Глобальные тренды системы образования высокорейтинговых стран по версии PISA-2018

Проблема и цель. Современная система образования – это комплекс разработанных социальных институтов, формирующий систему связей и социальных норм, соответствующих перспективным задачам, ориентированным на развитие личности, ее социализацию. Программа PISA оценивает образовательные достижения обучающихся и тем самым выявляет и трактует новые глобальные тренды в сфере образования. Цель исследования – изучить глобальные тренды системы образования высокорейтинговых стран по версии PISA–2018.

Материалы и методы исследования. Эмпирическое исследование состоит из трех этапов. Первый этап – актуализация материалов, сформированных по отчету PISA–2018 из трех групп рейтингов: ТОП-10 стран ОЭСР, ТОП-10 стран ОЭСР-партнеров и интегральный ТОП-10 всех стран-участниц. Второй этап – изучение ТОП-10 всех стран-участниц, где акцент перенесен на конкретную группу показателей, выявляющих глобальные тренды: глобализация, практико-ориентированное обучение, цифровизация, индивидуальные образовательные траектории, устойчивое развитие, социальный климат и эмоциональный интеллект. На третьем этапе проведен сравнительный анализ индикаторов глобальных трендов. Эмпирическое исследование включало описательную статистику (размах вариации, среднеквадратичное отклонение и коэффициент вариации), позволяющую оценить однородность выделенной авторами группы стран и степень отличий между ними.

Результаты исследования. Были отобраны десять высокорейтинговых стран мира с лучшими системами образования с точки зрения PISA–2018, выявлены те, которые максимально раскрывают глобальные тренды систем образования в высокорейтинговых странах. Обнаружены самые высокие показатели: практико-ориентированность обучения в Эстонии – 100%; наличие цифровых устройств дома в Финляндии – 82,6%; индивидуальная образовательная траектория (согласие учителя с мнением ученика) в Китайском Тайбее – 82,4%; эмоциональный интеллект и чувство принадлежности к школе в Корее – 78,7%; социальный климат и участие родителей в школьных мероприятиях в Китае (Пекин – Шанхай – Цзянсу – Гуандун) – 52,3%.

Обсуждение и заключение. Внедрение глобальных трендов в образовательную деятельность современной школы делает ее конкурентоспособной в условиях глобальной цифровизации и укрепляет позиции всей страны в рейтингах PISA. Все страны мира, признавая высокую роль образования в развитии своей страны, внедряют новые цифровые технологии и совершенствуют существующие. В итоге обнаружено, что ведущие страны мира задают глобальные тренды на цифровизацию и глобализацию образования, а другие страны – их внедряют.

Ключевые слова: PISA, система образования, глобальные тренды, глобальные тренды системы образования, глобальная цифровизация, цифровая трансформация, читательская грамотность, математическая грамотность, естественнонаучная грамотность, цифровая грамотность

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Problem and aim. The modern education system is a complex of developed social institutions that form a system of connections and social norms that correspond to promising tasks focused on personal development and socialization. The PISA program evaluates the educational achievements of students and thereby identifies and interprets new global trends in the field of education. The aim of the article is to study the global trends in the education system of the high-ranking countries according to the PISA-2018.

Materials and research methods. Empirical research has three stages. The first stage is the actualization of materials generated according to the Report PISA-2018 from three groups of ratings: TOP-10 OECD countries, TOP-10 OECD partner countries and an integral TOP-10 of all participating countries. The second stage is the study of the TOP-10 of all participating countries, where the focus is shifted to a specific group of indicators that identify global trends: globalization, practice-oriented learning, digitalization, individual educational track, sustainable development, social climate and emotional intelligence. At the third stage, a comparative analysis of global trend indicators was carried out. The empirical study included descriptive statistics (range of variation, standard deviation and coefficient of variation) to assess the homogeneity of the group of countries identified by the authors and the degree of difference between them.

Research results. TOP-10 countries of the world with the best education systems according to PISA-2018 were selected, and those that maximally reveal the global trends in education systems in the high-ranking countries were identified. The highest indicators were found: practical orientation of education in Estonia – 100%; having digital devices at home in Finland – 82.6%; individual educational track (teacher’s agreement with the student’s opinion) in Chinese Taipei – 82.4%; emotional intelligence and a sense of belonging to school in Korea – 78.7%; social climate and parental participation in school activities in China (Beijing – Shanghai – Jiangsu – Guangdong) – 52.3%.

Discussion and conclusion. The infiltration of global trends in the educational activities of a modern school makes it competitive in the context of global digitalization and strengthens the position of the entire country in the PISA ratings. All countries of the world recognizing the high role of education in the development of their country are introducing new digital technologies and improving existing ones. As a result, a picture emerges in which the leading countries of the world set global trends for digitalization and globalization of education, and other countries are implementing them.

Keywords: PISA, education system, global trends, global trends in the education system, global digitalization, digital transformation, reading literacy, mathematical literacy, science literacy, digital literacy

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Programme for International Student Assessment (PISA) is an international study of the education quality, which assesses both the knowledge and skills of students in schools at the age of fifteen. The PISA program was developed by the Organization for Economic Community and Development (OECD) in 1997. For the first time in 2000, it together with reputable international scientific organizations and with the participation of national centers assessed the educational achievements of students. From 2000 to 2018, an international study of the quality of education took place every three years. In 2000, 32 countries of the world took part in the PISA program, and in 2018 – already 78 countries. This program, on the one hand, compares the received assessments of the quality of education, and, on the other hand, acts as a tool for measuring the quality of education in the countries of the world.

Since 2000, the assessment of the literacy of students at the age of 15 has been carried out in the form of test tasks in reading, mathematics and science literacy. The PISA study is carried out in a computer format, which allows efficiently and quickly processing the results of test tasks and developing new tasks that meet modern realities in the context of global digitalization and digital transformation.

It should be added that the coronavirus infection in the world caused by COVID-19 has provoked a new impetus in the field of digitalization. We are now witnessing a situation of global digitalization and digital transformation of everything and in all spheres of human life. In connection with the pandemic, the international study of the quality of education PISA from 2021 was postponed to 2022. In addition to reading, mathematical and science literacy, the PISA study in 2022 will develop tests aimed at checking and assessing the digital literacy of students aged 15 years.

Global digitalization is both the introduction of innovative IT technologies into everyday life through the process of digitizing everything, and the automation of any processes using them. Today, global digitalization has absorbed all spheres of human life, and a modern school is obliged to use innovative IT-technologies and new formats, which allows, on the one hand, to increase the efficiency of the educational process by expanding the space of communication with students, teachers, parents, and on the other, to develop in a hybrid and digital transformation environment.

Digital transformation has reached a global scale, where, thanks to digitalization, modern schools are changing "analog" approaches both in working with students and in offering educational services, becoming a competitive participant in the context of global digitalization, the development of creative industries and pandemic threats and challenges.

All countries of the world, recognizing the high role of education in development, are introducing new digital technologies and improving existing ones. As a result, the leading countries of the world set global trends for digitalization and globalization of education, while others are implementing them.

The aim of the article is to study global trends in the education system of high-ranking countries in accordance with the PISA-2018. For the study, we will select the TOP-10 among the OECD countries, then the OECD partner countries, and based on these two ratings we will build the TOP-10 participating countries in a hybrid format, based on the PISA 2018 research. This will make it possible to identify and analyze in detail the global trends in
education systems in the world's top-rated countries, to reveal the distinctive features of education systems and to take into account new trends.

**Materials and research methods**

A combination of general and specific scientific methods was used as a methodological basis for scientific research. The variety of research methodologies associated with the analysis of the international program for assessing the educational achievements of students ensures the combined use of various approaches aimed at identifying and comprehending the essence of the educational systems of the countries of the world according to the PISA. The research methodology is represented by a complex of methods both of a general scientific plan and methods of empirical research, such as systematization, comparison, generalization, interpretation and analysis of the results of the PISA study of the assessment of reading, mathematical and natural science literacy.

Research materials include a variety of scientific and analytical sources. As part of the scientific study, we consistently worked with the materials of the results of the PISA 2018 study, which were posted in the public domain on the Internet and in official reports.

At the first stage of the study, the conceptual development was based on actualized materials, namely, ratings were formed: TOP-10 OECD countries, TOP-10 OECD partner countries in the PISA-2018 Rating, and, therefore, the adopted set of indicators (analysis of secondary information). At this stage, the key point was to identify the TOP-10 of all participating countries.

At the second stage, work continues with the selected TOP-10 of all participating countries, but the focus is shifted to a specific group of indicators: a multilingual environment, practice-oriented learning, digitalization, an individual educational trajectory, sustainable development (emotional intelligence and social climate). The analysis of secondary information on the selected indicators has been carried out, which makes it possible to identify global trends in the education systems of high-ranking countries according to the PISA-2018 version. Since the PISA report contains not only assessments of functional literacy in reading, mathematics and science, but also the characteristics of the students themselves and their learning conditions, the authors of the article have selected a set of indicators measured in the PISA study that capture and reflect global trends in education.

At the third stage, a comparative analysis of indicators of the involvement of teachers, students and their parents in the learning processes and extracurricular activities was carried out through the indicators: participation of parents in school activities; a sense of belonging to school among students; teacher support and teaching practice. Taking into account the peculiarities of the functioning of each education system, the best results were recorded and the factors that affect the result of a high assessment of the educational achievements of students were analyzed.

Empirical research involves carrying out descriptive statistics: calculating the maximum, minimum and average values; based on the data obtained, the range of variation; standard deviation and coefficient of variation. The obtained values are necessary to assess the homogeneity of the sample, namely, to what extent the TOP-10 participating countries according to PISA-2018 differ in their results, which will reveal different vectors of the strategy for the development of the education system in the context of global digitalization and digital transformation.
For more than 20 years of its implementation, the International Program for the Assessment of Educational Achievements in Students – PISA has established itself as a serious tool for analyzing the quality of the education system in various countries of the world. In our study, we consider it important to use the authoritative and objective data of the PISA report in order to identify high-ranking countries and what global trends they form in the field of education. Here we cite the approach of H. W. Rissom, who believes that the initiatives of international non-governmental organizations promoting research on the quality of education in developing countries deserve encouragement and full support [1]. Also Haw J. Y., King R. B., Trinidad J. E. R., researching the Filipino schools, conclude that the use of the experience of highly rated countries in the field of education has a positive effect on improving the quality of education in other countries. The results of the assessment of educational achievements indicate that it is important to strengthen the learning process in terms of improving the performance of students in reading literacy using an individual approach [2].

Mazurek J., Garcia C. F., Rico C. P. recommend increasing the performance of students in the PISA program, thereby increasing human capital and competitiveness, which will lead to a positive effect – reducing gender inequality and losses associated with them [3].

The PISA-2018 report, which contains a huge amount of data, motivates researchers to create a database and data mining [4]. Studying the global trends in the education system according to PISA-2018, we recontextualize the data from the array, analyze the results obtained and reveal the tendentiousness of the trend indicators. For example, other authors are also recontextualizing the PISA report to assess their research objectives. So, Cobb D. J. and Couch D. use report indicators to assess inclusiveness in the education system [5]. Note that in most studies, the authors, relying on the data of the PISA report, assess the quality of education in their countries [6]. Meanwhile, cross-country studies of specific PISA-2018 indicators are poorly represented in the scientific literature.

Nelis S. M., Gilleece L., Fitzgerald C., Cosgrove J. in their research recognize the value of reading, mathematical and natural science literacy, but pay attention to the fact that these are only partial ideas about the goals and results of education. Education, in their opinion, is endowed with other values, that is, the value of motivation, the value of striving to obtain a different education in the future and the value of employment [7]. Also, one cannot but agree with the concept of M. A. Dyachkova that the proposal spiritual and moral education based on universal human values affects the modern world outlook. In the educational process, the teacher should have an interest in the inner world of children and value attitudes associated with the recognition of the child’s right to personal self-determination [8; 9; 10].

Hori R. и Fujii M. actualize the significance of the PISA study for achieving the fourth goal of sustainable development, that is, obtaining quality education, and in the context of pandemic threats and challenges – high-quality online education. The authors argue that fluency in modern IT-technologies allows students to be more confident, easily prove their self-efficacy and show perseverance in the learning process [11]. The authors found that “using the possibilities of digital technologies can contribute to an increase in human, social and financial capital”, but also lead to the creation of a digital divide and inequality [12]. Ermakova Y. D. argues that global digitalization can provide a high-quality modern educational
environment, which will more stimulate interest in the study of educational resources and affect the formation of a conscious, urgent need for quality education [13].

In the context of global digitalization and digital transformation, the International PISA program by 2022 is forming a new strategy for assessing educational achievements of students and is developing a new block of test items on digital literacy, which is a kind of response to the pandemic threats and challenges of our time.

Research results

To conduct an empirical study, data were selected based on the results of the program of international education quality assessment PISA-2018 and rankings of ten highly-rated countries of the world with the best education systems among OECD countries, OECD partner countries and all participating countries that took part in this program in 2018 (see tables 1, 2 and 3).

We will build the PISA-2018 ratings in descending order of indicators of reading, mathematical and natural science literacy in the countries of the world. When forming the rating of high-ranking countries according to the PISA-2018 version, it is imperative to explain three types of functional literacy, which are aimed at applying their competencies to solving life problems. Reading literacy is “a person's ability to understand and use written texts, reflect on them and engage in reading in order to achieve their goals, expand their knowledge and capabilities, and participate in social life” [14, p. 5]. Reading literacy determines the level of mathematical and natural science literacy. So, with low values of reading literacy, it is impossible to achieve high indicators of mathematical and natural science literacy. Along with reading literacy, mathematical literacy is a skill that applies, formulates and interprets mathematics in various life situations [15]. Natural science literacy is also one of the types of functional literacy, where it is tested how the student is able to independently explain scientific phenomena, interpret and prove the findings. This pattern can be analyzed according to the data reflected in Tables 1–3.

| Rating | Country      | Total Score | Reading | Mathematics | Science |
|--------|--------------|-------------|---------|-------------|---------|
| 1      | Estonia      | 1576        | 523     | 523         | 530     |
| 2      | Japan        | 1560        | 504     | 527         | 529     |
| 3      | Korea        | 1559        | 514     | 526         | 519     |
| 4      | Canada       | 1550        | 520     | 512         | 518     |
| 5      | Finland      | 1549        | 520     | 507         | 522     |
| 6      | Poland       | 1539        | 512     | 516         | 511     |
| 7      | Ireland      | 1514        | 518     | 500         | 496     |
| 8      | Great Britain| 1511        | 504     | 502         | 505     |
| 9      | New Zealand  | 1508        | 506     | 494         | 508     |
| 10     | Sweden       | 1507        | 506     | 502         | 499     |

|        | Mean         | 1537.30     | 512.70  | 510.90      | 513.70  |
|        | Min          | 1507.00     | 504.00  | 494.00      | 496.00  |
|        | Max          | 1576.00     | 523.00  | 527.00      | 530.00  |

Table 1

TOP-10 OECD countries in the PISA-2018 Rating
Table 1 shows the TOP-10 OECD countries in the PISA-2018 Rating. According to the results of the assessment of the quality of education according to the international program PISA-2018, the following countries occupy the leading positions in the overall ranking of the OECD countries: first place – Estonia, second place – Japan, third place – Korea. It is important to note that if the rating of the OECD countries is based only on the results of an assessment of reading literacy, then Canada and Finland are in second place, and Ireland is in third place.

| Rating | Country | Total Score | Reading | Mathematics | Science |
|--------|---------|-------------|---------|-------------|---------|
| 1      | China (Beijing - Shanghai - Jiangsu - Guangdong) | 1736 | 555 | 591 | 590 |
| 2      | Singapore | 1669 | 549 | 569 | 551 |
| 3      | Macau (China) | 1627 | 525 | 558 | 544 |
| 4      | Hong Kong (China) | 1592 | 524 | 551 | 517 |
| 5      | Chinese Taipei | 1550 | 503 | 531 | 516 |
| 6      | Croatia | 1415 | 479 | 464 | 472 |
| 7      | Russia | 1445 | 479 | 488 | 478 |
| 8      | Belarus | 1417 | 474 | 472 | 471 |
| 9      | Ukraine | 1388 | 466 | 453 | 469 |
| 10     | Malta | 1377 | 448 | 472 | 457 |
| Mean   | 1521.60 | 500.20 | 514.90 | 506.50 |
| Min    | 1377.00 | 448.00 | 453.00 | 457.00 |
| Max    | 1736.00 | 555.00 | 591.00 | 590.00 |
| R (Range) | 359.00 | 107.00 | 138.00 | 133.00 |
| SD (Standard Deviation) | 129.74 | 36.60 | 50.51 | 44.32 |
| V (Coefficient of Variation) | 8.53% | 7.32% | 9.81% | 8.75% |

In the TOP-10 OECD partner countries in the PISA-2018 Ranking, the results of the assessment of mathematical and natural science literacy exceed the indicators of reading literacy among the leading countries (regions of one country). Asian countries – Singapore and four regions of China – have ousted other countries of the world from the first positions and demonstrate with convincing reliability that educational systems in these countries form mathematical (abstract) thinking and an idea of the world around students at a high level. Comparing the indicators of descriptive statistics from Tables 1 and 2, we can conclude that in the TOP-10 countries of the OECD group and OECD partner countries, both groups of the TOP turned out to be highly homogeneous (V = 1.65% and 8.53%). At the same time, the OECD countries are more homogeneous, have very similar values.

By combining the TOP-10 OECD countries and the TOP-10 OECD partner countries according to the PISA-2018 version, we received in a hybrid format the TOP-10 of all participating countries in the PISA-2018 Rating (see Table 3 for more details).
In our hybrid rating of all countries participating in the PISA-2018 study, the leading positions are held by groups of countries in China (4 out of 10). More broadly, then there will be seven out of ten countries from Asia and the East. After the publication of these ratings, the world began to say that "the era of China is coming". According to the study, every sixth Chinese student demonstrated the highest level of proficiency in mathematics. On average, in OECD countries, such students are about one in fifty [16].

It is interesting to note the results of the assessment of the achievements of Estonian students. Estonia entered the TOP-5 of all participating countries in the hybrid rating and demonstrates its results at a high level, gradually gaining momentum since 2006. In 2006, Estonia entered the PISA program for the first time. Of course, Estonia's success is not an accidental result. This is a well-structured strategy in the development of the education system in the country. Estonia has adopted the best practices of other countries, for example, Finland, and effectively introduced them into its education system, taking into account the trends and tendentious features of education in the world. In functional reading skills, Estonian students were ahead of the OECD average by 36 points, in mathematics by 34 points, and in science by 41 points.

The international program for assessing the educational achievements of students PISA is aimed, on the one hand, not only to identify the level of three types of functional literacy in 78 countries of the world, but also, on the other hand, to form trends and tendencies in the education system at the global level. With a careful recontextualization of data from PISA reports, it is possible to isolate and analyze the trend indicators of the world's top-rated countries according to the PISA-2018 version.

Let’s highlight a number of global trends in the modern educational space, based on the values of the PISA-2018 indicators among the leading countries:

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| Rating | Country                          | Total Score | Reading | Mathematics | Science |
|--------|----------------------------------|-------------|---------|-------------|---------|
| 1      | China (Beijing - Shanghai - Jiangsu - Guangdong) | 1736        | 555     | 591         | 590     |
| 2      | Singapore                        | 1669        | 549     | 569         | 551     |
| 3      | Macau (China)                    | 1627        | 525     | 558         | 544     |
| 4      | Hong Kong (China)                | 1592        | 524     | 551         | 517     |
| 5      | Estonia                          | 1576        | 523     | 523         | 530     |
| 6      | Japan                            | 1560        | 504     | 527         | 529     |
| 7      | Korea                            | 1559        | 514     | 526         | 519     |
| 8      | Chinese Taipei                   | 1550        | 503     | 531         | 516     |
| 9      | Canada                           | 1550        | 520     | 512         | 518     |
| 10     | Finland                          | 1549        | 520     | 507         | 522     |
| Mean   |                                  | 1596.8      | 523.7   | 539.5       | 533.6   |
| Min    |                                  | 1549        | 503     | 507         | 516     |
| Max    |                                  | 1736        | 555     | 591         | 590     |
| R (Range) |                                  | 187         | 52      | 84          | 74      |
| SD (Standard Deviation) | 62.72125 | 16.86581 | 26.85868 | 23.09978 |
| V (Coefficient of Variation) | 3.93%   | 3.22%    | 4.98%    | 4.33%    |
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- a multilingual environment is an environment that is characterized by the active use of language as a means of communication and a means of revealing the personality in direct introduction to ethnoculture;
- practice-oriented training is aimed at developing students' competencies, thanks to which they can solve practical problems in modern conditions;
- global digitalization is the integration of digital technologies into all spheres of human life: everyday life, work, educational process through the digitization of everything that can be digitized;
- an individual educational trajectory is a personal learning path based on a successful achievement strategy focused on the educational personal growth of the student with pedagogical help and support;
- sustainable development is a harmonious, balanced process of economic and social development, where the social component is aimed at a person, at maintaining the stability of socio-cultural systems, at reducing the number of destructive conflicts between people;
- emotional intelligence is the ability to manage one's own and other people's emotions, to show empathy, the ability to recognize emotions, to recognize negative and positive feelings;
- the social climate is the totality of the emotional and psychological state of all subjects of the educational process, reflecting their degree of satisfaction with various factors of the modern educational space, in which the general mood of teachers, students and their parents is formed and broadcast.

Studying the statistics of PISA-2018, it shows in Table 4, it is possible to identify indicators that maximally reveal the global trends in education systems in high-ranking countries. For example, the highest result of the indicator: practice-oriented education in Estonia – 100%; having digital devices at home in Finland – 82.6%; an individual educational trajectory, where in Chinese Taipei a teacher who listens to the student's opinion completely agrees with him – 82.4%; emotional intelligence and feeling for school in Korea – 78.7%; social climate and parental participation in school activities in China (Beijing – Shanghai – Jiangsu – Guangdong) – 52.3%. The introduction of global trends in the educational and extracurricular activities of a modern school, of course, makes it competitive in the context of global digital transformation, in the era of creative industries and strengthens the country’s position in the PISA ratings.

Our study clearly presents the average values of indicators of the socio-emotional environment of high-ranking countries in the context of sustainable development by categories: teacher support and teaching practice; a sense of belonging to school among students; participation of parents in school activities. Indicators of the emotional environment correspond to the feeling of involvement of teachers, students and their parents in learning processes and extracurricular activities (see Table 5 for more details).

Analyzing the TOP-10 countries according to the selected criteria for the implementation of global trends (multilingual environment, global digitalization, individual educational trajectories, practice-oriented learning, sustainable development, social climate, emotional intelligence), their high indicators should be noted. We believe that the high-ranking countries of the hybrid rating according to the PISA-2018 report do not so much follow global trends as create them themselves, directing the education system, the modern educational space on promising breakthrough projects that provide them with a high level of world
## Table 4

Global trends in education systems in highly rated countries according to selected indicators of the PISA-2018 report [17; 18; 19]

| Rating | Country                          | Multilingual environment | Practice-oriented learning | Global digitalization | Individual educational trajectory | Sustainable development (emotional intelligence, social climate) |
|--------|----------------------------------|--------------------------|---------------------------|----------------------|----------------------------------|---------------------------------------------------------------|
|        |                                  | Students who don’t speak in the language of instruction at home, % | «Preparedness for life», high, % | Availability of digital devices at home, % | Time spent on the Internet at school on a typical weekday, min | The teacher listened to my view on how to do things (agree, strongly agree), % | Sense of belonging at school, % (see Table 5) |
| 1      | China (Beijing - Shanghai - Jiangsu - Guangdong) | 0.5 | 93.5 | m | m | m | 82.8 | 81 | 55.6 | 70.0 | 25 | 52.3 |
| 2      | Singapore                        | 43.1 | 93.5 | 79 | 61.1 | 174.8 | 82.5 | 78.2 | 60 | 77.7 | m | 35.5 |
| 3      | Macau (China)                    | 18.7 | 8.6  | 78.7 | 33.9 | 154.5 | 71.3 | 67.2 | 49.2 | 62.7 | 13 | 41.3 |
| 4      | Hong Kong (China)                | 18.8 | 58   | 77.3 | 31.5 | 151.5 | 73.8 | 72.7 | 42.7 | 71.3 | 14 | 36.3 |
| 5      | Estonia                          | 5.4  | 100  | 80.1 | 80.5 | 173.5 | 69.5 | 62.8 | 77 | 72.0 | 35 | 31.3 |
| 6      | Japan                            | 1    | 98.4 | 67.5 | 25.6 | 107.8 | 69 | 47.3 | 66.9 | 74.3 | 20 | 32.3 |
| 7      | Korea                            | 0.6  | 99.6 | 71.4 | 25.9 | 100.8 | 80.3 | 76.7 | 53.3 | 78.7 | 26 | 33.3 |
| 8      | Chinese Taipei                   | 14.9 | 24.1 | 75.1 | 54.4 | 139.9 | 72 | 82.4 | 60 | 75.3 | 21 | 37.0 |
| 9      | Canada                           | 21.0 | 73.1 | m | m | m | m | m | 67.6 | 75.7 | m | 28.5 |
| 10     | Finland                          | 7.6  | 100  | 82.6 | 73.9 | 167.8 | 80.3 | 68.6 | 66.7 | 76.0 | 43 | 31.5 |
| Mean   |                                  | 13.16 | 74.88 | 76.46 | 48.35 | 142.44 | 76.83 | 70.77 | 59.9 | 73.37 | 24.63 | 35.93 |
| Min    |                                  | 0.50  | 8.60 | 67.5 | 25.6 | 100.8 | 69.50 | 47.30 | 42.7 | 62.7 | 13.00 | 28.50 |
| Max    |                                  | 43.10 | 100.00 | 82.6 | 80.5 | 174.80 | 82.8 | 82.40 | 77.0 | 78.7 | 43.00 | 52.30 |
| R (Range) |                                  | 42.60 | 91.40 | 15.1 | 54.9 | 74.00 | 13.3 | 35.10 | 34.3 | 16.0 | 30.00 | 23.80 |
| SD (Standard Deviation) |                                  | 13.25 | 33.96 | 4.94 | 22.04 | 28.45 | 5.16 | 10.99 | 10.11 | 4.66 | 10.21 | 6.79 |
| V (Coefficient of Variation) |                                  | 100.70 | 45.35 | 6.46 | 45.58 | 19.98 | 6.72 | 15.53 | 16.87 | 6.35 | 41.47 | 18.89 |

* Percentage of students who disagreed or strongly disagreed that "your intelligence is something about you that you can’t change very much".
## Indicators of the socio-emotional environment in the context of the Sustainable Development Goals

Table 5

| Place in TOP-10 | Country | Teachers’ support and teaching practices**, % | Sense of belonging at school***, % | Parental involvement in school activities****, % |
|-----------------|---------|--------------------------------------------|---------------------------------|---------------------------------------------|
|                 |         | A   | B   | C   | D   | Mean | A   | B   | C   | Mean | A   | B   | C   | D   | Mean |
| 1               | China (Beijing - Shanghai - Jiangsu - Guangdong) | 83  | 86  | 86  | 76  | 82.75 | 79  | 65  | 66  | 70.0 | 69  | 67  | 41  | 32  | 52.3 |
| 2               | Singapore | 80  | 84  | 88  | 78  | 82.5  | 78  | 73  | 82  | 77.7 | 43  | 75  | 12  | 12  | 35.5 |
| 3               | Macau (China) | 70  | 72  | 75  | 68  | 71.25 | 70  | 56  | 62  | 62.7 | 35  | 85  | 29  | 16  | 41.3 |
| 4               | Hong Kong (China) | 73  | 74  | 78  | 70  | 73.75 | 76  | 66  | 72  | 71.3 | 41  | 71  | 20  | 13  | 36.3 |
| 5               | Estonia | 60  | 74  | 76  | 68  | 69.5  | 71  | 74  | 71  | 72.0 | 39  | 50  | 17  | 19  | 31.3 |
| 6               | Japan | 75  | 81  | 83  | 77  | 79  | 69  | 80  | 74  | 74.3 | 13  | 78  | 20  | 18  | 32.3 |
| 7               | Korea | 79  | 80  | 87  | 75  | 80.25 | 77  | 78  | 81  | 78.7 | 42  | 46  | 33  | 12  | 33.3 |
| 8               | Chinese Taipei | 57  | 79  | 82  | 70  | 72  | 78  | 85  | 63  | 75.3 | 44  | 45  | 33  | 26  | 37.0 |
| 9               | Canada | m   | m   | m   | m   | 80.25 | 74  | 67  | 86  | 75.7 | 44  | 52  | 7   | 11  | 28.5 |
| 10              | Finland | 74  | 85  | 87  | 75  | 80.25 | 75  | 75  | 78  | 76.0 | 41  | 69  | 8   | 8   | 31.5 |

** Mean of indicators A, B, C, D, %, of the number of answers: A – The teacher shows an interest in every student’s learning; B – The teacher gives extra help when students need it; C – The teacher helps students with their learning; D – The teacher continues teaching until students understand.

*** Mean of indicators A, B, C, %, of the number of answers: A – I make friends easily at school; B – I feel like I belong at school; C – Other students seem to like me.

**** Mean of indicators A, B, C, D, %, of the number of answers: A – They discussed their child’s progress with a teacher on their own initiative; B – They discussed their child’s progress on the initiative of one of their child’s teachers; C – Participated in local school government; D – Volunteered in physical or extracurricular activities.
education assessment. For almost all selected indicators, the countries are homogeneous (low values of the coefficient of variation). However, there are strong differences in the multilingual environment (the language that the students do not speak at home) (V is more than 100%). In our opinion, this suggests that students have no language barriers; their non-native language does not prevent them from successfully learning. Moreover, we note that for Asian and Eastern countries, their cultural and national traditions play an important role in the educational process. That is why they maintain linguistic value by speaking their native language at home.

In terms of Internet use in school, there was a significant spread of indicators (standard deviation is 22.04) among the highly rated countries. Here you can see two principles in teaching: the active use of gadgets for educational purposes by countries (Finland, Estonia, and Singapore) and traditional educational technologies (the countries of China and Japan). As you can see, both of them are able to achieve high educational results by choosing different pedagogical technologies. According to the group of indicators, individual educational technologies of the TOP-10 countries can be considered an absolutely homogeneous group, as evidenced by all indicators of descriptive statistics.

In terms of emotional intelligence and social climate, the scatter of values among countries is small (SD within 10 or less). However, in terms of satisfaction with life, the coefficient of variation is more than 40%, the group is heterogeneous. Perhaps, students in Asian countries who are used to setting high goals for themselves without reaching them rate their satisfaction with this lower.

The growth mindset, or intelligence gain theory, is the belief that someone's ability and intelligence can develop over time. This is in contrast to the fixed mindset, or the belief that someone is born with a certain degree of ability and intelligence that is largely independent of experience [20]. Developing a growth mindset is often a strategy to help students put in more effort; but by themselves are unlikely to contribute to their personal growth. Learners who support the growth mindset also use other strategies that lead to greater learning and progress, such as learning from previous experiences, responding to feedback, and trying out new learning strategies [21; 22]. The growth mindset so that learners can achieve any goal; successful growth depends on the environment.

Slaten S., describing the concepts, includes in the concept such elements as school attachment, attachment to school, participation in school activities, school identification and school connections [24].

Results discussion

As a result of the study, it was revealed that the International PISA program, by analyzing the quality of education systems in 78 countries of the world, helps to identify and form new global trends and tendencies in the field of education.

Our study confirms the findings of Govorova E., Benítez I., Muñiz J. on the importance of a sense of belonging, a favorable climate and teacher enthusiasm as central factors in cognitive, psychological and social well-being, forming a solid construction of well-being in an educational context [25].

Our findings are consistent with the views of Eryilmaz N., Sandoval-Hernández A. that “cultural capital and student-to-school feedback is vital” for student learning and development. The sustainable development of the modern educational space, the formation
of a social climate and the development of emotional intelligence confirms our hypothesis that global trends in education are created in effective, successful educational practice [26].

Our findings are somewhat at odds with the results of the study by Koyuncu I., Fırat T., in which “sense of belonging to school is not significant predictors” for the development of reading literacy competencies in Turkey, China (B-S-J-Z) and Mexico [27]. On the contrary, we believe that sustainable development of the modern school, social climate, emotional intelligence in general, and a sense of belonging to school in particular, affect the level of assessment of educational achievements of functional literacy in reading, mathematics and science.

As a result of the study, it should be noted that the identification of global trends and tendencies in the educational system of high-ranking countries of the world according to PISA-2018 and their introduction into the education system of other countries is an important attribute of the development of the modern educational world space.

Conclusion

Following global trends in the activities of an educational organization increases the brand of the school and allows you to achieve the most effective results in assessing the educational achievements of students in reading, mathematical and natural science literacy.

Today, global digitalization has absorbed all spheres of human life, where the modern educational space is no exception to the rule. A modern school uses innovative IT-technologies and new formats, which allows it, on the one hand, to increase the efficiency of the educational process by expanding the space of communication with students, teachers, parents, and, on the other hand, to develop in a hybrid environment and conditions of digital transformation. All countries of the world, recognizing the high role of education in the development of the country, are introducing new digital technologies, improving existing ones. As a result of the study, it was revealed that the top-rated countries of the world, according to PISA-2018, set global trends for the development of digitalization, a multilingual environment, practice-oriented learning, individual educational trajectories, emotional intelligence, social climate and sustainable development of the modern educational space, and other countries – there are being introduced into their education systems.

REFERENCES

1. Rissom, H. W. (2020). The search for quality in education: Some comments on the international dimension. In Measuring the quality of education, 123-133. CRC Press.
2. Haw, J. Y., King, R. B., Trinidad, J. E. R. (2021). Need supportive teaching is associated with greater reading achievement: What the Philippines can learn from PISA 2018. International Journal of Educational Research, 110, 101864.
3. Mazurek, J., Garcia, C. F., Rico, C. P. (2021). Inequality and Students’ PISA 2018 Performance: a Cross-Country Study. Comparative Economic Research. Central and Eastern Europe, 24(3), 163-183.
4. Gamasa, A., Martinez-Abad, F. An exploration of factor linked to Academic performance in PISA 2018 through data mining techniques). Frontiers in Psychology, 11: 575167 doi: 10.3389/fpsyg.2020.575167.
5. Cobb, D. J., Couch, D. (2021). Locating inclusion within the OECD’s assessment of global competence: An inclusive future through PISA 2018? Policy Futures in Education, 1–17. doi: 10.1177/14782103211006636.
6. Gilleece, L., Nelis, S. M., Fitzgerald, C., Cosgrove, J. (2020). Reading, mathematics and science achievement in DEIS schools: Evidence from PISA 2018. Dublin: Educational Research Centre.

7. Nelis, S. M., Gilleece, L., Fitzgerald, C., Cosgrove, J. (2021). Beyond achievement: home, school and wellbeing findings from PISA 2018 for students in DEIS and non-DEIS schools. Dublin: Educational Research Centre.

8. Dyachkova, M. A. (2009). On the role of the teacher in the spiritual and moral education of schoolchildren. Scientific Life, 5, 99-103.

9. Dyachkova, M. A. (2008). Spiritual and moral education as a social and pedagogical phenomenon. Bulletin of the Volgograd State Pedagogical University, 4, 23-28.

10. Dyachkova, M. A. (2015). Human values as the basis of moral education. Philosophy of law and human rights. Collection of scientific articles. Yekaterinburg, 85-88.

11. Hori, R.; Fujii, M. (2021). Impact of Using ICT for Learning Purposes on Self-Efficacy and Persistence: Evidence from Pisa 2018. Sustainability, 13, 6463. doi: 10.3390/su13116463.

12. Kyzym, M., Balian, A., Levanda, O., Gryshova, I., Samsonova, V. (2021). Impact of Global Digitalization on Public Policy in the Context of Education. Annals of the Romanian Society for Cell Biology, 7045-7052.

13. Ermakova, Y. D. (2020). Changing educational trends in the context of global digitalization of society. Vestnik of Samara State Technical University. Psychological and Pedagogical Sciences, 2, 87-97.

14. Zuckerman, G. A. (2010). Reading Literacy Assessment: A discussion paper. Moscow: RAO Institute of content and teaching methods. P. 5.

15. Novikova, V. Formation of mathematical literacy in the modern educational space. July 21, 2021. Available at: art-talent.org (accessed on 10/22/2021).

16. PISA: Estonian schoolchildren ranked first among European countries. 04 December 2019. Available at: https://eadaily.com/ru/news/2019/12/04/pisa-estonskie-shkolniki-zanyali-pervoe-mesto-sredi-evropeyskih-stran (accessed on 17.10.2021).

17. PISA 2018 Results (Volume I): What Students Know and Can Do. Available at: https://www.oecd-ilibrary.org/education/pisa-2018-results-volume-i_5f07c754-en (accessed on 21.10.2021).

18. PISA 2018 Results (Volume II): Where All Students Can Succeed. Available at: https://www.oecd-ilibrary.org/education/pisa-2018-results-volume-ii_b5fd1b8f-en (accessed on 21.10.2021).

19. PISA 2018 Results (Volume III): What School Life Means for Students’ Lives. Available at: https://www.oecd-ilibrary.org/sites/acd78851-en/index.html?itemId=/content/publication/acd78851-en (accessed on 21.10.2021).

20. Dweck, C. (2006). Mindset, Random House, New York, NY.

21. Dweck, C. (2016). What having a “growth mindset” actually means. Harvard Business Review. Available at: http://thebusinessleadership.academy/wp-content/uploads/2017/03/What-Having-a-Growth-Mindset-Means.pdf (accessed on 19.10.2021).

22. Yeager, D., Dweck, C. (2012). Mindsets that promote resilience: When students believe that personal characteristics can be developed. Educational Psychologist, 47/4, 302-314, http://dx.doi.org/10.1080/00461520.2012.722805.

23. Dweck, C. (2016). Mindset: The New Psychology of Success, Ballantine Books, New York, NY.

24. Slaten, C. et al. (2016). School belonging: A review of the history, current trends, and future directions. The Educational and Developmental Psychologist, 33/1, pp. 1-15. doi: 10.1017/edp.2016.6.

25. Govorova, E., Benítez, I., Muñiz, J. (2020). Predicting student well-being: Network analysis based on PISA 2018. International Journal of Environmental Research and Public Health, 17(11), 4014.

26. Eryilmaz, N., Sandoval-Hernández, A. (2021). The relationship between cultural capital and the students’ perception of feedback across 75 countries: Evidence from PISA 2018. International Journal of Educational Research, 109, 101803. doi: 10.1016/j.ijer.2021.101803.

27. Koyuncu, I., Frat, T. (2020). Investigating reading literacy in PISA 2018 assessment. International Electronic Journal of Elementary Education, 13(2), 263-275.
Информация об авторах

Томюк Ольга Николаевна
(Россия, г. Екатеринбург)
Кандидат философских наук, старший научный сотрудник, старший преподаватель кафедры теории государства и права
Уральский государственный юридический университет
E-mail: helgago@yandex.ru
ORCID ID: 0000-0001-9524-8364
Scopus ID: 57211983935

Дьячкова Анна Викторовна
(Россия, Екатеринбург)
Кандидат экономических наук, доцент кафедры экономической теории и экономической политики
Уральский федеральный университет имени первого Президента России Б. Н. Ельцина
E-mail: a.v.diachkova@urfu.ru
Scopus ID: 57211156711
ORCID ID: 0000-0003-4970-1820

Киселева Наталия Александровна
(Россия, Москва)
Заместитель руководителя Департамента образования и науки города Москвы
E-mail: KiselevaNA@mos.ru
ORCID ID: 0000-0001-7139-0665

Камка Светлана Васильевна
(Россия, Москва)
Кандидат педагогических наук, заместитель директора
Корпоративный университет московского образования
E-mail: KamkaSV@mioo.ru
ORCID ID: 0000-0001-7575-0875

Николенко Ольга Игоревна
(Россия, Москва)
Заместитель начальника Управления оценки и сертификации
Корпоративный университет московского образования
E-mail: NikolenkoOI@mioo.ru
ORCID ID: 0000-0002-4503-1711

Information about the authors

Olga N. Tomyuk
(Russia, Ekaterinburg)
PhD in Philosophy, Senior Researcher, Senior Lecturer, Department of Theory of State and Law
Ural State Law University
E-mail: helgago@yandex.ru
ORCID ID: 0000-0001-9524-8364
Scopus ID: 57211983935

Anna V. Diachkova
(Russia, Ekaterinburg)
Associate Professor, PhD in Economics, Associate Professor of the Department of Economic Theory and Economic Policy
Ural Federal University named after the first President of Russia B. N. Yeltsin
E-mail: a.v.diachkova@urfu.ru
Scopus ID: 57211156711
ORCID ID: 0000-0003-4970-1820

Nataliia A. Kiseleva
(Russia, Moscow)
Deputy Head
Moscow Department of Education and Science
E-mail: KiselevaNA@mos.ru
ORCID: 0000-0001-7139-0665

Svetlana V. Kamka
(Russia, Moscow)
PhD in Pedagogic sciences, Deputy Director
Corporate University of Moscow Education
E-mail: KamkaSV@mioo.ru
ORCID ID: 0000-0001-7575-0875

Olga I. Nikolenko
(Russia, Moscow)
Deputy Head of the Evaluation and Certification office
Corporate University of Moscow Education
E-mail: NikolenkoOI@mioo.ru
ORCID ID: 0000-0002-4503-1711