

NATIONAL RESEARCH UNIVERSITY
HIGHER SCHOOL OF ECONOMICS

INSTITUTE OF EDUCATION

As a manuscript

Kseniia Adamovich

**REGIONAL INEQUALITY IN EDUCATIONAL OUTCOMES AND
TRAJECTORIES OF RUSSIAN SCHOOL STUDENTS IN THE POST-SOVIET
PERIOD**

Summary of the thesis
for the purpose of obtaining academic degree
Doctor of Philosophy in Education

Academic Supervisor: Andrei
Zakharov,
Candidate of Sciences. (Ped.)

Moscow - 2023

| | |
|--|--|
| Applicant's name | Kseniia Aleksandrovna Adamovich |
| Subject | Regional inequality in educational opportunities and outcomes for students in Russian schools in the post-Soviet period |
| Organization | National Research University Higher School of Economics, Institute of Education |
| Supervisor | Zakharov Andrei Borisovich, Candidate of Pedagogical Sciences, Leading Researcher, Institute of Education, National Research University Higher School of Economics |
| List of publications of the author of the thesis, which reflect the main scientific results of the thesis: | <p>Zakharov A. B., Adamovich K. A. Regional differences in access to educational resources, academic results and trajectories of Russian students // Economic Sociology. 2020. T. 21. № 1. C. 60-80.</p> <p>Adamovich K. A. Educational trajectories of Russian students after 9th grade in 2000-2017: types of regional situations and predictors of differences // Public Opinion Monitoring.</p> <p>Adamovich K. A. A. Conceptual Approaches To The Study Of The Phenomenon Of Spatial Inequality In Education (Economic Sociology).</p> <p>Adamovich K. A. Regional differences in the educational results of Russian students in PISA-2018: a socio-spatial approach. //Education policy. - 2022. - T.3 - №91.</p> <p>Adamovich K. Spatial differences in access to school resources, educational trajectories and academic results: a multilevel analysis on Russian data, in: EDULEARN2020 Proceedings. 12th annual International Conference on Education and New Learning Technologies. 6th - 7th of July, 2020.</p> <p>Adamovich K. Regional differences in students' reading, mathematics and science outcomes on PISA 2018 in Russia, in: EDULEARN2020 Proceedings. 12th annual International Conference on Education and New Learning Technologies. 6th - 7th of July, 2020.</p> <p>Adamovich K. Educational trajectories of Russian school students after 9th grades between 2000-2014: types of regional situations, in: INTED2020 Proceedings. 14th International Technology, Education and Development Conference Valencia, Spain. 2-4 March, 2020. IATED, 2020. doi P. 4696-4702.</p> <p>Adamovich K. Digital gap between Russian schools and its consequences for students' learning opportunities during Corona Crisis, in: 15th International Technology, Education and Development Conference: Online Conference. March 8-9, 2021. Valencia : IATED Academy, 2021.</p> <p>Adamovich K. A., Kapuza A. V., Zakharov A. B., Frumin I. D. Main results of Russian students in the international study of reading, mathematical and natural science literacy PISA-2018 and their interpretation. 2. M. Publishing house NRU HSE, 2019.</p> |

| | |
|---|---|
| <p>List of scientific conferences at which the results of the thesis research were presented:</p> | <p>ECER-2021 (Geneva). Report: Spatial Dimension for Maximally and Effectively Maintained Inequality Theories: Evidence from Russian Regions</p> <p>65th Annual Conference Comparative and International Education Society (CIES). Paper: The Effects of High-Stakes Test Implementation Reform on Students' Educational Track: Spatial Econometric Approach</p> <p>INTED2021. 15TH INTERNATIONAL TECHNOLOGY, EDUCATION AND DEVELOPMENT CONFERENCE (online). Report: Digital gap between Russian schools and its consequences for students' learning opportunities during Corona Crisis</p> <p>EDULEARN20. Report: SPATIAL DIFFERENCES IN ACCESS TO SCHOOL RESOURCES, EDUCATIONAL TRAJECTORIES, AND ACADEMIC RESULTS AFTER 9TH AND 11TH GRADES: MULTILEVEL ANALYSIS ON RUSSIAN DATA</p> <p>EDULEARN20. Report: Regional differences in students' reading, mathematics, and science outcomes on PISA 2018 in Russia</p> <p>14th annual International Technology, Education and Development Conference. The International Academy of Technology, Education and Development, Valencia, March 2-4, 2020. Report "EDUCATIONAL TRAJECTORIES OF RUSSIAN STUDENTS AFTER SECONDARY SCHOOL IN 2000-2014: TYPES OF REGIONAL SITUATIONS".</p> <p>XVII International Scientific and Practical Conference "Trends in Education Development". Moscow Higher School of Social and Economic Sciences, February 13-15, 2020. Report: "Interregional differences in access to quality education and student outcomes on PISA-2018 data".</p> <p>XVIII All-Russian Scientific and Practical Conference of Young Researchers in Education. 15.05.2019 - 15.05.2019 Russian Federation, Moscow Report: "Educational trajectories of Russian students after 9th grade in Russian regions in 2000-2014".</p> <p>CIES 2019 Annual Conference. 14.04.2019 - 18.04.2019 USA, San Francisco. Report: "Educational inequality across Russian regions: implications for university access".</p> <p>XX April International Scientific Conference. 7.04.2019 - 10.04.2019 Russian Federation, Moscow. Report "Dynamics of regional inequality in access to education in 2000-2016".</p> <p>XIX April International Scientific Conference on problems of development of economy and society. April 10-13. Moscow. Report: Regional differences in access to educational resources and their relationship with the trajectories of students after 9th grade and the results of the USE in Russian language and mathematics in 2015. Co-author: Andrey Zakharov.</p> <p>Conference of Young Scientists in the Education Sciences. Russian Academy of Education, Moscow. November 27-28, 2018. Paper:</p> |
|---|---|

| | |
|--|---|
| | "Dynamics of regional inequality in access to higher education in Russia 2000-2016: introduction of USE and its delayed effects". |
|--|---|

1. Introduction

The diversity of territorial contexts is one of the unique features of the Russian Federation. It is not only natural and geographic differences, but also social, economic, demographic and cultural contrasts. The scale of these within-country differences is such that they exceed those between countries. For example, in 2015, Russian regions differed by 17 times in terms of economic development. According to the World Bank report, in terms of GRP (PPP) per capita, the Sakhalin region is comparable to Singapore, the Tyumen region and Chukotka to the UAE and Hong Kong, and Karachay-Cherkessia and Ingushetia to Myanmar and Honduras [Sanghi et al., 2018]. An even starker contrast is related to linguistic diversity, with the result that the proportion of the population with the native Russian language in Russian regions ranges from 1% to 100%¹.

However, the effects of such differences on the educational outcomes and trajectories of Russian students, as well as the very scale of spatial differences in education itself, have been little studied so far (see section 2 below). This situation increases the risks of making ineffective policy decisions that can exacerbate inequalities between territories, which already go beyond education [Soja, 2013] - for example, decisions facilitating or hindering access to higher education for students from different regions can, in the long run, affect the dynamics of regional human capital and serve as an obstacle to the economic development of regions. This emphasizes the relevance of studying spatial differences in education, not only for Russia, but also for all countries with a large territory and/or significant differences in socio-economic and demographic contexts.

In sociology, spatial inequality is traditionally defined as *the unequal distribution of goods between territories, which has been shaped by historical and natural elements as a result of political processes* [Lefebvre 1975: 188, Lefebvre 1991, Fainstein 2014, Israel, Frenkel 2018]. However, in this dissertation research, carried out within the conceptual framework of Pierre Bourdieu's social space, not only the distribution of goods will be considered, but also the localization of the individuals who own them. Within this concept, social space has a relativistic character and can be characterized through its relative position (hierarchy) in comparison with other places and through the distance that separates this place from others.

The object of this dissertation is regional inequality in the field of education, viewed through the prism of Bourdieu's social space.

The subject of this dissertation is the accumulation of cultural capital by students in the form of their educational results and the choice of educational trajectory in Russia in the post-Soviet period. In contrast to qualitative studies devoted to the choice of a particular school or university [e.g., Manski, Wise, 2013; Konstantinovskiy, Popova, 2016], we focus on the choice of educational trajectory after the 9th grade as a practice of cultural capital accumulation.

This study focuses on the regional level, where the region is considered as a social and economic territorial community [Savelyev, 2013] located within regional boundaries². The study of regional inequality in education on Russian data is of special scientific interest. First, the diversity of territorial contexts and the scale of these differences make the Russian case unique at the international level. Second, Russia is characterized by a moderate level of decentralization, in which the framework and spheres of responsibility of administrative-territorial units are set at the federal level according to their hierarchy. This makes it interesting to analyze educational practices and solutions that may vary across regions. Finally, the focus of this paper is set over a rather long period of time, covering most of the post-Soviet period of Russian history. During the Soviet period, education, like many other spheres, was

¹ Results of the All-Russian Population Census 2010: in 11 volumes / FSSS - Moscow: Statistical Institute of Russia, 2012. T. 4: National composition and language skills, citizenship. URL: https://www.gks.ru/free_doc/new_site/perepis2010/croc/Documents/Vol4/pub-04-09.pdf

² Presidential Decree of January 16, 2017. N 13 "On Approval of the Fundamentals of State Policy of Regional Development of the Russian Federation for the period up to 2025".

highly centralized, and the formation of regions as subjects of educational policy took place after the collapse of the Soviet Union [Grof et al., 2019].

The following goals and objectives of the thesis research were formulated:

The purpose of this dissertation is to investigate the relationship of cultural capital, trajectories and practices of its accumulation by students, with the distribution of different forms of capital and access to educational resources in the space of Russian regions.

In accordance with the goal of the thesis research, the following **tasks** were set, reflecting the key stages of the work:

1. To assess the extent of differences in students' cultural capital accumulation practices and in the surrounding social space at the school, municipality, and regional levels, to identify the place of the regional component in the overall structure of spatial inequality.
2. To analyze the dynamics of spatial inequality in the choice of educational trajectories by Russian school students, from 2000 to 2017.
3. Analyze the relationship of students' educational outcomes and trajectories with the distribution of various forms of capital (economic, cultural and social) and access to educational resources.
4. Analyze regional patterns of the relationship of students' educational outcomes with the distribution of various forms of capital, access to educational resources, and educational practices.

To solve the tasks set, a wide arsenal of quantitative **methods** was used, including correlation analysis, regression analysis and cluster analysis of time series, as well as methods of descriptive statistics and mapping. The methodology used is described in more detail in Section 4.2. "Methodological Approaches to the Analysis of Spatial Inequality".

The results obtained are characterized by a sufficiently high degree of **reliability**. On the one hand, this is confirmed by the internal consistency of the empirical base, research methodology and conclusions (within each task, the analysis results obtained on some data using certain methods are cross-validated and confirmed by the analysis results in other tasks based on other data and methodologies). On the other hand, the findings are consistent with the results of other studies, both foreign and performed on Russian data.

Approbation of the obtained results was carried out in several keys. So, according to the results of the dissertation work, 4 articles, 4 publications in conference proceedings and 1 newsletter were published. The findings were presented at 12 scientific conferences in Russia and abroad.

This dissertation research is characterized by a rather high level of **scientific novelty**. This is the first, to the author's knowledge, a comprehensive study of spatial inequality in education in Russia, which, on the one hand, considers the educational trajectories and results of students in conjunction, as part of the overall process of the accumulation of cultural capital by students, and on the other hand, evaluates inequality in terms of its scales, dynamics and mechanisms of reproduction.

The **theoretical novelty** of this work lies in the fact that the study not only accumulates and systematizes the existing theoretical approaches to the study of spatial inequality in education, but also shows the prospects for applying concepts from other areas in the field of education - the concept of positional and situational capital, created by the French urbanist Jacques Lévy, a successor to the sociospatial theory of Pierre Bourdieu. Such adoption contributes to a more complete account of the spatial context in education. Moreover, this study allows supplementing the very sociospatial theory of Bourdieu by considering new administrative-territorial levels. The concept of "zoom" (successive approximation) that we proposed made it possible to systematize the results obtained for different levels of space and obtain empirical confirmation that the mechanisms of inequality reproduction described by Bourdieu at the level of individuals are also relevant at the level of regions. This allows, to a certain

extent, to remove the limitations of this theory associated with its rigid structure and focus at the level of individuals, and also opens up opportunities for applying this theory at higher levels (classrooms, schools, administrative-territorial units) in subsequent studies.

From the point of view of methodological novelty, this work not only shows the dynamics of regional differences over the post-Soviet period, but also covers different administrative-territorial levels, which makes it possible to assess spatial inequality in education as a complex process with its own prerequisites and consequences, as well as take into account the multi-level structure and local contexts. This made it possible to assess and compare the contributions of the municipal and regional components to the formation of the cultural capital of students and emphasized the importance of their analysis for research in the field of education.

The **novelty of the results obtained** lies, first, in the identification of typical negative scenarios in the accumulation of cultural capital by students that have developed in a number of regions. Secondly, the mechanisms of reproduction and strengthening of spatial inequality were recorded, operating at different levels (both regional and individual), which led to the formation of these scenarios. Finally, successive stages in the functioning of these mechanisms were identified, leading to aggravation of differences between regions. The current situation raises the question of the viability of educational policy measures that are not aimed at overcoming the identified negative patterns and do not consider differences in the cultural and social capital of students, as well as in the localization of educational resources.

The **practical significance** lies in the recommendations for researchers, teachers and practitioners in the field of education, as well as for politicians, prepared on the basis of the results of the work done (see section 6.2. "Recommendations from the results of the study"). It is also important to note that the data collected during the work on the dissertation were registered as the result of intellectual activity (certificate³ of state registration of databases No. 2022622421) and can be used by other researchers.

2. Concept of spatial inequality in education

The problem of spatial inequality in education is typical not only for Russia, but also for many other countries characterized by considerable geographical extent, complex administrative-territorial structure, and/or territorial variability of educational system. There are several studies that have ensured some manifestations of spatial inequality, but many of them are not supported by a theoretical basis or a unified conceptual framework and rarely take into account the structure of spatial data itself.

For example, analysis of the results of the Programme for International Student Assessment (PISA) in 2015 recorded significant heterogeneity in the results of 15-year-old students from different US states [Carnoy, Garcia, Khavenson, 2015]. Differences in mean scores between states were comparable to cross-country and equivalent to several years of schooling. For example, the average score of students from Alabama was on par with Greece's score in PISA, while the scores of students from Massachusetts were on par with Finland's. However, this study does not focus on an in-depth analysis of the sources of these disparities.

Other authors point out that gaps in the educational outcomes of students from different U.S. *states* can be explained by differences in their access to educational resources - curricula and qualified personnel [Jimenez-Castellanos, 2010], as well as schools with higher levels of funding [Odden, Picus, and Goetz, 2010]. It is worth noting that these works only consider variation in outcomes between states and focus less on differences in outcomes and access to student resources within the same state. In a broader sense, differences between jurisdictions (municipalities) in the United States are described in the research of Charles Tiebout, who hypothesized that any individual could select a relevant set of

³ Link to e-certificate <https://fips.ru/EGD/6d8efbed-2eb4-405d-a21e-0d646241cd3a>

public goods and their costs through a change of residence [Tiebout, 1956; Tiebout, 1961]. In general, his publications do not focus specifically on the educational component, nor do they problematize inequality as such.

In addition to the United States, the issue of spatial inequality in education is also raised in Europe. However, the cases of European countries have been studied to a lesser extent, and often researchers record only individual territorial differences. For example, it has been shown that in **Italy**, educational results of students from northern *provinces* are significantly higher than those of their peers from the South [Ballarino, Panichella, Triventi, 2014]. The authors link such differences not only to the socio-economic context, but also to the differences in access to educational institutions, in general, which is also reflected in their further choice of trajectories. Another study compares "regional penalties" from place of residence for students' scores in PISA 2009 and 2015 for **Italy** and **Spain** [Donato, Ferrer-Esteban, 2012; Jakubowski, Hippe, Araújo, 2018]. Regions in these countries also differ significantly in both socioeconomic indicators and students' literacy levels and access to educational resources. An analysis of the PISA results showed that the "gain" in scores for children from more advantaged families for northwestern Spain was almost three times less than for residents of central and southern regions. In Italy, similar differences are observed for residents of the islands and the northeast of the country. The effects of teaching practices, extracurricular activities, and migration status also differ, and the negative effects of living in the southern and island provinces of Italy, as well as in the southern *autonomous regions* of Spain, were stronger even than the effects of the level of school funding. There are also contrasts in the choice of trajectory: qualitative differences in human capital and educational policies of Spain's autonomous regions lead to students from Ceuta and Melilla and the Balearic Islands being more likely to repeat a year, and are less likely to enter high school and then university than their peers from the Basque Country, Catalonia, and Rioja [Enguita, Martínez, Gómez, 2010].

In **Turkey**, researchers have also recorded a gap in students' scores in PISA 2009 between different *ilis* [Tomul, Çelik, 2009]. For example, students from the Mediterranean region score at least 15% higher than students from Eastern and Southeastern Anatolia. This is only 20-30% lower than the cross-country differences.

In **Britain**, too, there are significant spatial inequalities in students' educational outcomes [Garner, Raudenbush, 1991]. Moreover, the negative effect on academic achievement from living in areas with high unemployment and less social well-being persists, even when controlling for students' personal characteristics and their family and school backgrounds.

Among other countries, the topic of spatial inequality in education has been most studied in **Chile**. Researchers have noted differences in access to educational resources for students from different areas. For example, students from more economically developed and urbanized *communities* are more likely to go to private schools with better education, while in less developed regions the share of children studying in municipal schools prevails [Larrañaga, Peirano, Falck, 2009]. A more detailed analysis of the Santiago case reveals an unequal distribution of private and public schools in the urban conglomerate, which limits access to higher quality education for students living in the less socially and economically advantaged northwestern part of the city [Flores, 2006].

Finally, there have been studies on this issue in Russia. For example, there are several works devoted to regional differences in the level of funding for general education [Abankina et al., 2016] and a comparison of teachers' salaries, considering regional coefficients [Derkachev, 2014]. It was shown that by no means do all regions' regulatory and legal frameworks for general education funding meet federal requirements, which creates risks of underfunding educational services in a number of regions. In addition, the importance of considering the economic situation in the region to solve the problem of low salaries was emphasized.

Significant regional differences were shown in the infrastructure of Russian schools [Zair-Bek et al., 2016] and in families' access to pre-school and additional education - for example, the disparity between the regions of the upper and lower deciles in school-based additional education coverage is 2.44 times [Agranovich, 2017; Barinov et al., 2015]. At the same time, it was noted that the region's economic

situation does not have a significant impact on the level of development of its educational infrastructure compared to such factors as the adequacy of management decisions and focus on equalizing access to educational services. At the same time, some regions have similar situations in the sphere of additional education, which makes it possible to typologize the regions by educational indicators.

There is a separate publication devoted to regional differences in the educational results of students, but it explains these differences only by the level of per capita funding of schools, without considering spatial differences in the rest of the educational infrastructure, socioeconomic and demographic context [Barinov et al., 2016]. Another paper considers the spatial context for students' choice of educational trajectories [Bogdanov, Malik, 2020]. The authors note that for students' choice of trajectory, the type of settlement is of key importance - it is even a more important indicator than the parents' education. In addition, high achievers from Moscow and St. Petersburg are more likely to enter selective universities after high school, while students from non-capital cities and rural areas are more likely to enter non-selective universities.

Most studies of inequality in education on Russian data do not focus on within-country differences at all. The territorial context is controlled rather conventionally, for example, by considering the level of urbanization of the territory or the size of the settlement when assessing the relationship between the students' educational results and curricula and teacher characteristics [Carnoy et al., 2016; Zakharov, Carnoy, Loyalka, 2014; Yastrebov, Kosyakova, Kurakin, 2018; Pinskaya, Kosaretsky, Frumin, 2011; Kapuza et al., 2017]. However, even these works do not show within-country differences in their entirety due to the limitations of the sample and tasks. In some articles, where predictors of spatial inequality in student outcomes are described in more detail, the research sample is represented only by a few regions of the Russian Federation [e.g., Agranovich, 2008]. This inevitably raises the question about the representativeness of the results obtained and their relevance in potentially different local contexts.

Finally, it is necessary to note significant institutional transformations due to the collapse of the USSR and its centralized system, which contributed to the change in the place and role of regions in the political system of Russia over the past 30 years. Thus, the period under consideration shows the formation of the region as an integral economic system: while under the conditions of the administrative-command economy it acted as part of the overall complex, during the transition to a market economy the region became a relatively independent subsystem with relatively strong internal ties between economic agents [Kuryanova, 2007]. On the other hand, federalism laid down a certain degree of decentralization of public administration, in which the powers of the federal center and the subjects of the federation, their budgets and sources of budgeting were delimited, which led to the formation of regions as subjects of politics, including educational policy. It is important to note the specificity of Russian federalism, which is asymmetrical, in which the subjects of the federation may have different sets of powers and degrees of autonomy depending on the type of region [Ignatenko, 2015]. This in itself is another source of regional inequality and emphasizes the importance of studying and comparing individual types of regions. Studies of Russian federalism also record different stages in the formation of the relationship between the federal center and the subjects. After the surge of regionalism in 1991-2000 (in some sources - until 2004 [Ignatenko, 2015]), a trend to strengthen the centralized system appeared [Belyanina, 2011; Kulakov, 2017]. However, in recent years, particularly during the COVID-19 pandemic, the regions have very clearly demonstrated their subjectivity, including in educational policy, from creating their own regulations governing the functioning of the educational system during lockdown to developing their own measures and practices to implement the educational process [Zair-Bek, Mertsalova, 2022]. This makes it especially relevant to study regional differences in education and compare the effects of the applied measures and practices in different regional contexts.

Thus, the topic of regional inequality in education in Russia, despite the uniqueness of the Russian case, has not been sufficiently studied. The existing studies in most cases give only a cross-sectional view of the situation and do not consider the possible changes in the educational, social, and economic situation that have occurred in the post-Soviet period. In addition, many of them are characterized by a lack of an appropriate holistic theoretical and conceptual framework, as well as

methodological incompleteness. At the same time, sociological theories of inequality have developed in neighboring branches of science that study spatial differences, and this experience may be of particular interest to researchers of inequality in education.

3. Theoretical Approaches to Defining Spatial Inequality

This paper analyzes two key conceptual approaches to defining and studying spatial inequality that are used in educational research.

The first approach is the concept of the geography of opportunity presented by the American geographer and urbanist Edward Soja [Soja, 2013]. This concept originates from the neo-Marxist tradition, where spatial inequality is seen as a function of the capitalist mode of production [Harvey 1969, 1996, 2001; Castells 1972] and as part of the social mechanisms that determine cultural, racial, class and gender power asymmetries [Soja, 2013]. This approach seems rather fragmented, since researchers here do not adhere to any common unified concept, as well as being polarized (the city versus the countryside, the educational oasis versus the desert).

Considering this, the concept of space by the French sociologist Pierre Bourdieu, which was further developed in the works of the French school of geographers and urbanists, seems more promising within the framework of this dissertation research. In the concept of Bourdieu and his followers, social space is considered separately from physical space, although they may overlap.

Space, according to Bourdieu, is a kind of arena in which various forms of capital - economic capital (financial assets and monetary income), cultural capital (e.g., the totality of education, knowledge, skills and manners acquired in the process of education and socialization), linguistic capital (linguistic skills of a person, which determine his position in society) and social capital (inherited or acquired social relationships of a person, their quantity, density and quality) are played out [Bourdieu 1984].

Let us focus in more detail on the essence of cultural capital as a key one for this dissertation research. As Bourdieu notes, cultural capital can exist in three states:

1. In an embodied state which is reflected in the form of lasting dispositions of mind and body. The accumulation of incorporated capital occurs through work on oneself, self-improvement, the learning process itself. With this in mind, the number of years of education traditionally considered as the "least imprecise" way to measure cultural capital in this state.

2. In an objectified state in the form of cultural goods (books, paintings, tools, etc.). Such cultural goods can be acquired both materially and symbolically, through the production and creation of cultural objects.

3. In an institutionalized state, defined through a set of educational qualifications assigned to a person⁴. Such a qualification acts as a certificate of cultural competence, legally confirming the value of its owner. Such institutional recognition of the accumulated cultural capital makes it possible to compare the skill levels of their owners and, moreover, allows the conversion of cultural capital into economic capital - for example, through the assessment of the value of an individual's competencies in the labor market. At the same time, theoretically, the effectiveness of such a conversion of cultural capital into economic capital depends on the scarcity of the acquired educational qualifications, however, in practice, the chances of such a successful conversion may change (in case of depreciation of the received specialty or diploma and, accordingly, the efforts invested in education).

⁴ In his work *Sociology of Politics*, Bourdieu also singles out educational capital as the total educational wealth of an individual and proposes to measure it through the type of diploma obtained, considering educational capital as an integral part of cultural capital [Bourdieu, 1993].

The benefits and resources associated with obtaining these and other forms of capital are unequally distributed in physical space. In this, Bourdieu's concept coincides with that of the geography of opportunity. However, the difference in Bourdieu's approach is that it considers the unequal distribution not only of material objects and resources, but also of the individuals who possess them. Together, this forms a social space, which Bourdieu singles out as a separate category.

In contrast to fully material physical space, social space has a more abstract character - it is constituted by "an ensemble of subspaces or fields (economic field, intellectual field and others), which owe their structure to the unequal distribution of certain types of capital. [Ibid., p. 53]. Realized physically, social space reflects the distribution not only of various goods and services, but also of individuals and groups who have opportunities for their appropriation, depending on the capital they have and the physical distance to these goods. It is in this way that the value of different areas of social space is differentiated twice. As an example, Bourdieu considers the social space of a school, where the teacher always occupies a special place in the classroom - for example, a separate chair (Bourdieu, 2005).

To describe social space, Bourdieu uses the concept of localization. Like social space itself, localization is relative, defined as a place in a hierarchy, a position, or through comparison with the position of other objects or individuals.

At the same time, social space is not disconnected from physical space. To understand this process, it is necessary to recall another concept of Pierre Bourdieu, that of habitus, "the system of dispositions that generates and structures the practices⁵ of the agent and its representations. [Bourdieu, 1993, p. 3]. It is habitus that allows an agent to spontaneously navigate in social space and react more or less adequately to events and situations [Bourdieu, 1998]. Moreover, habitus shapes habitat through the social use of this habitat [Bourdieu, 1993, p. 13]. Thus, people who live in an area where the concentration of sought-after resources, prestigious goods and services is higher, can use them and apply specific practices to maintain and further increase their social and economic capital. Conversely, economically disadvantaged areas tend to further deteriorate the quality of life of their inhabitants.

In addition to this concept, this dissertation study assesses the structure of inequality at different levels of space: from higher, regional, to the level of individuals. Thanks to this approach, a "zoom effect" is achieved, which allows us to fully assess the configuration of spatial inequality and the place of the regional component in its structure.

Operationalization and Research Methods

4.1 Operationalization of the Theoretical Concepts Used

As predictors of spatial inequality in education, we used indicators that operationalize different forms of capital and most often appear in the focus of researchers:

- Economic capital (the level of funding per capita of secondary and upper secondary education in the region, the level of GRP per capita in the region, the average salary of teachers in school)
- Cultural capital (share of population with higher and general education, students' mother's education, number of books at home).
- Language capital (share of population with native Russian language in the region, native language of the student)
- Social capital (share of urban population, migration growth rate, share of unemployed youth in the region).

In addition, social space in education was also considered through localization of educational resources in regions (as availability of budgetary places in universities and vocational schools, number of vocational schools in the region, students' access to specialized schools and advanced programmes)

⁵ Learning, in Bourdieu's context, is also a social practice that takes place within a social space (school, classroom, etc.) [Perkins, 2013]

and localization of resources and individuals within schools (as the number of students and the number of computers with Internet access; share of teachers with higher education and the highest category, share of teachers with professional experience less than 5 years, and also the share of teachers under 30 years old). School localization was also assessed through its selectivity (the practice of enrolling students based on their academic performance) and socioeconomic composition (the proportion of students from families with disadvantaged socioeconomic conditions in the school). The use of these indicators as operators of social space is justified because they meet the criteria of relativity and hierarchy, highlighted by Bourdieu.

Educational practices implemented at the regional level (the introduction of the Unified State Examination, USE) and in schools (teaching practices, reading practices) were considered. On the one hand, practices can act as a means for the use of capital and its further accumulation. On the other hand, through educational practices, schools and regions, as physical places, provide all their students with an average chance of receiving education and other benefits and services.

Finally, the variables of interest in this dissertation research were the educational results of schools and students, reflecting cultural capital in two aspects: its embodied state (reading and mathematical literacy of students) and institutionalized state (the results of students in the Unified State Examination in the Russian language and specialized mathematics); as well as the practices of further accumulation of cultural capital associated with the choice by students of their further educational trajectory (schooling choices). Despite the fact that the current legislation allows combined trajectories (admission to secondary vocational schools after graduating from high school, admission to a university after graduating from vocational education), the majority of students choose between an academic trajectory that involves studying in high school and preparing for the Unified State Examination to enter a university [Khavenson, Chirkina, 2018; Khavenson, Chirkina, 2019; Chirkina, 2018] and a vocational trajectory involving admission to vocational schools after the 9th grade, less often after the 11th grade [Popov, Tyumeneva, Kuzmina, 2012]. In this study, we focus on the choice of grade 9 students, since it is this decision that is one of the key stages for the educational trajectory in general [Khavenson, Chirkina, 2019; Bessudnov and Malik, 2016].

In the context of Bourdieu's theory, where the type of diploma obtained is one of the indicators of accumulated cultural capital, the choice of educational trajectory can also be hierarchical, since the trajectory is seen as a practice of accumulating cultural capital and involving the receipt of one or another type of diploma. Accordingly, in the general sense of this concept, the academic trajectory can be considered as more advantageous than the vocational one, since it implies, on the one hand, a longer education and, accordingly, a greater accumulation of cultural capital in its embodied state, and, on the other hand, obtaining a diploma of higher education, which has a higher value in terms of the chances of effectively converting accumulated cultural capital into economic capital. However, this approach has its limitations, since it does not consider industry specifics (for example, in the creative field, a vocational trajectory may be of comparable or even higher value than an academic one, and in the field of medicine, students with vocational schools' diplomas may have more higher chances of getting into university compared to high school graduates). In addition, it is necessary to take into account the ontological turn that occurred in later studies of educational experience and modern learning theories compared to Bourdieu's concept, in which a person is considered from the standpoint of a subject, and the value of the educational trajectory chosen by him is determined through compliance with his goals and interests at a particular moment. time [Dall'Alba, 2009].

However, it is worth noting that this dissertation focuses on a higher, regional level. We have no reason to assume the existence of statistically significant regional differences in the choice of professional fields by students (as well as there is no data to confirm or refute such an assumption). Moreover, perceptions of the value of academic and vocational trajectories may differ from individual to individual, but the existence of such differences at the regional level will literally mean the inequality of cultural capitals in these regions. Therefore, the hierarchic nature of Bourdieu's concept seems to be more applicable to the tasks of the current study.

4.2 Methodological approaches to the analysis of spatial inequality

The instruments of this dissertation research were determined in accordance with the set objectives and include the following methods:

1. The structure of the data and their distribution was facilitated using descriptive statistics methods.
2. The geographic distribution was shown by mapping.
3. The relationships between the indicators were assessed using correlation analysis (Pearson correlations, intraclass correlation coefficient) [Hedges, Hedberg, Kuyper, 2012] and regression analysis (ordinary least squares regression, multinomial logistic regression with the maximum likelihood method).
4. To assess the differences in the dynamics of the indicators, cluster analysis of time series (the method of time series dynamic transformation, Dynamic Time Warping) was used [Paparrizos, Gravano, 2017; Müller M., 2007; Sakoe H., Chiba S., 1990].

More detailed descriptions of the application of each of these methods are given in the relevant sections of the dissertation research.

5. Results

5.1. Inequality in the distribution of students' educational results and trajectories and indicators of schools' social space at different administrative-territorial levels

The focus of Bourdieu's concept of social space is mainly on the social space of the individual. This section attempts to transfer this framework to higher organizational levels and to study social space in the context of not only differences between schools, but also municipal and regional differences. Empirically, this is directly related to the specifics of the administrative-territorial structure of the Russian Federation, which involves a certain decentralization of educational policy in accordance with the hierarchy of power [Federal Law "On Education in the Russian Federation" of 29.12.2012 №273]. Thus, this section assesses the scale of differences in the students' practices of cultural capital accumulation and in the surrounding social space, at the level of schools, municipalities, and regions according to the principle of reverse zoom.

To assess the scale of such differences, we used self-report data from 39,068 Russian schools collected in 2013, during the implementation of the Comprehensive Education Modernization Project. The collected database has a hierarchical structure and includes information on educational results and trajectories of students, on financial activity and material and the technical base of educational institutions, aggregated at the school level.

The results show that the differences between municipalities within the same region can exceed the regional ones. Thus, at the regional level, the difference between the maximum and minimum scores of the Unified State Exam in the Russian language is almost 22.33 points, and at the level of municipalities - almost 40 points. For the USE in mathematics, the regional differences reach 21.5 points, and the municipalities - 46.8 points. The greatest contrasts are observed for the share of 9th graders enrolled in vocational schools: regional differences here reach 50%, while municipal differences are almost 90%.

However, despite this, the results of multilevel regression analysis showed that it is the regional level that plays an important role. Even when controlling for localization of educational resources in schools, between-regional differences explain 21-29% of the variance in educational outcomes and student trajectories, while within-regional differences account for only 2% (Table 1). But it is worth noting that the main share accounts for differences between schools within the same municipality.

Table 1. Intraclass correlation coefficient for educational outcomes and student trajectories after controlling for localization of educational resources in schools

| Indicator | Level | ICC | S.E. | 95% confidence interval | |
|---|--------------|------|------|-------------------------|------|
| | | | | | |
| USE in Russian language | Municipality | 0.00 | 0.00 | 0.00 | 0.00 |
| | Region | 0.21 | 0.01 | 0.19 | 0.23 |
| USE in Mathematics | Municipality | 0.02 | 0.03 | 0.00 | 0.09 |
| | Region | 0.29 | 0.03 | 0.22 | 0.35 |
| Share of students enrolled in vocational programs after the 9 th grade | Municipality | 0.02 | 0.02 | 0.00 | 0.05 |
| | Region | 0.23 | 0.02 | 0.19 | 0.26 |

Thus, spatial inequality in education is configured not only through differences between the schools themselves, but at a higher, regional level. From the methodological point of view, it is important to consider this result for the choice of the level of analysis in the next stages of the dissertation research. However, this observation also has its own scientific and practical significance.

These results allow us to remove certain limitations associated with Pierre Bourdieu's conception of social space. They emphasize the importance of the higher levels of space in which the individual (not only his school, but also the region) lives, in the context of decentralized education management - for example, in countries with federal systems.

In terms of educational policy, this shows the risks of the current system, where the capacity of schools to provide quality education is set by regional norms of funding. This, in turn, creates risks of so-called "glass ceilings", in which regional specifics can limit the educational opportunities and trajectories of students. Also, these results show the need to consider regional differences, not only in making educational policy decisions, but also in conducting research in the field of education.

5.2. *The dynamics of spatial inequality in education*

In accordance with the tasks set, this section of the dissertation research is devoted to the assessment of the dynamics of spatial inequality in the students' trajectory choice in the post-Soviet period. As Bourdieu's socio-spatial concept shows, spatial inequality can increase over time due to the processes of wealth accumulation by individuals living in more developed territories, and the reverse processes occurring in less developed territories, which Bourdieu describes in terms of stigmatization [Bourdieu, 2005]. With this in mind, the focus of this section is on the educational trajectory choice of 9th grade students for the period from 2000 to 2017, as well as indicators of various forms of regional capital and localization of educational resources.

The empirical basis for this section was also formed by the available data from the publications of the Federal State Statistics Service, the Ministry of Education and Science of the Russian Federation and regional educational agencies.

Overall, the prevalence of the educational trajectory involving enrollment in high school (upper secondary education) decreased from 62.72% to 50.39% during the observed period (Figure 1). This trend allows us to formulate a further *hypothesis*: the decline in the share of 9th grade students who then graduated from high school occurred at different rates and was faster in some regions than in others.

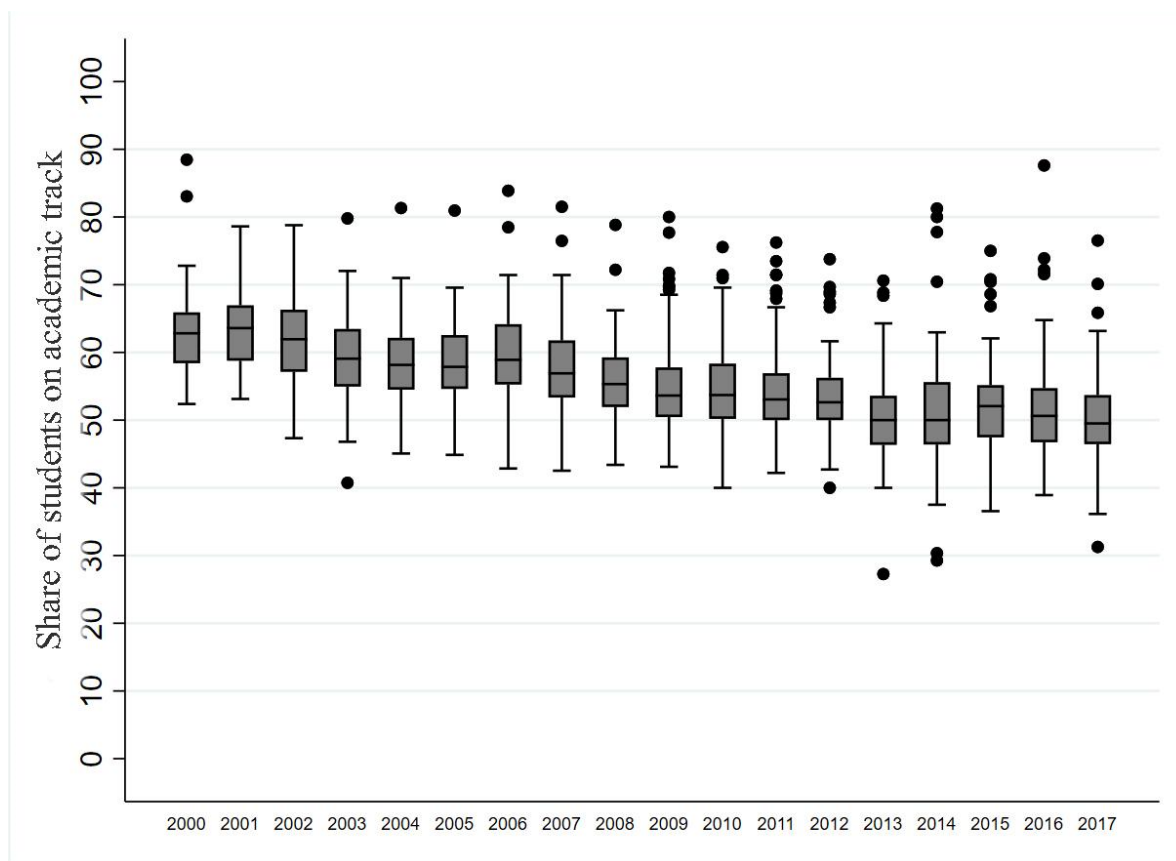


Figure 1. Dynamics of regional values for the share of students who continued upper secondary education programs in 2000-2017.

The results obtained show that the dynamics of students' choice of their educational trajectory is different in Russian regions. Despite the general decline in recent years in the share of 9th grade students who finished high school later, this decline occurred differently, and in a number of regions, this indicator is still quite high. In other words, there are various types of regional situations in the formation of students' cultural capital in the Russian Federation. Exploratory hierarchical cluster analysis allowed us to distinguish three such types (Figure 2):

1. "Gradual decline" - this type characterizes a consistent decline in the share of 9th graders who finish high school two years later, except for a small plateau in 2003-2006 and an additional sharp drop in 2013 followed by a small rebound. Over 18 years, the proportion of high school students in these regions fell by nearly 4 standard deviations.

2. "Delayed fall" - this type of dynamic illustrates the delayed decline in the high school graduation rate that began in 2006. By 2017, this indicator had declined, but less than in the previous group - by 3 standard deviations. This group of regions also saw a slightly sharp drop in 2013 - again, followed by a slight rebound in 2014.

3. "Sharp Decline" - this type of dynamic is characterized by a sharp drop in the proportion of 9th graders who finished high school by two standard deviations in 2000-2003, followed by two small drops in 2009 and 2013. The rate rose to 0 in standard deviations in 2014-2016, and then fell again. The final difference, from the starting level in 2000, was 4 standard deviations.

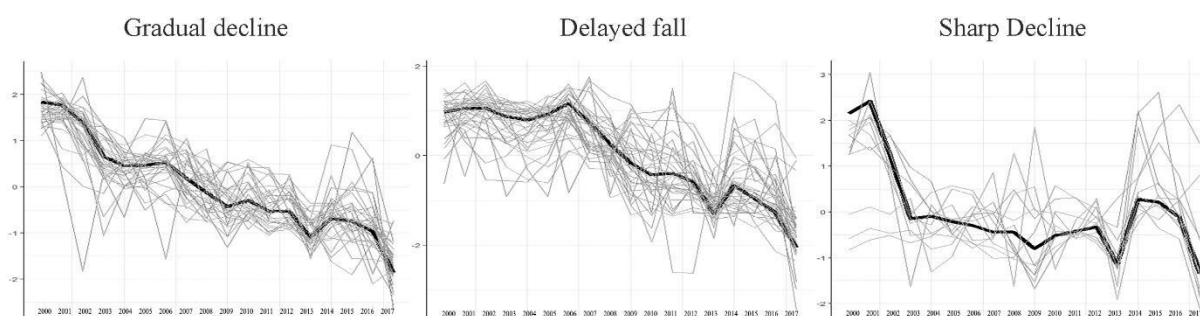


Figure 2. Types of regional situations in the dynamics of the proportion of 9th graders who chose an academic trajectory in 2000-2017

As the results of the multiple logistic regression have shown, the identified types, themselves, are associated with different forms of regional capital (more with economic and cultural, and less with social capital of the region), as well as with the localization of educational resources in the region, but to a smaller extent (Table 2). At the same time, a strong predictor of the type of dynamics of students' trajectory choice is the year of the Unified State Exam introduction. In the regions where the USE was introduced later, the decline in the share of high school students also came later. This result correlates with the data of other studies, which record the emergence at that time of another type of educational trajectory in Russia - a combined one, which involves entering vocational schools after the 9th grade and after that, higher education. Until 2015, this trajectory allowed university entrance without passing the Unified State Exam at the end of the 11th grade, which to some extent, contributed to the growth of enrollment in vocational schools [Bodovski, Chykina, Khavenson, 2019; Yastrebov, Kosyakova, Kurakin, 2018; Aleksandrov, Tenisheva, Savelieva, 2015]. However, in general, this observation requires further research and evaluation of the relationship between trajectory choice and participation in the USE.

Table 2. The relationship between types of regional dynamics in the share of students who chose an academic trajectory and indicators of the students' social space in 2000-2017 (multiple logistic regression method)

| Variables (reference type 1 - "Gradual decline") | Type 2 - "Delayed Fall" | Type 3 - "Sharp Decline" |
|---|-------------------------|--------------------------|
| <i>Economic capital of the region</i> | | |
| GRP per capita (logarithm) | -0.80*** (0.29) | 0.21 (0.45) |
| <i>Social capital of the region</i> | | |
| Share of young people among the unemployed (in %) | -0.04 (0.05) | -0.06 (0.10) |
| Share of urban population (in %) | 0.03** (0.01) | -0.00 (0.02) |
| Migration growth rate | -0.00 (0.00) | 0.00* (0.00) |
| Population of 9th graders | 0.04* (0.02) | -0.02 (0.03) |

| <i>Cultural capital of the region</i> | | |
|--|--------------------|--------------------|
| Share of population with higher education (in %) | 0.04 (0.03) | -0.08* (0.05) |
| Share of population with secondary education (in %) | -0.02 (0.02) | -0.13*** (0.05) |
| <i>Localization of educational resources in the region</i> | | |
| Availability of budgetary places in vocational schools (in %) | -0.02 (0.01) | -0.03 (0.02) |
| Availability of budgetary places in universities (in %) | -0.01*** (0.00) | 0.01 (0.00) |
| Year of the Unified State Exam implementation | 0.26*** (0.08) | 0.07 (0.14) |
| <i>Standard errors of regression coefficients are shown in parentheses; significance level is indicated by an asterisk: ***p<0.01, **p<0.05, *p<0.1</i> | | |

5.3. *The relationship of educational outcomes, student trajectories, and regional indicators of social space*

In accordance with the tasks set, the focus of this section is the relationship of students' educational outcomes and trajectories, with various forms of capital and social space indicators, aggregated at the regional level. The results obtained in the previous stages emphasize the need to investigate the contribution of regional characteristics, since this is the level where significant differences in the localization of educational resources forming the students' social space are observed. This is an urgent task in terms of complementing Bourdieu's theoretical concept, with its transfer from the level of the social space of individuals to larger spatial levels (regions).

The empirical basis of the study was formed by data from publications of the Federal State Statistics Service, the Ministry of Education and Science of the Russian Federation, and regional educational agencies. We use two data slices available for analysis, collected for one cohort of students who entered the first grade in 2004. The first slice covers 2013, when students in this cohort completed the 9th grade. This section collects indicators of the social space of schools for secondary education. The second section covers 2015, when those students from the selected cohort who entered high school took the Unified State Exam. In this section, the social space of schools considers the localization of educational resources for upper secondary education.

The results of the regression analysis show that regional differences in the localization of educational resources in schools are superimposed on relatively large socioeconomic inequalities. As a result, there are regions that benefit twice: both from more cultural and social capital (which means more opportunities for parents to support their children's education) and from the localization of educational resources. At the same time, a number of regions find themselves at a double disadvantage.

Educational trajectories were determined more by the cultural and social capital of the regions than by the localization of educational resources (Table 3.). This concurs with other studies showing that in Russia the choice of education is largely related to the social background of the student - even with equal academic results [Bessudnov, Malik, 2016; Yastrebov, Kosyakova, Kurakin, 2018].

Table 3. The relationship of students' educational trajectories with access to educational resources and socio-economic and demographic characteristics of the regions in 2013-2014 (ordinary least squares method, OLS)

| Variables | Coefficient |
|--|--------------------|
| <i>Localization of educational resources in the regions</i> | |
| The level funding of per capita of secondary education (logarithm) | -0.42 (1.84) |
| Percentage of teachers under 30 years old (in %) | 0.16 (0.22) |
| Share of teachers with the highest category (in %) | -0.02 (0.13) |
| Number of vocational schools | -0.04 (0.03) |
| <i>Forms of regional capitals</i> | |
| Share of population with higher education (in %) | 0.63*** (0.15) |
| Share of urban population (in %) | 0.24*** (0.07) |
| Share of population with native Russian language (in %) | -0.04 (0.03) |
| <i>The standard errors of the regression coefficients are given in parentheses; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$</i> | |

In contrast, the students' access to educational resources - to more prestigious, specialized schools, lyceums and gymnasiums - plays a major role for the USE scores (especially for the exam in advanced mathematics) (Table 4). At the same time, the results in the Russian language, themselves, are associated with the practices of the accumulation of students' cultural capital - their choice of trajectory, which is accompanied by an increase in the homogeneity of the social composition of high school students. In general, the localization of educational resources - training in specialized schools, lyceums and gymnasiums are important. Thus, we observe one of the mechanisms of reproduction of social inequality - through the choice of educational trajectory. In turn, the already accumulated, incorporated cultural capital of students is more related to the localization of educational resources in the region and the dropout of students after the 9th grade, which itself forms the students' social space.

Table 4. The relationship of students' educational outcomes, with their trajectory choice and access to educational resources, socio-economic and demographic characteristics of the regions in 2013-2014 (ordinary least squares method, OLS)

| Variables | Coefficient. | |
|--|---------------------|-------------------------|
| | Mathematics | Russian language |
| <i>Localization of educational resources</i> | | |
| The level funding of per capita of upper secondary education (logarithm) | 1.08 (0.65) | 0.34 (0.37) |
| Share of students in high schools in profile schools (in %) | 0.29** (0.12) | 0.08** (0.04) |
| Share of students in advanced classes (in %) | 0.01 (0.02) | -0.00 (0.01) |

| | | |
|--|------------------|--------------------|
| Share of subject teachers with less than 5 years of teaching experience (in %) | -0.09 (0.06) | -0.06 (0.04) |
| Share of subject teachers with the highest category (in %) | -0.01 (0.01) | 0.00 (0.01) |
| Share of students in lyceums and gymnasiums (in %) | 0.06** (0.03) | 0.04*** (0.01) |
| <i>Choice of educational trajectories by students</i> | | |
| Percentage of 9th grade graduates who then completed programs of upper secondary education (in %) | -0.00 (0.03) | -0.06*** (0.02) |
| <i>Forms of regional capitals</i> | | |
| Share of population with higher education (in %) | -0.00 (0.03) | -0.02 (0.02) |
| Share of urban population (in %) | -0.00 (0.02) | 0.01 (0.01) |
| Share of population with native Russian language (in %) | -0.01 (0.01) | 0.01 (0.00) |
| <i>The standard errors of the regression coefficients are given in parentheses; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$</i> | | |

5.4. Regional patterns of relationship of students' educational outcomes with the distribution of various forms of capital, access to educational resources, and educational practices.

The previous sections showed the relationship of students' educational results and trajectories with different forms of capital and access to educational resources in the regions of Russia. At the same time, the question of the relevance of these results to individual student data within regions remains open.

Pierre Bourdieu's concept of social space allows us to *hypothesize* that differences in students' educational outcomes and trajectories may be due to regional specifics of cultural capital accumulation practices. On the one hand, institutional practices may differ from region to region. On the other hand, students in different regions may have different opportunities to choose these practices. Finally, even with equal opportunities, the use of these practices may yield different results.

This formulation of the problem also raises the question of the relevance of recommendations to improve the students' educational results based on data from other countries or their experience⁶ (for example, those prepared based on the results of comparative international research TIMSS, PIRLS, PISA and others) [OECD, 2019b; OECD, 2019c; OECD, 2020a; OECD, 2020b]. In particular, it can be noted that, until recently, Russian educational policy was largely guided by the recommendations and country reports, on the results of PISA - for example, in terms of the development of functional literacy of students, their ability to perform practice-oriented tasks (similar to PISA tasks), as well as the development of the educational process, educational materials and teacher training of Russian schools [Basyuk, Kovalyova, 2019].

With this in mind, the focus of this section is on the individual data of 15-year-old students who participated in the international PISA study in 2018. A peculiarity of this PISA wave is that the study was conducted not only on the all-Russian sample, but also on three additional samples representing the

⁶ OECD. Programme for International Student Assessment (PISA) Results from 2018, Country Note: Russia. - OECD, 2019. - 10 p. URL: https://www.oecd.org/pisa/publications/PISA2018_CN_RUS.pdf

city of Moscow, Moscow region, and the Republic of Tatarstan. Such a design allows us to analyze the regional specifics of the distribution of various forms of capital and the use of the practices of their accumulation.

The results of this stage of the dissertation research show that the landscapes of educational inequality vary from region to region, and in some cases, not only the strength and significance of the relationship between students' educational outcomes and different forms of their capital, but also its direction differ.

Thus, the increase in the level of reading literacy associated with the cultural capital of the family in the samples for Moscow and for the whole of Russia was statistically significantly higher than in Tatarstan (Figure 3). In the Republic of Tatarstan, students with a non-native Russian language demonstrated a statistically significantly lower decrease in PISA scores compared with the all-Russian sample. Finally, depending on the sample, even the direction of the relationship between literacy and students' migration status can change. This relationship is statistically significant and negative only in the models for reading for Tatarstan, and for mathematics for the city of Moscow. A number of indicators lose significance in the full model after adding the whole set of predictors. However, the general patterns and directions of relationships remain the same. This calls into question the effectiveness of universal conclusions and recommendations that do not consider local contexts, especially in the case of Russia, as a country with a very extensive and diverse territory.

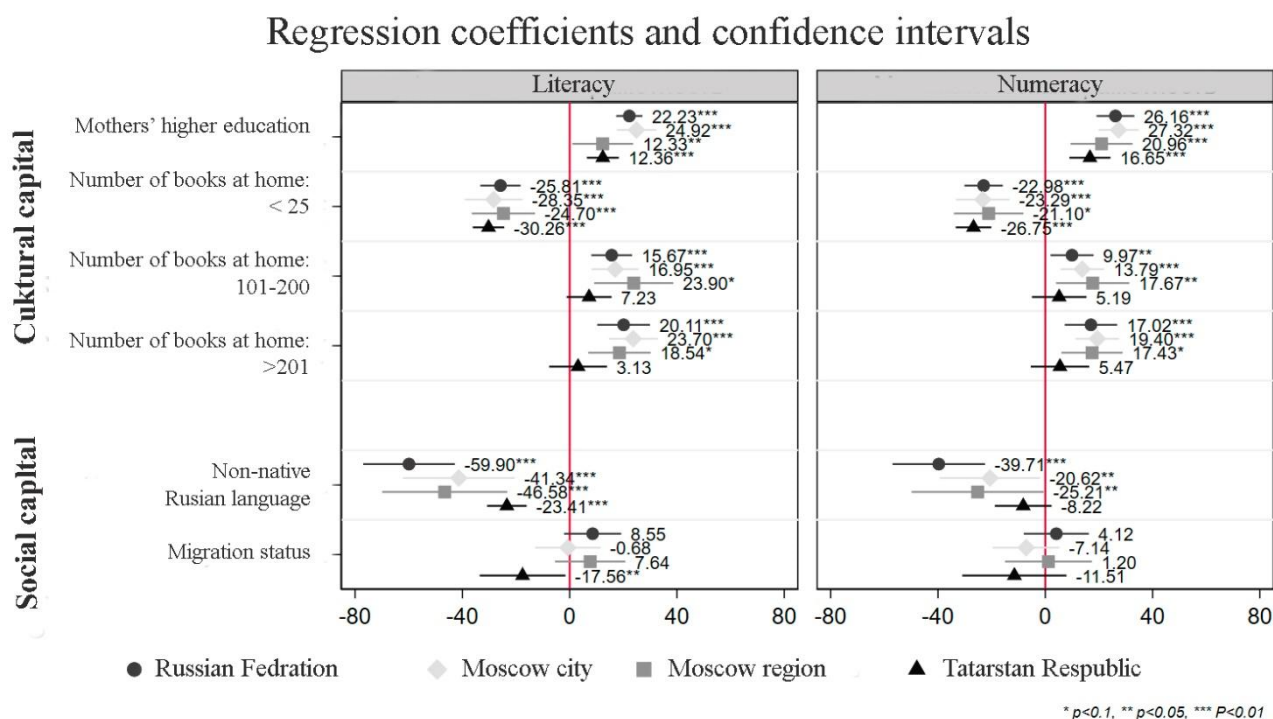


Figure 3. Regional differences in the relationship of literacy and numeracy levels of 15-year-old students in PISA 2018 and the cultural and social capital of their families

Social space indicators vary to a lesser extent between regions, but the patterns of their relationship to results are also different, even if the scale of these differences is not so great (Figure 4).

Regression coefficients and confidence intervals

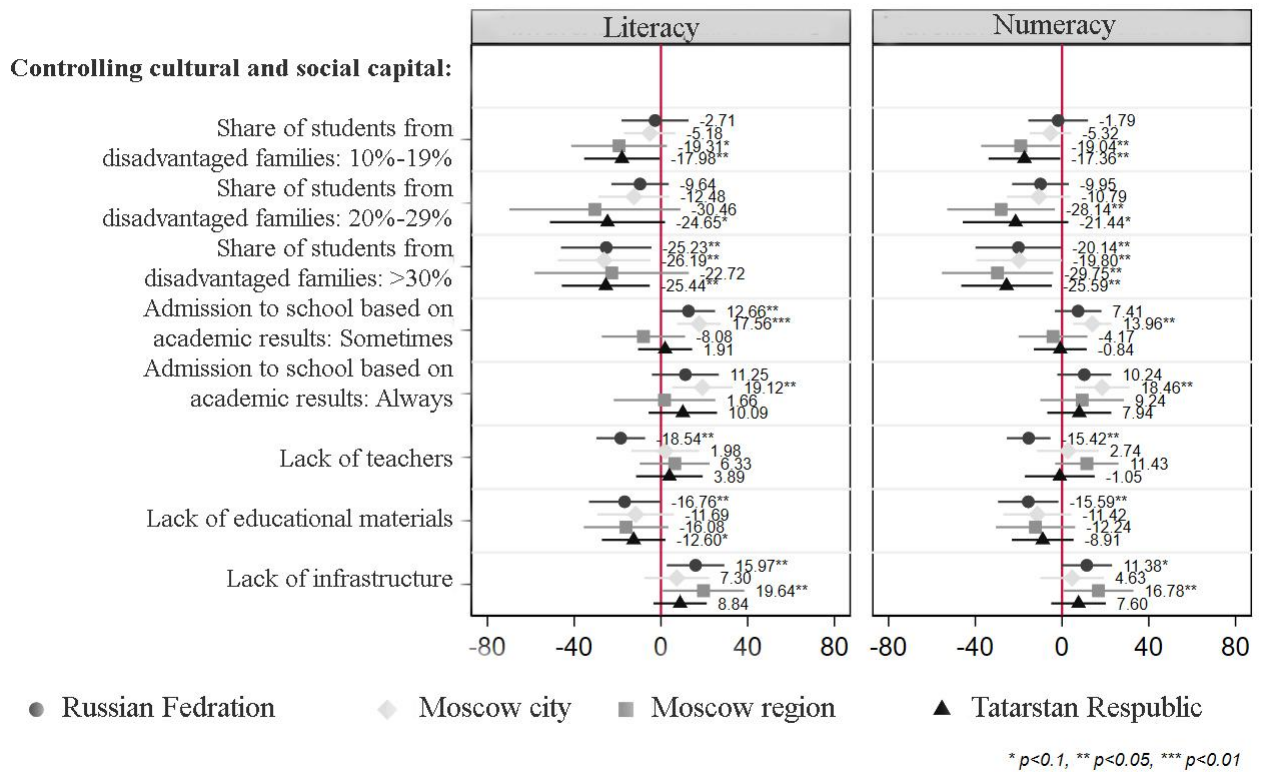


Figure 4. Regional differences in PISA 2018 literacy and numeracy levels of 15-year-olds in relation to the schools' social space after controlling for students' cultural and social capital – lack of resources

Finally, the reading instruction practices encountered by students from different regions are quite identical. But even here, their similar use may not show the expected increase in scores in the case of a particular region. In other words, these results do not suggest that the recorded differences in communication patterns are due to differences in the amount of resources analyzed between regions. For example, the rarer use of such practices as formulating questions to engage students in classroom activities was negatively associated with student scores when analyzed on samples for all of Russia and for the Republic of Tatarstan (Figure 5). But for Moscow City and the Moscow region, such a small decrease in the intensity of use of this practice was statistically insignificant, however, with a rarer use, here, negative coefficients also appear.

Regression coefficients and confidence intervals

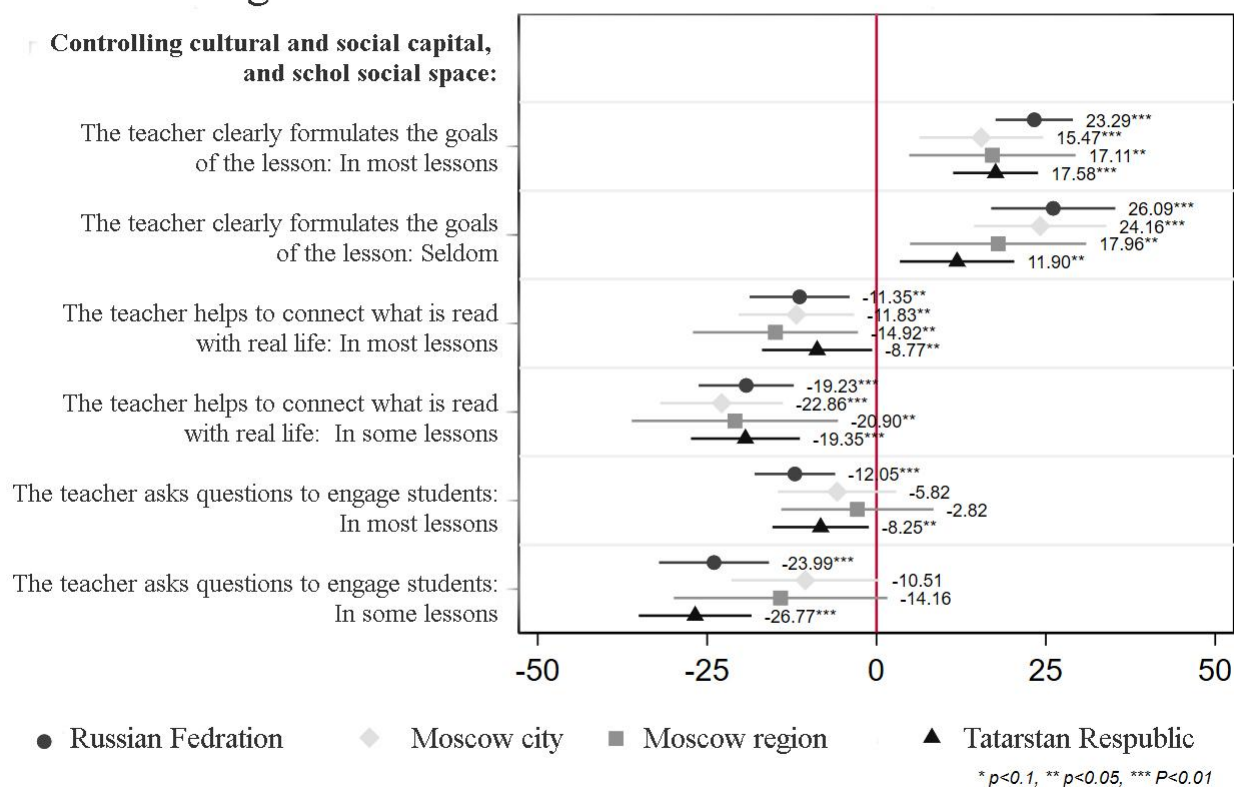


Figure 5. Regional differences in PISA 2018 literacy level of 15-year-old students with reading practices when controlling for their cultural and social capital and school social space

Interestingly, in the case of students' educational trajectories, regional specificity is expressed minimally. But even here we can assume the existence of secondary effects of regional differences: plans for admission to higher education are similarly related to the high performance of students, but the mechanisms of performance growth in the regions are different.

The results are also significant in the context of the discussion of policies to improve the quality of education in Russia. For example, measures and solutions that are based on practices that have been tested in one region may not yield the expected results in other contexts. Given the scale of regional differences, it is critically important to adapt these practices to local specifics.

6. Conclusions

This dissertation research allowed us to investigate inequality in education through the analysis of the relationship of already accumulated students' cultural capital and their trajectories with the distribution of different forms of capital and access to educational resources in the space of Russian regions. It is important to emphasize that despite the uniqueness of the Russian case, this topic has not been sufficiently studied in Russia, and the results obtained help to close the existing gaps to a certain extent.

First, this paper analyzes existing theoretical and methodological approaches to the study of spatial inequality. The possibilities and limitations of two key theoretical frameworks - Nicholas Hillman's concept of the geography of possibilities and Pierre Bourdieu's socio-spatial concept - have been identified. It has been shown how Bourdieu's concept can be applied to detail the mechanisms and factors of spatial inequality in the context of forms of capital and practices of capital accumulation. This paper also contributes to this concept by extending it by adding new, higher levels of space itself to the analysis.

Secondly, this dissertation research assesses the structure of spatial inequality in education. The obtained results show that although the differences between the municipalities within one region in some cases can exceed the regional ones, it is the regional level that plays an important role in the analysis of students' educational results and trajectories. In general, spatial inequality in education is configured not only by the differences between schools themselves, but also at a higher, regional level. In terms of theoretical novelty, this allows to complement Bourdieu's concept and shows the importance of higher levels of space. For educational policy, it highlights the need for greater decentralization to reduce the risks of "glass ceilings" for students and the need to consider regional differences not only in educational policy decisions, but also in educational research.

Thirdly, this dissertation research allowed us to assess the dynamics of spatial inequality in education on the example of regional differences in the students' educational trajectory choice. During the period from 2001 to 2019 these differences have significantly increased, which indicates the ongoing processes of divergence in a number of regions. At the same time, different types of these dynamics were formed in the regions - "Gradual Decline", "Delayed Fall", "Sharp Decline". These types showed a relationship not only with the economic, social, and cultural capital of the regions, but also with the localization of educational resources in them, as well as with the year of the USE introduction in the region, which is, in turn, a tool determining the access to the academic trajectory and measuring the students' accumulated cultural capital through their subject results. This testifies to the reassessment of ideas about the value of higher education that took place in a number of regions in the post-Soviet period, which in itself speaks of the aggravation of differences in the structure of cultural capital between regions. This situation illustrates Bourdieu's thesis about the risks of divergence and pathologisation: we see how students, through their habitus, change the social space of the region in the direction of its further development or deterioration. That is, the current situation lays the prerequisites for further aggravation of regional inequality not only in the field of education, but also beyond its borders.

Fourthly, further study allowed to fix one of the mechanisms of spatial inequality in education. It was shown that educational trajectories as a practice of further accumulation of cultural capital by students are largely related to the cultural and social capital of the region. Further, the choice of trajectory is superimposed on the localization of educational resources in the region and is reflected in the incorporated cultural capital of students, which itself forms the social space where the younger students are. As a result, there are regions that benefit twice: both from more cultural and social capital (which means more opportunities for parents to support their children's education) and from the localization of educational resources. At the same time, several regions lose out twice: children in these regions lag behind due to lower cultural and social capital. This lag could be compensated by greater access to educational resources (for example, specialized programs in schools and more qualified teachers). However, such compensation does not occur - moreover, the lack of access to such resources only exacerbates this lag.

Finally, it was shown that the landscapes of educational inequality - educational outcomes, trajectories and practices of students in their relationship with different forms of capital and localization of educational resources - vary in regions to an extreme degree, and this is not explained by the differences in the amounts of analyzed resources between regions. This observation calls into question the effectiveness of universal conclusions and recommendations that do not consider local contexts, especially in the case of Russia as a country with a very extensive and diverse territory. The use of practices and measures that have proven successful in some regions may not produce the expected results in others, and thus may also lead to an increase in inequality. Thus, adapting practices that are disseminated in local contexts is critical to improving the quality of education.

The results show the importance of regional contexts both for understanding the mechanisms of educational inequality in general, and for the development of educational policy measures in the conditions of multi-component countries of federal type. In theory, a decentralized system of governance implies a transfer of responsibility and authority for resource allocation from a higher, federal level of power to the level of administrative-territorial units, which allows educational institutions to be more flexible and sensitive to the needs of local audiences [Bray, 1991]. Given the lack of redistribution of capital and educational resources between the regions, such adaptability of regional agencies in

conjunction with an evidence-based approach to decision-making will help to reduce, if not the differences themselves, then the rate of their growth. In practice, decentralization of educational policy coupled with increasing autonomy of primary, secondary and higher education organizations has been implemented in various countries since the early 1980s [Grof et al., 2019]. At the same time, the reduction of managerial control is balanced by the growth of responsibility of organizations for the quality of education they provide. Moreover, in an environment of constant change, increasing centralization and decreasing regional powers carry risks of destabilizing state democratic governance [Hahn, 2003].

6.1 Key scientific findings and conclusions submitted for defense

The dissertation research carried out allows us to make the following provisions for defense:

1. A multilevel analysis of differences in educational outcomes and student trajectories, as well as in the localization of educational resources, showed that it is the regional component that plays a more important role in explaining student outcomes and trajectories, even though differences between municipalities within one region can sometimes exceed between-regional. This makes accounting for regional differences critical for educational policy action and research.

2. Negative scenarios have been identified in the students' practices of the accumulation of cultural capital in a number of regions. Thus, in some subjects of the Russian Federation, there are risks of "glass ceilings" in the students' educational trajectory choice, which leads to the accumulation of differences in this indicator. Despite the general downward trend in the share of students completing high school, the types of dynamics of this cultural capital accumulating practice differ in the regions. On the other hand, in several regions there is a situation of a double penalty for educational outcomes, when students consistently lose out - first due to lower family capital, then due to lower access to educational resources. In other words, students do not get the opportunity to compensate for the lack of cultural and social capital of their families through access to educational resources in the regions.

3. The identified negative scenarios are consistent and are due to the operation of one of the mechanisms for the reproduction of spatial inequality. This mechanism lies in the fact that regional differences in educational trajectories and results are explained, on the one hand, by the cultural and social capital of the regions, and by the localization of educational resources in them, on the other. These measures obtain different weights in explaining outcomes: cultural and social capital are more strongly associated with student trajectory choices in secondary school, while educational resource localization is better at explaining student outcomes. At the same time, the choice of a trajectory and educational results are also interconnected. The current situation testifies to the accumulation of differences in the structure of the cultural capital of the regions, which lays the groundwork for further aggravation of spatial inequality outside the sphere of education as well.

4. Even with similar access to educational resources in the regions, the same measures and practices can provide opposite results from the expected. This causes another mechanism of spatial inequality, which is the heterogeneity of the relationship between educational results and student trajectories with educational practices, various forms of capital, and the localization of educational resources. This highlights the risks of using universal recommendations based on data from common country assessments or regional testing.

6.2. Practical appliance of the study

The results obtained allow us to formulate several practical recommendations for researchers and practitioners, as well as for policymakers in the field of education:

Recommendations for researchers are aimed, first, at a deeper and more multifaceted consideration of the spatial context when planning and conducting an analysis, especially in the case of countries with a large and diverse territory in terms of socio-economic, demographic and other characteristics (like Russia). To do this, we can recommend the inclusion of various indicators of spatial capital in the analysis, which will reduce the risks of bias in assessments and situations of "double penalty" in the implementation of educational policy. Thus, the control of situational capital through

geographic mobility and transport accessibility will better consider the opportunities of students for educational mobility. Positional capital, operationalized through the cost of housing, living in more and less prosperous areas, or distance to a regional center, will allow considering the social hierarchy of space, which is not adequately described by the division into rural/urban areas.

Another block of recommendations for researchers is related to the design of an empirical base for evaluating the effectiveness of certain policies or practices. For generalizable conclusions in these works, the results of country-wide assessments, or only the results of assessments of individual regions, are not enough since this casts doubt on the effectiveness of such decisions in local contexts. To overcome this problem, it can be recommended to conduct regional assessments on a wide sample, including regions of different types, which, at the same time, are as varied as possible both in terms of the key socio-demographic characteristics and the education system conditions. This design of the empirical base will reduce the risks of average estimates and assess potential differences in the analyzed practices' effects.

Recommendations for teachers and educators mainly relate to the specifics of the transfer of practices and solutions that have shown their effectiveness in other regions. Successful implementation of such measures and practices requires preliminary testing directly in the region of introduction and their adaptation to the local context, as well as the capabilities and needs of specific students.

Recommendations for education policy makers also include taking spatial factors into account when developing measures to make informed decisions and overcome the identified negative scenarios. It is important to emphasize that to develop effective recommendations, it is necessary to analyze typical situations and cases of academically successful and lagging regions, including an analysis of non-systemic factors. This will allow identifying groups of similar regions where the transfer of practices and solutions is possible with minimal changes, as well as identifying measures to help overcome negative scenarios.

Finally, it is important to emphasize the prospects and advantages of a decentralized education management system in terms of implementing the recommendations described above, which seem difficult to achieve in a centralized state. The transfer of managerial powers to lower administrative levels in relationship with the growing responsibility of institutions will make it possible to adapt general recommendations, practices, and measures, considering the problems and tasks that exist in the space of a particular region.

6. References

1. Ballarino G., Panichella N., Triventi M. School expansion and uneven modernization. Comparing educational inequality in Northern and Southern Italy //Research in Social Stratification and Mobility. - 2014. - T. 36. - C. 69-86. <https://doi.org/10.1016/j.rssm.2014.01.002>
2. Bourdieu P. Accardo, A., Balazs, G., Beaud, S., Bonvin, F., Bourdieu, E. The weight of the world: Social suffering in contemporary society. - Alhoda UK, 1999.
3. Bourdieu P. Distinction: A social critique of the judgment of taste. - Harvard university press, 1984.
4. Bourdieu P. The forms of capital. Handbook of theory and research for the sociology of education. JG Richardson //New York, Greenwood. - 1986. - T. 241. - №. 258. - C. 19.
5. Bourdieu P. The social space and the genesis of groups //Theory and society. - 1985. - T. 14. - №. 6. - C. 723-744. URL: <https://link.springer.com/content/pdf/10.1007/BF00174048.pdf>
6. Bray M. Centralization versus decentralization in educational administration: regional issues //Educational Policy. - 1991. - T. 5. - №. 4. - C. 371-385. <https://doi.org/10.1177/0895904891005004003>
7. Carnoy M. Khavenson, T., Loyalka, P., Schmidt, W. H., Zakharov, A. Revisiting the relationship between international assessment outcomes and educational production: Evidence from a longitudinal PISA-TIMSS sample //American Educational Research Journal. - 2016. - T. 53. - №. 4. - PP. 1054-1085. <https://doi.org/10.3102/0002831216653180>

8. Carnoy M., Garcia E., Khavenson T. Bringing it back home: Why state comparisons are more useful than international comparisons for improving US education policy //Econ Policy Inst. - 2015. - C. 1-65. URL: <http://www.epi.org/publication/bringing-it-back-home>
9. Donato L., Ferrer-Esteban G. Desigualdades territoriales en España e Italia: nuevas evidencias a partir de la evaluación PISA-2009. - 2012. <https://doi.org/10.5944/reec.19.2012.7580>
10. Enguita M. F., Martínez L. M., Gómez J. R. School failure and dropouts in Spain //Social studies collection. La Caixa, Barcelona N. - 2010. - T. 29.
11. Flores C. Residential Segregation and the Geography of Opportunities: Spatial Dependence and Spatial Heterogeneity in Education: A Case Study of Santiago //ponencia presentada en 2006 Population Association Meeting, Los Ángeles. - 2006.
12. Garner C. L., Raudenbush S. W. Neighborhood effects on educational attainment: A multilevel analysis //Sociology of education. - 1991. - C. 251-262. <https://doi.org/10.2307/2112706>
13. Hahn G.M. The Past, Present, and Future of the Russian Federal State // Demokratizatsiya. 2003. Vol. 11. No. 3. P. 361.
14. Harvey D. Spaces of capital: Towards a critical geography. - Routledge, 2001. - 320 p.
15. Harvey, D., Braun, B. Justice, nature and the geography of difference (Vol. 468). Oxford: Blackwell, 1996.
16. Harvey, D. Explanation in geography. - 1969. 486 p. DOI: <http://dx.doi.org/10.4135/9781446213742.n4>
17. Hedges L. V., Hedberg E. C., Kuyper A. M. The variance of intraclass correlations in three-and four-level models //Educational and Psychological Measurement. - 2012. - T. 72. - №. 6. - C. 893-909. <https://doi.org/10.1177/0013164412445193>
18. Israel E., Frenkel A. Social justice and spatial inequality: Toward a conceptual framework //Progress in Human Geography. - 2018. - T. 42. - №. 5. - C. 647-665. <https://doi.org/10.1177/0309132517702969>
19. Jakubowski M., Hippe R., Araújo L. Regionalequalities in PISA. The case of Italy and Spain //Luxembourg: Publications Office of the European Union - 2018. - 50 p. DOI: <https://doi.org/10.2760/495702>
20. Jimenez-Castellanos O. Relationship between educational resources and school achievement: A mixed method intra-district analysis //The Urban Review. - 2010. - T. 42. - №. 4. - C. 351-371. <https://doi.org/10.1007/s11256-010-0166-6>
21. Larrañaga O., Peirano C., Falck D. Una mirada al interior del sector municipal //La asignatura pendiente: Claves para la revalidación de la educación pública de gestión local en Chile. - 2009. - C. 77-97. <https://doi.org/10.17583/remie.2015.1461>
22. Manski C. F., Wise D. A. College choice in America //College Choice in America. - Harvard University Press, 2013.
23. Müller M. Dynamic time warping //Information retrieval for music and motion. - 2007. - C. 69-84. https://doi.org/10.1007/978-3-540-74048-3_4
24. Odden A. R., Picus L. O., Goetz M. E. A 50-state strategy to achieve school finance adequacy //Educational Policy. - 2010. - T. 24. - №. 4. - C. 628-654. <https://doi.org/10.1177/0895904809335107>
25. OECD. PISA 2018 Results (Volume I): What Students Know and Can Do. - OECD, 2019. - 354 p. DOI: <https://doi.org/10.1787/5f07c754-en>
26. OECD. PISA 2018 Results (Volume II): Where All Students Can Succeed. - OECD, 2019. - p. 376. DOI: <https://doi.org/10.1787/b5fd1b8f-en>
27. OECD. PISA 2018 Results (Volume V): Effective Policies, Successful Schools - OECD, 2019. - 328 p. DOI: <https://doi.org/10.1787/ca768d40-en>
28. OECD. PISA 2018 Technical Report. - OECD, 2019. - 14 p. URL: <http://www.oecd.org/pisa/pisaproducts/SAMPLING-IN-PISA.pdf>
29. OECD. Programme for International Student Assessment (PISA) Results from 2018, Country Note: Russia. - OECD, 2019. - 10 p. URL: https://www.oecd.org/pisa/publications/PISA2018_CN_RUS.pdf

30. Paparrizos J., Gravano L. Fast and accurate time-series clustering //ACM Transactions on Database Systems (TODS). - 2017. - T. 42. - №. 2. - C. 1-49. <https://doi.org/10.1145/3044711>
31. Perry L. B. Causes and effects of school socio-economic composition? A review of the literature //Education and Society. - 2012. - VOL. 30. - NO. 1. - P. 19-35. <https://doi.org/10.7459/es/30.1.03>
32. Sakoe H., Chiba S . Dynamic programming algorithm optimization for spoken word recognition //IEEE transactions on acoustics, speech, and signal processing. - 1978. - T. 26. - №. 1. - C. 43-49. <https://doi.org/10.1109/TASSP.1978.1163055>
33. Sanghi A., Abate, M. A., Benitez, D. A., Cineas, G., Kim, Y. S., Stavrou, S. G., Rostovtseva I. Rolling back Russia's spatial disparities: re-assembling the Soviet Jigsaw under a market economy. - The World Bank, 2018. - №. 126805. - C. 1-60. URL: <https://www.worldbank.org/en/country/russia/publication/rolling-back-russias-spatial-disparities>
34. Soja E. W . Seeking spatial justice. - U of Minnesota Press, 2013. - Vol. 16. - 280 pp. <https://doi.org/10.1285/i20356609v7i3p682>
35. Tiebout C. A Pure Theory of Local Expenditures // The Journal of Political Economy. - 1956. - T. 64, № 5. - P. 416-424. - ISBN 5-7598-0073-6.
36. Tiebout C. An Economic Theory of Fiscal Decentralization / In: NBER, Public Finances, Needs, Sources and Utilization. - Princeton (Univ.Press), 1961. - P.79-96.
37. Tomul E., Çelik K. The relationship between the students' academic achievement and their socioeconomic level: cross regional comparison //Procedia-Social and Behavioral Sciences. - 2009. - T. 1. - №. 1. - P. 1199-1204. <https://doi.org/10.1016/j.sbspro.2009.01.216>
38. Yastrebov G., Kosyakova Y., Kurakin D. Slipping past the test: Heterogeneous effects of social background in the context of inconsistent selection mechanisms in higher education //Sociology of education. - 2018. - T. 91. - №. 3. - C. 224-241. <https://doi.org/10.1177/0038040718779087>
39. Zakharov A., Carnoy M., Loyalka P. Which teaching practices improve student performance on high-stakes exams? Evidence from Russia //International Journal of Educational Development. - 2014. - T. 36. - C. 13-21. <https://doi.org/10.1016/j.ijedudev.2014.01.003>
40. Abankina, I. V., Alashkevich, M. Yu, Vinarik, V. A., Derkachev, P. V., Slavin, S. S., Filatova, L. M., Merkulov, M. V. Analysis of normative per capita financing of general education in the Russian Federation. Education Facts. No. 6; National Research University "Higher School of Economics", Institute of Education. - M.: NAU HSE, 2016. - 64 c. - URL: <https://publications.hse.ru/mirror/pubs/share/folder/qya1fpknjc/direct/188928073.pdf>
41. Agranovich M. L. Indicators in Education Management: What Do They Show and Where Do They Lead? / / Education issues. - 2008. - №. 1. - C. 120-146. URL: <https://cyberleninka.ru/article/n/indikatory-v-upravlenii-obrazovaniiem-cto-pokazyvayut-i-kuda-vedut> .
42. Agranovich M.L. Indicators of achieving the goals of sustainable development in education and national education policy // Education Issues. - 2017. - №. 4. - C. 242-264. <https://doi.org/10.17323/1814-9545-2017-4-242-264>
43. Barinov S. L. L., Belikov A. A., Polyakova Y. A. Correlation of educational results and financing of education in the subjects of the Russian Federation. In book: XVI April International Scientific Conference on the problems of economic and social development: in 4 kn. Moscow: HSE Publishing House; 2016. - C. 11-22. URL: <https://publications.hse.ru/chapters/180763180>
44. Barinov S.L., Belikov A.A., Zair-Bek S.I., Kupriyanov B.V. Additional education in RF subjects: types of regional situations / Education Facts. No. 1(1); National Research University Higher School of Economics, Institute of Education. - M.: NAU HSE, 2015.
45. Basyuk V. S., Kovaleva G. S. Innovative project of the Ministry of Education "Monitoring of the formation of functional literacy": the main directions and the first results // National and foreign pedagogy. - 2019. - T. 1. - №. 4 (61). - C. 13-33. URL: <https://cyberleninka.ru/article/n/innovatsionnyy-proekt-ministerstva-prosveteniya-monitoring-formirovaniya-funktsionalnoy-gramotnosti-osnovnye-napravleniya-i>

46. Belyanina I. V. Peculiarities of the formation of Russian federalism // Bulletin of State and Municipal Administration. 2011. №1. URL: <https://cyberleninka.ru/article/n/osobennosti-formirovaniya-rossiyskogo-federalizma> (date of reference: 02.02.2023).
47. Bessudnov A. R., Malik V. M. Socio-economic and gender inequality in the choice of educational trajectory after the 9th grade of high school // Education Issues. 2016. №1. - C. 135-167. URL: <https://cyberleninka.ru/article/n/sotsialno-ekonomicheskoe-i-gendernoe-neravenstvo-pri-vybore-obrazovatelnoy-traektorii-posle-okonchaniya-9-go-klassa-sredney-shkoly> . .
48. Bogdanov M.B., Malik V.M. How are social, territorial and gender inequalities combined in the educational trajectories of Russian youth? // Public Opinion Monitoring: Economic and Social Changes. - 2020. - №3 (157). - C. 392-421. URL: <https://cyberleninka.ru/article/n/kak-sochetayutsya-sotsialnoe-territorialnoe-i-gendernoe-neravenstva-v-obrazovatelnyh-traektoriayah-molodezhi-rossii> .
49. Grof J. de et al. Managing the education system at different levels: vertical power, power transfer and regional cooperation: a collective monograph. : National Research University "Higher School of Economics", 2019.
50. Derkachev P. V. Inter-regional differences in solving the problem of increasing the salaries of teaching staff // Voprosy Obrazovaniya. - 2014. - №. 4. - C. 128-147. URL: <https://cyberleninka.ru/article/n/mezhregionalnye-razlichiya-v-reshenii-zadachi-povysheniya-zarabotnoy-platy-pedagogicheskikh-rabotnikov>
51. Zair-Bek S. I. I., Belikov A. A., Mertsalova T. A. Index of educational infrastructure of the subjects of the Russian Federation in 2014 // Education Facts. Special Issue. - 2016. - №. 1. URL: <https://publications.hse.ru/books/199188056>
52. Zair-Bek S. I. Patterns of behavior of regional systems of general education in conditions of unpredictable crisis at the first stages of its manifestation (the period of "shock") / S. Zair-Bek, T. Mertsalova; National Research University "Higher School of Economics", Institute of Education. - MOSCOW: NATIONAL RESEARCH UNIVERSITY HIGHER SCHOOL OF ECONOMICS, INSTITUTE OF EDUCATION. 2022. - 62 c. - 100 copies. - (Modern analytics in education. № 8 (68)).
53. Kapuza A. V., Kersha Y. D., Zakharov A. B., Khavenson T. E. Educational results and social inequality in Russia: // Education Issues. - 2017. - №4. - C. 10-36. URL: <https://cyberleninka.ru/article/n/obrazovatelnye-rezultaty-i-sotsialnoe-neravenstvo-v-rossii>
54. Konstantinovsky D.L., Popova E. C. Modern School Graduate in the New Conditions of Choice //Russia Reforming. - 2016. - №. 14. - C. 309-335.
55. Kulakov S. V. Development of Russian regionalism in the context of political identity // Pro nunc. 2017. №2 (18). URL: <https://cyberleninka.ru/article/n/razvitie-rossiyskogo-regionalizma-v-kontekste-politicheskoy-identichnosti> (date of reference: 02.02.2023).
56. Kuryanova T. V. The formation of the Russian region as an independent economic entity // Regional Economy: Theory and Practice. - 2007. - №. 12. - C. 26-29.
57. Ignatenko I. M. The formation of a new model of Russian federalism // Bulletin of the Volga Institute of Management. - 2015. - №. 5 (50). - C. 107-112.
58. Pinskaya M. A., Kosaretsky S. G., Frumin I. D. Schools that work effectively in complex social contexts // Education Issues. - 2011. - №. 4. - C. 148-177. URL: <https://cyberleninka.ru/article/n/shkoly-effektivno-rabotayushchie-v-slozhnyh-sotsialnyh-kontekstah>
59. Managing the education system at different levels: vertical power, transfer of powers and regional cooperation: collective monograph / Jan de Grof, S.V. Yankevich, M.L. Agranovich, A.A. Belikov et al. Ed. by Jan de Grof, S. V. Yankevich ; National Research University "Higher School of Economics". - M.: Publishing house of the Higher School of Economics, 2019. - 336 c.