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RESULTS OF KAZAKHSTAN IN INTERNATIONAL EDUCATION QUALITY ASSESSMENTS: A STUDY OF THE UNDERPERFORMANCE CAUSES

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The Analytical report presents the results of a study of the reasons for the low performance of Kazakhstan in international comparisons of the education quality and the identification of factors influencing these results.

The report is intended for the teaching community, administrators at all levels, as well as for anyone interested in education issues.

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The content of this publication reflects the views of the authors, which do not necessarily coincide with those of the Soros Foundation-Kazakhstan.

The authors are responsible for the facts, information, judgments and conclusions contained in the publication.

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TABLE OF CONTENTS

FOREWORD

In November-December 2019 the Organization of Economic Cooperation and Development (OECD) and Institution for Educational Assessment (IEA) announced the results of three international large-scale assessments (ILSA) in the field of education: PIAAC (Program for International Assessment of Adult Competencies), PISA (Program for International Student Assessment), and ICILS (International Computer and Information Literacy Study).

Kazakhstan participated in all three studies and placed in outsider positions. Minister of Education and Science of the Republic of Kazakhstan commented on this fact in a quick, unbiased, and politically correct manner. However, the results of the international assessment did not gain wide coverage within the academic circles. Events following the transition of power in Kazakhstan, replacement of two Ministers of Education and Science, as well as adoption of the Law "On the status of a teacher" and the State Program of Education and Science Development for 2020-2025 years dominated the public attention.

Meanwhile, in January 2020, U.S. News published two rankings of systems of childcare and education (Best Countries for Raising Kids, Best Countries for Education U.S. News-2020). Results of the rankings correlate with results of PIAAC, PISA and ICILS in terms of Kazakhstan's outsider positions. These rankings also failed to resonate with the public, as the news were dominated with the Korday events and the beginning of the COVID-19 pandemic.

Right before the publication of this report, IEA published the results of TIMSS-2019 (Trends in International Mathematics and Science Study). Here Kazakhstan also witnessed a decline compared to previous TIMSS cycles (2007, 2011, 2015).

History is rich with examples of tragic events that drive the political focus towards false milestones of secondary importance, while the original causes of informational waves are left out of the picture. In such a situation, providing an unbiased view of reality and correctly identifying the fundamental causes of the growing problems and the threats they pose (provided these threats exist) is that much important.

In this context, PIAAC, PISA, ICILS, and the 2020 U.S. News «Best Countries for Raising Kids» and «Best Countries for Education» rankings have reliably demonstrated a critically low level of development of human capital in Kazakhstan, which poses a threat to the well-being of the nation in the long run.

Problems identified in the aforementioned ILSAs are reflected in the State program of development of education and science for 2020-2025. The program mentions that the lack of change in the current situation in the foreseeable future inevita-

bly brings about a worsening in the quality of human capital, de-professionalization of human resources and the decline of nation's economic potential.

Thus, it is time for the Kazakhstani society to seriously rethink the fundamental causes of the worsening in quality of human capital as the main source of potential dangers for stable development and prosperity of Kazakhstan.

Considering the fact that previously there has been no analytical research of factors that cause underperformance of Kazakhstan in ILSAs, it means that there are no thoroughly studied and scientifically based recommendations to solve this problem. As such, with the help of the Soros Foundation-Kazakhstan we attempted the following:

- study the international practice of developing the human capital based on prioritization of the education system (cases of Finland, South Korea, Singapore, the USA, and Estonia), as well as the practice of using ILSA results in policy-making;
- problematize the low results of Kazakhstan in ILSA not only within the field of education, but incorporating contextual (socio-economic status, early development, values and motivation, and school characteristics) and other factors that also influence academic achievements;
- study the opinion of experts in education and other fields, teachers and decision-makers regarding factors that impact the performance of Kazakhstan in PISA, ICILS, and PIAAC;
- study potential consequences of low performance in PISA, ICILS, PIAAC on human capital and economic growth in Kazakhstan;
- develop a set of recommendations to address the identified problems and improve the education policy in Kazakhstan based on gathered data.

We assume that this work can spark interest among practicing teachers, scientists, analysts, experts, education managers, parents, undergraduate and graduate education students, and decision-makers in education at various levels.

INTRODUCTION

«Many nations claim that education is a top priority. There are some simple questions one can ask to find out whether countries live by that claim. For example: What is the status of the teaching profession; and how do countries pay teachers compared to how they pay others with the same level of education? Would you want your child to be a teacher? How much do the media report on schools and schooling? When it comes down to it, which matters more: a community's standing in the sports leagues or its standing in the academic league tables?»

From A. Schleicher's book «World Class»

From human capital to economic growth

The basic definition of human capital is an aggregation of skills and experience possessed by a human, enterprise, or nation. International Economic Forum (2017) defines human capital as «knowledge and skills [possessed by humans, which] enable them to create value in the global economic system».

In a seminal work «On the mechanics of economic development» Lucas (1988) formulates the definition of human capital as «qualification level» of an individual that is directly related to his or her productivity.

World Bank (2018) defines human capital as «knowledge, skills, and health that people accumulate throughout their lives, enabling them to realize their potential as productive members of society».

In the present several analytical institutions conduct several major international studies that measure human capital quality globally. Among them the UNDP Human Development Index (HDI), Global Competitiveness Report (GCR) by World Economic Forum, and Human Capital Index (HCI) by World Bank. Apart from offering rankings, these studies offer an in-depth analysis of the composition of human capital and their development trends.

As World Bank experts note «human capital is critical for its economic success», as it constitutes 64 per cent of national wealth (Patrinos and Angrist, 2018). The concepts of human capital and economic growth are tightly interlinked in the political and economic discourse. Studies show a positive correlation between the two concepts. For instance, Pelinescu (2015) identified a positive relationship between the ability of a nation to innovate and GDP per capita.

Barro (2002) compared the potential contribution of "human" and "physical" capital to economics, noting a higher effect of human capital (*note – knowledge and skills*) compared to physical capital (*note – population size*) «generates a higher economic growth». This is due to the ability of a nation to master technology as well as due to a difficulty of managing human capital compared to physical capital. Therefore, «***a country that starts with a high ratio of human to physical capital—such as in the aftermath of a war that destroys primarily physical capital—tends to grow rapidly by adjusting upward the quantity of physical capital***».[1]

Human capital and education

OECD considers education as a key factor in the human capital development, noting a correlation between education level, GDP per capita and general economic growth (Hanushek and Wessmann, 2010). Research concerning effect of human capital on economic growth frequently uses education ***as a proxy for human capital***. For example, Blundell et al. (1999) identify the three main components of «human capital»: early skills (acquired and natural); qualification and knowledge gained through formal education; and skills, competencies and experience, gained through workplace training.

As such, there is proof of a direct connection between education and general national economic indicators. In fact, education parameters are present in all of the main human capital indices:

- «Years of education corrected for "quality" is one of the three components of Human Capital Index (along with "survival" and "health"). The education component reflects the quality and quantity of education (Kraay, 2018). World Bank experts developed indicators "corrected for years of education" and "harmonized test results" in order to better reflect the quality of education (Angrist et al., 2019).
- A report on global human capital by World Economic Forum (2017) defines knowledge and skills as one of four key elements of human capital. As such, "Potential" measures the level of formal education attained by population, while "Development" measures formal education and professional development of the current workforce and the future generation. "Deployment" and "Know-how" measure the use of skills by men and the depth of specialized skills possessed by the labor market participants.
- Inclusive Development Index (IDI) was introduced World Economic Forum at Davos (January 2018) as an alternative to GDP in terms of measuring economic development of world countries. IDI is notable due to inclusion of national education spending as one of its parameters. What is also notable is that, among the 12 IDI parameters, the only item from a government spending list is education.

1 ibid., p.17

This means that the global community recognizes the important role education plays in the economic development of states.

- Global competitiveness index (GCI, which is an annual study of cross-country competitiveness), also published by WEF, analyzes the effectiveness of states according to 12 main components, including "skills" (Schwab, 2018).

All of the rankings represent education using two main indicators: highest education attainment of the population (years of education) and student literacy level in mathematics, science and reading, measured by the major ILSAs.

As noted by OECD experts, all of the economic growth theories «***acknowledge the positive effect of education on economic growth***» (Hanusbek and Woessmann, 2010). Global database of average years of education compiled by Barro and Lee (2013) serves as a reference point in measuring the effect of education on economic indicators, such as GDP per capita. Return on investment in education is usually measured as a ratio of individual or government spending to his or her current earnings (Patrinos and Psacharopoulos, 2018).

Impact of education on national economic indicators finds support in numerous studies conducted by both major organizations, such as World Bank, and individual researchers (Psacharopoulos and Patrinos, 2018). For instance, a study in the UK identified that citizens with an official qualification «have significantly larger returns than individuals with the same number of years of schooling but who completed no formal qualifications» (Blundell et al., 1999, p.4).

In the analysis of factors of economic growth in 110 states Gennanioli et al. (2013) measured the impact of geography, education, institutions and culture, and identified that ***education is the single most important variable that explains the cross-national and intra-national difference in income***. Data analysis of 1500 subnational entities demonstrated that ***education is «the only factor that explains a substantial share of regional differences***».

Nobel Prize winner Paul M. Romer (1986) put together a model were the main determinant of economic growth was increasing investment in human capital. According to this model, in the long run ***economies with highly developed human capital have higher growth rates compared to economies that do not have this advantage***.

It is important to mention some of the main trends in research on links between education, human capital, and economic growth:

- There is evidence that primary education provides a higher return on investment compared to secondary or higher education. This is due to foundational importance of early years of learning, when an individual acquires cognitive abilities. Since the effect of education is cumulative, the impact of secondary and higher

education (any additional year of learning) is generally lower (Psacharopoulos and Patrinos, 2018).

- Return on investment in education for girls is higher than for boys. Blundell et al. (1999) identified that return on investment in education of men with higher education is almost twice as low as it is for women. As such, according to estimations of authors, return on investment among men who did not finish higher education is 15%, while for those who finished it is 21%, while for men with graduate education the rate is 15%. Meanwhile, for women the rates are 26%, 39% and 43% respectively (note: this does not mean that men earn less, this only means that higher education becomes a more beneficial investment for women).

How to measure quality of education (how to understand quality of education)

In order to estimate the return on investment, experts frequently cite major-scale ILSAs, such as PISA (Program for International Student Assessment), TIMSS (Trends in International Mathematics and Science Study), or PIRLS (Progress in International Reading Literacy Study). These studies represent the most complete and representative data base of international academic indicators.

There are justified concerns about the appropriateness of using tests to measure the quality of education; that is to say, to what extent learning results in absolute terms reflects school processes and factors that impact general academic achievement.

There is a question of viability of using "years of education" (it usually covers the period of early childhood and school education) to measure human capital. One of the concerns is that this approach automatically assumes that each country (or each region within the country) in the ranking guarantees an equal quantity and quality to each student throughout each year of education, which is undoubtedly impossible. According to authors of Human Capital Index, «*students around the world are going to school but many of them are not learning—an emerging gap in human capital formation*» (Angrist et al., p.2).

Besides ILSA data, which is valuable due to its comparatively cross-national nature, each country uses its own tools of assessing education quality.

When talking about early childhood and school education, usually the main tool is inspection (note: state certification in Kazakhstan), planned and random inspection of the authorized authority, and student assessment (for instance, Unified National Testing and External Evaluation of Academic Achievement). Inspection is an important source of complex and contextual information on educational organization. Its format usually means collecting data on all aspects of school activity for

a period of several days. At the same time, objectivity and transparency of national test results (such as UNT and EEAA) are constantly challenged (Fischman et al., 2019; Addey et al. 2017; Rappleye and Komatsu, 2019). Standardized testing inevitably assumes the possibility of memorizing, and consequently provide an incomplete assessment of student competencies. Nevertheless, just as international testing is important to achieve cross-country comparison, so is national testing important in allowing to gain a full picture of knowledge and skills of students in different parts of the country.

Considering that ILSAs remain *the main source of data on academic achievement within the international context*, they will probably find use in calculating human capital of countries. Barro (2002), for instance, found out that *international test results are more efficient at explaining and forecasting economic growth compared years of education*.

In 2019 results of several authoritative international large-scale assessments of education were published:

- PIAAC 2018 (study of reading, mathematical and computer literacy of adults aged 16-65);
- PISA 2018 (study of reading, mathematical and science literacy of 15-year-old students);
- ICILS 2018 (study of computer and informational literacy of 8th graders).

Students and adults of Kazakhstan participated in these studies. Kazakhstanis underperformed in these surveys, failing to reach Level 2.

15-year-old students in Kazakhstan scored 387 points in reading literacy (69th nominally of 78), 423 points in math literacy (54th of 78) and 397 points in science literacy (69th of 78) in **PISA-2018**. Of 6 levels of difficulty, most Kazakhstani adolescents only completed Level 1 or 2 tasks. As such, Kazakhstan ranks among countries with low levels of functional literacy. Moreover, there is a decrease in scores compared to PISA 2009 and 2012 results. Students in Kazakhstan not only rank lower than their peers in OECD states, but also in post-Soviet nations like Estonia, Russia, Belarus and Ukraine. The ratio of low-performing students in our country (37,7%) is twice as high as that in Ukraine (17,5%,) and three times higher than in Russia (11,2%).

The average score of Kazakhstani 8th graders in **ICILS** is 395, which is the lowest result among the 14 participating education systems. Students in Moscow (the Russian Federation) scored 549 points based on survey results, which represents one of the highest scores among the participating countries. With 4 difficulty levels, 54% of students in Kazakhstan failed to compete Level 1 tasks, 27% competed them, 15% completed Level 2 tasks, only 4% of students completed Level 3 tasks, and none could complete the most difficult Level 4 tasks.

The OECD PIAAC survey measures adult skills (ages 16-65), including work with textual information and the decision-making skills using this information; the ability to use and interpret math information; computer skills, and the ability to use the Internet, e-mail, etc.

PIAAC is conducted by means of testing and sociological survey of 5,000 people from different socio-economic backgrounds and regions. Kazakhstan participated in this survey for the first time in 2017, with results published in 2019.

OECD also conducts PISA. This survey measures the knowledge and skills of 15-year old students, which they need to properly function within society (functional literacy).

ICILS is conducted by the International Association for the Evaluation of Educational Achievement (IEA) and measures the IT-skills of 8th graders. The survey allows to find out whether school education is conducive to formation of IT-skills of students, as well factors at play. All tasks are computer-based, student perform a search, processing and delivery of information in a specially crafted environment, without access to other resources.

The surveys study the various factors that have an effect on academic achievement by offering questionnaires to their respondents (students, teachers, or parents). The questionnaires collect data on socio-economic characteristics of students, their families and schools, teacher qualification and school infrastructure, as well as other aspects of education that will be offered in the international reports on study results along with comparison of academic results of countries.

Source: IAC MES RK, iac.kz

PIAAC, which is a study of adult literacy, also shows Kazakhstan among countries that scored well below the OECD average. Kazakhstani adults averaged 249 points in reading literacy and 246 in math literacy. Similar to PISA results, most Kazakhstanis (48%-51%) only managed to complete Level 2 tasks in reading and math. Meanwhile, only 10% of 25-34-year-olds and 40% of 55-65-year-olds could not complete basic ICT tasks due to their inability to work with computers. Overall, only 16% of participants completed Level 2 and 3 tasks on ICT literacy. Again, adult literacy in Kazakhstan is lower than in post-Soviet countries like Estonia, Lithuania and Russia.

INTERNATIONAL PRACTICE OF ANALYSIS AND APPLICATION OF RESULTS OF EDUCATION QUALITY STUDIES

This chapter offers a brief review and analysis of education policy and practice in countries that are of high interest for the education system of Kazakhstan, according to certain authors. These countries are notable due to their outstanding performance in ILSAs and due to similar historical context. Practice of any of these countries can serve as a lesson for education policy-makers in Kazakhstan.

Case 1. Finland. Thorough preparation and mutual trust.

Results of international large-scale assessments in education indicate Finland as one of the most successful countries. In general, within the last decade this country became a de facto synonym of high-quality education. Many countries have sent and keep sending their experts to Finland so that they can see firsthand successful policies and practice, which they can apply in their own schools (Schleicher, 2018).

Finland experienced major changes after World War II due to population growth and a transforming economy. Growth in both population and economy led to growth in the number of parents, who were in search for better education for their children. Growing number of students and inequities in access to education necessitated serious reforms. There was a need to guarantee education for all children regardless of their socio-economic background or residence. All of this served as a catalyst for change in Finnish education in 1970s.

As noted by Crehan (2017), November 22, 1963 was a notable year because of the JFK assassination and a birth of the new education system in Finland. Shortly before people found out about the assassination, Finnish politicians celebrated the passing of legislation that regulated the creation of the education system that was based on the principle of equal opportunity for every child. This approach replaced the two-tier system under which children were sent to different types of school. In one case students had the opportunity to study in a university after graduating school, whereas the second case led to completion of technical and vocational education. The Finnish education reform took 16 years and was completed in 1979.

A notable factor behind the success of the Finnish education was ***a thorough preparation for change*** without any hesitation. The second half of 1960s was dedicated to development and trial of the new curriculum for new schools to identify the most efficient teaching methods for students with different abilities and social status. Hundreds of teachers participated in the preparation process. Implementation did not start right after the preparation of the curriculum. The first stage was launched in Northern Finland, in Lapland, a place that needed reform the most. Reform spread to

the rest of the country in the next seven years. Implementation of the new curriculum was accompanied by special on-the-job training of teachers (Crehan, 2017).

Continuity was especially important within the Finnish education system**.** In 2014–2017 Finland undertook reforms of national curricula at all levels. As a result, core curriculum now constitutes a consistent line throughout the entirety of the education system. Transparency and wide popular participation, strong knowledge base and expertise, commitment to the future based on research – all of this accompanied the reform process and were conducive to its success (Halinen, 2018).

Another important aspect behind the success of the Finnish education system was ***selectivity***. In 1974 teacher education went from pedagogical colleges to universities. Starting in 1979 master's degree was a requirement for all teachers. Only 10 years later was there a noticeable change in public perception of the teacher status, when the reform became widespread and was adopted throughout the country, with teachers starting to gain more autonomy.

Before the education reform, decisions, acts and orders regarding schools were highly centralized. This changed in 1985, when the general decentralization process led to an increase in ***freedom and responsibility of municipalities*** in many areas, including education policy. In 1994, the National Education Council developed a nation-wide foundational education program, which only contained general goals and comprehensive guiding principles for teaching different subjects, while municipalities and schools created their own local curricula. In 1991 school inspection system ceased to exist. As such, it took about 20 years of thorough monitoring before teacher were granted autonomy.

In the present time, nine universities offer teacher education in Finland. One in nine candidates successfully apply for teaching major. Candidate selection process for the teacher education consists of two stages: (1) an assessment exam of academic skills of applicants; (2) a combination of written question and tests to assess skills, motivations and job loyalty of applicants (Pont et al., 2013). After being sent to schools, teachers continue their learning as part of mandatory professional development. Even though teacher salary is average compared to European standards, teaching is viewed as an important and respected profession, while teachers have a high degree of autonomy (Crehan, 2017).

The Finnish education system differs drastically from those in Asian countries (such as Singapore and South Korea, leaders of education rankings). Students in Finland receive less homework, there are no school inspections, and teachers have a lot of autonomy. Similar to other high-performing education systems around the world, the Finnish system is based on the assumption that students from vulnerable families can succeed in school and that all schools must offer high-quality education regardless of their location.

Case 2. South Korea: discipline and clear priorities in policy

Life quality in South Korea in 1960s was comparable to present-day Afghanistan, while quality of education was one of the lowest around the world (Schleicher, 2018). Today, however, South Korea has a highly technological economy, and at the foundation is its education system.

According to experts, there are two factors behind the high performance of South Korean education: national mentality and effective education policy.

Koreans traditionally value education and believe it to be a key factor of a successful career. Dedication to learning is praised by the public and is strongly supported by the family. The socio-economic background does not have a significant effect on academic achievement, and social mobility is high in South Korea. As such, TIMSS (2015) results show that students in South Korea, Singapore and other East Asian states tend to believe in their own efforts rather than their innate talent. As Schleicher (2018) notes, ***Asian children are frequently taught that effort and hard work is the key to success***.

At the same time, targeted political decisions play their role in increasing quality and fairness of education. Increase in coverage of school education, school system reform, development of high standards for national curricula and textbooks, increase in teaching quality and use of "high-stakes" exams contributed to an effective system. OECD (2014) notes that ***increase in education spending and development of targeted programs at all education levels*** were among the key reforms that influenced the improvement in South Korean education.

10 innovative measures in education were introduced in late-1985 as part of a new national program "Raising Koreans as leaders of the 21st century". These included: modernization of university application, strengthening of school infrastructure, increase in quality of science education, update of education content and methodology, increase in higher education quality and autonomy of education authorities. A decade later, the 1995 document entitled "Foundations of the new education system" introduced a new model of education directed towards building a knowledge-based society, where schools have more autonomy and accountability.

Increase in education spending led to a rise in the number of schools and improvement of education quality at primary and secondary levels. The South Korean government also undertook measures to ***decrease the number of students in class, increase the number of teachers as well as their salary***. ***Timely monitoring of student performance*** played an important role in high performance of students. National Assessment of Educational Achievement for students of 9th and 11th grade students was developed in South Korea in 1998 as part of the national strategy of human resource development.

Character building and creativity development were a priority for education policy in 2020 and paved a way for major changes in the learning process. National curriculum was updated in 2009, where earlier it was focused mostly on absorption of textbook material. Creative Management Schools were launched throughout the country, with some key features like autonomy in management, focus on talent breeding and wholesome development of students, their creativity and individual talent. Franchises of these schools are active in the US, China and Thailand[2].

The "SMART Education" (2011) program was a major step towards improving the quality of education process. Digitization of textbooks took place as part of this program. By 2015 students also had a chance to learn at anytime and anywhere using cloud technology. According to the South Korean government, one of the undisputed advantages of interactive digital textbooks compared to their paper-based counterparts is the ability to offer constant updates and reduction of costs, along with a personalized approach to students[3].

As such, the education policy in South Korea is an example of a well-rounded approach to increasing education quality and ***prioritizing education at a national level with a clear goal of raising a generation of leaders***.

Case 3. Singapore. Focus on education as a driver of national identity formation and economic development

Singapore is a city-state that is a leader of many well-being indices, including GDP per capita, low unemployment rate, and life expectancy. The government of Singapore achieved ambitious goals using various tools, with education remaining the single most important investment that was made in a brief history of Singapore. The focus on education allowed the city-state to achieve the highest performance on an international level. Singapore has held the top positions throughout many cycles of international large-scale assessments like PISA, PIRLS or TIMSS. It is notable that Singapore achieved this despite having lower positions initially.

In 2018, Singapore was 1st in PISA rankings of science, reading and math literacy, scoring 556, 535 and 564 points respectively.

Singaporean 4th and 8th graders also topped the TIMSS 2015 rankings in science and math (math: 4th grade – 630, 8th grade – 621; science: 4th grade – 590, 8th grade – 597). PIRLS 2016 results have 4th graders from Singapore placed 2nd in reading literacy (576), behind their peers from Russia (581).

After gaining independence in 1965, Singapore was a poor country with a limited reserve of natural resources and illiterate population. The education system was quite different to what it is now. Singapore had a population of over 1.5 million, and

2 https://www.gmipost.com/special-feature/55/south-korea-2018/161/education.html
3 http://groups.itu.int/LinkClick.aspx?fileticket=-4b9-wDydtc%3D&tabid=1862

even though the average age was 18, only 3.5 thousand were enrolled in national universities, 4.6 thousand were in teacher education or professional and vocational education (Ministry of Education of Singapore, 2015, as cited in Kent, 2017). Share of primary and middle school students was low. British middle schools with English as medium of instruction offered the bulk of secondary education, along with Chinese schools with Mandarin, Malay and Tamil as mediums of instruction. There was a significant gap between the two school systems, with graduates of Chinese schools generally had fewer chances to acquire a high-paying job after finishing school (Kent, 2017). By the time Singapore gained independence there were only two universities, Singapore campus of University of Malaya and Nanjing University.

Establishment of a successful education system in Singapore is based on ***a policy decision to use education as the main tool for economic development***. In other words, there was an understanding of the importance of education in human capital development, which led to a higher focus on education spending. At the same time, focus on education development not only allows to strengthen the national economy, but also unite the different ethnic groups and religions, instilling a common sense of national identity (Schleicher, 2018).

Development of education system in Singapore more or less consists of 3 stages (OECD):

- *The survival phase: 1959-1978*

During the first years of independence, most of the 2 million people in Singapore did not have any qualifications. School building was intense during this period, a bilingual policy was introduced so that children could learn English and their native language. Universal access to primary education was achieved in 1965, in 1970s it was extended to secondary education. Nevertheless, the quality of education was still lacking. Many students failed to finish school, with teachers leaving their job at high rates. There were attempts made to increase access to professional and vocational education, but its status remained low.

Expanding basic education offered Singapore with a literate and qualified workforce to meet the needs of the economy, from trade to export-based production. In late 1960s annual GDP per capita growth averaged 12.7%, since Singapore attracted foreign producers who needed cheap and low-skilled workforce.

- *Focus on effectiveness, 1979-1996*

Increasing competition from other Asian nations that were attracting cheap production, as well as the 1973 Oil Crisis forced Singapore to increase the bar for its economic development.

The Singapore government made a decision to reorient from having an economy of low-skilled workers to an economy with highly qualified human resources,

which could attract investment from international high-tech companies. In 1979 a new concept of the secondary education system was introduced, with new curricula and different ways of achieving academic and professional education. Students could choose additional subjects in schools with a differentiated learning plan and approaches in teaching that allowed a higher number of students to apply for higher education. School dropout rated decreased during this period, with only 6% by 1986 compared to over 50% of students failing to complete 10 years of schooling in 1960s. Education quality improved, more students started to successfully pass their English O Level tests (from 40% in 1960s to 90% in 1984). Singapore students demonstrated good results in TIMSS 1995.

In 1992 Singapore invested heavily in developing the Institute of Technical Education in order to improve the status of professional and vocational education and guarantee training comparable to what was offered in universities.

- *Focus on skills and further development: 1997-present*

By early 1990s development of global knowledge economy necessitated a paradigm shift in the education system of Singapore and a shift in focus towards innovation, creativity and research.

The concept of "Thinking Schools, Learning Nation" was created at school level, and prime-minister Lee Hsien Loong was actively advocating for it in 1997. A firm confidence in the importance of developing education is the basis of this concept.

Agency for Science, Technology and Research plays a key role in developing the knowledge economy and offers generous research funding in an attempt to attract leading scientists and research organizations. Singapore attracted 1 million foreign citizens with scientific, technical and management skills to work in international corporations and institutions of higher education. Three Singapore universities, especially the Nanjing Tech University, established research partnerships with leading international universities, with a focus on bioinformatics, information science and medicine technologies.

In 2010 education comprised 20% of government expenditure in Singapore, ranking 2nd behind defense. Education spending became a key element of economic investment that leads to rise of national income.

Just as other top-performing education systems, Singapore was able ***to improve the status and professionalism of its teachers***. The leading and most motivated university graduates apply for teaching jobs, with professional development being of especial importance. Teachers have the right for a hundred hours of annual paid professional development. Major changes occurred in school management. Schools were organized into geographic clusters and gained more autonomy. Cluster leaders,

former successful principals were appointed to mentor others and aid with innovation. New forms of responsibility accompanied a higher degree of autonomy. Previous inspection system was modernized and presented as a new domination model for schools.

Singapore went from an education model of knowledge transfer, to a model based on creativity and self-learning. Curricula and assessment were changed with a focus on project work and creative thinking.

Singapore demonstrates its adherence to fairness and equity, which was the leading philosophy since the leadership of Lee Kuan Yew. Starting from Grade 1 children have access to systematic aid in the form of additional lessons. Moreover, even though most pre-school organizations are privately funded, government offers financial assistance to those pre-school organizations with children from low-income families. All of this led to a dramatic development of education and economy of Singapore.

In sum, Singapore is a state that create an effective education system basically from scratch. Measures it undertook to improve the quality of education system has led to consistently high performance of Singapore students in international large-scale assessments. In 2008 McKinsey named the education system of Singapore the most effective system in the world. Results of the 2007 IMD (International Institute for Management Development) study demonstrated that the education system of Singapore most efficiently meets the needs of global economy.

Case 4. The USA. Systematic reforms and initiatives based on big data

The United States has an established culture of national standardized testing, as well as participation in international large-scale assessments. The government uses the results to inform the national policy. Some of the more well-known cases include the results of the Coleman report, which resonated and created a rift in education research practice not just in the United States, but internationally as well, and Ronald Reagan's "A Nation at Risk" speech in 1983.

- *Equality of educational opportunity, Coleman's 1966 report*

In 1960s the United States were leading the world in terms of school graduation rates. As Schleicher (2018) notes in his book "World Class", the US was not only the economic and military superpower, but it was also the leader in terms of youth access to education. However, it was not all smooth within the education system. In 1966 the US government published the results of the soon-to-be influential if rather controversial study "Equality of educational opportunity". The report was based on a broad analysis of educational opportunities of American children (sample included 650,000 students and teachers in over 3,000 schools) and was written by a sociologist James Coleman (1966).

«Equality of educational opportunity» became a seminal research in political science and one of the first scientific studies to be ordered by the US Congress in the aftermath of World War II. The driving force of the report was idea, which was ahead of its time, of ***the need to evaluate equality of opportunity based on equality of results rather than equality of starting positions***. Authors collected data about educational resources available to different groups of children, as well as educational achievement of children in testing. For the first time it was possible to identify how and to what extent US schools could overcome the inequalities when children first entered school, with race being a major contributor.

One of the key conclusions of the report was that various school factors (for example, spending per student, school library size) did not affect student achievement, whereas ***the socio-economic conditions of student's family had a strong correlation with student achievement***. Moreover, authors concluded that student achievement is affected not only by the socio-economic conditions of their own families, but also that of other students in school, though not as strongly.

These revolutionary results evidently had consequences in terms of rethinking the battle against inequality in the United States. ***The need to desegregate schools and offering equal opportunity to all students, regardless of their background, became a priority***. The study itself has had long-term effects on the direction of education research and influenced the school desegregation policies many years after its publication.

- *"A Nation at Risk", Ronald Reagan's speech, 1983*

By early 1980s American students demonstrated a decline in SAT performance. Results of international large-scale assessments showed that American children were lagging behind their peers from Japan, the Soviet Union and West Germany in math and science.

In 1983, US president Ronald Reagan gave a speech "A Nation at Risk", which came as a result of a special investigation of the National Commission on Excellence in Education. He told that American students never ranked first or second in international large-scale assessments and ranked last among industrially developed states 7 times. Approximately 23 million adults in the US demonstrated functional illiteracy in reading, writing and comprehension (Reagan, 1983).

While there was a serios critique among American policy-makers and scientists in education in terms of reliability of the report, the shocking and emotional call to save the national economy by improving education and teacher status, who are "trusted with the most valuable job" had the desired effect. ***"A Nation at Risk" instantly put the attention to and prioritized the problems of the education system at a national level***.

The results of the report, where one of its conclusions was curriculum inconsistencies, led to reforms in education standards. Nevertheless, many problems noted by the report, are still present in the American secondary education, including attracting talented teachers and increasing their pay[4].

Case 5. Estonia. Atypical results for a post-Soviet republic

In the present Estonia is the leader of international education rankings, ranking higher than other post-Soviet countries. The success of Estonia is of especial significance for Kazakhstani policy-makers due to shared historical context and relative geographic proximity compared to previous cases. OECD notes that Estonia demonstrates positive results in quality of education, environment, work-life balance and gender equality (Santiago, 2016).

It is notable that the Soviet Union had a centralized education system, which was more or less identical in all republics, while Estonian teachers could already go back to their own curricula and teaching methods in 1960s, even under Soviet control. Teachers were mostly oriented towards individual learning and interactive teaching, compared to conventional methodology of Soviet schools (Carnoy et al., 2015).

As such, curriculum and teacher training programs in Estonian schools differed considerably from those practiced in Russian-language schools even before the secession in 1990. In 1990s Estonia introduced the system of national assessment in 3rd, 6th, 9th and 12th grades, which was comprised entirely from open questions similar to questions in PISA rather than TIMSS (ibid.).

Analysis of PISA (2006 and 2009) results by Carnoy et al. (2015) show that students in Russian-language schools show results comparable with their peers in Russia, but lag significantly behind their peers in Estonian-language schools. Meanwhile, results of Russian-language schools in Estonia are lower than Estonian-language schools for students of high socio-economic status (*difference of over 40 points in 2009*), as well as low socio-economic status (*difference of over 40 points in 2009*).

Authors link this situation to retention of conventional system of teaching in Russian-language schools compared to ***a program that is more adapted to ILSA content*** in Estonian schools. National aspiration towards high results also plays an important role; Ministry of Education of Estonia clearly identified the importance of high results for school leaders (Carnoy et al., 2015).

Another factor that can explain high performance of Estonia compared to other post-Soviet states is a ***significant degree of decentralization*** of school education. As such, Santiago et al. (2016) note in their review of education in Estonian schools that

4 http://neatoday.org/2013/04/25/a-nation-at-risk-turns-30-where-did-it-take-us-2/

the central government and municipalities (rural municipalities and cities/smaller towns) comprise the two levels of school management. The Estonian government and Ministry of Education and Science are responsible for nation-level education policies and the general strategy of the education system development. The responsibilities of the Ministry include general coordination of the development of the education system, general concept of learning goals, determining spending rates and conditions, determining minimum wage of teachers and maintaining register of schools that are part of the school network.

In turn, the structure of each district government includes an education department, which is responsible for the direct coordination at a local level and serves as a link between the municipality and the Ministry of Education. Departments of education in large cities are also responsible for school quality and support.

Boman (2019) analyzed the high performance of Singapore and Estonia and notes that both countries attracted attention by placing high in international education rankings within the last decade, despite having different historical and economic context.

Estonia can be proud of its strong performance even with their relatively peripheral position within OECD and the EU (Boman, 2019, p. 10). When it comes to good results in international education rankings compared to other developed nations, according to Boman (2019), Estonia is somewhat of "minor mystery".

The Baltic state is not notable for high wages unlike OECD members (approximately $23,000 in the US, which is twice as low as Singapore at $60,000).

Moreover, in comparing Estonia and Singapore, the author mentions that the average literacy of Estonian teachers according to PIAAC results is 285 points in numeracy and 294 points in literacy, compared to 303 and 300 points in Singapore respectively (OECD average is 259 and 268). National IQ 99.4 is in Estonia and 102 in Singapore. School year is 18 days shorter in Estonia than in Singapore.

THEORETIC FRAMEWORK OF THE RESEARCH

ILSA as source of data in policy decision-making

International large-scale assessments in education were introduced relatively recently (UNESCO trialed their assessment in 12 countries in 1958). However, a number of such ILSAs increases every decade. Some of the more well-known studies among the population and policy-makers in education are PISA and TIMSS, which measure math and science literacy in over 50 countries of the world. As is the case with other credible studies, these are conducted by OECD and the International Association for the Evaluation of Educational Achievement (IEA).

As noted by Fischman et al. (2019), extensive coverage of the results of each new cycle of the ILSA creates conditions for the focused attention of the education policy-makers of respective countries, regions and cities.

There is critique of ILSAs within the academic discourse, which is connected to an obvious commercial focus of the ILSAs, as well as a worry about the ILSAs as a potential measure used to keep educational institutions accountability (Gorur, 2016; Sahlberg, 2015; Verger, 2008; Verger, et al., 2012).

However, until recently a serious analysis of the extent to which ILSAs are used in education decision-making or integration into national education policy was not conducted.

Analysis by Fischman et al. (2019) shows that, even if active media coverage of ILSAs creates *an impression of them being used in policy*, there is no causal relationship between government policy decisions and ILSA results. While some countries take some measures after ILSA results are published, use of this data is limited in other countries that use ILSA results to *justify reforms that are already in progress* (Rautalin, 2009). Tan (2012), for example, analyzes the high performance of Shanghai students in PISA as a justification behind the successful curriculum reform in China. She argues that, despite the existing discourse, *it is not possible to consider the assessment results as proof of reform success*, since there is a huge difference between the assessment itself and real life, which will show whether learning goals are achieved.

Aspiration of nations to place high in ILSA rankings leads to the practice of copying education policy (Fischman, 2018; Baird et al., 2016; Mowat 2018). It is possible to mention the example of the "Finnish school" phenomenon, which is well-known throughout the world (including Kazakhstan), with myths about it, sometimes unfounded, gaining traction.

Fischman et al. offer the examples of Canada, England, France and China in their review. They show that governments of these states used participation in PISA (OECD) as a "magic spell" to justify any educational reform regardless of results. Rautalin (2009) notes that education ILSAs by OECD became a more authoritative source of data that informs the national education policies. The author also discusses the example of Finland using the PISA results, whereby high performance and low levels of education spending were interpreted as an argument in favor of high qualification of teachers that require improvement in their working conditions.

Nevertheless, Fischman et al. (2018) note that in the present there is no definite proof of a causal relationship between ILSA participation and introduction of education policy. The authors conducted an expert survey, which shows that ***38% of respondents believe that ILSAs results are interpreted and used incorrectly used in national policy context***.

Authors use the Finnish example, where uniformly high student performance were interpreted as an indicator of equal opportunity of Finnish children, while policy-makers explained the rural-urban gap among children as a problem *outside of the scope of education policy*.

Such a position, where policy-makers use the ILSA results to justify their reforms and outside, contextual factors to justify the unwanted data is not completely wrong. At the end of the day, the commonly accepted practice of separating the economic sectors by different executive bodies inevitably leads to separation of responsibility. Countries with strict and centralized rule (such as in post-Soviet republics) can even witness the unwillingness of government institutions to collaborate with each other.

In sum, if ILSA results are used to inform decision-making, it is important to not only consider the justice of study instruments, but also analyze the *causes* of any results of a country in the ILSAs.

Factors influencing student achievement

Socio-economic status of students

The traditional definition of socio-economic status (SES) of students is their family background and access to education resources. Academic research frequently uses this contextual factor in analyzing its effect on student performance ILSAs like PISA and TIMSS, along with international data bases allow to study the impact of any given contextual variable (teacher education, career, education resources at home, etc.) on study results.

For instance, Fertig (2003) establishes that students with parents that only finished high school demonstrate significantly lower results compared to ***students with***

more educated parents. At the same time, there is ***a more statistically significant positive effect of a working father*** (compared to a mother, whose income does not have a large effect on child's learning) and a ***clear negative effect of a less educated mother*** (compared to a father, whose education does not have a large effect on child's learning). Doyle (2008) analyzed PISA results of England and France and identified a strong correlation between students' SES and study results.

In other words, ***father's career and mother's education have a clear effect on child's academic performance***.

The effect of parent education and career on child's academic performance was studied and confirmed by other researchers as well (Crede et al., 2015; Edgerton et al., 2008; Harding et al., 2015; Bofah and Hannula, 2015). For instance, Harding et al др. (2015) insist that the mother possesses a certain level of social, cultural and human capital that she can pass on to her child. The means of transfer can include a choice of the best school, search for best educational opportunities, her everyday behavior, and even the "quality" of her immediate circle of friends and colleagues.

Nevertheless, there is evidence that *mother's career* does not have a clear positive effect on child's performance in school and his or her future income. For instance, Wilson (2001) identified that influence of a mother that works full-time correlates negatively with child's income at the age of 20 or older. Mueller and Kerbow (2018) also proved that ***children whose mothers work part-time achieve better results*** compared to their peers with mothers working full-time.

Some ILSA questionnaires (such as TIMSS, PISA and PIRLS) include questions for students and parents regarding possession of *study resources at home* (possession of personal workspace, number of books, gadgets, etc.). Study results demonstrate from cycle to cycle that ***students that have access to study resources have higher results and generally have a more comfortable study environment at home***. Analysis by Fertig (2003) show that, for example, lack of a computer or Internet access negatively impacts the results of German teenagers in PISA. Meanwhile, ***possession of computers at school did not have a significant effect on student performance***. Geesa et al. (2019) analyzed TIMSS student data from Turkey, the US and South Korea and identified that resources at home influence student math performance, with electronic devices having a smaller impact compared to books.

Overall, it is important to note that ***the socio-economic status of student's family is one of the most significant factors that impact his or her academic results*** (Perry, 2010).

Early development of students

Early childhood development, including pre-school education, is an important factor that influences the learning process and performance. Analysis of internation-

al study results demonstrates that going to a kindergarten positively affects student achievement. For example, TIMSS 2015 identified that students outperform their peers in terms of quality of their knowledge if they go to institutions of pre-school education and if their parents give them additional time to study at home. ***Students that do not go to pre-school education institutions and did not have training at home perform worse by 30 points***.

Hattie (2009) performed a synthesis of a meta-analysis of factors that impact student achievement and note that the benefits of early childhood development manifest themselves in variables like IQ, fine motor skills, language acquisition and academic performance of the child. Author mentions the results of a work by Goldring and Presbrey (1986), where they performed a meta-analysis of development programs for children from vulnerable backgrounds. They demonstrated that there is a positive effect of pre-school education regardless of differences in program length and curriculum. Jones (2002, as cited in Hattie, 2009) found out that ***going to full-day kindergartens has a significant effect on child's performance in primary school***. Nelson et al. (2003) note that pre-school curriculum have a strong effect if students visit them for at least a year.

This corresponds to ILSA results of Kazakhstani students. For instance, TIMSS-2015 results show that students who went to institutions of pre-school education significantly outperform their peers in terms of quality of their knowledge. Moreover, ***students that went to kindergarten for more than 3 years demonstrate significantly higher results in math and science in 4th grade compared to students who had less than 3 years of kindergarten***.

As summarized by Hattie (2009), *it is in pre-school organizations* that the foundation is set for some of the more notable and important personal traits, such as openness to experience, desire to invest in education, intellectual curiosity, with subsequent development at school. Setting the right tasks for children and ensuring that success is dependent on the effort that students make allows them to develop their self-esteem and create a favorable reputation among their peers. This, according to the authors, is the key to success. Instilling these personal qualities can have a significant effect on learning outcomes (Hattie, 2009, p.60).

Values and motivation of students

The impact of values of an individual on his or her academic achievement and consequent "success in life" are understudied. However, this aspect deserves some attention, since there is evidence to suggest that it can be the second most important factor, behind SES of the student.

For example, Wilson (2001) finds that both perceived economic benefit and SES of students affect their level of education. Achievements of older people in the

surrounding that have an equivalent experience influence ***student perception of education value***. This might inspire (or disincentivize) them to attain higher education. In other words, "*the youth respond to economic incentives in education*" (Wilson, 2001, p. 545).

The more successful their acquaintances that went to higher education institutions and are employed, the higher that chances that a current school graduate will follow their example. At the same time, if costs of higher education (including potential loss in income from having worked in the same period) are too high in the eyes of a teenager, or his or her parents, he or she might refuse to apply for university. This calculation can also influence the student interest to learning at school. ***If there is no point in going to a university, performance in school will also lose its value***. As noted by Edgerton et al. (2008), potential losses due to poor academic performance in schools would not upset students with low levels of SES, as they already (on top of all) do not expect a substantial return from continuing their formal education. Meanwhile, attitudes of students with higher SES to losses due to low performance can be more negative.

Hattie (2009) notes that students that consider their learning as a personal responsibility are usually more successful than students that think that learning outcomes are out of their control. In turn, Bofah and Hannula (2015) conclude in their analysis of TIMSS results in African states that student *intention regarding continuing education* strongly correlate with their achievements. At the same time, the influence of student motivation on their results is paradoxical to a certain extent. As such, Ghana displayed the highest level of motivation and the lowest level of knowledge among African students (ibid.).

This state of affairs is curious but not at all impossible. The leaders of math rankings (South Korea, Japan, Chinese Taipei, etc.) demonstrates some of the lowest levels of student motivation (*for example, the TIMSS "Students love math" indicator*). Notably, in Kazakhstan the situation is reverse, Kazakhstani students and parents are at the top of TIMSS rankings in terms of love of math, while displaying relatively average results.

Authors explains this phenomenon by saying students show higher results but find math hard in countries with a strong curriculum focus on math, with a deeper specialization. This can lead to emotional exhaustion of students and a subsequent internal tension due to the need to study this subject.

Students' place of residence

The influence of the neighborhood where a student lives on his or her academic achievement is one of the frequently mentioned and researched factors. More affluent and successful parents usually look for the more attractive educational opportu-

nities for their children. For example, they choose where they live based on the presence of a good school, well-off neighbors and other factors (Marks and Pokropek, 2019). In turn, this affects the quality of student cohort, motivation and performance of students.

For instance, Blundell et al. (1999) find that ***the local environment and the quality of schools that are located where the student lives***, affect their education level. Gimenez et al. (2018) analyze the social development level of the neighborhood where Latin American students live and its impact on PISA results. They find that the economic level of the neighborhood (measured with a social development index, including population health, education, economy and electoral activity) has a direct positive effect on student performance in ILSAs in all of the included subjects that are being studied. Authors also use the study of Burdick-Will et al. (2011) as an example to show that the effect of moving out of the neighborhood is more pronounced ***for children that previously lived in less affluent neighborhoods.*** Introducing measures to increase the level of social development as part of education policy also has a bigger effect in less affluent district (Gimenez et al., 2018).

As such, regional development is an important factor that influences the student performance. Since the economy of the region\district reflects itself in quality of life of students' families and their neighbors, regional development is frequently viewed as a factor that indirectly affects student performance.

For instance, Edgerton et al. suggest that ***"The observed interprovincial differences in academic proficiency are in general consistent with long standing disparities between provinces in fiscal capacity"*** (2008, p. 880).

This is confirmed by Tesema and Braeken, who found in their study of regional factors affecting education in Ethiopia that "whenever different regions within a country have major economic differences, it is likely that students from economically less developed regions are more disadvantaged" (2018, p. 52).

Gennanioli et al. (2013) tested the influence of interregional characteristics, such as geography (oil reserves, climate, etc.), culture (mutual trust), institutions and education (level of education) on human capital in more than 1500 subnational entities of 110 countries. The conclusion of the authors is notable due to the fact that oil reserves do not explain any significant intra or interstate differences. The quality of institutions also fail to explain the difference in per capita income within the country, despite it accounting for 25% of the difference in income among countries.

Meanwhile, ***regional education explains 58% of interstate and almost 40% of intrastate difference in income per capita***. In other words, of the measured factors "*none comes close to education in explaining within country variation in income per capita*" (ibid., p. 129). Authors come to conclusion that regional education is «*the*

critical determinant of regional development, and the only such determinant that explains a substantial share of regional variation » (ibid., p. 152).

As such, the cyclical effect is evident, meaning that education influences regional development, which in turn influences education. This is exactly why Gimenez et al. (2018) note that "*educational policies should broaden their focus and not only target the school […], but also the socio-economic characteristics of the environment where it is located*» (p. 92).

School characteristics

In addition to factors that are out of control of schools, the *school itself* is a main factor that influences student performance and academic achievement. At the same time, school combines within itself several internal aspects, such as instruction quality, infrastructure, school resources, student cohort, etc. Questions about teacher training and specialization are frequently included in ILSAs and are measured against test results in final ranking tables.

Quality instruction in and of itself has been a topic of extensive research and has found proof; "quality of the education system cannot exceed the quality of teachers working within it" (OECD, 2014). This is why we will provide a brief overview of other aspects mentioned in relation to impact of school on student achievement.

In his analysis of PISA-2000 results of German students, Fertig (2003) comes to a conclusion that individual schools are more successful in schools that aim to select a more ***homogenous cohort in terms of academic performance***. The author also mentions that academic achievement of students is ***higher in schools with a mixed-gender*** cohort compared to schools exclusively for girls or boys. Studies also identified ***a negative effect of high student to teacher ratio***, or teacher shortage (Fertig, 2003; Demir et al., 2010). Another notable on influence academic performance of a child is ***socio-economic status of the school cohort***. For instance, children that study in schools with a more well-off cohort outscore by 40 points their peers from schools that have a cohort with low SES in TIMSS-2015 (as an example math scores of 4th graders in Kazakhstan are 553 and 513 respectively. In 8th grade the difference is 32 points).

As Perry and McConney (2010) note, the relationship between SES of the school and student achievement is "fuzzy and emerging" (p. 1139). Authors performed a secondary analysis of PISA results from Australia and identified that improvement in ***the SES of the school cohort increases the student performance***, and the other way around. Hattie (2009) provides an example of an analysis by Stekelenburg (1992), who identified a relationship between academic achievement and school ***cohort size***. Author notes that ***curriculum effectiveness decreases when the number of students exceeds 800 people***, despite the fact that costs of maintaining a small school are higher.

Funding of a certain school in and of itself is a controversial topic in academic research, despite being linked to student achievement quite frequently. For example, Hanushek (2003) analyzed the relationship between TIMSS results in 23 countries and spending per student and did not find a significant correlation. Hattie (2009) explains this by saying that it is not the quantity of financing provided to schools, but rather where it is directed.

Related to this is a study of PISA results of Russian students, which showed that school financing does not have a significant effect on student achievement, while teacher salary size impacts exam results and performance in international testing (Lazareva and Zakharov, 2019). Authors conclude that ***improvement in academic performance of students occurs only when there is an increase in teacher salary*** in any given region.

In 2017 OECD published a report on financing of school education. According to the report, there is no obvious relationship between national education spending and student results.

In the same year, Department for Education of the United Kingdom used the results of the study on efficiency of school financing, which confirmed the PISA data on the difference in interstate results as not being related to financing.

Similar to school financing, it is impossible to interpret the effect of school management with much clarity. Fertig (2003) concludes that school autonomy negatively impacts individual student results in ILSAs.

At the same time Haahr et al. analyze the factors that impact ILSA results and note that there is a "***positive correlation between a high degree of school autonomy and average student results***" (Haahr et al., 2005). Authors recommend policy makers to ensure whether schools have a sufficient degree of autonomy in their countries.

Another aspect of school influence is availability of learning and other resources. Among these Center for Assessment of Education Quality of RAS mentions teachers, lab equipment, as well as school infrastructure (Kovalyova, 2019)

Mussina (2019) mentions in the analysis of factors that influence results of Kazakhstan in PISA that the number of computers and Internet access are the most significant determinants of results of Kazakhstani students, with the effect increasing with each cycle. It is notable that there is a relatively weaker effect of qualified teachers.

RESEARCH METHODOLOGY

Statement of need for research

In the present there has not been an analytic research in Kazakhstan that would study the causes of low ILSA performance of the country. Subsequently, there is a lack of recommendations concerning measures to fix the critical situation, which is has scientific support with strong arguments.

The causes of Kazakhstan lagging in ILSA results is to be researched as part of this project. The study will allow to problematize the low results of the country not only within the field of education system, but also with a consideration of contextual and other factors that could influence the education indicators. Results of this study can support change in existing reforms and give an impulse to develop new strategies in order to improve the quality of education at all levels. Moreover, they will aid in improving the quality of expert and public discussion on current questions of education development in Kazakhstan.

Research goal

The goal of present research is to identify and extensively analyze the causes of low ILSA results of the education system of the Republic of Kazakhstan, as well as to offer practical recommendations to the competent authority and other stakeholders of change in the current situation.

The following research objectives were identified:

- Undertake literature review on factors that influence the education quality and student performance.
- Perform statistical analysis of various factors influencing education indicators of Kazakhstan.
- Study the opinion of experts in education and other fields, teachers and managers regarding the factors that influence performance of Kazakhstan in PISA, ICILS, and PIAAC.
- Study potential consequences of ILSAs (PISA, ICILS, PIAAC) on human capital and economic growth of Kazakhstan.
- Develop a set of recommendations based on gathered data in order to solve the identified problems and improve the education policy of Kazakhstan.

Authors also formulated the following research questions:

- Which factors influence the quality of education based on literature review?
- Which factors influence the performance of Kazakhstan in international large-scale assessments like PISA, ICILS, PIAAC?

- What are the potential consequences of international large-scale assessment (PISA, ICILS, PIAAC) results for human capital and economic growth of Kazakhstan?
- What are the ways of improving the education quality in Kazakhstan and improve its performance in international studies?

Data collection methods and rationale behind its choice

As part of current study, a decision was made to use qualitative methods of primary data collection, as well as quantitative analysis of secondary data of ILSA results in which Kazakhstan participated in 2018.

Combination of these data collection methods allowed to perform triangulation of them (Wilson, 2014). This study in particular uses intersectional methodological triangulation, which unites quantitative and qualitative data collection methods (Casey and Murphy 2009). Methodological triangulation allows to gather more complete data, increases the validity of research results, and leads to a better understanding of the phenomenon in question. Triangulation allows to minimize the limitation of one method and strengthen the research results overall (Denzin 1978, Sharif and Armitage 2004, as cited in Bekhet and Zauszniewski, 2012).

Literature review and quantitative analysis of secondary data

In order to identify the factors that influence the low performance of the education system of the Republic of Kazakhstan as a result of participation in ILSA, review of relevant research is conducted along with collection of international reports and databases of Kazakhstan's participation in PISA, ICILS and PIAAC in 2018. Correlation and regressive analysis was conducted based on existing international reports and databases, which identifies school and contextual factors that impact the education indicators of Kazakhstan in ILSAs. Correlation and regressive analysis was performed using the SPSS statistical software.

Qualitative method of primary data collection

Qualitative research is based on text and image analysis (Creswell, 2014). This method allows to collect the more complete, in-depth and detailed data regarding the research topic. The current study uses the following methods of qualitative data collection: *expert survey with open-ended and closed questions, as well as semi-structured expert interviews*.

A) Survey with open-ended and closed questions

The questionnaire list is a group of sequential questions to gather information regarding the research topic from the respondent (Dodge, 2003). This instrument is developed to cover the largest number of participants possible and to identify answers to research questions. The advantage of the survey is the simplicity of its design, speed and efficiency of data collection (Creswell, 2014).

As part of the current study, a survey was conducted via means of an online questionnaire, links were sent to e-mail addresses of experts that were invited to participate in research. The possibility of participation and deadlines to complete the online questionnaire were agreed upon by all participants in advance.

Online collection of qualitative data saves participants' time, simplifies the data processing, and offers the survey opportunities the time to reflect on the answers they give the questions. As a result, they can provide a more in-depth reflections regarding the research topic (Nicholas et al., 2010 as cited in Creswell, 2013). Using the virtual space for data collection also helps to build a comfortable and safe environment for the respondent in terms of offering answers to questions. This factor is especially relevant during the time current study was conducted, which coincided with the state of emergency in Kazakhstan and quarantine measures, which drastically limited the mobility of citizens and the opportunity to conducted face-to-face interviews.

Survey results are used together with interview results in analyzing the research data.

B) Structured interviews

Interview is defined as « interchange in which one person… attempts to elicit information or expressions of opinion or belief from another person or persons » (Maccoby and Maccoby (1954, 449), as cited in Young et al., 2018). In order to conduct an interview a research usually personally meets with participants, contacts them via a telephone, or organizes a focus group with up to 8 people (Creswell, 2014).

Semi-structured interview format is used in the present study. This format allows the interviewer to ask additional questions in order to obtain more detailed answers in addition to questions prepared in advance.

Research sample

Targeted sampling was used to select respondents for the research. Targeted sampling means that research participants are chosen in a predetermined fashion based on certain characteristics.

The need to use targeted sampling comes from the fact that the area of research for the current study has a narrow specialization and requires a certain level of expertise that the general population might not possess. Along with knowledge and experience of research participants, it is important to consider the consent and readiness of the selected candidate to participate in the study (Etikan et al., 2016).

According to Meuser and Nagel (1991, as cited in Bogner et al., 2009), "expert" is a person that is responsible for development, realization and control of decisions\strategies\policies. Moreover, expert is a person that has the access to information about a group of people or a decision-making process.

Expert sample is necessary if the research area is lacking in body of evidence. IN addition, this sampling method is a good instrument in studying a new area and assessing the next research stages (Etikan et al., 2016). Participation of experts in the survey and the interview allows to gather data quickly and gain truly high-quality data.

Overall, the advantages of the sampling method in use is an opportunity to collect in-depth expert opinion of respondents and effectively use the resources available to achieve the research goals. The limitations of this sampling method potentially include subjective mistakes of the researcher, low level of reliability of collected data and difficulty in generalization of results, since research results will be based only on opinions of selected respondents (Dudovsky, 2018).

Respondent categories:

The following categories of research participants were identified for conducting the interviews and surveys:

- **Category 1. Education experts**. This category includes individuals with experience of administration in education (local authorities, MES RK, etc., as well as individuals that have experience of working in education institutions or think-tanks and who have their own publications and other accomplishments). Participation of these respondents in the research is due to their ability to answer the questions in a more comprehensive fashion. Moreover, their participation leads to a more in-depth and detailed research of administration issues in education. Education experts can be more informed about the results of Kazakhstan in international large-scale assessments and provide more concrete and specific causes behind Kazakhstan's low performance in ILSAs, as well as recommendations to improve education performance of the country.

- **Category 2. Practicians (school principals and teachers)**. School principals and teachers are individuals who are informed about the practical implementation of education policy. At the end of the day, effectiveness of reform implementation depends largely on teachers. Participation of teachers in the research allows

to identify the practical causes and factors that influence the low performance of Kazakhstan in international studies.

- **Category 3. International experts**. This category includes experts that have experience of working within the context of education system of RK, as well as post-Soviet experts that have experience of working with international large-scale assessments. In-depth and practical knowledge of international experts about education systems of other countries, including their knowledge about the education system of Kazakhstan, allows to obtain a more objective view of causes that influence the low performance of Kazakhstan in terms of education quality according to leading international studies, as well as obtain "*an outsider's perspective*".

- **Category 4. Experts in fields related to education**. This group includes experts with experience of working in analytical institutions, government bodies, and NGOs, who have extensive expertise, administration experience in their fields, as well as their own scientific publications. Issues of the education system are usually viewed as its own prerogative, even though at its core may lie factors (such as well-being of the population, employment, health, economic development, etc.) for which other government bodies bear responsibility. Participation of experts in other fields allows to study the opinion from a further external perspective, as well as study other factors (besides education policy) that influence low education performance in international studies.

Overall, 35 experts participated in the study.

	Category 1	Category 2	Category 3	Category 4
Interview	2 people	2 people	2 people	2 people
Survey	9 people	10 people	2 people	6 people

Participation of different respondent categories in research allowed to examine the causes of Kazakhstan underperforming more comprehensively in terms of education quality in ILSAs and do so using different perspectives. This also allowed to perform triangulation of data; that is, collect data from different sources and from different groups of individuals (Wilson, 2014), and identify the similarities and differences in views of different respondent groups regarding low results of Kazakhstan in international studies.

Analysis of research data

Quantitative data analysis

In order to identify the factors influencing the underperformance of education system of the Republic of Kazakhstan as a result of participating in ILSAs, research

authors use international reports and databases with information on Kazakhstan participating in PISA, ICILS and PIAAC in 2018. Correlation and regression analysis were performed based on existing data in order to identify school and contextual factors that influence the educational performance of Kazakhstan in international large-scale assessments. Correlation and regression analysis of data was performed using SPPS statistical software.

Secondary analysis of data also uses the 2018 PISA, ICILS and PIAAC data (the most up-to-date data). Data from questionnaires of students, teachers, school principals and adult population of Kazakhstan is also used. This allowed to analyze in detail the factors and identify the extent to which they impact the education performance in ILSAs.

It is important to note that data from the aforementioned ILSAs differ both in terms of categories of research participants (schoolchildren and adult population) and research methodology. For example, PISA uses a wide conceptualization of student socio-economic status (indicators of well-being, domestic education resources, culture subjects and household possessions), while ICILS uses indicators like profession, education level of parents and number of books at home. In addition to these differences, the two studies have a lot in common: for instance, assessment of similar competencies and identical age of respondents from certain categories. Therefore during the analysis a condition was established to follow as close as possible the methodology of international studies that is used in data analysis (using weighting files, plausible values and other techniques).

Quantitative data analysis uses various statistical methods and approaches (correlation and regressive analysis). Correlation analysis assumes measurement of the extent of the relationship and interaction between two or more variables. Then, these relationships between several variables can be included in more complex interactions, which are demonstrated by linear regression models or logical regressions. Regression models demonstrate the extent and explanatory power of several independent variables (predictors) in relation to the dependent variable (Creswell, 2012). For example, socio-economic status of teachers explains 4.7% of results in PISA-2018 reading of Kazakhstani students. In other words, socio-economic characteristics of a schoolchild explain only 4.7% of performance in reading.

Results of study participants from Kazakhstan (dependent variable) are analyzed in terms of significance of various factors (predictors), such as education level, profession, geographic location, language of instruction, number of books, possession of a computer, etc. Each study is viewed separately; however, common, inter-study factors (parents' education and the number of books) are also considered in analysis.

Qualitative data analysis

Analysis of qualitative data collected by means of survey and interview was conducted using NVivo software. There are no universally accepted techniques of qualitative data analysis methods, which is why analytical skills and critical thinking of research is quite important in data analysis.

Formal and linguistic-rhetoric analysis of statement structures was conducted using methods by Keller (2011), and Wengeler and Ziem (2010). Keller (2011) notes that statements must be interpreted according to their rhetoric and style. Wengeler and Ziem (2010) use the following elements in analysis:

- key words, thematic framework;
- conceptual metaphors, metaphor fields;
- argumentative template;
- collective symbolism, conceptual metaphors.

Current research uses framework analysis, which consists of phases like introduction, identifying thematic framework, coding, charting, mapping, and interpretation (Dudkovsky, 2018).

Qualitative data analysis includes the following coding techniques:

- Open coding. Primary organization of raw data.
- Axis coding. Merging and linking of code categories.
- Selective coding. Formulation of «stories» through category merging.

Qualitative data interpretation uses the following methods:

- words and recurring phrases – scanning of primary material to identify the most recurring words and phrases of respondents, as well as words and phrases with intonation;
- comparison of primary and secondary data – comparison of interview and survey results with results from literature review and discussion of differences between the two;
- search for missing information – discussion of research aspects that were not mentioned by the respondents, despite researchers expecting this information;
- metaphors and analogies – comparisons of primary research results with phenomena from other fields and discussion of similarities and differences (Dudkovsky, 2014).

In order to guarantee inter-code agreement among researchers; also, reliability of data analysis relies on a set of predetermined common codes (Creswell, 2013). The final stage introduces the answers to research questions based on gathered data.

Research instrument

The existing narrative surrounding the topic of underperformance of Kazakhstan in ILSAs is used in developing the research instrument. In particular, interviews of officials and expert discussions in open access were analyzed. According to speaker opinion, results of Kazakhstani students are "low", "worse", "not the best", "not outstanding", which demonstrates overall negative assessment of ILSA results. A large bloc of phrases emerge in discussing problems: "underfinanced", "presence of three of two-shift schools", "unattractiveness of the teaching profession", "low salary", "neighboring countries are performing better", "we are lagging", "opportunity gap between a regular school and our small grade schools" and others. Preliminary analysis did not identify statement about the responsible individuals that make decisions, and actions to improve results. The issue of the socio-economic status of students, which explains up to 14% of PISA results in OECD states, is also not addressed. In formulating the survey questions, the aforementioned aspects were taken into consideration.

Common categories and codes were identified in comparing texts in order to form the common methodological base of analysis. Overall, 3 questionnaires were developed within the framework of research for different respondent categories (Appendix 1). Surveys gave the following structure:

- Information on research goals and procedures for completing the questionnaire/ responding to questions.
- Short overview of international study results of Kazakhstan.
- Questions for respondents.

RESULTS OF ANALYSIS OF FACTORS BASED ON ILSA DATA

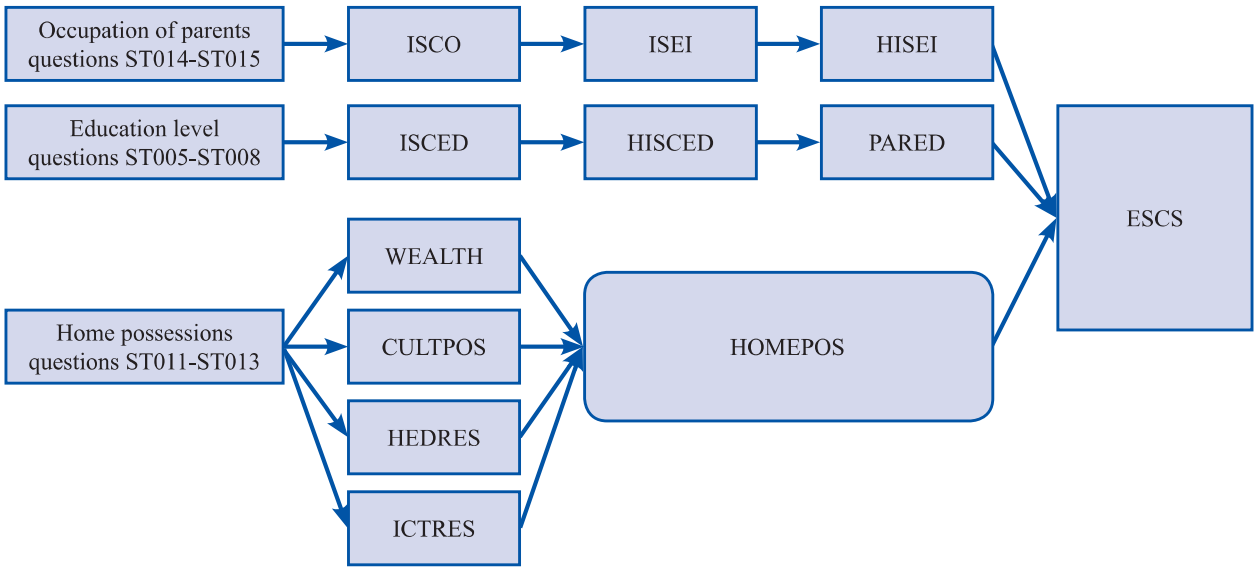
General information

As part of PISA, 15-year-old students are offered to fill in an individual questionnaire. Questionnaire consists of over 70 questions about family, home, language of instruction, attitude to reading, views on life, school and time devoted to learning. 15 questions about family are the basis of estimating the socio-economic status of schoolchildren.

Index of economic, social and cultural status (ESCS in the database) is comprised of the following indicators in the research: the highest parental occupational status, HISEI; highest education of parents, PARED; and the home possessions index, HOMEPOS.

According to theory by Bourdieu, the HOMEPOS domestic items index consists of such indicators as wealth (WEALTH), cultural possessions (CULTPOS) and educational resources at home (HEDRES). In 2015 the index underwent some changes, it expanded to include new variables, such as the indicator of ICT resources at home. As such, for instance, questions from the previous cycles of the study about the possession of a dishwasher and a media player at home were removed the questionnaire. Questions about the possession of an electronic book, tablets and smartphones were added.

Figure 1. ESCS estimation scheme in PISA



Source: Adapted from OECD/Bertling & Alegre, 2019

Despite the difficulties involved in measuring this index, PISA ESCS is considered to be the golden standard of socio-economic status in ILSAs (Cowan et al., 2012). There are several studies that question the validity of this index in cross-country comparison. As such, researchers state that there are huge socio-cultural differences among countries, and the theoretical framework of Bourdieu is based exclusively on Western standards (Rutkowski and Rutkowski, 2013). Moreover, what is noted is the lack of relevance of material possessions that are part of the ESCS index. For instance, possession of a smartphone is not an indicator of a high socio-economic status. In case of divergences in the analysis of ESCS among countries OECD reviews the variables while taking into consideration country-specific variables (i.e. variables chosen by the participating country are chosen, see OECD, 2019: 52). The ESCS index has a mean value of 0 and the standard deviation has a value of 1.

However, despite the difficulties of measuring the PISA ESCS index, this index allows to conduct comparison at student and school level. For instance, PISA classifies student respondents into 4 (25%) quartiles according to their socio-economic status. 25% of students with highest ESCS scores have the highest socio-economic status, 25% of students with the lowest ESCS scores have the lowest socio-economic status. Students in the middle 50% are considered part of middle ESCS (distributed as third 25% and second 25%).

As such, if one considers Kazakhstani students by quartiles in terms of the number of books at home, what becomes clear is that more than 58% of students have up to 25 books at home, 28% have up to 100 books, 12% have up to 500 books, and only 2% have more than 500 books according to the 2018 results. Analysis of ESCS data will include the following variables that are part of home possessions index (see Table 1).

Results of analysis of factors based on PISA 2018

The "WEALTH family wealth" indicator

Regression results of Kazakhstan's results in PISA 2018 demonstrated the impact of the wealth indicator on reading (3.2%), math (1.1%) and science (1.8%) literacy of Kazakhstani schoolchildren[5].

More than 83.2% and 89% of Kazakhstani students have their own room and Internet access respectively (for instance, 94% of Finnish students have their own room and 99.6% have Internet access). Half of students have a photo or video camera, and 70% of students have a satellite dish.

This indicator includes a question about the number of certain items in students' homes. For instance, 1.3% of students do not have a television at home, 10.2% have

5 PV1 was used in the analysis, there are possible minimal errors

more than three televisions, 49% have one, and 39.4% have two. Families of 31.5% of students do not have a car, 48.7% have one, 14.8% have two and 5% have more than three.

PISA also considers the availability of ICT resources at home. 29.7% of students in Kazakhstan do not have a cell phone with Internet access, 22.5% have one phone at home, 12.7% have two, 35.1% have three or more (Finland: 0.3% have none, 1.2% have one, 4.6% have two, 93.9% have three or more).

20.5% students aged 15 do not have a computer at home, 52.6% have one laptop, 21.1% have two and 5.8% have three or more (Finland: 1.1% have none, 15% have one, 29.9% have two, 54% have three or more). 38.5% do not have tablets, 37.1% have one, 11.8% have two and 12.6% have three or more. 80.3% of students do not have e-readers, 15.5% have one, 2.3% have two and 1.9% have three or more (similar to Finland and South Korea).

The "CULTPOS cultural possessions" indicator

Results of PISA questionnaire questions about the possession of cultural items at home show that over 70% of Kazakhstani families have classic literature in their home library, more than 60% have books about art, books of poetry and artworks (paintings). Also over 60% have one or more musical instruments at home. **The impact of this indicator on student competencies appears to be weak: 1.8% for reading, 1.1% for math, 1.1% for science** (to compare with Finland: 7.9% for math, 8.1% for reading, 8.4% for science).

Table 1. ESCS variables list

Variable	Indicators				
	Family wealth WEALTH	Culture possessions CULTPOS	Education resources HEDRES	ICT resources ICTRES	Home possessions index HOMEPOS
A desk			x		x
A room of your own	x				x
A quiet place to study			x		x
A computer			x		x
Educational software			x	x	x
A link to the Internet	x			x	x
Classic literature		x			x
Books of poetry		x			x
Works of art		x			x

Variable	Indicators				
	Family wealth WEALTH	Culture possessions CULTPOS	Education resources HEDRES	ICT resources ICTRES	Home possessions index HOMEPOS
Books to help with school work (encyclopedias, formula books, etc.)			x		x
Technical reference books			x		x
Dictionary			x		x
Books on art, music, or design		x			x
Digital camera*	x				x
Video camera*	x				x
Satellite dish*	x				x
Television	x				x
Car	x				x
Bathroom	x				x
Cell phones with Internet access	x			x	x
Computer (laptop)	x			x	x
Tablet computer (iPad)	x			x	x
E-book	x			x	x
Musical instruments (guitar)		x			x
Number of books at home					x

**Note: Kazakhstan variables in PISA-2018*
Source: ОЭСР 2017: 300

The "HEDRES home educational resources" index

Educational resources at home include a desk, a quiet place to study, a computer and other educational resources.

Analysis of PISA 2018 results in Kazakhstan identifies that 92.1% of Kazakhstani 15-year-old students have a desk, and 90.9% have a quiet place to study. 74.2% have a computer at home to do their homework (94.2% in Finland). 59.3% of students have educational software. 85.2% of Kazakhstani students have an additional educational literature to do homework, 60.4% have technical reference books, 87.3% have dictionaries.

Analysis results demonstrate that this indicator explains up to 2.9% of performance of Kazakhstani students in math, 5.9% in reading and 3.7% in science (Finland: 7.2% for math, 5% for reading, 5.8% for science).

All of the aforementioned indicators are the basis of the home possessions index, which is part of the ESCS index. The largest impact of all of the items at home is on reading literacy (6.5%) followed by science (4.2%) and math (2.7%) (Finland: 7.2% for math, 5% for reading, 5.8% for science).

The "HISEI highest parental occupational status" indicator

The impact of occupation of parents on academic performance of Kazakhstani students is 1.6% for math, 2.6% for reading and 1.7% for science (Finland: 4.2% for math, 3.4% for reading, and 3.7% for science).

The "PARED highest education of parents in years" indicator

The highest education of parents is measured by converting education level into a number of years. Regression analysis results show that education of parents does not affect the results of students in Kazakhstan (0%) (Finland: 4.1% for math, 3.5% for reading, and 3.7% for science).

The index of economic, social and cultural status of students (ESCS) *is comprised of all of the aforementioned indicators.*

Regression analysis shows the influence of ESCS on math literacy (2.2%), reading literacy (4.4%) and science (2.8%) (Finland: 11.8% for math, 9.4% for reading, and 10.6% for science). In terms of scores, improvement in ESCS of a student leads to an increase of 15 points on average in math, 19 points in science and 14 points in science.

On average, ESCS accounts for 12% of student performance in reading literacy in OECD member states in 2018. ESCS has an impact of 15% or more in 20 of 79 member states, and in 31 states the impact of ECSC is less than 10% (OECD, 2019).

Additional variables that have a significant effect in Kazakhstan are reviewed below. These include geographic location, language of instruction and gender identity.

Geographic location

The variable that defines the geographic location of the school, is present in the school survey and consists of five categories: settlement (less than 3,000 inhabitants) – 29.8%, urban-type settlement (3,000 to 15,000 inhabitants) – 10.7%, a small town (15,000 to 100,000 inhabitants) – 8.2%, a town (100,000 to 1 million inhabitants) – 33.4%, and metropolis (over 1 million inhabitants) – 17.9%. These categories were recoded into two variables settlement into rural schools, and urban-type settlement, a small town, a town, and a metropolis into urban schools (dummy coded 0, 1). **Regression analysis results demonstrate that the geographic location of schools has an impact of 1.1% on math, 5% on reading and 3.2% of science**

scores. As evident from analysis results, this factor has an effect comparable to ESCS.

As such, if geographic location is viewed together with student's ESCS, then the effect multiplies, i.e. a student from an affluent family will perform 1.7% better in math, 3.1% better in reading and 1.9% better in science. If one transfers this into scores, an urban student will have on average 28 more points in math, 48 more points in reading and 37 more points in science.

Language of instruction

The research database includes several variables that relate to language of instruction, such as test language, questionnaire completion language, language at home, language of conversation with parents, siblings and friends.

Regression analysis results show that language of instruction accounts for 4.4% of performance in math, 19.1% in reading and 15.7% in science.

As such, if this factor is viewed along with student's ESCS, the effect multiplies. For instance, a student from an affluent family who studies in Russian will have on average 51 more points in math compared to a student from a disadvantaged family who goes to a Kazakh-language school. This factor has an especially strong effect on reading literacy together with ESCS of up to 22.9%, or 86 points in terms of scores. It also has a strong effect on science literacy of students at 18.1% along with student's ESCS.

Analyzing geographic location, language of instruction and student's ESCS together, it is possible to observe that the overall effect of all three factors is stronger with 6.5% for math, 24% for reading, and 18.7% science literacy. In terms of a score, a student from an affluent family in an urban area who studies in Russian has on average 56 more points in math, 100 more points in reading and 82 more points science.

Gender identity

In terms of gender, 48.6% of PISA 2018 participants were girls, and 51.4% were boys. Our analysis did not identify the impact of gender on math literacy. Differences in gender have an effect on reading literacy of 2.9%, and 0.3% of science. For instance, girls score on average 29 more points in reading.

Results of analysis of factors based on ICILS 2018

The results of the inaugural ICILS study in 2013 identified that characteristics that reflect the high socio-economic status are associated with high levels of computer and informational literacy within and among participating countries (Fraillon

et al. 2014, p. 250). ICILS 2018 used responses from student questionnaires in order to measure the socio-economic conditions, specifically the occupational status and education of parents, and the number of books at home.

Similar to PISA study, students reported about the occupation of their parents, which was coded according to ISCO-08, further coded as the ISEI "International socio-economic index of occupational status".

For instance, 51.7% of students' parents in Kazakhstan work in an occupation that ranks below 50 points on the ISEI scale, while 48.3% of parents work at more prestigious jobs. Education level of parents is also distributed according to ISCED-11 categories.

ICILS results suggest that 1% of Kazakhstani parents do not have education, 9.3% have a 9th grade equivalent in education, 23.8% have secondary education, 30.5% have technical and vocational education, and 35.3% have higher education.

In order to identify the highest level of education, two categories of parent education are used, "below ISCED-6 (post-secondary non-tertiary education, short cycle of tertiary education)" and "ISCED-6, 7 and 8 (undergraduate and higher)". The number of books at home was calculated using five response categories: "0 to 10 books" (few or none at all), "11 to 25 books" (approximately one shelf), "26 to 100 books" (approximately one book cabinet), "101 to 200 books" (approximately two book cabinets), and "over 200 books" (approximately three or more book cabinets). In order to identify the influence of books on computer and informational literacy, two response categories were used: "less than 26 books" and "over 26 books" (IEA, 2019). As such, for instance, 14% of students have up to 10 books, 41% have up to 25, 31% have up to 100 books, 9.2% have up to 200 books, and 4.8% have over 200 books. There is a 2-3% difference with PISA responses.

Students provide this information in the questionnaire chapter "Home and family", which not only includes the questions about the education and occupation of parents, but also includes questions about the country of birth of students and parents, language of communication at home, the number of ICT devices at home (computer, laptop, tablet, e-book, etc.), Internet access and the number of books.

Occupation of parents has in impact of 3% on informational literacy. In terms of scores according to the socio-economic index of the occupational status of parents, there is an average difference of 39 points between students whose parents work in an occupation of a lower status and whose parents work in higher status occupations (difference in 37 in Finland, 19 in Korea and 21 in Moscow). The average difference in education level of parents is 42 points, meaning that students whose parents have higher education outscore their peers (difference is 15 in Finland, 22 in Korea and 31 in Moscow). In percentage terms education level has an impact of 4% on computer and informational literacy.

The number of books at home has the highest impact among the variables, with an average difference in scores of 52 points among students who have up to 26 books at home and those who have more (difference is 44 in Finland, 52 in Korea and 33 in Moscow) (IEA, 2019). This is equal to 6% in percentage terms. Internet access at home also has an impact of 4% on computer and informational literacy (an average of 63 points).

In addition, students provided information in the questionnaire about computer devices at home and the length of its use. Students that have two or more computer devices at home score 48 more points in computer and informational literacy compared to students who have fewer ICT devices (difference is 26 in Finland, 28 in Korea and 23 in Moscow). The difference in experience of using the ICT devices is 61 points among students who have an experience of less than 5 years and those who have used a computer for over 5 years (difference is 34 in Finland, 47 in Korea and 19 in Moscow).

Moreover, the migration status of Kazakhstani students makes a difference of 25 points, meaning that students with parents born in other countries score 25 less points (difference is 51 in Finland and 18 in Moscow). Language of education and communication with family did not lead to a significant difference (difference is 46 in Finland and 42 in Moscow) (IEA, 2019).

According to regression analysis, there was no significant difference as a result of gender differences on computer and informational literacy. Unfortunately, the open access database does not have the information on geographic location of the study participants.

Results of analysis of factors based on PIAAC 2018

PIAAC study participants also completed a questionnaire with indicators of socio-economic conditions of the adult population of the RK, such as the highest education level of both parents and the number of books at respondent's home at the age of 16. The PIAAC questionnaire also collected information about the occupation, education, health and lifestyle of respondents.

The results of analysis of all variables in PIAAC allowed OECD to identify that education level of parents of the respondent is one of the strongest predictors of socio-economic status of the respondent. Using this indicator in the first three rounds of the study established that adults in OECD member states that have one parent with higher education score 41 more points than those respondents whose parents do not have secondary education. The average difference between people with higher and secondary education is 17 points (OECD, 2019). OECD explains such a significant difference due to individual characteristics, since the effect of the socio-economic conditions is passed on from one generation to the next, meaning

that respondents that have parents with higher education will earn higher education themselves (OECD, 2019).

The average difference between Kazakhstani respondents who have one parent with higher education and those that did not graduate middle school is 20 points, and only 5 points between higher and secondary education.

Such a small difference between the education levels in Kazakhstan suggests that an increase in the share of population with higher education did not have an effect on literacy of the population. Literacy of young people aged 25-34 is at the level of a senior generation aged 55-65. This means that the RK does not have significant differences among study participants in terms of age, compared to OECD member states where the average difference is 28.6 points in favor of the younger population.

18% of adult population in Kazakhstan had less than 10 books at the age of 16, 30% had up to 25 books, 35% had up to 100 books, 11.2% had up to 200 books, 4% had up to 500 books and 1.8% had over 500 books. This data was recoded in a fashion similar to (up to 26 books is 0, over 26 books is 1). Regression analysis demonstrated that **the number of books at home has an impact on reading literacy of 5%, or an average of 17 points in terms of scores. Possession of books at the home of parents improves the math literacy by 18 points (6%), and problem-solving skills by 14 points on average (4%).**

Comparative analysis of the effect of variables in three international studies

As such, reviewing the results of three international large-scale assessments in terms of common SES variables allows to conclude that the main indicators that have impact are education of parents and the number of books at home.

The number of books at home has an effect of 3-6% on development of skills.

Parents' education in PISA does not have an impact within the context of Kazakhstan, which can be due to worsening of the quality of higher education in the country.

Parents' education has an effect of 4-6% in the PIAAC study.

There is a significant effect of these factors on computer and informational literacy (see Table 2).

Table 2. Comparative analysis of variable impact in the RK

		Education level of parents		Number of books at home	
		Score (average)	%	Score (average)	%
PISA	reading	1	0	34	5
	math	1	0	29	3
	science	0	0	32	4
PIAAC	reading	10	4	17	5
	math	11	5	18	6
	science	11	6	14	4
ICILS	computer and informational literacy	42	4	52	6

RESEARCH RESULTS

In order to guarantee anonymity and informative value of data from experts who provided the statements below, the category of the expert in accordance to research methodology is offered:

- Category 1 – Experts in the field of education of the RK (e.g., "Expert 1.1", "Expert 1.2");
- Category 2 – Practicians (school principals and teachers) (e.g., "Expert 2.1", "Expert 2.2");
- Category 3 – International experts with experience of working in the education system of the RK, and post-Soviet experts with experience of working with ILSAs (e.g., "Expert 3.1", "Expert 3.2");
- Category 4 – Experts in the fields related to education (e.g., "Expert 4.1", "Expert 4.2").

Expert opinion on significance and usefulness of ILSAs

Experts answered the questions on the impact of ILSA results and their general usefulness in building the overall picture of the education system, questions about the awareness of experts about and their assessment of the role of ILSAs.

Overall, 50 statements on significance and usefulness of ILSAs by experts were extrapolated. During the analysis of qualitative data three main sub-topics were created: "Use of ILSA results", "ILSA as source of data" and "Consequences of ILSA results".

According to observation of experts who participated in interview, ILSA results are used in data analysis and development of education policy in Kazakhstan. However, it is **not always effective**.

«These studies always were an important trigger for change in discussion… they explain, motivate and justify further reforms in education».

(Expert 3.2-I)

«…we are using PISA in Soviet way here, as a sort of ideological instrument of informational policy of the government».

(Expert 1.1-I)

Many respondents agree that participation in ILSA is mostly necessary to acquire data on education. Experts share a common opinion that ILSAs provide "the real picture", "cross-section", assess "the level" of current education, and allow to compare national achievement with that of other countries.

«…external assessment of the education system plays a key role».

(Expert 4.1-I).

Among 26 answers of respondents 33 mentions were coded concerning the importance of using international large-scale assessments **to inform and change the education policy**.

«Participation in international studies is an important aspect of guaranteeing quality of education. It is an opportunity to observe the system from different perspectives, creating conditions to make policy decisions with substance. Thanks to studies it is possible to identify factors that have an effect on education».

(Expert 4.1-S)

«Ceasing the studies means ceasing your own development and move nowhere. Studies need to go on in order to increase the competitiveness of Kazakhstani education and science, upbringing and education of the individual based on values common to all of humankind».

(Expert 2.5-S)

«Today it is one of the only reliable sources of data that undergoes verification. It is already possible to make conclusions and change the approach in the work on developing the human capital based on them. Ignoring them will lead to work in the wrong direction, which will result in worsening in quality of human capital».

(Expert 1.3-S)

«Any form of measurement has its own disadvantages. However, measuring up against the progressive world in order to achieve your own progress is the most important course that our state has chosen. Improvement of indicators within the framework of these studies is an important task, but it is important to study it comprehensively, instead of chasing digits so that you can report results at meetings with the leadership with pride».

(Expert 4.1-S)

At the same time, 3 out of 26 survey respondents note that there is **no need to overly focus** on the results of international large-scale assessments.

«Since the aim of PISA is to measure whether students can apply their knowledge in practice, while our education system does not have such goals, I do not see the point of Kazakhstan participating in such tests».

(Expert 2.3-S)

Both interviewees and survey respondents note the **need to correctly interpret** and analyze the ILSA data for further development of education policy.

«…I think we need to put more emphasis on analytics, research and take concrete measures based on their results ».

(Expert 2.1-I)

«Participation is useful. However, there needs to be action after receiving results, instead of cyclically participate without respective analysis. We do not use the study results wisely, do not publicize them. We need a good analysis of national databases in international studies for further policy decisions».

(Expert 1.7-S)

«I am opposed to adopting specialized research preparation programs. Good study results must be the results of systematic and effective reforms in education and related sectors. This is why

it is important to conduct a strong cause and effect analysis across study results, current reforms and their weak spots».

(Expert 1.3-S)

«We need regular analytics that is not based on statistics, but on qualitative characteristics. There is a need to develop a system of national assessment, while international studies are merely a reference point. We must build a "portrait" of the entire system and processes of education in our country. Only then we can identify if the "field of issues" of education is becoming clearer, after which a "field of projects" emerges to initiate change and improvement».

(Expert 4.2-S)

In talking about the need for quantitative data analysis obtained as a result of participation in ILSAs, interviewees recommend **developing the national analytical study potential,** noting, among other, a deficit of professionals. The recommendation is to develop research center and the potential of human resources, distribute scholarships to analyze the ILSA results. Two survey participants also expressed this opinion.

«…The research component is lacking in the ministry. There is not enough analytics. Sometimes I think that the decisions are made to earn check marks from the society, and are not based on any analytical data …».

(Expert 2.1-I)

Experts answered the question about satisfaction with the RK results in ILSAs, calling them "*unsatisfactory*" and "*uncompetitive*".

«…We were assessed. Correctly assessed. Reality is what it is. It is horrible, very bad. It is a tragedy, to be honest».

(Expert 4.2-I)

«…It is a wake-up call for us. It is a hint that we need to change something, since the results suggest that our children now are comparatively … uncompetitive. That is the result, that is the conclusion».

(Expert 2.1-I)

More than a third of the survey participants (7 out of 26) agree.

«According to the latest data, the quality of education is declining. In the future this will have an effect on social as well as economic development of the country. Low qualification of human resources, the inability to apply modern technology, lack of scientific potential, all of this can have a negative effect for the country in the future».

(Expert 1.8-S)

«We need to do something. Results of Kazakhstan are really low. PIAAC results of Kazakhstan disappointed me. This means that the young generation did not become smarter over the years, even the reading skills are basic».

(Expert 4.5-S)

«If we talk about the system in general, then the results of these studies actually show that there are a lot of problems in the field of education policy, in the system of teacher training and in the quality and content of their training».

(Expert 1.1-S)

Six experts answered the questions about the projected consequences of the ILSAs results for the well-being of the country, agreeing that data suggests a quite worrying forecast.

«…These trends will become stronger. And this will result in very serious issues in the labor market … Having a low quality of labor resources will make it hard to be competitive. So there is a vicious cycle, since it will have an impact on nation's income».

(Expert 4.2-I)

At the same time, experts note that the ILSA results might not be a substantial indicator of forecasting the economic growth of the country.

«Economy… does not only depend on results of these measurements. Overall, economy is a complex concept… If we improve the results of international large-scale assessments in education, how much would that improve our economic condition and the success of the economy?»

(Expert 1.2-I)

Along with opinions about Kazakhstan's participation in ILSAs, experts offered other assumptions. For instance, there was a worry that focusing attention on ILSAs creates a "*race*" no one needs. Experts recommend systematic development of education.

«…This does not mean that we need to lie and only upgrade our skills in science, math and reading. We must not only get into and chase after good positions in international rankings».

(Expert 4.2-S)

«…We do not really need … to 100% concentrate and rely on results of these tests and use them exclusively to talk about the quality of education in Kazakhstan».

(Expert 2.2-S)

Factors that influence the quality of education according to opinion of experts

The main goal of the current study was to identify the reasons behind low results of Kazakhstan in ILSAs and the problems in education that come from them, according to experts.

Expert that participated in the interview and survey could express their opinion about the main factors that influence the ILSA performance of Kazakhstan, such as education policy, school features and contextual indicators.

Experts also responded to questions about the main problems of the education system that affect its development, and which problems they believe must be solved

in order to improve the Kazakhstani education system while considering international studies (see Appendix 1).

Respondents touched upon a broad spectrum of issues and questions that influence the quality of national education and ILSA results while answering the interview and questionnaire questions. It is important to note that during the semi-structured interviews experts could comment on and mention certain problems in the education system, which they link to ILSA results. They provided these answers while answering the questions that did not directly address these problems. In this case their comments were coded as relating to "problems" of education.

5 main conceptual categories mentioned by experts as problems that affect the quality of education were identified during data analysis:

- quality of instruction and shortage of professional human resources,
- education policy and strategy,
- financing and infrastructure in the education system,
- quality of the curriculum and academic and methodological complex,
- gap in knowledge level and inequality in education.

Problem 1. Quality of instruction and shortage of professional human resources

Overall, the results of interview coding allowed to extrapolate 51 statements by experts regarding the importance of teaching quality and its effect on academic performance of students.

During the analysis of study results using NViVO responses of experts were grouped around the main sub-topics: quality of university training of teachers and the problem of attracting talented individuals into the profession.

Experts talked about the influence and quality of university training, commenting on the overall quality of the higher education system in the country as well as the specific problems of teacher training and professional development.

For example, experts (6 people) commented on the ILSA results as part of the interview, noting the low quality of higher education in the country.

«PIAAC actually suggests that a higher level of education in Kazakhstan might not make us better. You can study five years to acquire higher education, and it will not make you smarter or more competent».

(Expert 3.1-I)

«This means that the quality of higher education here in Kazakhstan also does not meet the requirements of the time. You cannot expect otherwise, since experienced individuals left the systems of both secondary and higher education, and the salary is low. This tendency is still here».

(Expert 4.1-I)

The low quality of university teacher training was mentioned by experts several times as a principal cause of problems in quality of national education.

«Formal teacher training and easy access to diplomas in pedagogical universities. What I saw with my own eyes was that becoming a rural teacher was really easy. You come, submit documents, and in a year or two, without ever coming to sessions, without passing any exams, you make agreements and come back with a diploma. While these "mediocre" pedagogical universities exist and offer diplomas to anyone, our education will be lacking. We need to reform the pedagogical universities and forbid them from offering these documents. This, I believe, is on the verge of being a crime against our kids».

(Expert 2.2-I)

«… Senior and experienced teachers leave the education system. It is the era of new teachers who have a very low educational potential. Emotional characteristics, I think, require something better. The weakest teachers remain in the education system. This is a dangerous trend».

(Expert 4.1-I)

«I think that they do not have the skills needed to do concrete things … You can ask any primary class teacher ask about the language acquiring theory, how a child understands language, how he learns phonetics, alphabet, coding, and comprehension. They do not understand all of that, they do not understand the concept of theory and methodologies itself. They are too dependent on the textbook. The textbook is still the truth to them».

(Expert 1.1-I)

Similarly, 10 out of 26 survey participants note the low quality of higher pedagogical education in the country.

«Unfortunately, most of the education schools and institutes still follow the Soviet pedagogy and theory. There is no innovative pedagogy nor the pedagogical science».

(Expert 1.1-S)

«Professional and methodical teacher training in universities is unsatisfactory».

(Expert 1.9-S)

«It is assumed that the new system will update the students' way of thinking. However, teachers are stuck on the old system. We need to start teacher training from the university, Many young teachers have a weak grasp of new methods and technologies of education».

(Expert 2.4-S)

Two interviewees also noted **the lack of systematic connection and succession** between the school, TVET institutions and universities.

«…qualification system, modular curricula, competency banks, sectoral competence centers, which should guarantee the connection between education and the labor market, do not actually perform the functions declared by the Ministry of Education. This is due to the fact that resources are scattered in an irrational fashion, without the analysis of the entire education infrastructure, regional economics and connections with the economy».

(Expert 4.2-I)

«I would introduce as much autonomy as possible for the two levels of education (TVET and higher). It is important that, especially for TVET actually, the colleges could set their own regional needs, the needs of their own employers, re-build modular education and hybridize».

(Expert 1.1-I)

Important aspects mentioned by the experts, when they answered the questions about the problems that affect the education quality, include **quality of applicants that apply for pedagogical majors, as well as their motives.** As follows from the analysis of respondent opinions, there is a problem in quality of future teachers that can be solved by attracting talented specialists into the profession (teacher education is not necessary); however, the competitiveness of the working conditions needa to be guaranteed first.

«Yes, very weak applicants apply for pedagogical majors. I think we need to drastically reform the pedagogical universities using these studies».

(Expert 3.1-I)

«They do not view the teacher career as a career. There are no substantial talks about it. The teacher profession is not viewed as a career, but as a job you have to do».

(Expert 1.1-I)

Low level of academic performance of candidates that choose the teacher profession is noted by the survey respondents as well.

«Competency and refilling of the teacher cohort leaves a lot to be desired».

(Expert 2.8-S)

According to experts, **there is no system of attracting talented specialists into the teaching profession** in the present in Kazakhstan, and this is one of the main problems in improving the education quality.

«Until there is a judicial and financial system in place whereby talented people would want to enter education or consider education as a thought-out career, everything else will be useless».

(Expert 1.1-I)

«We must improve the quality of teachers, the quality of selection in the teaching profession, solve the financial issues of teachers. Being a teacher must be attractive for graduates with a good academic standing».

(Expert 2.1-I)

«We need to return the qualified individuals that have good training back into the education system».

(Expert 4.1-I)

10 survey participants think that it is important to increase the requirements for applying to pedagogical majors and attractive the most talented individuals.

«It is important to not only drastically change the teacher training system and teacher education. It is important to make the teaching profession prestigious, increase the salaries and generally create an attractive social package. Then people will not apply to become teachers by

the leftover principle, so it is important to establish high requirements for applying to pedagogical schools».

(Expert 1.1-S)

«Selection during career advising in pedagogical universities needs to be improved. Only best school graduates to pedagogical universities».

(Expert 1.9-S)

Moreover, 18 out of 26 survey participants find it necessary to improve the teacher status in Kazakhstan.

«Increasing the moral, material and social status of employees in the education center. The level of education does not depend on attempts of officials based on various, sometimes pseudo-events of increasing the quality of education. The most important thing is that there should be demand in educated people, specialists in society, industry, and economy, as is the case in Japan, South Korea and other developed nations in terms of educated people. Such demand on behalf of these institutions is non-existent, which explains the condition of our education».

(Expert 1.4-S)

«The second factor is a low social status of teachers in Kazakhstan, including low salary, high workload of teachers with work that is not characteristic for them given by local authorities only because they receive their salary from the local budget. All of this leads to dissatisfaction of teachers with their status, salary and lack of opportunities. Teachers are afraid of voicing their dissatisfaction to their administration due to fears of being fired, so they let it out on children. That is the vicious cycle of violence and bullying against teachers, from the highest central authorities down to local authorities, to school principals, teachers and children… And that is how you have low results in international studies!»

(Expert 4.6-S)

«It has become commonplace to sat that the quality of the education system cannot be higher than the quality of teachers. Without professional staff, modern infrastructure (typical school buildings, school subject rooms and labs, Internet, etc.), good moral and psychological climate and competent management it is impossible to achieve a high quality of education».

(Expert 1.9-S)

Problem 2. Education policy and strategy

The results of interview coding resulted in extrapolation of 23 statements by experts on the influence of government policy on the education system in general and the ILSA results of Kazakhstan in particular.

During the initial coding, expert responses were grouped into two main sub-topics: quality of administration of the education system and strategy/education policy. It is important to note that statements of experts relating to such aspects of education administration as financing and provision of infrastructure are analyzed as a separate problem. At the same time, the framework of this section offers analysis of expert opinions about the strategic vision of education development and administration.

As such, experts pointed out the following problems of school management and principal autonomy.

«There is an opinion that all schools must be managed by the ministry or the local executive authority. I am against the idea that schools should come under the ministry, but I also disagree with the control of executive authorities. This often results in the former akim of the village becoming the school principal, or former principal becoming the district akim. This goes on in circles. To break the cycle, we need to gradually transfer control to the private sector».

(Expert 1.2-I)

«Schools will function better if they come to understand that it is not about matching some formalities, but rather simply their own improvement, that they will be responsible for this improvement. If you do something like this, you start to see which principals are actually good».

«Currently the system promotes, stimulates and rewards the principals with different types of skills, talented in other ways, such as knowing "the rules of the game" and following them in a proper manner. They are more about administration. They are not rewarded for being creative. On the contrary, if you are too creative, you will have all sorts of problems with inspectors, regional education departments, the ministry and others».

(Expert 3.2-I)

6 out of 26 survey participants highlight the important and influence of the leadership of the educational organizations, as well as the need to improve the qualification of the school leadership.

«I believe a lot comes down to regional budget and the principal. School leaders influence the environment quite a lot. I have the experience of working in North Kazakhstan and in the South, I frequently talk to colleagues from comprehensive schools. Everyone complains about corruption. The situation in the South is off the charts. And the disrespect of teachers. Of course, there are individual outstanding principals. But the observed trend is the reverse».

(Expert 2.1-S)

«Kazakhstani schools do not use a lot of digital technologies in management and teaching. Because the paper version is still a requirement. We need to change the administrators and deputies by appointing younger personnel».

(Expert 2.4-S)

«The school management system requires a lot of change. Administrators need to get rid of the old methods and stereotypes, when certain administrators are still not familiar with the updated educational program, and all of the work is done by their deputies. Administrators only study a certain subject during the advanced training courses and after defending and obtaining a certificate they do not continue studying it, since the school problems (a large number of children, inspections, complaints, financial problems, tasks from higher-ups, etc.) take a lot of time, and research fades into the background. Post-course support and control must be continuous. Moreover, most school administrators are vulnerable against competent authorities and parents. It is necessary to enact change in the 77th decision, schools must accommodate a position of lawyer. Administrator must improve the education quality at school. He must first acquire all of the competencies himself».

(Expert 2.4-S)

Separately during the interview experts mentioned **approaches to management in the field of education in general**. There was both criticism of the main executive authority and suggestions to decentralize the management of education.

«It once again comes down to the management system in education. It is absolutely inefficient, it is directed towards making some sort of reports, purely cosmetic, one-off tasks, without the strategic vision and understanding of their mission and role, especially when it comes to current conditions connected to the tasks of transitioning to the new economy, economy of knowledge and digitization».

(Expert 4.2-I)

«…quite often the plans of the Ministry of education and science seem to be detached from reality in some way. They can be too ambitious, the timeline might be too unrealistic, and that is what often happens. As such, in fact everything leads to the fact that the system does not function as planned, simply because there are no opportunities to realize the plans at the school level. And students pay for all of this, of course».

(Expert 3.2-I)

«The ministry resembles a dog on the pile of hay now, it cannot do anything itself to improve the education quality nor can it offer the market mechanisms to properly function».

(Expert 1.1-I)

«Kazakhstan is a vast country, which is why the illusion that the ministry can control everything. It simply does not work, just as it did not in the Soviet Union».

(Expert 3.2-I)

«Policy is developed top-down. However, the people responsible for it of course stand at the school level. For me it is of utmost importance what happens in schools, the extent to which schools and teachers become the part of the reform, part of the education policy».

(Expert 3.1-I)

9 survey participants also note the importance of change in the mechanisms of administration in the education system.

«First, you need to build a hierarchy of the 'field of problems' of education, so as not to sort them out just like that, side by side. First and foremost, they are related to the management of the education sector at the level of the country, regions and schools».

(Expert 4.1-S)

«Liberalization of ways to achieve compliance with state and international education standards, namely the choice of textbooks, teaching methods, curriculum and subject content in education».

(Expert 4.2-S)

«It is necessary to create an effective management structure of the school and activate the work of the board of trustees».

(Expert 1.10-S)

«Regional authorities are not efficient enough to stimulate, as well as ensure the high-quality performance of certain tasks facing the school. All this basically shows that the "higher ups" demand, but the "subordinates" cannot do this. This includes the material and technical support

of educational organizations, and the qualifications of teachers, and the unfeasibility of some points of the educational strategy or policy, including the lack of quality feedback on the programs being implemented in the field of education».

(Expert 2.8-S)

Analyzing the vision and implementation of educational policy in the country as one of the factors influencing the results of the ISI, experts agreed on the **lack of a clear focus of state policy on education issues.**

«It's time to understand that without raising the educational level of the population, without improving the quality of education, we will not be able to withstand the competition. Therefore, it is necessary, first of all, to make the solution of problems of education and science a priority».

(Expert 4.1-I)

«I draw your attention to the fact that there is no need to chase after the result. It will generally come itself. The question is what needs to be done with the education system, its effectiveness, etc. Moreover, we should be concerned not only with state institutions, but also with the general infrastructure and the flow of knowledge in general».

(Expert 4.2-I)

«Education is the main priority, the quality of human capital. This is the basic condition. Everything else will follow. [....] Until this priority of state policy is built… – there is no need to say anything else».

(Expert 1.1-I)

«I think that if education is not a priority at the government level, then the Ministry of Education and Science alone will not solve anything. […] At the level of government… they must realize – again for the sake of the country's future – education must be a priority so that human capital will develop, and the country will be competitive».

(Expert 2.1-I)

«Culture and policies of the country. Unless education is interesting, and teaching is prestigious, it is difficult to globally and systematically change the quality of education».

(Expert 3.3-S)

«It is not about the results of international large-scale assessments to develop human capital and economic growth in Kazakhstan, but about real attention and real concern about the education system on the part of the state, authorities, and the whole society».

(Expert 1.4-S)

Experts also voiced **criticism about the main policy document on education** (State Program for Education and Science of Development), which, in the opinion of experts, does not contain specific measures to solve the relevant issues.

«…There is no vision, mission, general flow of some kind, some incomprehensible textbooks or programs were lowered from above, well, we are implementing them. Criticism? Well, okay, good, let's go and keep running further».

(Expert 4.2-I)

«The program is a tool for implementing state policy in this area. It should contain specific things, specific directions, specific priorities and necessary resources. If there are many words in the document that cannot be realized, then they do not give the desired result […]. There is a

huge gap between educational policy and the educational program prepared by the Ministry of Education and Science. Society has requests ... People would like their children to receive a decent education. But the program that exists today suffers from verbiage».

(Expert 4.1-I)

«All things are connected in the following way: in order to influence the reduction of the role of the socio-economic background and context, you must have the right policy in place. For the policy to be correct, you must have the right school environment, the right teachers, and so on».

(Expert 3.2-I)

Three experts mentioned in the framework of the interview **corruption** as one of the factors hindering the development of the education system as a whole. At the same time, corruption, as a phenomenon, was noted at all levels of education, as well as in the process of employment.

«Unfortunately, education is very corrupt, from the security guards at the school to the principal. Well, and higher up. All of these facts are well known, and I personally heard that the principal will not hire a technician for less than $1000. The principal's wage is $25,000. Everyone knows this, but they are silent. Until corruption is eradicated, there can be no talk of quality. Unfortunately, that is our big problem».

(Expert 2.2-I)

«…A graduate comes out of a university without any experience. On a call once, and gets in, and that's it – the problem is solved».

(Expert 1.1-I)

The problem of corruption in education is also mentioned by 6 of 26 expert participants of the survey.

«Remove the factor of corruption, extortion of principals in secondary schools, "bribes" for getting a job in South Kazakhstan. Education departments have too much power».

(Expert 2.1-S)

«It is necessary to actively involve parents and students of schools in the formation of the school budget, where the budget funds are spent, as well as monitoring the execution of the budget. This will reduce the level of corruption at the level of schools and municipal/regional education departments».

(Expert 4.4-S)

«Non-transparent public procurement from a single source and corruption risks at all level, including Ministry of Education and Science, municipal/regional education departments, school principals and teachers».

(Expert 4.4-S)

As part of the interview experts also mentioned that the main **focus of the education system in terms of supporting children from vulnerable groups is on its social function** (assistance to students from low-income families, the priority of attendance rather than academic achievement), which affects the efficiency of both the school education and, later, the state of the economy. It is important to note that the experts do not object to supporting vulnerable students per se,

but emphasize the weak accountability of educational organizations for academic learning outcomes

«On the one hand, there are many efforts to support a student from a dysfunctional family who is experiencing difficulties. On the other hand, there is no support for him or her in terms of academic achievement. Efforts to achieve greater equality, fairness and support for disadvantaged groups in education, which are now being made in Kazakhstan, have a strong social focus. There is support for children to come to school and eat at school. But if we talk about academic support, then it is much weaker for some reason. This is not about academic support, because the school really cannot provide it. Teachers do not know how to do this, they have no time, and they are tired».

(Expert 3.2-I)

«We have to decide who will graduate. Does our professional education perform the role of issuing diplomas to certain people, providing them with some kind of employment through free education, meals, etc.? Or are we still training employees for the economy?»

(Expert 4.2-I)

Problem 3. Shortage of financing and weak infrastructure

Statements of 34 experts in the interviews were coded as concerning the state of infrastructure and financing of the education system, which affect the quality of education and academic achievement of students, including the ILSA results.

Speaking about infrastructure problems, the experts first noted the congestion of schools, teachers and the shortage of new schools. This opinion was shared by both experts, practitioners from the field of education, and experts from other fields.

«The very first, most important factor of poor performance is, of course, the school infrastructure. This is unambiguous. This is the basis of everything. It makes no sense to talk about competition with OECD countries without good infrastructure».

(Expert 1.2-I)

«There are not enough schools. And there is no money to build them. The question is, why did you spend money on something that did not bring any benefit at all, when you do not have enough schools? It is unclear».

(Expert 1.1-I)

«The fact that more than half of Kazakhstani schools, even in cities, have outdoor toilets, that says something. Therefore, this issue was raised last year. This year, special measures are being implemented to address this problem. There is no sewage system, no water, no toilets. But this is, let's say, the very first necessity».

(Expert 4.1-I)

«...congestion in big cities and overcrowding of children in classrooms. We are updating the content of the programs. And the classrooms are very overcrowded. We have 30-32 children in primary grades at school. But here you need an individual approach. Therefore, the teacher has a lot of work, and they are overloaded [...] Plus, teachers have a lot of workload as is, because they take, say, 27-30-33 hours in order to earn a normal amount. Imagine this, the teacher teaches

33 hours a week in a class of 30-32 children. And, consequently, he himself as a teacher, as a person has a very heavy workload».

(Expert 2.1-I)

Thus, the experts describe a complex problem of the infrastructure of school education – the lack of school buildings, the resulting two-shift and three-shift schools, which affect the quality of the educational process and the comprehension of material by students. As one of the practitioner experts notes, a big teacher workload that they take because of the specifics of the remuneration system, also affect quality of teaching and their ability to work.

Four survey participants also noted the problem of congestion in schools.

«The quality of infrastructure directly affects the quality of education. There are schools that work in 3 shifts. In some classes, the number of children reaches 40. It is difficult to talk about quality, given that the teacher cannot devote even 1 minute to each child. At present, the most urgent task is that schools should work in one shift».

(Expert 2.10-S)

«A large number of small schools, lack of schools by regions and cities».

(Expert 1.2-S)

«Local executive authorities should regularly report on the excessive number of children at school, eliminate 3 shifts in schools, allocate land for the construction of schools, attract private investors, and monitor the quality of construction. In the State Program for the Development of Education and Science of the Republic of Kazakhstan for 2020 – 2025, one of the main tasks is to ensure a safe and comfortable learning environment. I would like to note the responsibility of government authorities for the implementation of the program, for example, the Ministry of Education and Science together with the regional akimats. Demand from educational organizations is always high».

(Expert 2.10-S)

The problem of the lack of schools is closely related to the funding allocated for the development of secondary education in the country. As expected, the experts noted insufficient funding as one of the main problems hindering the improvement of the quality of education during the interviews.

«This is the most important problem at the country level, problem number one. We have announced that we will bring funding for the education system up to 7% of GDP. But it remained all talk. We must follow through with this declaration, move from words to deeds».

(Expert 4.1-I)

«It is necessary to allocate a sufficient amount in the budget so that the education system is not in need of anything, so that something is constantly moving forward, something is improving. All this requires money. If education is not a priority of the government, then, accordingly, sufficient funds will not be allocated for it. And everything in our education depends, of course, on the budget. If there is a good budget, then there will be good staff, good schools».

(Expert 2.1-I)

A third of the survey participants also draws attention to the underfunding of the education system.

«Funding for education should be significantly increased, without this there can be no change».

(Expert 1.2-S)

«Also ... it is necessary to think about measures to improve the social status of the population in terms of increasing their income, as well as bringing the total spending on education up to 5 percent of the country's GDP».

(Expert 1.8-S)

Experts also **associate insufficient funding of education with a shortage of qualified, motivated teachers.** One of the experts spoke about the possible low quality of textbooks and noted that a good teacher should be able to find other sources of data to conduct lessons, and not be completely dependent on them. Raising teacher salaries, according to the respondents, is one of the main tools for attracting talented specialists to the profession

«Today there are many sources of information. It is not necessary to follow Kazakhstani textbooks. On the Internet, you can find and guide children to additional sources. But most importantly, only teachers in the classroom can work with children. Therefore, the first thing, of course, is to make talented teachers return. To do this, they need to raise their wages to an appropriate amount».

(Expert 4.1-I)

«And salary is also an old topic. It seems to be increasing by a penny. Inflation is outstripping the penny, and therefore the growth of teachers' salaries is not felt at all».

(Expert 2.2-I)

The need to raise wages and improve the social package was also mentioned by 7 survey participants.

«I think we should start by solving the most basic problems – to provide teachers with good working conditions, improve the material base of schools, and work to improve social mobility in society».

(Expert 4.1-S)

«Raise the salaries of teachers, while defining the criteria they must meet».

(Expert 1.2-S)

The respondents note **per capita financing** as one of the ways to solve the problem of uneven financing of educational organizations.

«Special attention should be paid to the work of schools, depending on their capacity. If possible, achieve 1 shift work by switching to a per capita financing system. Give schools the freedom to use their own funds. There should be no interference from education departments. There should be even funding from the state. It is necessary to increase the funds allocated for each child».

(Expert 2.10-S)

«We need comprehensive work: involving the public in education problems, introducing per capita funding, conducting high-quality advanced training courses, working with school principals, developing leadership among teachers and parents».

(Expert 2.1-S)

Problem 4. Educational content

Answering interview questions, the experts actively spoke about the quality of teaching materials, the language environment and the curriculum content in schools. In total, 21 statements by experts were extrapolated in the framework of interviews, in which they touch upon the topic of the content of education and teaching materials.

«It is quite obvious that our academic environment and our publishing houses, unfortunately, do not have the intellectual, organizational, and financial potential to produce high-quality textbooks. That's it. That is what we have to admit».

(Expert 1.1-I)

«I also wanted to talk about textbooks. This is also one of the big questions and a topic that surprises no one and is constantly in sight. People find some oddities and mistakes in our Kazakhstani textbooks. This has already become a topic for jokes»

(Expert 2.2-I)

Three teachers participating in the survey are also not satisfied with the quality of the textbooks.

«Textbooks are changed too often, even though they ideally should be tried out, tested, checked and changed as needed, at least 3-4 years in pilot schools, and only then used everywhere in schools. This led to mistrust and poor-quality textbook drafting. In addition, in textbooks and in teaching itself, the focus is on memorization, and not on the analysis and comprehension of information, the development of critical thinking and functional literacy. If the textbooks focused on functional literacy, the ability to analyze information and the development of critical thinking, exam results would be better».

(Expert 2.8-S)

«Pay attention to the quality of textbooks. When compiling a textbook, it is necessary to take into account the age characteristics of students».

(Expert 2.9-S)

«It is necessary to consider the age characteristics of students while drafting a textbook».

(Expert 2.10-S)

One of the problematic aspects mentioned by the experts is the **low quality of literature** in the Kazakh language and the absence or low level of reading culture both among schoolchildren in general and among students with Kazakh as language of instruction in particular. Experts associate the low level of general reading literacy with the low results of schoolchildren in the latest ILSAs.

«There is no good, competent literature on the development of reading literacy in the Kazakh language, none at all. […] This is a common problem. And the fact that there is no correct, good,

competent literature and tasks for the development of reading skills greatly affects the lag that we must acknowledge».

(Expert 1.2-I)

«There are still very few good, informative materials in the Kazakh language on the Internet. They should be aimed at teaching both preschool children and children of primary grades, senior grades and so on».

(Expert 4.1-I)

«…Children do not read books at all, at all. This is a problem, in the Kazakh language in Kazakh schools, this is clear. […] The reason they do not study is mainly because they no longer use libraries, this literature is not built into their educational process».

(Expert 1.2-I)

«There is no point in defending the domestic market if it is not competitive. We need to give permission to publishing houses to cooperate directly with international publishing houses and take foreign textbooks as a basis, and that's it».

(Expert 1.1-I)

Speaking about the results of Kazakhstan in the latest ILSAs, the experts noted the **inconsistency of the curriculum and the general approach to teaching in Kazakhstani schools with the tasks of these studies** as one of the reasons for underperformance.

«If you take PISA, the key points that PISA evaluates, you will see that they are all qualitative. That is, there are no quantitative indicators, either in reading or math literacy».

(Expert 1.1-I)

«I don›t think students can be prepared for what PISA is measuring. They may be prepared for the importance that PISA has to your country. But they are not prepared in terms of understanding why this study is so different from the domestic content of education».

(Expert 3.2-I)

«There is no need to chase these results too much. In my opinion, in general, all these international tests pursue different goals. And everyone has different tools. How to answer these questions and what tasks are included in these studies – this is what our children are not taught at school».

(Expert 2.2 -I)

«You are trying to solve the PISA and PIAAC problem by asking people to meet a whole different set of expectations».

There were also comments regarding the inconsistency of approaches to assessment in the traditional Kazakhstani school with those parameters and competencies that are assessed within the ILSAs.

«When your assessment system is tuned to quantitative indicators, then a child simply starts to fail by entering a test that is tuned to qualitative indicators».

(Expert 1.1 -I)

«There is, of course, a cultural difference, if you will, in how students are graded throughout the year and how the PISA test works».

(Expert 3.2 -I)

The need to improve the assessment system was also mentioned by five survey participants.

«Since the main goal of public schools is to pass the UNT and exams, the learning process is also biased towards preparation for tests, and not towards the qualitative acquisition of new knowledge. At the same time, highly motivated students can learn on their own. But this happens in spite of educational policy, not because of it».

(Expert 2.3 -S)

«Since 1940s, the school community, including parents, has formed an evaluation-oriented consciousness. Such stereotypes only imply or require grades from students, and not knowledge and skills. This problem slows down the implementation of the updated program, and also negatively affects the final test results in international rankings».

(Expert 2.6 -S)

«Schools do not provide knowledge, but prepare for tests in order to enter higher educational institutions, without worrying about helping to determine the strengths».

(Expert 2.3 -S)

One of the experts also raised the issue of motivating Kazakhstani students in ILSAs, which can affect their results.

«None of these tests actually have a high stake for students. There is such a factor that when passing tests, no matter how important it is for the country, for the Ministry of Education and Science, schoolchildren do not care. PISA is a long test, it takes several hours and has complex mental tasks. And the student cohort is not interested in any way to really do the job properly».

(Expert 3.2 -I)

The experts also spoke about the quality of the curriculum and the overall content of education.

«The curriculum and its content should be made more modern. But now, unfortunately, the program is lagging behind, both teachers and textbooks are doing the wrong thing».

(Expert 1.2 -I)

«The student was not forced to think. He was not forced to form his own opinion, to form a certain critical attitude to information. Certain information was simply «drilled in» and the student was forced, let›s say, to retell or memorize information as accurately as possible».

(Expert 1.1 -I)

18 out of 26 survey participants left their comments on the need to improve the content of education. For example, some of the respondents noted that the curriculum is not aimed at developing functional literacy in students.

«I think that in general the results show that it is necessary to change the approach to learning and the content of education itself, which is not functional in its nature, that is, it is not focused on the development of functional literacy, and the results show that the education system

does not prepare students for the future. Therefore, it is probably difficult to say that our education system is increasing the human capital if we, of course, do not count individual elite schools that are aimed at selecting only talented students. They actually give the education that is necessary for the development of human capital and economic growth of the country».

(Expert 1.1 -S)

Other respondents believe that the interdisciplinary connection in the updated content of education can be tracked in lower secondary and high school to a lesser extent.

«The introduction of updated content has a positive effect on the change in the orientation of school education from an academic level of knowledge to a practical one. But at the same time, there are problems of oversaturation of academic questions in subject programs. If in primary school there are clearly interdisciplinary connections when studying cross-cutting topics, then in the middle level this connection is lost, which leads to a decrease in students' skills in solving combined tasks on natural science literacy and complicates the analysis of texts when completing tasks on reading literacy».

(Expert 2.2 -S)

In addition, the respondents note the focus of school education on the study of certain subjects, especially in senior grades.

«Education at school, especially in high school, is aimed at preparing three or four subjects of the final exam. The rest of the subjects are not actually studied. Therefore, the education received at school is of low quality. Yes, and the higher authorities assess the work of the school management by the number of people who entered the university. This requirement lowers the quality of general education».

(Expert 1.4-S)

Problem 5. Gap in knowledge level and inequality in education

The gap in the level of knowledge and competencies both between students and among representatives of the adult generation, due to the peculiarities of place of residence, language of instruction and other factors, has also become one of the main problematic aspects most frequently mentioned by the experts related to the ILSA results of RK in 2018.

Thus, predictably, inequality in the knowledge quality of students from urban and rural schools is mentioned by the experts in connection with the quality of infrastructure and, in general, the difference in living standards.

«And rural children, where there is no good Internet, are deprived of such an opportunity. Therefore, especially today, it is the infrastructure of schools that plays an important role in providing access to unlimited Internet resources».

(Expert 4.1 -I)

«The influence is significant. This has to do with accessibility, with the inclusiveness of education. We know that we have imbalances in the quality of urban and rural education. This also applies to our metropolises, the cities of Nur-Sultan and Almaty. That is, urban or rural

infrastructure certainly affects the availability of quality education. I believe that today we have absolutely different regional levels, meaning the village and the city».

(Expert 4.2 -I)

«Urban children go to school and if they do not understand something or find it difficult, they have the opportunity to sign up for various additional activities. All city students without exception receive additional education, English courses, etc. I know this for sure, I can say it with confidence. There is no such opportunity in the village. That is why rural schoolchildren are lagging behind. This is the difference between a town and a village».

(Expert 2.2 -I)

«Unfortunately, we have to admit that the place of residence (city, village) affects the quality of education due to the presence of small schools in the countryside, the weak material base of rural schools and the lack of professional teaching staff in the countryside».

(Expert 1.9 -S)

«There is a big gap in the quality of education in Kazakhstan between rural schools and urban, private and public ones. Not all rural schools have Internet access or qualified teachers».

(Expert 4.5 -S)

«If a child lives in a village where there is often no infrastructure and highly qualified teachers, and bullying by teachers is even more widespread, this also prevents the child from achieving success in learning and showing good results».

(Expert 4.6 -S)

There is also social differentiation of learners within big cities, as one expert practitioner noted.

«Let›s say good teachers don›t go to work to the outskirts of the city. They work in schools, which are mainly located in the city center, where communications are present, it is easier to communicate. Subsequently, the location of the school can affect academic performance, since the level of teachers who work in the center is higher».

(Expert 2.1 -I)

«There is a difference in the quality of education not only by region, but also within each region. Two neighboring schools can differ very significantly in the quality of education».

(Expert 2.5 -S)

Seven survey participants believe that the **socio-economic status of a student's family** has a significant impact on his academic achievement.

«The higher the socio-economic status (income, education and occupation of parents) a child has, the more opportunities to get a better education and become more diversified and competitive».

(Expert 2.8 -S)

«The influence of the socio-economic status of the family on the quality of education (parents' education, possession of books, computers, etc. in the family) is obvious, this is demonstrated by remote learning during the pandemic».

(Expert 1.9 -S)

«Children from families with low socio-economic status mostly eat worse, which affects their physical and intellectual development. In addition, they are more often forced to work to support their families instead of studying».

(Expert 4.5 -S)

«Socio-economic status and place of residence definitely affect the indicators of the quality of education. If a child lives in a poor family or in a destructive family, or in a family where parents do not create or cannot create, for objective reasons, conditions for their child to have their own space and time to study, then this will all affect the academic performance in school. For example, in a large family that lives in a one- or two-bedroom apartment, parents will more often ask their older children to do household chores to the detriment of their schooling».

(Expert 4.6 -S)

One of the interviewees also separately mentioned the possibly low human capital in general in remote regions of the country, which affects the quality of teaching in secondary and higher education institutions.

«...in terms of the amount of funding that they have, as for regional local executive authorities, and the fact that the result is so low according to the results of the ILSAs, first and foremost indicates that it is a low level of human capital and the level of teachers».

(Expert 1.2 -I)

Speaking about the consequences of such a gap in the level of knowledge and skills between the different categories of the population (at the place of residence, age, profession and so on.), three experts that participated in interviews noted that this could further **exacerbate the social and economic segregation**, negatively impact the environment in society as a whole. It is noteworthy that all experts belong to different categories.

«Tensions will grow in our country, and a discrepancy of qualifications for jobs will be felt. Moreover, this will put tremendous pressure on the income of the population. The social problems associated with the impossibility, again, to earn money will be aggravated».

(Expert 4.2 -I)

«We know from history that in order for a society to be healthy, cohesive, and not have social tension, there should not be too great of a difference in classification according to socio-economic characteristics. And education, too, should not reinforce segregation. And now those who have the means have good education. Anyone who does not have it does not receive it».

(Expert 3.1 -I)

«We received a very large percentage of the population from children who did not receive an appropriate education. Accordingly, they are not equipped with the skills to support themselves. Moreover, their competitiveness will only decline every day. Now there are new challenges, a digital society, quarantine, and a pandemic. And suddenly it became clear that those who, like you and me, can guide each other online, then just live like this in an online format, they can survive in a new format. And those who cannot do this, and it is a critical mass of people as we found out, they will generally be left without the means of subsistence. This is a mass that is ready, as in the United States, for mass protests. Fuel for uprisings, rallies. Because they have no other choice. They will have no choice but to go outside and start robbing other people. That›s all».

(Expert 1.1 -I)

The need to equalize the quality of educational services was mentioned by four survey participants.

«State aid is provided to students from low-income families. Children from such families are diligent in their studies, set specific goals for themselves. It is necessary to further equalize the opportunities of students regardless of the socio-economic status of the family, even when providing state educational grants. Measures are being taken to reduce the gap in the quality of education between students in urban and rural schools. However, remote learning has revealed the disadvantages of the digitalization system. In some villages there is a low level of quality of teaching staff. Due to unemployment in the rural areas, there are teachers who received a second higher education by correspondence, many graduated from private educational institutions with low tuition fees».

(Expert 2.10 -S)

Finally, one more topic that is of interest from the point of view of explaining the reasons for the underperformance of Kazakhstani schoolchildren in ILSAs, according to the experts, is the excessive **focus on teaching gifted children**. Thus, in the opinion of two experts, this may have a negative effect on the quality of education for the majority of Kazakhstani schoolchildren, primarily in terms of education financing.

«We have built an elite secondary education system where there are 200 top elite schools, and they take away the best resources, the best teachers, and the best students».

(Expert 1.1 -I)

According to another expert, teachers in comprehensive schools also **lack recognition and encouragement for their everyday work with low-performing students**, which generally signals that the education system is oriented towards absolute achievements.

«The system of motivating teachers to do something is again based on the idea of excellence. Have you heard of a teacher who received an award for helping struggling students? A teacher that helped the students stay in school. They still have bad grades. But they go to school, they have not dropped out, and this is a huge achievement! But this teacher will not be considered good. The system doesn›t recognize him as a good teacher at all».

(Expert 3.2 -I)

Experts draw attention to the incomparability of the effect of teaching children in specialized and comprehensive schools.

«Have you seen it on the news? There are always school graduates with 5-7 invitations to top universities. But how many guys are like that? Dozens, well, hundreds at most. And we produce hundreds of thousands annually. Again, that is less than 1%».

(Expert 1.1 -I)

«You have to move away from the obsession with perfection. Having created systems for assessing teachers and school performance, it is necessary to make them sensitive to various kinds of achievements. Achievements that may not be so flashy, may not be at the top of performance

and Olympiads, but somewhere in the lower range. But these achievements also have a bigger effect than others sometimes, because much more effort is put into working with students who are performing poorly».

(Expert 3.2 -I)

Three survey respondents note the need to attract the most talented teachers to rural schools to improve the quality of education in the most lagging educational institutions.

«Raise the starting salary of novice teachers to at least 200,000 tenge, including in rural areas. This will motivate real enthusiastic teachers who love their profession and work with children to come and stay in the profession. And it will also solve the problems of negative selection for the position of a teacher, where they now come only because they have scored a low UNT score, or there were no other opportunities».

(Expert 4.6-S)

Expert opinion on the role of MES, society and school

As part of the research framework, together with the study of the reasons for Kazakhstan's underperformance in ILSAs, one of the important focuses was to identify the opinions of experts regarding the responsible individuals and determining their role in the education system.

The study experts answered the question of who, in their opinion, is responsible for improving the results of Kazakhstan in education, and assessed the extent of responsibility of the following stakeholders: the government, the Ministry of Education and Science, local executive authorities, schools, family, etc.

Based on the qualitative analysis of data, 27 statements about the role and influence of the key stakeholders in the educational process were extrapolated. Four sub-topics were identified that were most clearly traced in expert responses: "Role of the family in teaching children", "The role of the school", "Shared responsibility" and "The role of MES".

Only one of the interviewed experts raised the topic of family responsibility in education. In his opinion, parents should not shift responsibility from themselves to the system.

«First of all, these are parents, this is a family. In any case, for all the negativity we are talking about in relation to the education system and schools or universities, there should be no attempt to shift responsibility from oneself to the system. And the family is primarily responsible for the quality of education. But this family must also evolve, must study somewhere in order to understand that it is responsible, what it can give and can do».

(Expert 1.2 -I)

Meanwhile, 16 out of 26 experts that participated in the survey noted the importance of family in ensuring the quality of education in general. Experts mainly

commented on the impact and role of the socio-economic status of the child's family and the availability of educational resources.

«They have a direct impact, since the social status of the family, including family income, allows them to have more conditions for obtaining a quality education».

(Expert 3.6 -S)

«All children and people are different. Different aptitudes, different abilities. A child who has both a mother and a father with higher education, who have good earnings, a child who has his own desk, room, computer, is ahead by 2 years in the quality of education, in terms of his knowledge, skills and abilities compared to a child who does not have all that».

(Expert 2.5 -S)

«Motivation to study and exposure to achievements in humanities and natural sciences is largely determined by the socio-economic status of the families of students. Unfortunately, this issue has now been shifted onto the shoulders of the school, although the initial attitudes towards learning should be formed within the family. In conditions of economic inequality and material problems, a child may develop a negative attitude towards the learning process itself, since the desire to learn is a higher-level need for a child than the need to satisfy his physical needs: for food or parental care ... If a child does not feel protected by his family, he simply will not be motivated to continue his education».

(Expert 2.2 -S)

11 out of 26 survey participants believe that school has a significant impact on the quality of education and academic achievement of students.

«Any educational policy is implemented locally. The quality of teaching and teachers can indeed determine the results of schoolchildren in any form of assessment. In turn, the motivation of teachers depends on the top management of the schools. With computer-based testing, school infrastructure is also at the forefront. And in general, a school with great material and technical resources, capabilities and conditions will be able to give more to its students».

(Expert 1.7 -S)

«All school-related factors strongly influence outcomes, provided socio-economic factors are not dominant. In Russia, the most significant factor is SES. But school factors also have an effect. In Russia, teacher behavior has a negative impact on learning (teacher behavior hindering learning). In Kazakhstan, the impact of this factor is even greater (the largest negative impact of all the countries participating in PISA-2018). Climate (school relationships), discipline, skipping class, involvement in learning and, of course, interest in studying subjects have an effect. All of this is related to the quality of teaching. PISA-2018 data shows that there are serious problems in Kazakhstani schools».

(Expert 3.2 -I)

Talking about the influence of the school, one of the interviewees raised the topic of their autonomy.

«It is really about the school. But only if it has the freedom and support to do so. I›m not sure how achievable it is. Do schools have the freedom to meet their own needs to a certain extent,

and do they have the support to do so without being constantly in a position of fear and the need to follow the rules?»

(Expert 3.2 -I)

«Of course, it is the staff first and foremost. Second is the schools themselves and their compliance with modern requirements. If it is universities, then it is their compliance with the current requirements. Then it is the school infrastructure in the broadest sense of the word. I think that the quality of the textbooks and the involvement of society probably follows after that».

(Expert 4.1 -I)

In addition, experts say that personal characteristics of the student play an important role, but the school must provide conditions for further development.

«As I understand, personal characteristics of children will help up to a certain level. But the school must create conditions under which a child with such characteristics could develop further. Here again, everything depends on the school itself, on school policy, rather than personal characteristics of the children».

(Expert 2.1 -I)

During the interviews and questionnaire, experts actively commented on the role of the main executive body – the Ministry of Education and Science. As such, such subcodes as "Isolation of state bodies", "MES as a developer of educational policy", "The role of the Minister of Education" were identified in analyzing the expert responses as part of the interviews and survey.

«We have the Ministry of Labor and the Ministry of Education, two key ministries that do not communicate with each other at all, do not talk at all. Each live their own lives parallel to each other».

(Expert 1.1 -I)

«... the education system has a life of its own, as does the economy with the labor market».

(Expert 4.2 -I)

«Therefore, at least 4-5 ministries should be involved in this work. In general, it is high time to create a human capital bloc within the government».

(Expert 1.1 -I)

Experts say that the MES of RK is primarily responsible for the quality of education. At the same time, experts point to the **need for active involvement of other government agencies in the development of the education system.**

«In my opinion, the educational policy pursued by the Ministry of Education and Science has a direct impact on the indicators of the quality of education».

(Expert 2.2 -I)

«... the responsibility always, of course, rests with the ministry, because it makes decisions and develops proposals. And for the state, education is always a priority in terms of execution, which is quite clear, just like defense and security».

(Expert 1.2 -I)

«There are many interesting topics, it seems to me that all these topics should be funded by the state, not by the private sector and not, let's say, with our own investments. And in this regard, all responsibility, of course, occurs at two levels the ministry and the government».

(Expert 1.2 -I)

«I would say that it is not the results of education that need to be improved, Kazakhstan needs to improve the quality of education. And the results will follow. The leading flagship, the structure that promotes these reforms, I believe, is responsible for the quality of education. That is, of course, the Ministry of Education, but the Ministry of Education is not the only body that is bears responsibility».

(Expert 3.1 -I)

Along with the responsibility of the relevant Ministry, experts expressed their views on the role of the Minister of Education himself. They believe that the minister should have political weight and maintain continuity of the initiated reforms.

«If the minister of education has a lot of political weight, he will be able to convince the president and the prime minister».

(Expert 4.1 -I)

«…ministers change every year. Each minister comes with his own program, his own vision. And every time he starts something new, he does not see it through to the end. Then another one comes in his place. Firstly, that cannot be serious, and secondly, what kind of progressive work can there be if there is no stability. I think this is the number one problem».

(Expert 2.2 -I)

In general, responding to a question about who is responsible for improving the quality of education, **the majority of experts agreed on the shared responsibility of all stakeholders of the educational process:** the president, the parliament, the government, local authorities, employers, businesses, parents, teachers and the entire society.

«What we got is, in part, the result of a misunderstanding of who is responsible. It is the general responsibility of society, and it is impossible to single out who is the most responsible. Parents must be involved, the ministry, the government, local authorities, employers, businesses too. But for some reason, we think that only the MES must».

(Expert 4.2 -I)

«I would say it is the entire community: the president, the government. When we say "the government" we also mean the ministry of education. Ministry of education are not the only ones responsible for the quality of education, the parliament also is. Local executive authorities are. Many educational programs in our country are financed from the local budget, so if parents and the whole society do not turn their attention to the problems of education, we will not have anything good».

(Expert 4.1 -I)

«When it comes to the quality of education, the ministry cannot bear more responsibility than the teacher. No, absolutely not. It is like the clock gears, where every detail plays a role. And if some small bolt does not hit somewhere, then the clock will not work».

(Expert 2.2 -I)

«…it starts with the government, ends with the parents. I think all these stakeholders should be held accountable. In education, one body – the Ministry of Education – cannot be responsible for all these processes».

(Expert 2.1 -I)

«I would not argue that it is solely the Ministry of Education. All stakeholders should focus on ensuring that the Kazakhstani student receives an even better education than now».

(Expert 3.1 -I)

20 out of 26 survey participants also noted the **shared responsibility of all education stakeholders.**

«Education is a matter of the country›s future. Therefore, education issues are not only the business of officials, they are the most important area and priority for the state, people and society as a whole. Therefore, all of them should be involved in addressing the issues of our education».

(Expert 1.4 -S)

«Collaboration is important in education. In education, relationships are built on interdependence. Students depend on teachers. Teachers depend on top managers of the school. School managers depend on regional and central departments. Therefore, I cannot single out any institution. I believe that the work should be structured so as to achieve the best result with a joint effort».

(Expert 1.7 -S)

«It is as if there are no guilty parties. Everyone must work together. I know it is easy to say, but harder to implement. I also think we should not interfere but support independent education providers who are trying to do something in this area. But in general, we need systemic changes, there is no way otherwise».

(Expert 3.5 -S)

«First of all, the government and the MES are responsible for the overall policy and the level of allocated funding. Local executive authorities and education departments are responsible for execution and effective implementation. And then it is educational organizations and teachers. The family and the community should participate and assist, including in monitoring the proper implementation of policies and training, and influence improvement through active participation and expression of their opinions, wishes, etc.»

(Expert 1.1 -S)

CONCLUSIONS AND RECOMMENDATIONS

Education as an economy sector of the country has no clearly defined boundaries. No one knows exactly when its effect on the development of a citizen begins and ends, to what extent the mistakes or talent of a teacher predetermine the success of a graduate, what other establishments and institutions in addition to the education system and the family are responsible for, and what their role is in the formation of the country's final human capital. One thing that is clear in the present is that education is the main component of a country's human capital, affecting the country's economic well-being to the greatest extent (World Bank, 2020; Gennanioli et al., 2013).

The authors of this study, first of all, see education as trans-sectoral, meaning that the causes and factors of its high or low quality (as well as its consequences) are not confined to the boundaries of the influence/responsibility of an individual government body, official, or school.

The study of the reasons for Kazakhstan's underperformance in the ILSAs, the results of which are presented in this report, is the first study in this area to be based on qualitative data obtained as a result of expert interviews and polls in our country.

Using the instruments of interviews and a survey of national and international experts in education and other related sectors has allowed to obtain for the first time a cross-section of professional opinions from both the individuals directly involved in the development of educational policies, as well as from practitioners, teachers who implement this policy in a changing environment on a daily basis... In addition, participation of experts from other fields in the study provided an opportunity to get a fresh perspective with an impartial, "unblurred" look.

It is also important to note the value *of the subjective and professional assessment* of educational problems by our experts. In planning this study, we did not aim to "depersonalize" the respondents' comments as much as possible, thereby removing an important personal assessment from them (author's note: *here we are talking about expressiveness and, possibly, harsh personal judgments – the anonymity of the research participants is fully observed*). Rather, with the help of targeted sampling we hoped that the extensive professional experience and a high level of professionalism and expertise would allow study participants to combine personal and professional perspectives, thus allowing authors of the study to not only answer the questions, but also to approximately measure the "degree" of the respondents' emotional response. **Education is not emotionless, and due to its trans-sectoral nature, it simply cannot be so. One way or another, it affects the interests of every citizen of the country.** This was proved by the results of our study.

Analysis of the results helped to identify both the issues of the education system that were previously familiar to all of us, affecting the results of Kazakhstani

schoolchildren in ILSAs, and previously unreported problems. These problems have been grouped into broader clusters as follows:

- the quality of teaching and the lack of professional staff,
- educational policy and strategy,
- financing and infrastructure of the education system,
- the quality of the curriculum and teaching materials
- the knowledge gap and inequality in education.

According to experts, the poor quality of teaching is one of the main reasons for the underperformance of Kazakhstani schoolchildren in international studies. The experts noted the following aspects of this problem: low quality of university training, low salaries of teachers, lack of a mechanism for attracting talented young people to the profession, insufficient professional development, and shortage of school staff. Indeed, international studies prove the importance of the role of teachers in the education system; teachers are agents of change on the ground, as they implement educational reforms.

Most experts also note that education is not a state policy priority, it is financed on a leftover basis and needs more autonomy at the school level. A critical point has been singled out in the need for coordinated joint work of all government agencies to improve the quality of education and, subsequently, the level of human capital. This is contrary to positioning this task as an exclusive prerogative of the Ministry of Education and Science.

The problem of lack of schools and overcrowding in classes was repeatedly mentioned by experts that participated in the study. Experts believe that it is necessary to increase funding for education in general and to increase the funds allocated to each child. It is necessary to separately consider the approaches to **financing** rural and urban schools, significantly increasing the budget of rural schools, including development of infrastructure and provision of high-quality and long-lasting ICT equipment. Experts also recommend increasing the salaries teachers and research workers in both secondary and higher education. The currently practiced step-by-step increase in wages, as noted by the respondents, does not have the desired impact due to the rise in inflation. In addition, decent wages could be a good incentive to attract teachers to rural areas. Experts also focus on the need to improve school infrastructure, naming, among the main objectives, provision of computers, connection to high-speed Internet, and lab equipment. Experts recommend the involvement of private companies as an approach to solving the problem of schools in emergency condition and three-shift schools.

Insufficient quality of the curriculum and teaching materials is another problem, according to experts. Teachers need high quality curricula and textbooks to work successfully in schools, which are not sufficient in Kazakhstani schools, according to experts. The discrepancy between the content of the curriculum to that

of international studies (e.g., PISA), and the lack of focus on the development of critical thinking in the country's secondary education curriculum, in their opinion, also affects the low performance of Kazakhstani students in ILSAs. The "solution" to the problem of the country's poor ILSA performance, in their opinion, is mostly superficial – «*you are trying to solve the PISA and PIAAC problem by asking people to meet a whole different set of expectations*».

Experts also named **inequality in education** among the reasons for the poor ILSA results of the Republic of Kazakhstan**,** noting the uneven distribution of resources between the city and the village, regional features that affect the quality of education, the influence of socio-economic factors on academic performance and the focus of the education system of Kazakhstan on teaching gifted children. Experts also spoke about the low level of literacy of the population in general.

The analysis also revealed **previously unreported problems of** Kazakhstani education; for example, a one-sided scheme of incentives for teachers (only victories in Olympiads, etc. are rewarded, lack of reward for systematic work with low-performing students), isolation of the Ministry of Education and Science of the Republic of Kazakhstan as a structure (there are no mechanisms to interact with other government agencies), insufficient development of the teaching and school management culture (schools and principals must meet certain requirements, there is no room for development and creativity).

Based on the results of the study, literature review and data from international large-scale assessments, international trends in the education system, including those related to the impact of the pandemic, we offer several **recommendations** to education managers and analysts, and other government bodies and institutions.

1. Strengthening the research and analytical potential of the education system, including by expanding the focus of work (not only a summary of the ILSA results in the Kazakhstani context, but a comprehensive analysis of their results, along with development indicators of the country). As the respondents of our study note, the ILSA results in Kazakhstan as such are used in data analysis and to inform educational policy, but it is not always effective, and is viewed only as a prerogative of the MES of RK and its competencies. Experts warn about the surface-level perception of the ILSA results, without an in-depth analysis and discussion. It is also important to consider that there is a shortage of professional staff specialized in collecting, analyzing and processing data, who are capable of presenting this data in a comprehensively generalized way to the general public. Thus, what becomes important is establishment and development of research centers, or a significant "enrichment" of the functions of the JSC "IAC" under the MES of RK, with a focus beyond coordination and coverage of the ILSA results, but also on interdepartmental cooperation to analyze the causes and consequences of these results for the country's human capital.

«I just took my temperature, and it is 40^0. Does it affect me? No, it is not the temperature measurement that will affect you, but the fact that you have a temperature. We can discuss whether the ILSA results really reflect the human capital in the country, and if so, what kind of human capital the country has, and whether this will have an impact on economic development».

2. Improving the quality of teaching staff, with a focus on the development of functional literacy of students. The low quality of university training of teachers was repeatedly mentioned by experts as the root cause of the problem of the education quality in the country. As one of the ways to solve this issue and attract the most talented staff to the profession, experts note the need to increase the requirements for admission to pedagogical majors[6].

«It is assumed that the new system will refresh the thinking of students. But teachers are fixated on the old system. It is necessary to begin training teachers at the university. Many young teachers have little knowledge of new education methods and technologies ».

It is also necessary to consider the resilience of the teaching staff (emotional stability), their ability and moral preparedness to work in difficult conditions. The nation-wide implementation of remote education showed that many teachers were not ready to not only use the ICT equipment on a daily basis, control the security of connections, etc., but also to experience the difficulties in organizing interaction with parents. There is an obvious need for Kazakhstani teachers to teach the basics of effective communication remotely, as well as the basics of ergonomic use of Internet resources, managers, etc.

The lack of teachers who are able to actually develop the functional literacy in their students, which was noted by experts (as opposed to the traditional approach of *knowledge-based* teaching), indicates the need to first analyze the actual competencies of teachers (to what extent certificates of completion of various advanced training courses reflect the assimilation of the material by teachers and the application of knowledge in practice), secondly, the focus on the university training of young specialists, who should already have teaching skills "at the exit" from the university to develop the functional literacy of students.

3. Expanding the school autonomy. Among the measures necessary to improve the quality of education, experts also note the need for greater autonomy of school principals. The respondents emphasize the importance of the professionalism of administration in educational organizations and the need to improve their qualifications. Nevertheless, there is a certain degree of skepticism as to whether school

6 *This was also noted in the report of the Center for Analysis and Strategy «Beles» (2019) "Teachers of Kazakhstan: Why young people choose this profession and what motivates them to remain?* «

leaders will show any kind of creativity given the conditions of the established bureaucracy, with no formal autonomy.

«Schools will function better if they come to understand that it is not about matching some formalities, but rather simply their own improvement, that they will be responsible for this improvement. If you do something like this, you start to see which principals are actually good. Currently the system promotes, stimulates and rewards the principals with different types of skills, talented in other ways, such as knowing "the rules of the game" and following them in a proper manner. They are more about administration. They are not rewarded for being creative. On the contrary, if you are too creative, you will have all sorts of problems with inspectors, regional education departments, the ministry and others».

Expanding the school autonomy is also one of the recommendations of OECD experts, which they made based on results of a country review of the secondary education system in Kazakhstan in 2014. It should be noted that an increase in both academic and financial autonomy of schools should go hand-in-hand with training and increasing the potential of principals and teaching staff in secondary education organizations. Schools must be ready for autonomy.

4. Educational policy planning in cooperation with other government agencies and the involvement of experts at all levels of education. Experts mentioned approaches to management in the education system separately during the interview. Both criticism of the main executive agency and recommendations for the decentralization of education management were voiced.

«Regional authorities are not efficient enough to stimulate, as well as ensure the high-quality performance of certain tasks facing the school. All this basically shows that the «higher ups» demand, but the «subordinates» cannot do this. This includes the material and technical support of educational organizations, and the qualifications of teachers, and the unfeasibility of some points of the educational strategy or policy, including the lack of quality feedback on the programs being implemented in the field of education».

Analyzing the vision and implementation of educational policy in the country as one of the factors influencing the ILSA results, experts agreed on the need for a *clear focus of public policy on education issues* , with an understanding of its principal role in increasing the country's human capital. In this regard, it is advisable to develop a National strategy for improving the quality of education in *conjunction* with other government agencies, based on an in-depth analysis of data from all relevant ILSAs, national tests and exams, and revised indicators. It is also necessary to clearly prioritize the quality of education in all program documents and plans for the development of RK regions (with a focus on measuring qualitative changes, and not on the final absolute indicators). As practice shows, *in the absence of a formally*

fixed priority, both the regions and the central executive authority tend to confine themselves to collecting information required within the framework of the indicators of the State Program for Education and Science Development.

5. Ensuring high quality and availability of educational and additional literature in the Kazakh language, the development of a general reading culture. One of the problematic aspects mentioned by experts is the low quality of literature in the Kazakh language and the absence or low level of reading culture among school-age children in general and among students with the Kazakh language of instruction in particular. Experts associate the low level of general reading literacy with the low results of schoolchildren in the latest ILSAs. The respondents focused on the growth of the Kazakh-speaking population and the lack of quality Kazakh-language content on the Internet. It is recommended to encourage the publication of high-quality educational and additional fiction using competitions for writing children's books, announcement of the national reading year, development of mobile applications and games in the Kazakh language by domestic IT companies.

6. National program to improve school infrastructure. Most expert comments related to infrastructure and state funding of the education system. We must acknowledge poorly developed infrastructure of educational organizations, especially in rural areas of the country. Experts mention overcrowding in schools, workload of teachers and lack of new schools. Addressing basic problems and ensuring equal access to school infrastructure for all students should be the main priority of the country's national educational policy. Given the scale and urgency of the issue, as well as the proven importance of high-quality school infrastructure for the academic achievement of students, it is necessary to develop a program for its systemic simultaneous development in all regions of Kazakhstan.

«Do you want NIS quality? Well, sorry, pay up 3 million. In NIS, somewhere around 3 million per child per year is spent from the budget[7]*. If you want 40-thousand-tenge education, well, pay 40 thousand tenge do not ask high results from these students, schools, teachers or laboratories that do not exist, computer classes that do not exist, broadband Internet that does not exist. In fact, it is all fiction. Do not demand NIS quality from them, it is useless, everything depends on resources and support».*

7. A clear focus on academic achievement *on par* with school attendance, implementation of targeted measures to reduce inequality in the education system. As rightly noted by experts of the study, the Kazakhstani education system is focused on the social aspect (ensuring access to education for all students) of inequality, whereas the gap in academic achievement between children from different categories of the population is not addressed or discussed. Children from disadvantaged families receive material assistance (in the form of clothes, textbooks,

7 *Authors of the study cannot confirm the accuracy of this statement*

stationery), expectations for them are deliberately low, ***priority is their attendance, not their academic performance***. However, the school should help these children receive academic support and motivation from teachers. It is necessary to systematically consider the issue of academic support for low-performing schoolchildren, including provision of a comfortable place to study outside the classroom, necessary educational equipment (as relevant as ever in a remote learning environment), and individual psychological support.

8. Study of the causes of inequality in the education system for individual regions and development of specialized regional programs for the development of education. Experts note the possible influence of the regional context on the academic results of students, which leads to a gap in ILSA results between different regions of the country. A comprehensive study of the reasons for this gap is necessary to ensure equity in education and prevent significant losses in human capital for entire regions of the country. The fact that today several of the southern and western regions of the country are one and a half to two years (or more) behind Nur-Sultan and Almaty (Kopeyeva, 2020) in ILSA results, all while demonstrating chronic underperformance, deserves an immediate and deep expert analysis at a public policy level.

The directions of work to improve the quality of education in RK and improve the ILSA results are **not limited to these recommendations.** Rather, these recommendations highlight a broad outline for required changes, where each of them breaks down into dozens of separate events and initiatives. In addition, for the last decades **relevant issues exist** such as improvement of curriculum and assessment system, increase in education financing at all levels, decentralization of regional education departments, harsh suppression, the need to teach zero tolerance for corruption at all levels of education and the authorized institutions. They remain as cornerstones holding back full and positive implementation of reforms and initiatives in the education system.

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- ***Jaliya Jaydakpayeva,** teacher-moderator, NIS CB Almaty;*
- ***Mihaylo Milovanovitch,** senior expert, Center for Applied Policy and Integrity;*
- ***Duishonkul Shamatov**, associate professor, Graduate School of Education, Nazarbayev University;*
- ***Nartay Ashim,** head and founder, Knowledge Engineering;*
- ***Shakarim Seisenbay,** principal, school-lyceum №54, Nur-Sultan;*
- ***Daulet Argandykov**, founder and CEO, "Manpower advisory Kazakhstan".*

Information on participation is published exclusively with the consent of the experts themselves. The experts' quotes in the report are presented anonymously. Data on the experts who took part in the survey are not published at the request of the respondents.

Appendix 1.

MEASURING SOCIAL INEQUALITY IN ILSA. OVERVIEW OF COMMONLY ACCEPTED METHODS

According to Hradil (2001), social inequality occurs when certain individuals regularly receive more resources relative to their social position than other members of the community. Based on this definition, social inequality implies unequal, different opportunities for people or groups of people in their access to important and valuable social resources. For example, in industrial or post-industrial societies, these resources include income level, wealth, professional qualifications, and education.

According to Hradil (2001), the following aspects are the "basic forms" of social inequality: material wealth, power, prestige, and education. Such forms assume stratification and class division of society, where privileged groups are at the top according to the hierarchical structure, and the disadvantaged groups are at the bottom. In addition to the basic forms, there are also differences in "conditions" of work, life, environment, and rest. Conditions include age, gender and nationality, as well as marital status and the number of children in the family (Hradil, 2001).

Manifestations of social inequality in education can be measured by comparing various factors in ILSAs. Our study will consider certain factors (basic forms and conditions) that are available in the database of the three ILSAs in consideration.

International studies usually determine potential social inequality (or the level of access to certain benefits) use data on the **socio-economic status** of the student's family. Socioeconomic status refers to the position of an individual or family in the hierarchical structure of accessibility of or control over valuable resources such as wealth, power, and social capital (Mueller and Parcel, 1981).

Many studies (including the aforementioned study by Coleman et al., 1966) have shown that a student's SES determines his academic performance to a significant extent. Knowledge of the extent to which socio-economic status impacts educational achievement of a student is extremely important for researchers and administrators in the field of education in order to plan educational policy both on a national scale and at the level of individual settlements.

International large-scale assessments use different methods and combinations of variables to measure the socio-economic status of a student, which leads to difficulties in interpretation and comparison of results (Sirin, 2005; White, 1982; White et al., 1993). The core components of the socio-economic status of a student are also

a controversial topic among researchers. Many studies use only family budget, occupation of parents, or social position (for example, the right to a hot meal at school). In using this indicator researchers also measure the socio-economic status of the school or the student's area of residence, which greatly complicates the understanding of the influence of this factor.

Most studies use two approaches to measure socio-economic status: *categories and a continuous indicator. A continuous indicator* assumes the calculation of an index of socio-economic status with a specified value (for example, from zero to one). The categorical approach is the division of society into clearly distinct groups or classes. *For more about the division into categories see the International comparative measurements of socio-economic status sub-item.*

PISA uses a *continuous indicator* approach to calculate socio-economic status. Variables are selected with a theoretical construct to compose the index. The theoretical construct of the PISA socio-economic status index is based on the **theory of Pierre Bourdieu**, who believes that status consists of cultural, economic, and social capital (Bourdieu, 1986).

In this case, the term "capital" is different from its economic definition. According to Bourdieu, capital is accumulated work, which is expressed either in material form or in an intrinsic "incorporated" form.

Economic capital is directly converted into money and institutionalized in the form of property rights. Under certain conditions, *cultural capital* is converted into economic capital and can be institutionalized in the form of educational qualifications. According to Bourdieu, there are three types of cultural capital: incorporated (skills and competencies), objectified (cultural objects: a collection of paintings, books, etc.) and institutionalized (certificates, diplomas, academic degrees, etc.). *Social capital* implies social interactions, acquaintances and belonging to a group of persons (for example, a party or an association), which are converted into economic capital under certain conditions.

According to Bourdieu, the transition of capital from one form to another can occur under certain conditions, but cultural or social capital cannot always become economic capital. However, *economic capital is the basis for other types of capital*. All types of capital are interconnected and affect each other. If the exchange or transfer of economic capital slows down within the society, the importance of cultural and social capital increases. This information is used in the PISA Influences sub-clause.

International comparative measurements of socio-economic status

The classification of occupations plays an important role in determining socio-economic status. Based on this classification, class models and types of strati-

fication of societies are used, where it is assumed that people with a similar profession, level of education and wages belong to the same social group.

Professional activity is classified according to three measurement approaches: prestige scales, socio-economic indices, and social classes. Each approach has its own logical structure and theoretical framework. However, all measurements of occupational systems that use a category or continuous indicator approach are based on the International Standard Classification of Occupations (ISCO-08). ISCO-08 is an international occupational classifier and an internationally standardized method for coding occupations (Ganzeboom and Treiman, 1996).

International Standard Classification of Occupations (ISCO-08)

ISCO was developed in 1958 by the International Labor Organization of the United Nations in Geneva. ISCO-08 has the following functions: comparison of international classifiers of employment, standardization of international professional mobility, and development of national classifiers of employment. ISCO-08 is based on concepts such as the level of competence in the professional field, skills, abilities, and qualifications. These characteristics determine the number of tasks and responsibilities in one profession. ISCO-08 is a four-tier hierarchical classification in which formal education follows the International Standard Classification of Education 2011 (ISCED-11).

International Standard Classification of Education 2011 (ISCED-11)

The International Standard Classification of Education was adopted at the International Conference on Education (Geneva, 1975) and became known as ISCED 1976. ISCED 2011 is part of the United Nations International System of Social and Economic Classifications, used in statistics to collect and analyze internationally comparable data. ISCED classifies educational programs according to their content using two main classification variables: levels of education and areas of education.

International Socio-Economic Professional Status Index (ISEI)

The International Socio-Economic Index was developed in 1992 by researchers Ganzeboom, De Graaf and Treiman for cross-country comparison and to measure the socio-economic status of occupations. The index is calculated on the basis of data on education, profession and income of the population. According to the logic of the index, education is converted into wages, i.e. education affects the occupation, and the occupation affects income. Thus, an index was created that measures the indirect and direct impact of education on a person's income through his occupation (Ganzeboom et al. 1992: 11).

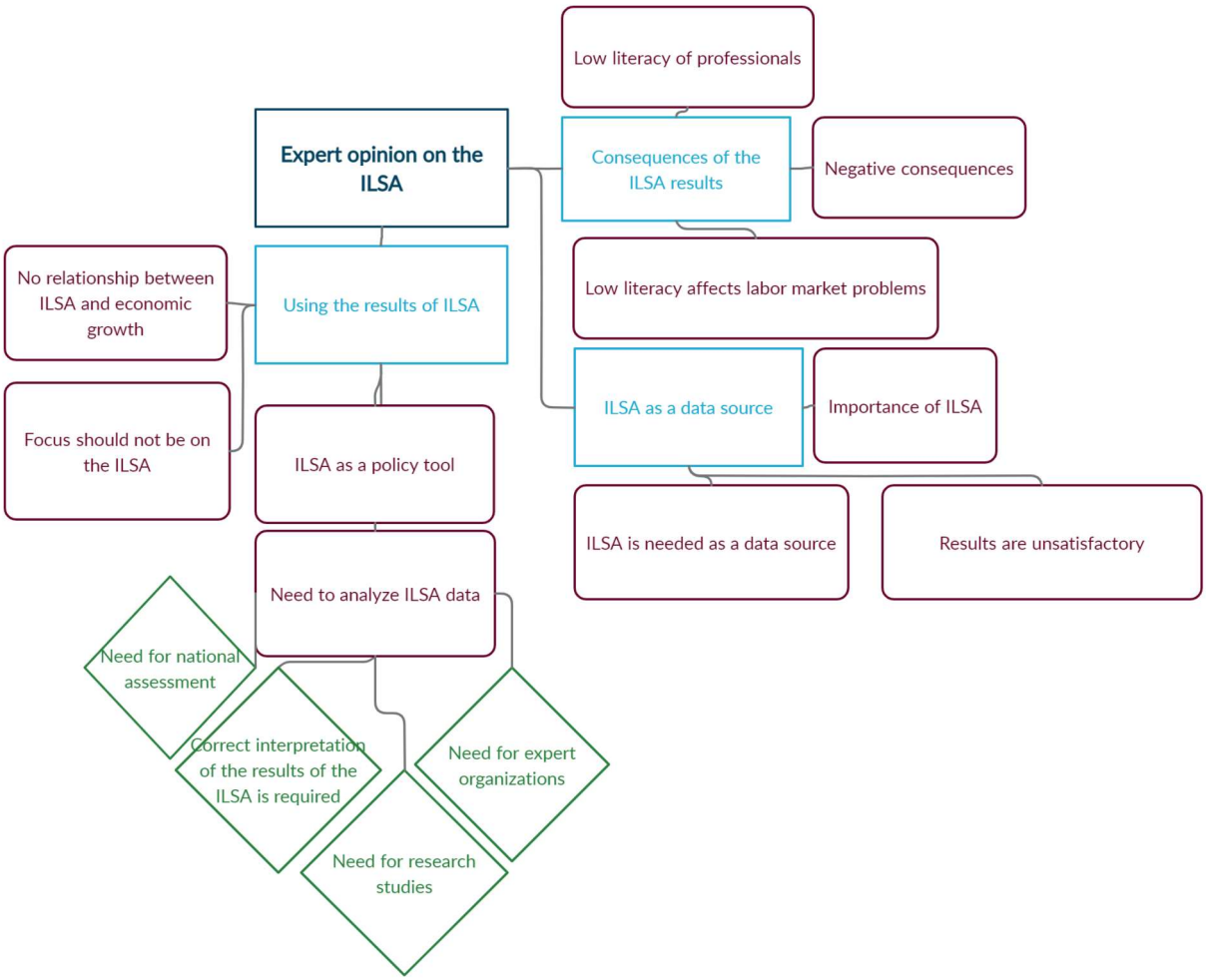
According to the index, each occupation is assigned points on a scale from 16 to 90. Low or intermediate-level occupations are at the level of up to 50 points, professions above 50 points are classified in a high socio-economic index of occupational status. This index is recognized as a more reliable measure of occupational status than other similar classifications such as the SIOPS (Standard Index of Occupational Prestige Scores) and EGP (Erikson-Goldthorpe-Portocarero Classification).

PISA uses a combined index (what is combined with what is not clear) (Highest occupational status of parents – HISEI), which corresponds to the highest status of parents or one parent. This index is calculated by the OECD based on student responses regarding parenting occupations, which are first coded in ISCO-08.

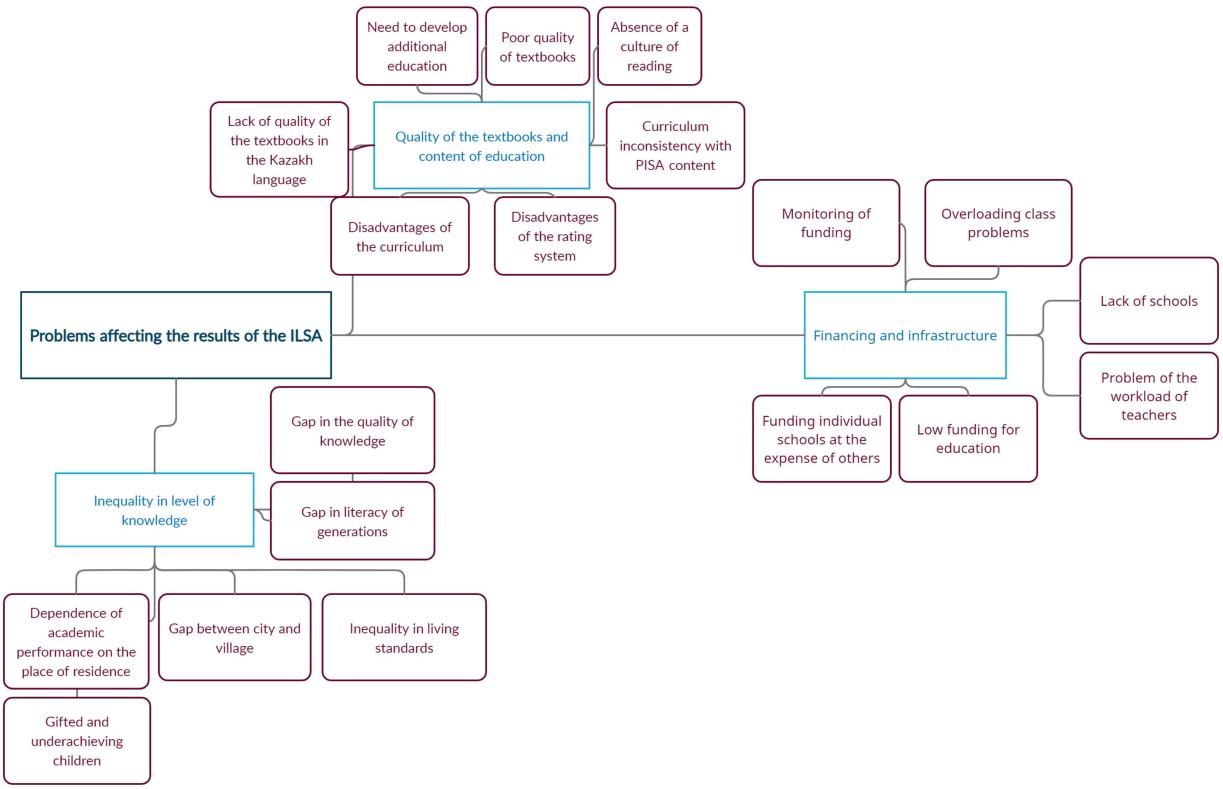
Appendix 2.

RESULTS OF CODING OF INTERVIEWS AND SURVEYS OF EXPERTS AS PART OF THE STUDY

Figure 1. Opinion of experts on international large-scale assessments



Figures 2,3. Problems that impact RK performance in ILSAs according to experts



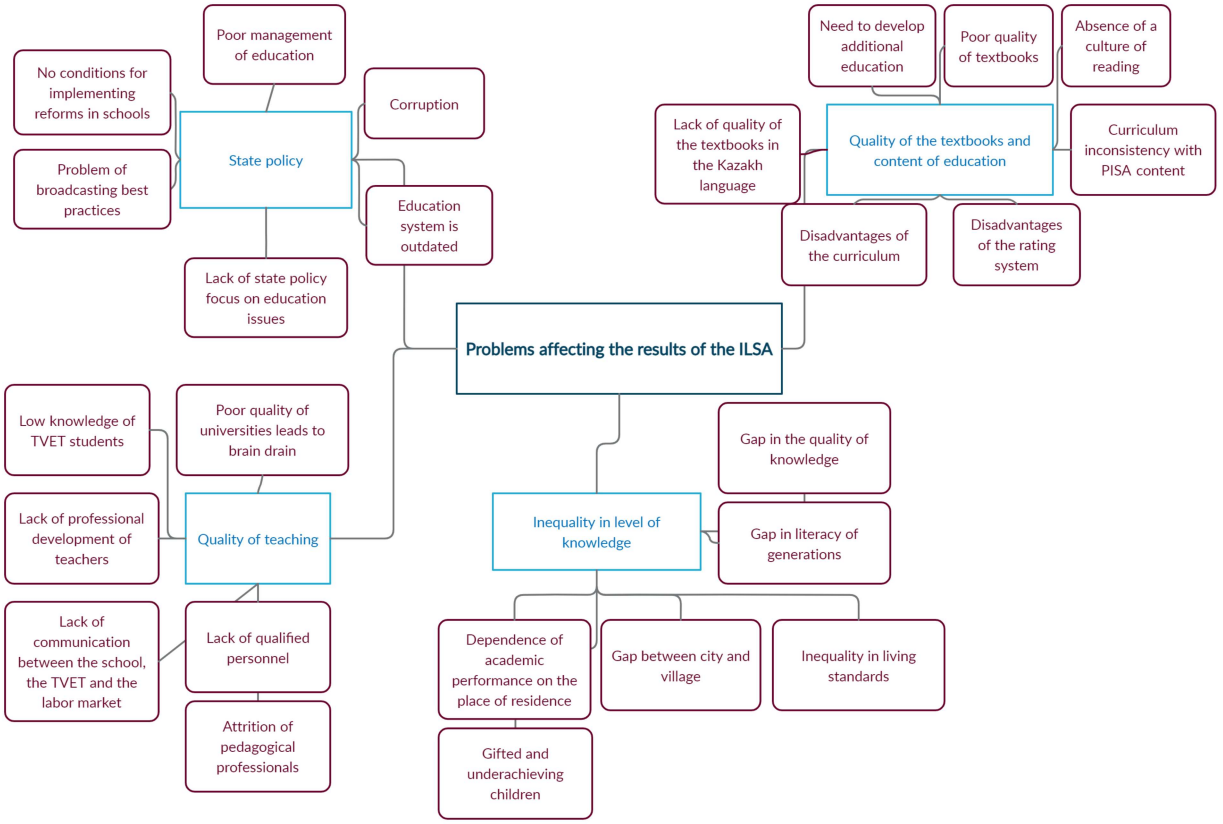
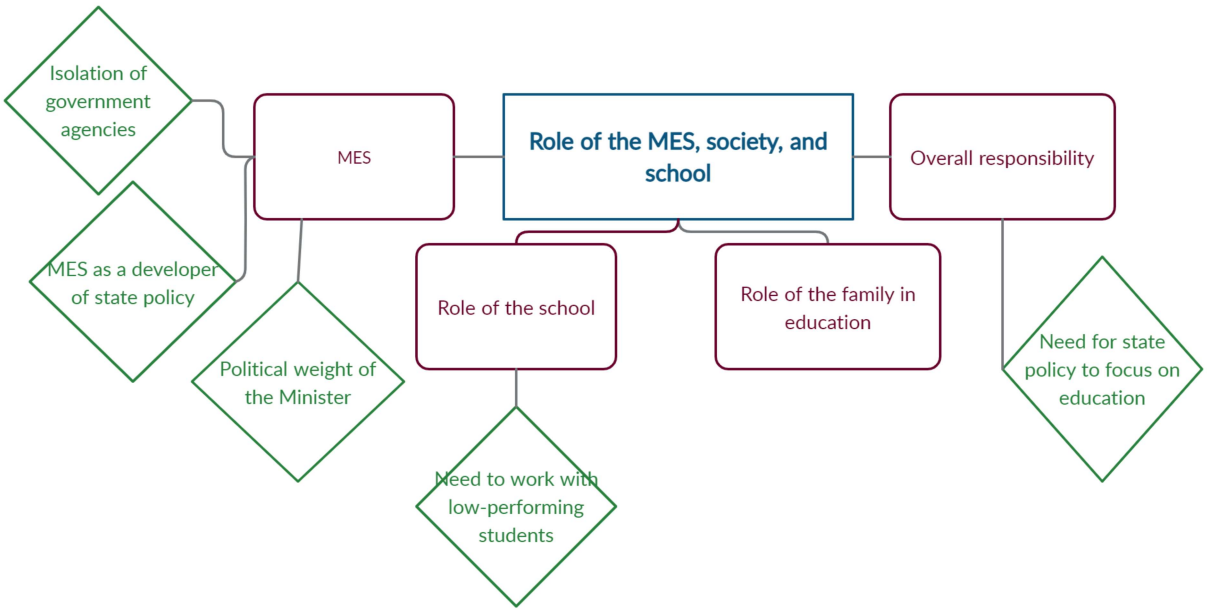


Figure 4. Expert opinion on the role of MES of RK, community and school in increasing the education quality



LIST OF ABBREVIATIONS

AMC – Academic and methodological complex

CNT – Common National Testing

COVID-19 – Coronavirus Disease 2019

EEAA – External Evaluation of Academic Achievement

GCI – Global Competitiveness Index

GDP – Gross domestic product

GPDES – 2020-2025 Government program of development of education and science

HDI – Human Capital Development Index

HDI – Human Development Index

IAC MES RK – Information-analytical Center MES RK

ICILS – International Computer and Information Literacy Study

ICT – Information and Communications Technology

IEA – International Association for the Evaluation of Educational Achievement

ILSA – International large-scale assessment

ISCED – International Standard Classification of Education

ISCO – International Standard Classification of Occupations

LEA – Local executive authorities

MES RK – Ministry of Education and Science of the Republic of Kazakhstan

MTR – Material and technical resources

NIS – Nazarbayev Intellectual School

OECD – Organisation for Economic Co-operation and Development

PIAAC – Programme for the International Assessment of Adult Competences

PIRLS – Progress in International Reading Literacy Study

PISA – Programme for International Student Assessment

RK – The Republic of Kazakhstan

SGS – Small grade school

TIMSS – Trends in Mathematics and Science Study

TVET – Technical and vocational education and training

UNDP – United Nations Development Programme

UNESCO – United Nations Educational, Scientific and Cultural Organization

USA – The United States of America

WEF – World Economic Forum

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For notes