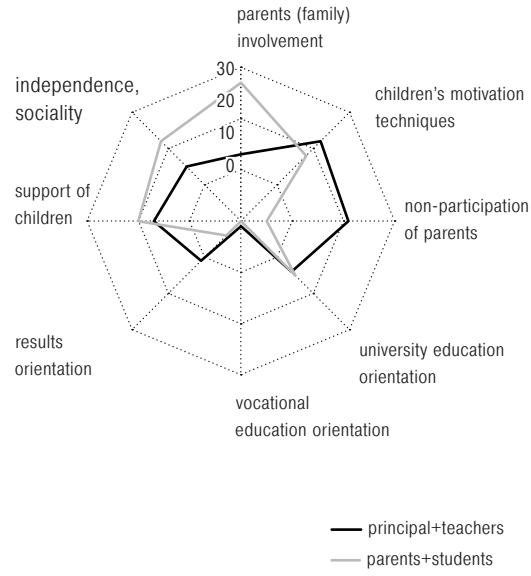


Fig. 3. **The radar diagram of the frequency code distribution at the General Education School № 1**



supports students in educational process. This applies to all schools, and is clearly visible in the case of the General Education School № 1 (Figure 3).

4. Conclusions

The study conducted at three socially disadvantaged but successful schools allowed us to describe the main educational strategies associated with resilience. The key feature of the students' recruitment and enrollment process, which allows schools working in disadvantaged social conditions to provide high educational achievements, is the limited senior school selection. Considering schools do not conduct selection to form primary school classes and teach therefore the most complex student body, including pedagogically and socially neglected children, students with disabilities, and migrants who do not speak Russian, such a strategy of balanced student body formation is imperative in ensuring high educational achievements at senior school. The fact that resilient students are more often taught at schools conducting selection is also noted by foreign researchers [Longobardi, Agasisti 2014].

Schools take into account the students' different starting position when entering school, different educational requests and different levels of their abilities. They create broad educational opportunities for different students and a basis for choosing their further educational trajectory. The teachers and the school administration consider individual support and the motivation of students to be their priority. The results are in line with the conclusions of PISA data analysis in the OECD report [Agasisti et al. 2018].

Schools are focused on forming high expectations about the academic achievements of students and the development of their skills and competencies, providing an informed choice of educational trajectory. Such approaches as the creation of a transparent requirements and learning outcomes system common for all students and teachers; objectivity of assessment, support and stimulation of the students' educational activity, and the formation of educational trajectories, taking into account the student's educational achievements and the request for education are common to all schools.

The formation of students' independent thinking, the ability to assess their capabilities, build personal career plan and bear responsibility for it is also the common goal considered by schools to be their mission. These cognitive and non-cognitive skills, or competencies, are among the key skills needed for successful socialization and to respond to the 21st century skills framework[5] accepted by the World Economic Forum [World Economic Forum 2015] as a guide for modern education.

The schools' values and orientations divide students' families. Students take responsibility for their achievements or failures and trust teachers. Parents see the lack of students' efforts as the main reason for poor academic performance and educational problems, they appreciate teachers' attention and help and do not make claims against the school. However, the lack of parent involvement in the educa-

[5] https://www.oecd.org/site/educeri21st/40756908.pdf

tional process and the need to increase their contribution to education is recognized by schools as an urgent and the most difficult issue. Although students clearly state the need for the parents' support, schools have to fill in for the lack of not only the cultural resources of the family, but also the attention of the parents.

The study showed that school educational policy is well understood and supported by the teaching staff who accept its mission and responsibility for improving the students' life chances. Such a coherent, targeted policy implemented in a complex of managerial and pedagogical decisions can be considered as a condition for the school resilience as a whole and the resilience factor of individual students.

The field study confirmed the results of the quantitative data analysis of the large-scale survey of school principals conducted in the framework of the MEMO. However, we cannot judge to what extent the high achievements of students from disadvantaged families are due to the school influence, and to what extent they can be determined by their individual characteristics. This issue remains open also to foreign authors studying academic resilience [Agasisti, Longobardi 2017]. To see the school contribution more clearly, the next step in research would be to compare the conditions resilient students are taught under in schools overcoming the negative impact of social disadvantages and in those schools, which do not cope with social disadvantages and show the lowest results.

It is also important to evaluate the degree of sustainability of individual academic resilience revealed at the school educational level. This requires tracing the educational trajectories of graduates and determining whether a high level of educational outcomes is the basis for success in higher education and/or career.

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Differences in General Education in Vocational and High Schools:

Characteristics of Teachers and Teaching Practices in Mathematics

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Abstract. Every year, more and more middle school graduates opt for vocational high schools. They are normally less academically successful students from lower economic and cultural backgrounds. Still, the vocational education system must provide the chance to have a quality high school education to anyone who follows this track after the ninth grade. The article uses findings of the Trajectories in Education and Careers longitudinal study to compare the key conditions of obtaining a mathematics education in high schools, i. e. the professional and demographic characteristics of vocational and academic high school teachers and their teaching practices. The comparison reveals an inequality in students' access to educational resources depending on the chosen trajectory. The differences revealed are related to the institutional characteristics of the two tracks and make it possible to say that those tracks offer high school education of different types.

Keywords: educational inequality, education quality, vocational education, academic high school, teaching mathematics, teachers, teaching practices.

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Secondary education in Russia can be obtained in institutions of two types: those of general education (10th-11th grades of secondary school) and those of vocational education (vocational or trade schools). In the latter case, general education (in a somewhat modified form) is combined with vocational training.

The last 15 years have seen a redistribution in the flows of middle school graduates choosing between the two educational trajec-

tories after the ninth grade. Between 2000 and 2015, the academic high school enrollment rate dropped from 1,422,400 (66.8 percent of all middle school graduates) to 638,300 (54.9 percent). The outflow of students from academic high schools began earlier and was more rapid in rural localities. Only 45.2 percent of rural school students proceeded to the 10th grade in the 2015/16 academic year [National Research University Higher School of Economics 2010; 2012; 2014; 2016].

As a consequence, vocational and trade schools enrolled more and more middle school graduates from year to year-263,800 in 2000, 313,200 in 2005, and 474,400 in 2016—raising their proportion in the total population of vocational students from 38.6 to 65.9 percent in 12 years. The proportion of vocational students in secondary education thus increased from 35.9 percent in 1990 to 49.2 percent in 2016 [Ibid]. The number of students obtaining secondary education in vocational institutions is now nearly equal to that of students in academic high schools.

In order to assess the consequences of such student redistribution, it is necessary to compare the outcomes of secondary education obtained in academic and vocational high schools. No standardized tests are conducted within vocational education, so probably the only opportunity for such comparison is provided by the Program for International Student Assessment (PISA)[1]. The 2015 PISA results reveal a considerable gap in the mathematical literacy of 15-year-old academic high school students (526 scores) and their peers from vocational schools (478 scores)[2], which corresponds to about 1.6 years of learning[3].

These differences have economic effects, too. People who did not acquire a required set of knowledge and general competencies in high school will most likely have to choose from unskilled and low-paying jobs, which makes them extremely vulnerable in the context of rapid socioeconomic and technological development. The lack of social and cognitive skills necessary to live in a contemporary society disqualifies them as workers, reducing their opportunities for professional and

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[1] http://www.oecd.org/pisa/

[2] One should be careful when making inferences about the literacy of students in academic and vocational high schools on the basis of PISA results due to some sampling peculiarities. Notably, the data represents 15-year-olds, not students of vocational or academic high schools. Thus, the 2015 Russian sample included 5,268 ninth-graders (87 percent of the sample), 581 academic high school students (9 percent) and 187 vocational school students (4 percent). With these limitations in mind, we believe, however, that the data specified should be largely indicative of the general tendency of vocational school students scoring lower in general subjects.

[3] The difference of one year of learning is normally defined as one-quarter to one-third of a standard deviation, or about 30 scores [Woessmann 2016].

career growth [Cedefop 2016a; 2016b]. As the percentage of the college-educated population is growing, those who have not obtained a quality general education will feel even worse in the labor market, which is another factor aggravating social inequality [Lyubumov 2008].

The gap in mathematical literacy unveiled by the PISA is largely conditioned by the differences between students proceeding to academic high school after the 9th grade and those outflowing to vocational education institutions. Russian research findings demonstrate that ninth-graders choosing between the academic and vocational tracks differ in the level of educational achievement and socioeconomic backgrounds, which indicates inequality of educational opportunity [Aleksandrov, Tenisheva, Savelyeva 2015; Bessudnov, Malik 2016; Konstantinovskiy 2010]. Vocational and trade schools are usually chosen by average-performing students. The socio-professional status of their parents varies, being anywhere from skilled workers to highly skilled professionals. Parents and students form this social group regard vocational education as a relatively safe way of improving the family's status, as vocational school graduates often progress to institutions of higher education [Aleksandrov, Tenisheva, Savelyeva 2015; Bessudnov, Malik 2016]. The same studies show that more talented and socially advantaged students choose to proceed to high school.

However, characteristics of students and their families are hardly the only factor determining the level of academic performance. Ample research has found that teacher quality has a significant impact on student achievement. Specifically, better performance is observed in classes taught by teachers with some (yet not too many) years of teaching experience [Rockoff 2004; Rivkin, Hanushek, Kain 2005; Clotfelter, Ladd, Vigdor 2006] and Master's degrees [Goldhaber, Brewer 2000; Kukla-Acevedo 2009]. Other effective teachers include professionals with academic degrees in a specific field (e. g. mathematician, as compared to a teacher of mathematics) [Darling-Hammond 2000] or vocational qualifications [Goldhaber, Brewer 1996; Cavalluzzo 2004; Clotfelter, Ladd, Vigdor 2006; Harris, Sass 2011; Goe 2007].

A number of publications indicate a relationship between student achievement and classroom teaching practices, e. g. active learning methods, when students engage in projects and present their results orally or in writing, explain problem solving methods in front of the class [Frome, Lasater, Cooney 2005], work in groups and discuss their findings [Blatchford et al. 2003], etc. Students tend to perform better in math if their teacher demonstrates the relationship between mathematical concepts and everyday phenomena [Schoenfeld, Sloane 2016; Marcoulides, Heck, Papanastasiou 2005; Wenglinsky 2000; 2002]. However, other findings show that this correlation is not that unambiguous [Carnoy et al. 2016]. Successful development of mathematical thinking skills correlates positively with the frequency

of doing math homework [Cooper 1989; Kannapel et al. 2005; Marcoulides, Heck, Papanastasiou 2005], in particular with the frequency of using final exam tests as part of homework assignments [Zakharov, Carnoy, Loyalka 2014].

All the research referred to above deals with teaching in academic high school. Scholarly literature sheds no light on the extent to which education obtained in vocational high schools differs from that provided in academic high schools in Russia. Little is known about how general subjects are taught in vocational and trade schools. It remains an open question as to whether the social inequality observed at the fork of educational tracks after the 9th grade is exacerbated by the differences in access to educational resources within those tracks.

This study aims to describe the differences in the way mathematics is taught in vocational and academic high schools. The focus is placed on the demographic and professional characteristics of math teachers, their teaching techniques, and the inequality of access to educational resources (in the form of teacher qualifications) among students choosing between the academic and vocational tracks.

The article is structured as follows. Section one describes the research data and methods. Section two presents the findings, i. e. the key characteristics of vocational teachers as compared to those of academic high school teachers, the teaching techniques applied in the classroom by academic and vocational high school teachers, and the results of analyzing student access to educational resources in the academic and vocational tracks. The findings are discussed and inferences are made in the conclusion.

1. Data and Analysis Strategy

1.1. Research Data

The empirical basis of the research was provided by the Trajectories in Education and Careers[4] longitudinal study organized by National Research University Higher School of Economics. This long-term project is unique for Russia. It started with the Trends in International Mathematics and Science Study (TIMSS) in spring 2011. The sample represented Russian school eighth-graders[5]. The same students, now in the 9th grade, took part in the PISA in spring 2012[6]. After the ninth grade, 32 percent of middle school graduates went on to vocational schools (Table 1). Information about teenagers studying in vocational and academic high schools was collected during the subsequent waves of the longitudinal study, in fall 2013 and spring 2014.

In addition to student testing and surveying, the study included a survey of math teachers (from this point on, information will pro-

[4] https://trec.hse.ru

[5] For more details on the sampling procedure, see https://trec.hse.ru/sampling

[6] That was an addition to the national PISA-2012 sample.

Table 1. **The tracks of students involved in the longitudinal study Trajectories in Education and Careers**

	Spring 2011	Spring 2012	Spring 2014	
Educational track	8th grade	9th grade	1st year of vocational school	11th (final) grade of academic high school
Number of students surveyed	4,893	4,399	1,348	2,731

vided on algebra teachers[7]) from the educational instituti-ons[8]. Data on 11th-grade teachers was collected in spring 2014, and vocational teachers were surveyed in spring 2015. The surveys involved the schools teaching at least three longitudinal study participants and vocational institutions teaching at least two. The resulting sample consisted of 294 teachers teaching to 2,347 eleventh-graders (86 percent of all the respondents) and 441 teachers teaching to 741 vocational and trade school students (55 percent of the sample). Given the small number of respondents (60) enrolled in skilled worker and public servant training programs, whose teachers were also included in the sample, the analysis only compared the data for students and teachers of the 11th grade of academic high school and those in the vocational education programs for mid-level professionals.

1.2. Variables

The following easily accessible indicators of teachers' professional experience were the focus of analysis: years of service, qualifications, and professional and top scorer awards. We also compared the demographic characteristics of teachers (gender and age) with their levels of cultural capital (number of books at home[9]). Finally, we compared teacher engagement in self-instruction (how often teachers read literature on the theory and methodology of teaching their discipline).

With a view to identifying the peculiarities of the educational pro-

[7] In most schools, algebra and geometry were taught by the same teacher.

[8] The survey of academic and vocational high school teachers was organized by the International Laboratory for Education Policy Research, National Research University Higher School of Economics (https://ioe.hse.ru/lepa/) as an additional source of data under the longitudinal project Trajectories in Education and Careers.

[9] According to Pierre Bourdieu's philosophy, books, just like other cultural products, form a type of objectified cultural capital [Bourdieu 2002]. Using other indicators is unproductive. For instance, the level of education (an operand of institutionalized cultural capital) is a poor discriminator since nearly all teachers possess academic degrees.

cess in academic and vocational high schools, we first of all evaluated how often teachers demonstrate the relationship between the material and other fields of study as well as real-life situations and human activities. The teachers were asked how often their students used the mathematical language to describe everyday life and how often they solved standard problems. Besides, the teachers answered questions about using the teaching techniques designed to increase children's involvement in learning, i. e. how often students were assigned long-term (at least week-long) projects aimed at answering a research question, how often they worked in small groups to find a solution together, etc. The teachers were also asked how often they applied differentiated instruction depending on students' abilities. Finally, some questions bore upon widespread schooling practices: how often students were assigned homework, how often they used USE (Unified State Exam) tests while working in the classroom, etc.

The analysis made allowance for the characteristics of academic and vocational high school students. Mother's education (whether or not the mother has a college degree) and the index of family income[10] were used as indicators of cultural and economic capital. Both variables were obtained from the TIMSS-2011 student survey. In addition, student gender and PISA scores in mathematics were taken into account.

1.3. Analysis Methods

Analysis was conducted in three stages, corresponding to the research objectives. The first stage suggested using descriptive statistics to compare the demographic, cultural and professional characteristics of teachers teaching mathematics to academic and vocational high school students. The significance of differences was assessed using parametric and nonparametric criteria: the Student's t-test, the Mann–Whitney *U* test, and the Kruskal–Wallis *H* test.

At the second stage, a series of ordinal logistic regressions was used to assess the significance of differences in math teaching practices in academic and vocational high schools. The frequency of relevant teaching practices was the dependent variable, the type of educational institution (academic/vocational high school) being the main predictor. The analysis controlled for student and teacher characteristics.

At the third stage, we compared accessibility of educational resources for eleventh-graders and vocational students using descriptive statistics and an ordinal logistic regression. Teacher qualifications were the dependent variable, and the predictors included social family characteristics, student gender, and learnings outcomes at the end of the 8th and 9th grades.

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[10] The index of family income is calculated based on students' answers to the TIMSS survey questions about having specific household goods at home and recoded into an ordinal scale (low, medium and high levels accounting for 30, 40 and 30 percent of the observations, respectively).

Two limitations must be considered when interpreting the results obtained. First, analysis was descriptive at each stage, in accordance with the research objectives, and did not aspire to evaluate the cause-effect relationships. Second, inferences should rather be made about the peculiarities of educational trajectories than about the performance of vocational schools as compared to academic high schools, given the specific qualities of data, which does not represent teachers. What matters here is the learning environments in which the 2012 middle school graduates found themselves.

2. Findings

2.1. The Demographic, Cultural and Professional Characteristics of Math Teachers

Regardless of the educational track—vocational or academic—most academic high school students had female teachers of mathematics (92 and 95 percent, respectively). The differences between the groups are very small and statistically insignificant (the Mann–Whitney *U* test). The average age of math teachers in academic and vocational high schools was 55 and 50 years, respectively. The number of eleventh-graders taught by teachers aged 41–60 is 23 percent higher than that of vocational students (Fig. 1). At the same time, vocational school students were 20 percent more likely to be taught mathematics by younger teachers (aged 25–41). These differences are statistically significant ($p<0.05$, Student's t-test).

Figures 2 and 3 compare the indicators of teachers' professional experience. Much fewer eleventh-graders than vocational students were taught by teachers possessing up to 15 years of teaching experience (11 and 63 percent, respectively). The greatest gap between the two tracks is observed in the proportion of students taught by new teachers who have worked for up to five years (1 and 35 percent) (Fig. 2). This is in line with the above distribution of students by the age of teachers, whose term of service is linearly correlated to their age. The number of students taught by teachers with the lowest (second) qualification category or those with no teaching credentials at all—normally young teachers with the least extensive experience (of 13 years on average)—was 20 percent greater among vocational school students than among academic high school students (Fig. 3). Academic high schools demonstrate a 21-percent higher proportion of students taught by teachers with professional and distinction awards (75.5% as compared to 54.5%) and a 15-percent higher proportion of students taught by professional competition award winners (27.9% as compared to 13%) than institutions of vocational education. Teachers with professional and distinction awards usually have a more extensive teaching experience. The differences in the distribution of academic and vocational high school students among all the indicators of teacher experience are statistically significant ($p<0.05$[11]).

[11] The Student's t-test was used to compare the teachers' age and years of ex-

Fig. 1. **The age of math teachers**

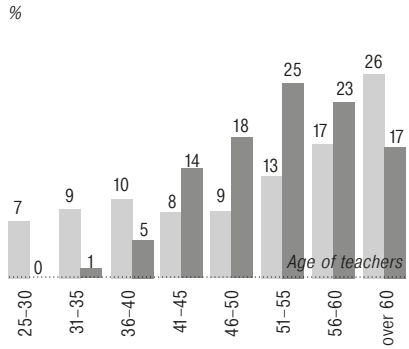


Fig. 2. **Teaching experience of math teachers**

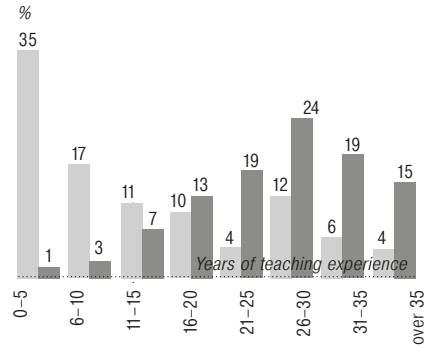


Fig. 3. **Qualification categories of math teachers**

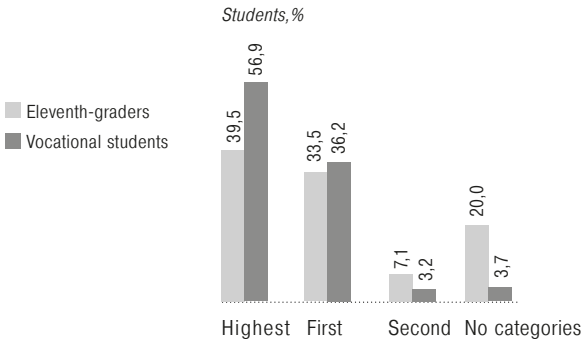


Fig. 4. The number of books in math teachers' homes

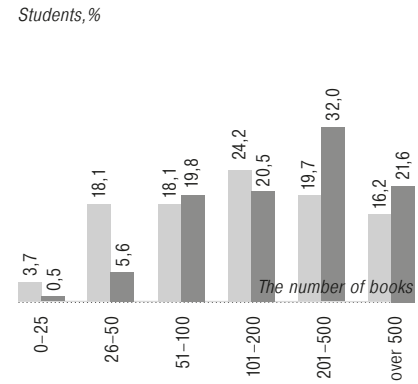


Fig. 5. **The frequency of reading mathematical theory books**

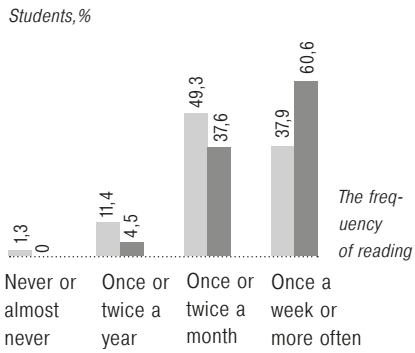
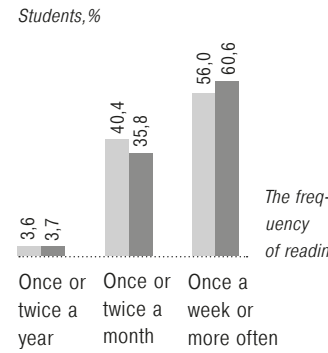


Fig. 6. **The frequency of reading books on the methodology of teaching mathematics**



Figures 4–6 compare the level of cultural capital (the number of books at home) and the level of engagement in self-instruction (the frequency of reading books on the theory and methodology of teaching a specific discipline) among teachers in academic and vocational high schools. Eleventh-graders were more likely to be taught by teachers with greater cultural capital: 54 percent of academic high school students were taught by teachers whose home libraries consisted of 200 books or more, as compared to only 36 percent in vocational schools. Moreover, 22 percent of vocational students were instructed by math teachers with the minimum number of books at home (less than 50), as compared to only six percent in academic high schools (Fig. 4). These differences are statistically significant ($p<0.05$, the Kruskal–Wallis test).

Academic high school teachers were more likely than vocational school teachers to read specialized literature (Fig. 5, 6). The highest frequency of reading mathematical theory books (once a week or more often) was observed among 61 percent of academic high school teachers and only 38 percent of vocational school teachers. The differences observed are statistically significant ($p<0.05$, the Kruskal–Wallis test). As for books on the methodology of teaching mathematics, the frequency of reading does not differ that much here. Academic high school teachers were more likely to do it as well, yet the difference was not significant.

Many of the vocational school teachers used to teach academic high school students in the past. The survey results show that such teachers are on average two years older and have an overall teaching experience of on average five years more than their colleagues with no experience of teaching at school. As many as 72.1 percent of the vocational school students were taught mathematics by teachers with academic high school teaching experience[12].

2.2. Classroom Mathematics Teaching Practices Used in Vocational and Academic High Schools

2.2.1. Relationship of Mathematics with Everyday Life and Other Subjects

In order to see how often the elements that students study in math lessons relate to their daily lives and the content of other subjects, we analyzed the teachers' answers to the questions on their engagement

perience, the Kruskal–Wallis *H* test to compare teacher credentials, and the Mann–Whitney *U* test to compare the proportions of award winners and distinction holders.

12 This indicator is considered to be very high, given that 35 percent of vocational students were taught mathematics by teachers with teaching experience of five years or less (see Fig. 2). Otherwise speaking, this data suggests that nearly all the teachers with teaching experience of over three years should have at least some minimal experience of teaching in academic high school. A high indicator like this can also be explained by teacher mobility (see the conclusion section for more details) and the subjective perception of teaching experience by the respondents, who sometimes extend the term to teaching practice they did as students.

Fig. 7. **How often teachers demonstrate the relationship of mathematics with other subjects in the classroom**

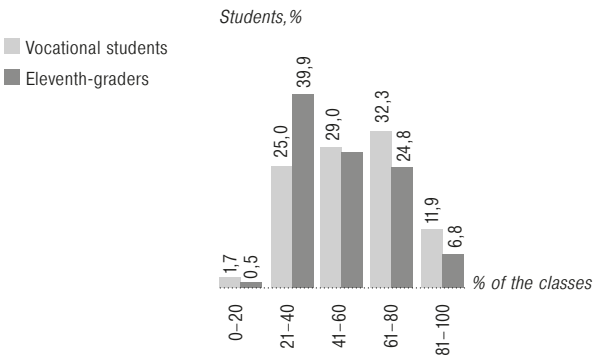
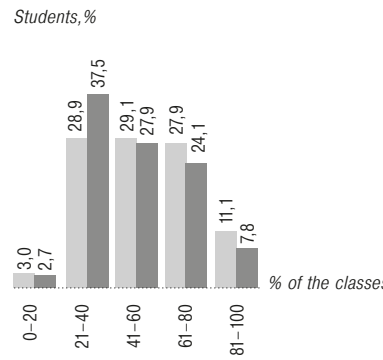


Fig. 8. **How often teachers of mathematics demonstrate the relationship of new material with everyday life in the classroom**



in the classroom and the frequency of solving specific types of problems in the classroom by students.

In vocational education institutions, teachers were more likely to demonstrate the connections of mathematics with other disciplines (Fig. 7). Seventy-three percent of vocational students and 60 percent of their academic peers had such connections explained to them in over 40 percent of the classes. However, further analysis showed that if allowance is made for teachers' professional experience and cultural capital as well as student characteristics (mother's education for the most part), the differences in the frequency of using such practices in academic and vocational high schools will be statistically insignificant (Supplement 1, Table 1). In other words, it is not the type of educational institution but rather the teacher and student characteristics that explain the differences observed.

Vocational teachers were also slightly more likely to demonstrate how new material was related to students' everyday lives (Fig. 8). This difference in teaching is not too prominent: 68 percent of eleventh-graders and 60 percent of vocational school students obtained such information in over 40 percent of the classes. Just as in the previous case, this difference is determined by student characteristics and becomes statistically insignificant if student achievement in the 9th grade (PISA score in mathematics), family income and mother's education are controlled for (Supplement 1, Table 1).

Eleventh-graders were more likely to describe real-life events and phenomena using the mathematical language: such tasks were performed by 56 percent of academic high school students and only 39 percent of vocational students in over 40 percent of the classes (Fig. 9). If we compare equally-performing middle school graduates with the same sociodemographic characteristics taught by equally experi-

Fig. 9. **How often students describe everyday life phenomena using the mathematical language in the classroom**

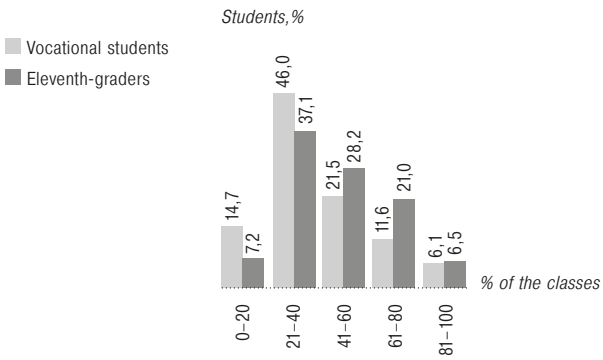
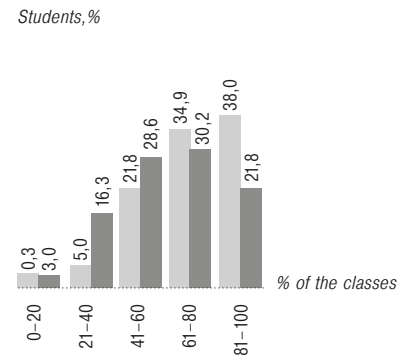


Fig. 10. **How often students train to solve standard problems in the classroom**



enced math teachers, their chances of solving such tasks in academic high school are 1.5 times higher than in vocational schools (Supplement 1, Table 1). Vocational students solved standard problems in the classroom more often than eleventh-graders (Fig. 10): 73 percent as compared to 52 percent of academic high school students in 61 percent of the classes or more often. Even if the teacher and student characteristics are controlled for, the chances for doing conventional tasks are 1.7 times higher among vocational students than among their academic peers (Supplement 1, Table 1).

2.2.2. Classroom Management

Homework is assigned more often in academic high school: 64 percent of eleventh-graders received homework assignments in nearly every class (81–100 percent of the classes). Only 24 percent of vocational students were given homework as often (Fig. 11). These differences retain statistical significance when controlling for student and teacher characteristics: eleventh-graders' chances of being assigned homework are almost four times higher (Supplement 1, Table 1).

As for practices designed to promote students' engagement in learning, differences are not always observed here. The frequency of working in small groups is nearly the same in both educational tracks (Fig. 12; Supplement 1, Table 1). Vocational students were more likely to be given assignments depending on their abilities (Fig. 13). Sixty-eight percent of vocational students and 59 percent of eleventh-graders performed differentiated tasks in over 60 percent of the classes. Finally, nearly all vocational school students (96.9 percent) were given math assignments in the form of long-term (at least week-long) projects aiming to find a research solution. This practice has been very widespread in schools over recent years, yet it was not ubiquitous at the time of the survey-80.9 percent of eleventh-graders

Fig. 11. **How often teachers assign homework in the classroom**

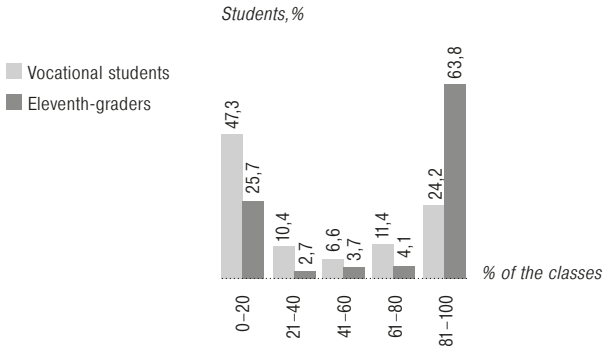


Fig. 12. **How often students work in small groups in the classroom**

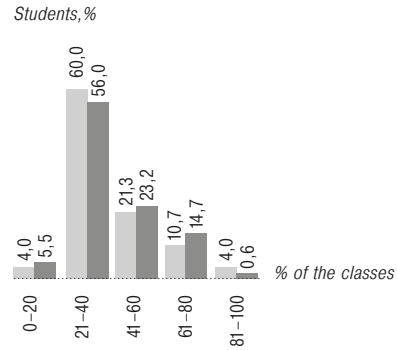
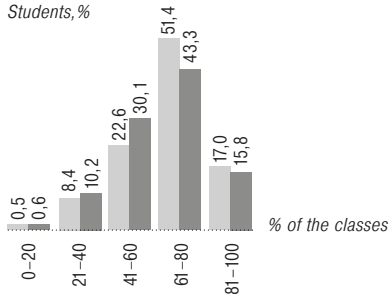


Fig. 13. **How often teachers apply differentiated instruction in the classroom depending on students' abilities**



in the sample were engaged in such projects. On the whole, if we compare students with the same context characteristics taught by teachers with similar experience and cultural capital, we can see that vocational students are much more likely to often engage in activities that suit their abilities better and to participate in research projects (Supplement 1, Table 1).

Although vocational school graduates are admitted to most colleges without passing the Unified State Exam (in cases where the fields of study match), vocational school teachers still use USE tests in the classroom. However, teachers in the eleventh grade, where the USE is obligatory, pay more attention to USE tests. In more than half of the classes, part B tests were performed by 34.8 percent of academic high school students and part C tests by 26.4 percent, as compared to 8.1 and 10.6 percent of vocational students, respectively (Fig. 14, 15). If student and teacher characteristics are taken into account, we

Fig. 14. **The proportion of time devoted to part B USE tests in the classroom**

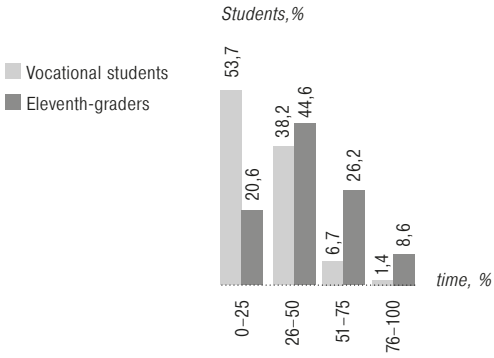
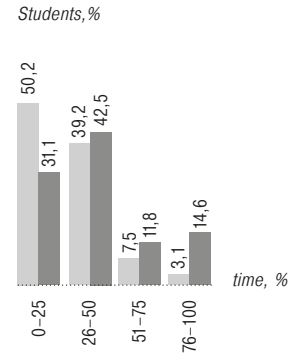


Fig. 15. **The proportion of time devoted to part C USE tests in the classroom**



can see that academic school students, for instance, are four times more likely to solve part C tests in the classroom than their peers in vocational schools[13] (Supplement 1, Table 1).

2.3. Access to Educational Resources among Academic and Vocational High School Students

Previous research has shown that the academic achievement of middle school graduates opting for vocational education is much lower than that of their peers progressing to the tenth grade. Where levels of academic achievement are comparable, vocational students tend to have families of lower cultural capital [Aleksandrov, Tenisheva, Savelyeva 2015; Bessudnov, Malik 2016, Konstantinovskiy 2010]. In spite of such distribution, the student population in both academic and vocational tracks remains heterogeneous in terms of academic achievement and family social characteristics. This study analyzes whether the two tracks provide equal access to educational resources, e. g. in the form of teachers' professional experience, for students from similar family backgrounds.

Students differing in the level of cultural capital and family income are distributed unevenly among teachers with different qualification categories in both academic and vocational high schools (Fig. 16). Both trajectories reveal a principle that could be conventionally referred to as "support for the strong". Students from wealthier families with higher levels of cultural capital are more likely to be taught by better qualified teachers, whichever educational track they choose to follow (Fig. 17). However, further analysis demonstrates that this dif-

[13] The great difference in the chances of doing part B tests observed when student and teacher characteristics are controlled for can be explained by the fact that those characteristics correlate with both the frequency of doing tasks and the choice of educational trajectory (academic or vocational high school).

Fig. 16. **The distribution of students among teachers of different qualification categories depending on whether their mothers have a college degree**

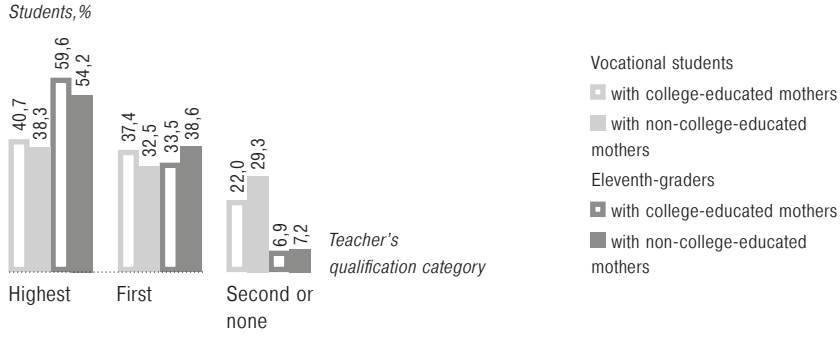
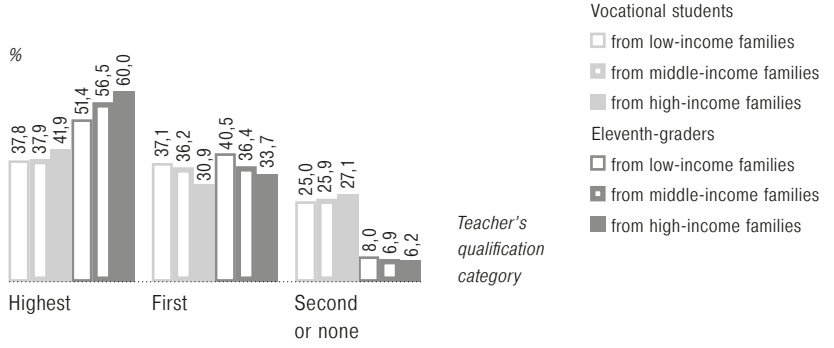


Fig. 17. **The distribution of students among teachers of different qualification categories depending on their family income**



ferentiation manifests itself more in academic high schools, mostly correlating with family income. The differences observed are statistically insignificant in vocational schools, while eleventh-graders from low-income backgrounds have significantly lower chances of being taught by math teachers of higher qualification categories than their peers from wealthier families, even with equal levels of academic achievement at the end of the 8th or 9th grade. Besides, the odds of being taught by a better qualified teacher are higher for students who demonstrate better learning outcomes in mathematics at the end of middle school, which is true for both educational tracks (Supplement 1, Table 2).

3. Inferences and Discussion

Differences in access to quality education are largely conditioned institutionally. The educational contexts in academic and vocational high schools differ greatly not only in terms of administration and management but also in the educational environment characteristics. The choice of educational track after the 9th grade determines the extent of subsequent access to educational resources, i. e. how qualified the teachers will be and which teaching practices they will use. This raises two questions: (i) what causes the differences between the educational trajectories? and (ii) what are the students' benefits or losses from choosing a specific trajectory?

The longitudinal study participants who went to vocational schools after the 9th grade were much more likely to be taught by math teachers with relatively lower levels of cultural capital and little teaching experience without a high qualification category or professional credentials than their academic high school peers. This situation can be partly explained by differences in teacher pay between academic and vocational high schools. The so-called Putin's May decrees suggested bringing teacher pay in line with the region's average in both academic and vocational high schools, but the rates of teacher salary growth differed greatly between the two types of educational institutions. Whereas teacher salaries in academic high schools had reached the required level by 2014, vocational schools are only expected to reach it in 2018[14]. As a result, salaries of math teachers with the same workload could differ between academic and vocational high schools by as much as 15–25 percent during the survey period [Kuzminov, Popova, Yakobson 2017], which inevitably affected the distribution of employees. Young teachers normally have less experience and fewer professional skills, and they are also less involved in professional networks that can provide access to higher-paying jobs [Roshchin 2006]. As a consequence, it was easier for graduates of teacher education colleges to start their careers in vocational education institutions.

At the same time, recent years have seen the number of teacher jobs in vocational high schools growing at the expense of those in academic high schools due to student redistribution. The demographic crisis and the reorganization of the school network in the 2000s caused the number of middle school graduates proceeding to academic high school to reduce by 55.2 percent over a fifteen year period (from 1,422,400 in 2000 to 638,300 in 2015). Vocational and trade schools, on the contrary, kept increasing their middle school graduate enrollment rates (from 313,200 in 2005 to 474,400 in 2016) [National Research University Higher School of Economics 2010; 2012; 2014; 2016]. The result was not only a greater number of jobs for young teachers in vocational education institutions but also an outflow of

[14] Decree of the President of the Russian Federation No. 597 "On National Social Policy Measures" of May 7, 2012: http://legalacts.ru/doc/ukaz-prezidenta-rf-ot-07052012-n-597/

teachers from academic to vocational education institutions, which has been documented in this study.

By choosing a specific educational track, students predetermine not only the teacher characteristics they will have to deal with but also the teaching practices that will be applied to them. Vocational students are comparatively less likely to be asked to describe everyday life phenomena using the mathematical language and more likely to solve standard mathematical problems. On the other hand, they are comparatively more likely to receive differentiated instruction depending on their abilities and to work on long-term (at least week-long) research projects. Meanwhile, eleventh-graders are more likely to be given homework and do USE tests in the classroom more often.

Some discrepancies, e. g. in the frequency of applying differentiated learning techniques, are hard to explain. Others may be largely conditioned by the institutional peculiarities of the two tracks (the content of education and the quality assessment methods) and the level of middle school graduates' competencies. In particular, USE tests are more often used in the classroom by academic high school teachers than by their colleagues in vocational schools because all eleventh-graders have to take the USE as a final exam, which is not the case with vocational students. The reason for the difference in the frequency of doing homework may be the same, as eleventh-grade homework assignments are mostly built around preparing for the USE [Zakharov, Carnoy, Loyalka 2014], the outcomes of which determine students' life chances and the results of teacher and school performance assessment.

The findings about practice orientation in teaching mathematics in academic and vocational high schools look somewhat controversial. Unlike in academic high schools, it is recommended to organize secondary education in vocational schools in connection with the future career context. This should be achieved, in particular, by engaging students in project activities and establishing the relationship of what is learned in general subjects with everyday life and career-specific disciplines[15]. Project activities are thus an obligatory component of the content of vocational education. At the same time, the relationship of new material with everyday life and other subjects is established in a rather formal way in the classroom—from the teacher's words. In this study, vocational and academic high school students were told, with equal frequency, about this relationship. The fact that teaching mathematics is only formally practice-oriented is also con-

[15] Recommendations on Implementing the High School Education Program in Institutions of Vocational Education Pursuant to the Federal Basic Education Plan and the Guidelines on Developing Education Plans for Vocational Education Institutions of the Russian Federation. Letter of the Ministry of Education and Science of the Russian Federation No. 03–1180 of May 29, 2007: http://www.garant.ru/products/ipo/prime/doc/6232537/

firmed by the higher frequency of explaining everyday life phenomena using mathematical language among eleventh-graders.

The differences observed in practice-oriented learning may be related to the level of students' mathematical competencies. Middle school graduates going to vocational schools usually have lower achievement in mathematics [Bessudnov, Malik 2016]. For most of them, learning math is fraught with a lot of difficulty, and applying mathematical relations to solve practical problems requires quite a bit of knowledge of mathematical theory [Tyumeneva, Valdman, Carnoy 2014]. Vocational school teachers thus have to spend much more class time on explaining the basic mathematical concepts and solving standard problems within each topic to ensure that at least the basics are digested. Under such conditions, teaching students to apply mathematical knowledge to solve real-life problems requires more time and effort.

The differences in teachers' engagement in self-instruction may also be determined by the level of student competencies and the external assessment system. Feeling no pressure from the looming USE and working with academically weaker students, vocational school teachers experience a lesser need to look to books on mathematical theory on a regular basis.

Another issue associated with the choice of educational track after the 9th grade has to do with the effects of observed inequality in access to educational resources. To what extent do students win or lose in terms of the quality of secondary education by choosing between vocational school and academic high school? Unfortunately, it is impossible to compare the learning outcome of graduates from academic and vocational high schools directly. The standardized examination testing the knowledge of the secondary education content is only mandatory for eleventh-graders. However, some assumptions can be made based on earlier findings. For example, it has been established that teachers with some teaching experience (yet not too extensive) are more effective than new teachers, the peak of their effectiveness being observed during the first years of teaching [Hattie 2017:166–167]. Other researchers have shown that it makes a lot of difference for low-performing math students to be taught by teachers with qualifications, whereas qualification grades play no great role in regards to high performers [Carnoy et al. 2016]. Vocational schools are more likely to enroll teenagers with low achievement in mathematics who are taught more often by young teachers with minimum experience and no qualifications. Such students can be expected to lose out by choosing the vocational track.

Social inequality in access to educational resources (in the form of teacher' qualifications) and thus probably in the chances for better learning outcomes manifests itself ambivalently. When students—often from families of low cultural capital [Bessudnov, Malik 2016]—choose the vocational track, this very choice reduces their chances

of access to resources. However, students progressing to academic high school do not get better access to educational resources by default. Further distribution of academic high school students among teachers of various qualification grades is determined by the level of family income.

By choosing an educational track after the 9th grade, students choose their future. Both academic and vocational high schools should provide access to quality education, which is hardly possible in a situation of unequal access to educational resources overlapping the social inequality in actually choosing between the two educational tracks.

Supplement 1

Table 1. **How educational processes differ between academic and vocational high schools**[1]

Dependent variable	Model 1	Model 2	Model 3
How often teachers demonstrate the relationship of mathematics with other subjects	0.56*** (0.11)	0.54** (0.14)	0.46 (0.23)
How often teachers demonstrate the relationship of new material with everyday life	0.67** (0.13)	0.78 (0.23)	0.63 (0.29)
How often students describe everyday life phenomena using the mathematical language in the classroom	1.90*** (0.41)	1.86*** (0.05)	1.50*** (0.11)
How often students train to solve standard problems in the classroom	0.39*** (0.09)	0.53*** (0.02)	0.59*** (0.02)
How often teachers assign homework	3.69*** (0.86)	3.43*** (0.14)	3.97*** (0.43)
How often students work in small groups in the classroom	1.07 (0.24)	1.15 (0.21)	1.05 (0.26)
How often teachers apply differentiated instruction in the classroom depending on students' abilities	0.43*** (0.09)	0.35*** (0.02)	0.37*** (0.02)
Whether teachers have given project assignments	0.12*** (0.86)	0.11*** (0.14)	0.13*** (0.43)
Proportion of time teachers devote to part B USE tests in the classroom	5.82*** (1.35)	8.64*** (2.56)	10.78*** (1.11)
Proportion of time teachers devote to part C USE tests in the classroom	7.68*** (2.40)	5.38*** (0.20)	4.22*** (0.40)

[1] The table rows present the results of analyzing the relationship between the dependent variable in column 1 and the type of educational institution (0 = vocational school, 1 = academic high school). As the dependent variables had an ordinal scale (1 = 0–20% of the classes; 2 = 21–40% of the classes; 3 = 41–60% of the classes; 4 = 61–80% of the classes; 5 = 81–100% of the classes), an ordinal logistic regression was used to assess the relationship. In the case of project assignments, a logistic regression (binary choice model) was used. Columns 2–4 capture the ratio of chances of academic high school students to those of vocational students for doing tasks of a specific type more often. No covariates were used in model 1. In model 2, analysis controlled for

student characteristics: gender, socioeconomic status, PISA score, and mother's education. Model 3 controlled both student and teacher characteristics, the latter including qualification category, the frequency of reading books on the methodology of teaching the subject, and the number of books at home.
*** p<0.01, ** p<0.05, * p<0.1

Table 2. **The difference in the chances of students from low-income families for being taught by highly-qualified math teachers in academic and vocational high schools**[1]

	Vocational high school			Eleventh grade of academic high school		
Variable	(1)	(2)	(3)	(4)	(5)	(6)
Low-income family	1.09 (0.20)	1.09 (0.21)	1.30 (0.27)	0.74** (0.10)	0.77* (0.11)	0.76** (0.10)
Middle-income family	1.00 (0.22)	1.02 (0.23)	1.17 (0.29)	0.89 (0.10)	0.87 (0.10)	0.87 (0.10)
College-educated mother	1.25 (0.25)	1.19 (0.24)	1.23 (0.28)	1.16 (0.17)	0.99 (0.13)	1.02 (0.13)
No data on mother's education	1.36 (0.27)	1.39* (0.27)	1.36 (0.27)	0.91 (0.15)	0.93 (0.16)	0.94 (0.16)
Student gender (female)	1.03 (0.20)	1.04 (0.21)	0.99 (0.20)	0.92 (0.09)	1.00 (0.10)	0.98 (0.11)
PISA score (standardized)		1.24** (0.13)			1.57*** (0.16)	
TIMSS score (standardized)			1.40*** (0.16)			1.41*** (0.15)

[1] Teacher's qualification category is the dependent variable. The relationship was assessed using an ordinal logistic regression. "High level" is the reference group for the index of family income, and "no college degree" is the reference group for mother's education. Columns (1) and (4) did not control for previous learning outcomes of students. Columns (2) and (5) controlled for PISA results (9th grade). Columns (3) and (6) controlled for TIMSS results (8th grade).
*** p<0.01, ** p<0.05, * p<0.1

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Distance Learning as Compared to Full-Time Programs in Higher Education (based on Russia's official statistics)

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Abstract The indicators of development of distance higher education in Russia since 2000 until now are described as compared to full-time learning programs using the estimates based on the primary data obtained from the Ministry of Education and Science of Russia as well as official statistics. The study involves analysis of the chronological changes in the indicators of enrollment rates, the applicants per place ratio, the distribution of applicants by age characteristics and the level of educational attainment, the number of students and their gender composition, graduation as such and broken by the type of degree (Bachelor's, Specialist's, Master's), the form of ownership of an educational institution (public/private), and the ratio of state- and self-funded places (which takes into account youth demographics, where possible). Data on the proportion of distance learning students in the 2017 enrollment rates is used to identify a series of trends that characterize the development of this form of education in particular federal okrugs and subjects of the Russian Federation.

Keywords higher education, full-time education, distance learning, enrollment rate, number of applicants per place, Bachelor's degree, Specialist's degree, Master's degree, public college, private college, region-specific peculiarities.

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Popular Philology and Secondary School

A Review of the Book: Troitsky V. (2010) Sudby russkoy shkoly. Problemy naslediya russkoy slovesnosti [The Fate and Fortune of Russian School. Legacy Issues in Russian Philology]. Moscow: Institute of Russian Civilization.

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Abstract It appears relevant to provide a critical review of the presented book as a manifesto of conservative views, so popular today, and as an indicator of the disorientation of modern society, which has a poor knowledge of the Russian school and thus sees its traditions in things that pronouncedly contradict them. The review provides an analysis of Vsevolod Troitsky's perspective on teaching literature in school, the list of authors he finds advisable to include in school syllabi, his conception of historicism in teaching literature, and his ideas of the old Russian and Soviet schools.

Keywords teaching literature in school, old Russian school, Soviet school, syllabus, equality in education, educational policy.

University as a Center of Exemplary Knowledge

Review of the book: Boguslavsky M. Vysshee obrazovanie v nemetskoy i russkoy traditsiyakh [Higher Education in the German and Russian Traditions].

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Abstract As globalization accelerates around the globe, universities are becoming a critical national resource. The book captures a broad range of problems faced by universities in the era of globalization and crisis intervention processes, including the development of new business strategies, the upgrade of education programs to enable graduates to integrate into the global labor market, and the provision of universities' competitiveness in the education market. Alternative versions of university education in the information age are proposed along with such innovative institutional models as open university, network university, multiversity and educational hub. All the three sections of the monograph —the theory, the background and the project—describe in parallel the experience, regularities and prospects of the development of higher education systems in Russia and Germany. The book goes into the sociocultural foundations of the higher education systems and the evolution of the sociocultural concept of "education" in Russia and Germany. Examples of Russian and German universities are used to demonstrate how international cooperation in higher education could be organized and maintained.

Keywords higher education, universities, Russia, Germany, strategy for the development of higher education, educational traditions, university education models, international cooperation.