PISA 2018: KEY FINDINGS AND CONCLUSIONS

WHAT UKRAINIAN 15-YEAR-OLD STUDENTS KNOW AND CAN DO

- Results of Ukrainian Students in PISA 2018
- What Affects Ukrainian Students' Performance?
- Well-being, Attitude to Education and Aspirations of 15-year-old Ukrainians
- Learning Environment and Educational Resources in Ukraine

PISA AND ITS SIGNIFICANCE

- PISA is the OECD's Programme for International Student Assessment. It is the world's biggest international education survey, involving schools and 15-year-old students more than in 85 countries around the world.
- PISA studies how well 15-year-olds can use their Reading, Maths and Science knowledge and skills they have learned in school to meet real-life challenges. It consists of computer-based assessments.
- PISA normally has a three-year cycle. Every cycle, one of the three main domains (Reading, Mathematics, and Science) becomes the leading one – the major domain.
- In addition to tests, PISA offers a whole range of questionnaires – for students, school administrators, teachers, parents, etc.
- Within the first PISA cycles, testing and questionnaires were conducted as paper-based assessments. In 2012, a gradual transition to a computer-based assessment began. Today, most countries are choosing the comuter-based version of participation in PISA.
- The test scores of PISA participants enable countries / economies to assess the level of knowledge, skills, and abilities that their 15-year-olds possess and reflect how well their young citizens are prepared for active participation in life. In turn, thanks to the survey data, it is possible to evaluate various factors that reflect the state of the educational systems of different countries / economies associated with their students' performance.
- Countries / economies use PISA results to make evidence-based political decisions in the field of education. And, as evidenced by the experience of many countries / economies, motivated decisions made by policy-makers on the basis of PISA data provide an opportunity to significantly improve some problematic situations in the field of compulsory education.

UKRAINE IN PISA 2018

In 2016, Ukraine joined the PISA project for the first time, and became one of nearly 80 countries / economies participating in the seventh cycle of triennial PISA survey. The main study of that cycle was held in 2018. Our country participated in mandatory for all participating countries / economies test and survey options: Reading, Mathematics and Sciences tests and Student and School Questionnaires. In Ukraine, all tests and questionnaires of that cycle were held as a paper-based assessment.

To administer PISA in Ukraine, the PISA National Center was organized on the basis of the Ukrainian Center for Educational Quality Assessment.

PISA 2018 SAMPLING

In 2018, 5,998 Ukrainian students from 250 educational institutions took part in the Programme for International Student Assessment (PISA). This sample of participants represented 315,388 15-year-olds of Ukraine according to various parameters (*gender, type of educational institution, type of settlement*), most of whom complete basic secondary education or begin to obtain complete general secondary education at this age, i.e. study in grades 9–10 of institutions of general secondary education or in the 1st year of professional (vocational and technical) education institutions or higher education institutions of I-II levels of accreditation[11]. The main study of PISA including tests and questionnaires within the framework of PISA-2018 was held in Ukraine in April-May 2018.

Based on the results of the main study, the PISA National Center prepared a ***National Report***[2]*, which supplements and expands the data of several parts of the* ***International Report***[3]*.*

The key findings recorded in the National Report are summarized below.

[1] In this report, all pupils who study at different above mentioned educational institutions are generally called 'students'.
[2] [2]http://pisa.testportal.gov.ua/wp-content/uploads/2019/12/PISA_2018_Report_UKR.pdf
[3] [3]http://pisa.testportal.gov.ua/wp-content/uploads/2020/02/PISA2018_Mizhnarodnyj-zvit_ukr.pdf, and http://www.oecd.org/pisa/publications/

WHAT UKRAINIAN 15-YEAR-OLD STUDENTS KNOW AND CAN DO

The results of Ukrainian students in all PISA subject domains – Reading, Mathematics, and Science – are comparable with the average results of students in OECD countries and reference countries[4].

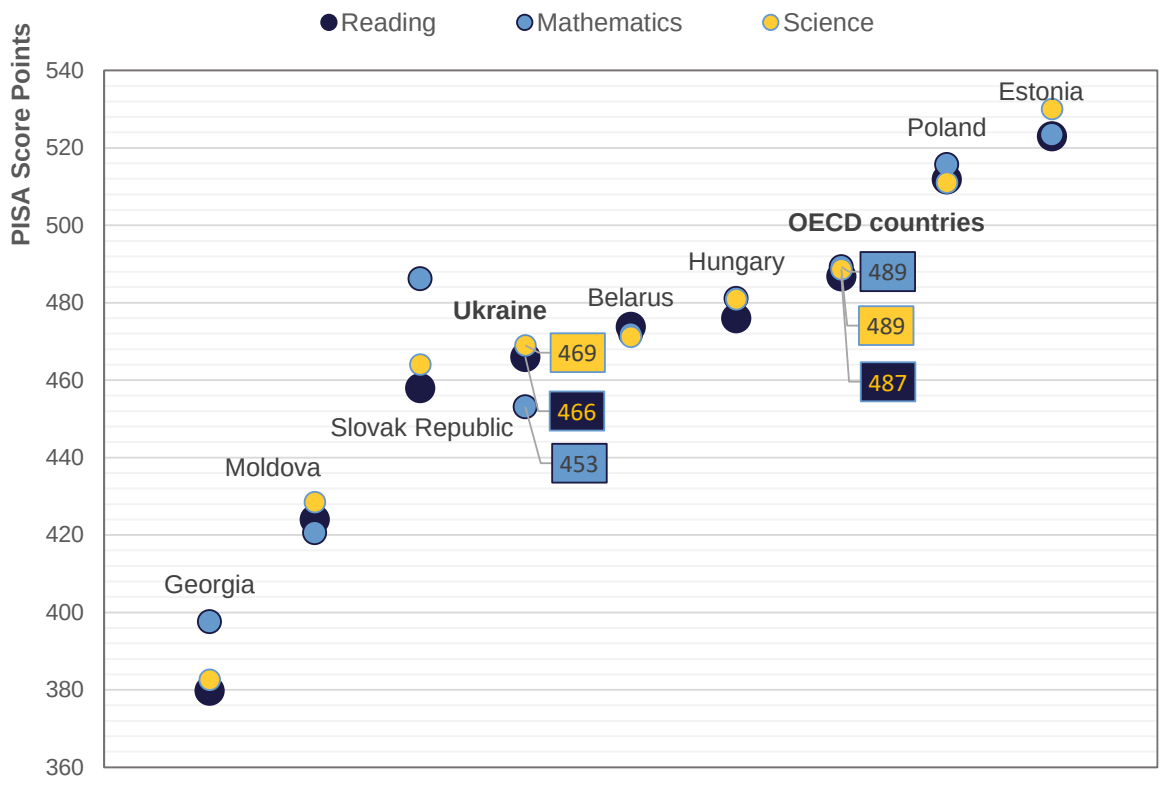


Figure 1. Students' performance in Reading, Mathematics and Science

The average scores which Ukrainian students obtained in Reading, Mathematics, and Science are lower than the scores of students in OECD countries, Estonia, and Poland, but higher than those of students in Georgia and Moldova. According to the PISA 2018 results, the difference in Reading and Science scores between Ukraine, Belarus, Hungary and the Slovak Republic is not statistically significant, but in Mathematics Ukrainian students are less competent than students of these countries.

4 Reference countries are countries whose educational parameters and student performance results are taken for comparison with similar parameters of Ukraine. The reference countries were selected on the basis of the similarity of their socio-economic status and the socio-economic status of Ukraine or due to their cultural or historical affinity with Ukraine. The list of reference countries includes: Belarus, Georgia, Estonia, Moldova, Poland, Hungary and the Slovak Republic.

HOW WELL CAN UKRAINIAN 15-YEAR-OLD TEENAGERS READ?

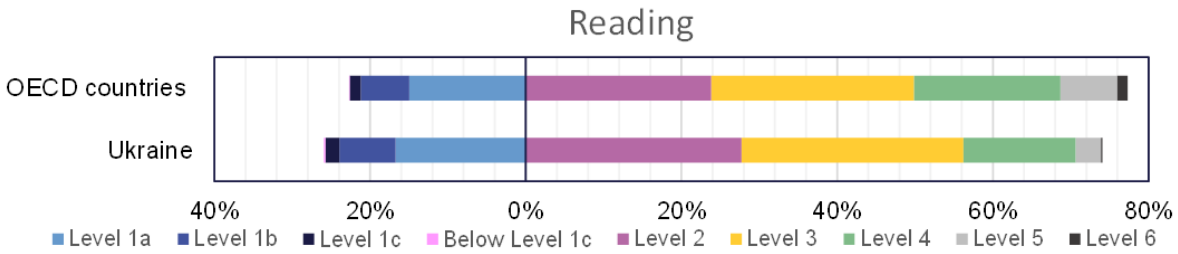


Figure 2. Levels of Ukrainian students' reading literacy compared to performance of their peers from OECD countries

- 74% of Ukrainian students achieved at least Level 2 or higher on the PISA Reading scale (in OECD countries, on average, 77% of students achieved Level 2 or higher). At least these students can fairly easily recognize the main idea of a text, make inferences given several conditions, and make some comparisons and contrasts between information in the text and information outside the text (from background knowledge). At the same time, less than 30% of Ukrainian students can cope with tasks asking to retrieve the similarity and association between information provided in several paragraphs or other parts of the text, integrate the content of parts of the text to determine its main idea and purpose, understand the contextual meaning of a word or a phrase, evaluate the formal features of the text. The Ukrainian students face difficulties when asked to find necessary information in the text, especially if it is scattered in different, often non-adjacent, parts of the text. It is difficult for 15-year-olds to think critically, understand familiar categories in a new context, make assumptions, and critically evaluate texts.
- About 3% of Ukrainian students performed the best in Reading, that is, they reached 5 or 6 levels according to the PISA reading scale (on average, in OECD countries, there are 9% of such students). The students who achieved these levels demonstrated a skill of detailed analysis of an unfamiliar text, working on which it was necessary to make assumptions while the obvious information was missing, an ability to think critically and make predictions, pay attention to details, and find information that is not directly stated in the text.

HOW CONFIDENT ARE UKRAINIAN 15-YEAR-OLD TEENAGERS IN MATHEMATICS?

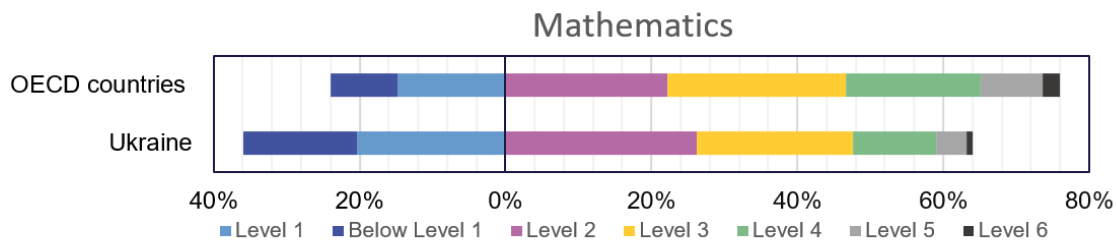


Figure 3. Levels of Ukrainian students' numeracy (mathematical competency) compared to performance of their peers from OECD countries

- About 64% of the students in Ukraine achieved Level 2 or higher according to the PISA scale in Mathematics (on average in the OECD countries, the number of such students is 76%). At least, these students quite easily solved those problems that involve the use of elementary algorithms, formulas or procedures. They were able to solve problems with whole numbers, could answer questions related to known contexts, identify obvious information and carry out typical procedures according to clear instructions. Meanwhile, Ukrainian teenagers performed worse when the tasks asked them to create simple models and use simple solving strategies, justify their actions, use percentages, and operate with fractions and decimals.

- Only 5% of Ukrainian students achieved the highest levels of performance (Level 5 or 6) in Mathematics (for OECD countries it is 11%, on average). These students could develop models of complex situations and work with them, showed advanced skills in analysing and reasoning, using symbolic representations of situations, conceptualising, generalising and using information based on their own research in new situations.

HOW GOOD ARE UKRAINIAN 15-YEAR-OLD TEENAGERS AT SCIENCE?

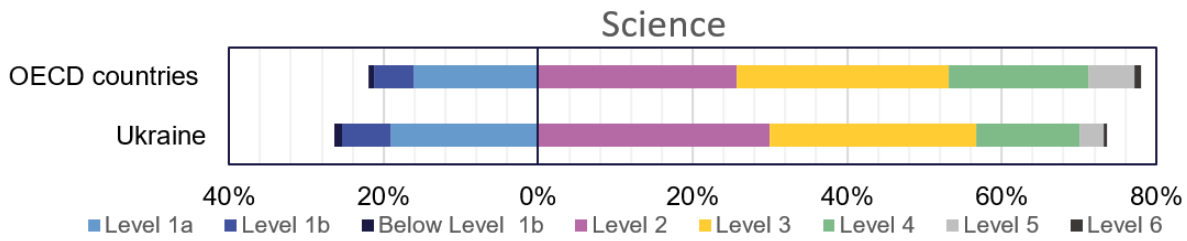


Figure 4. Levels of Ukrainian students' scientific competency compared to performance of their peers from OECD countries

- About 74% of the students in Ukraine achieved Level 2 or higher according to the PISA scale based on the results of testing in science (on average, for OECD countries, there are 78% of such students). At least, these students could demonstrate their ability to perform the tasks that require the medium level of subject knowledge in and Science-related disciplines (Biology, Physics, Chemistry, Geography, and Astronomy) to identify certain known phenomena or offer acceptable explanations for them. Regarding less well-known or more difficult situations, Ukrainian students could offer explanations only if some prompts or help were available.
- Only 3% of the students in Ukraine participating in PISA 2018 showed to be the top performers in Science (that is, they achieved Level 5 or 6 according to the PISA score scale for Science) while OECD countries average is 7%. Such students could demonstrate their ability to use abstract scientific ideas, explain unfamiliar and complex phenomena, qualitatively interpret information and make predictions, evaluate alternative plans for conducting experiments, and draw conclusions about complex unfamiliar phenomena.

THE BACKGROUND OF UKRAINIAN STUDENTS' PERFORMANCE

STUDENTS' PERFORMANCE AND THEIR GENDER

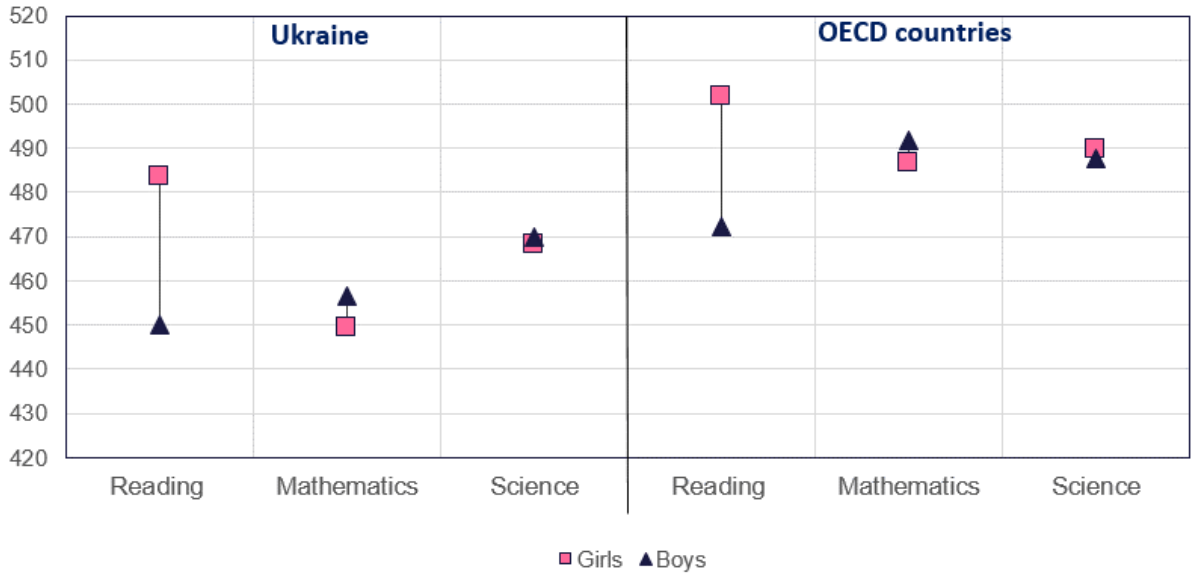
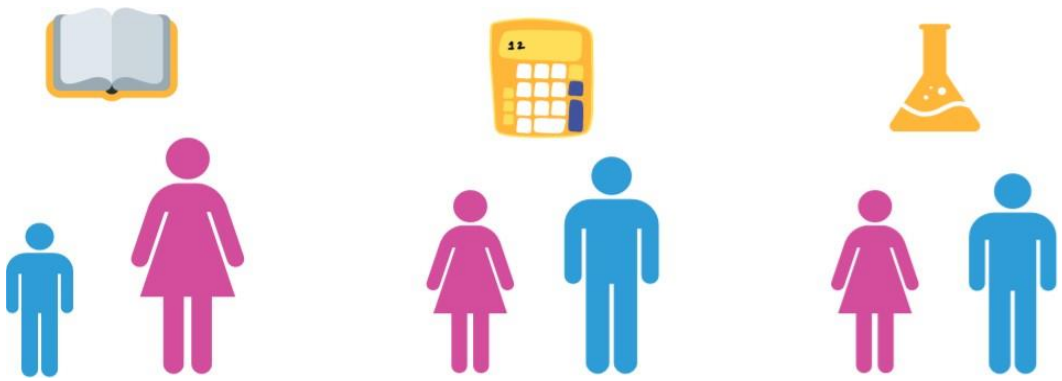


Figure 5. Differences in students' performance related to their gender

In Ukraine, 15-year-old girls outperformed boys in Reading by about one year of schooling (the difference is 33 score points on the PISA scale, which on average is proportional to one year of schooling). On the contrary, boys slightly outperformed girls in Mathematics (the difference is 7 score points on the PISA scale). There was almost no performance gap between boys and girls in Science. Similar trends are characteristic of students' performance in Reading, Mathematics, and Science in OECD countries.



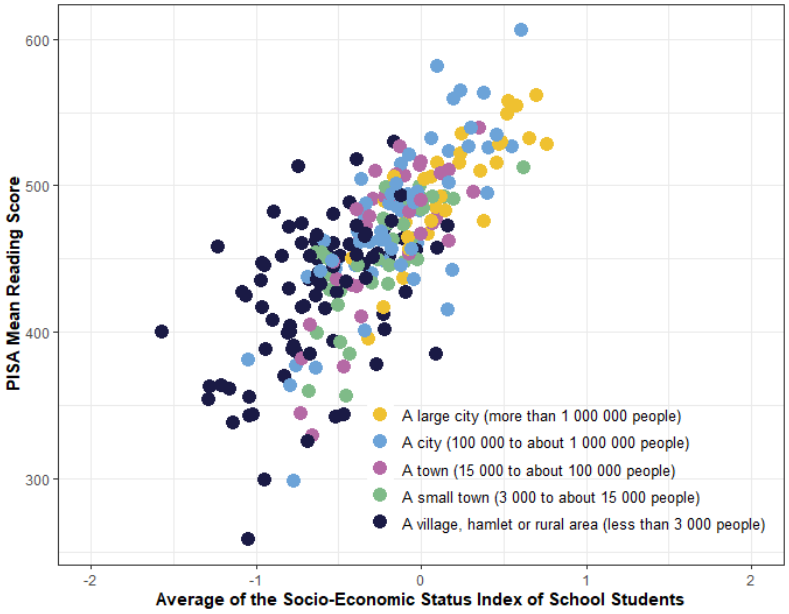


Figure 6. Differences in students' performance related to students' socio-economic status and the location of their schools

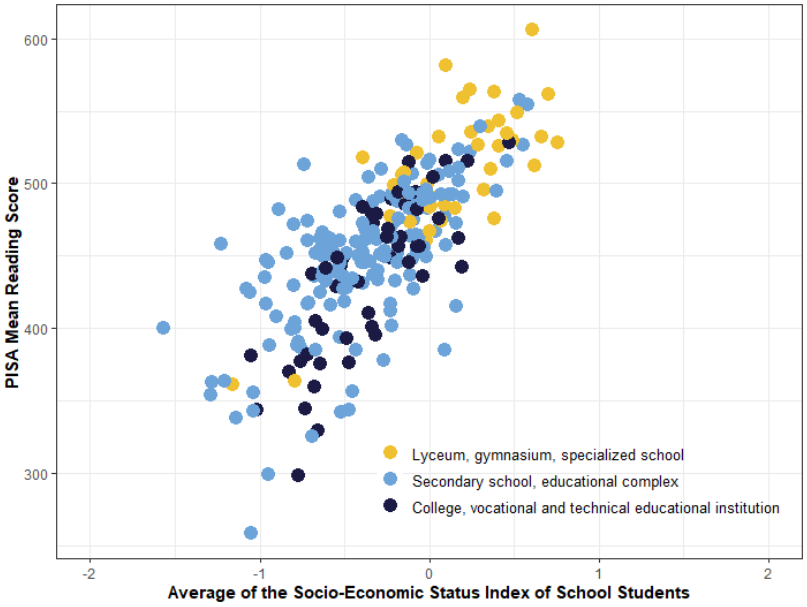


Figure 7. Differences in students' performance related to their socio-economic status and the type of their schools

- Students' performance largely depends on their socio-economic status. Students with high socio-economic status are from two to three times more likely to show high academic achievements than their peers with low socio-economic status.

- Students with a high socio-economic status outperformed their peers with a low socio-economic status by 90 points, which corresponds to three years of schooling on the PISA scale.

- The socio-economic status of students is one of the most important factors that can be used to predict student academic success in many countries. 14% of the variation in PISA Reading scores in Ukraine is explained by the socio-economic status of students (in OECD countries it is 12%).

- In Ukraine, students with a lower socio-economic status most often study in mainstream general secondary schools and live in small cities, towns or villages. The maximum difference in performance scores is observed between students whose schools are located in large cities and students whose schools are located in villages: it is more than 2 years of schooling on the PISA scale.

RESILIENT STUDENTS: LOW SOCIO-ECONOMIC STATUS BUT HIGH PERFORMANCE

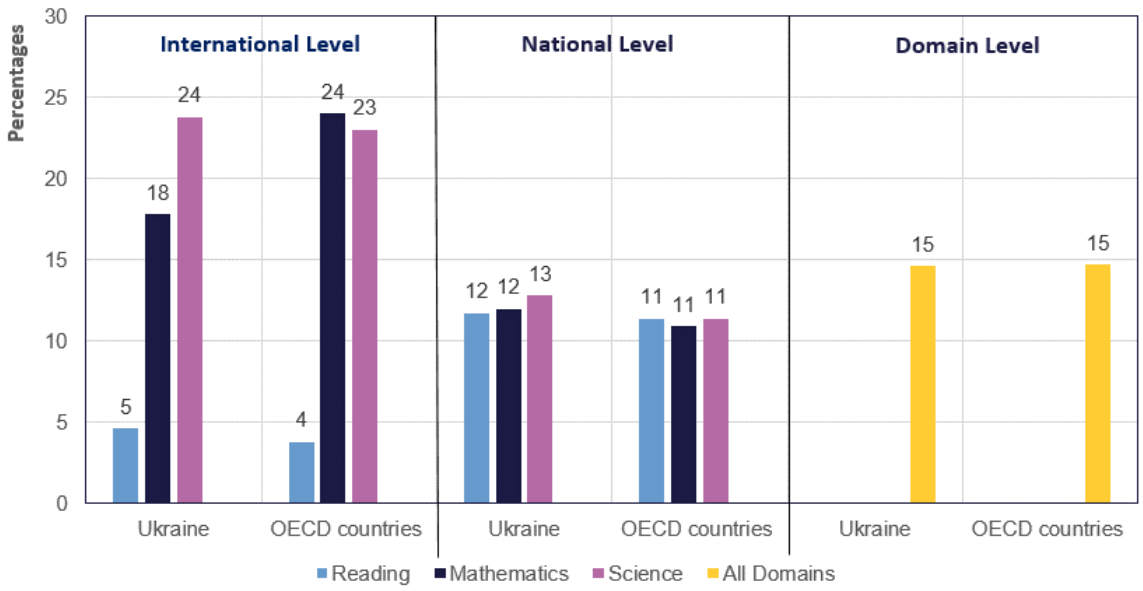


Figure 8. Percentages of resilient students at the international, national and industry levels

- On the national level, in Ukraine, there are 12% of 'resilient' students, i.e. of those who have the lowest index of socio-economic status but high test results in three main subject areas of PISA (for OECD countries, there are 11%, on average). On the international level, there are 5% of such students in Reading, 18% – in Mathematics and 24% – in Science (which is somewhat less, on average, than in OECD countries). Like in OECD countries, 15% of Ukrainian students have the basic level of knowledge and skills at Level 3 or higher according to the PISA scales in Reading, Mathematics and Science.

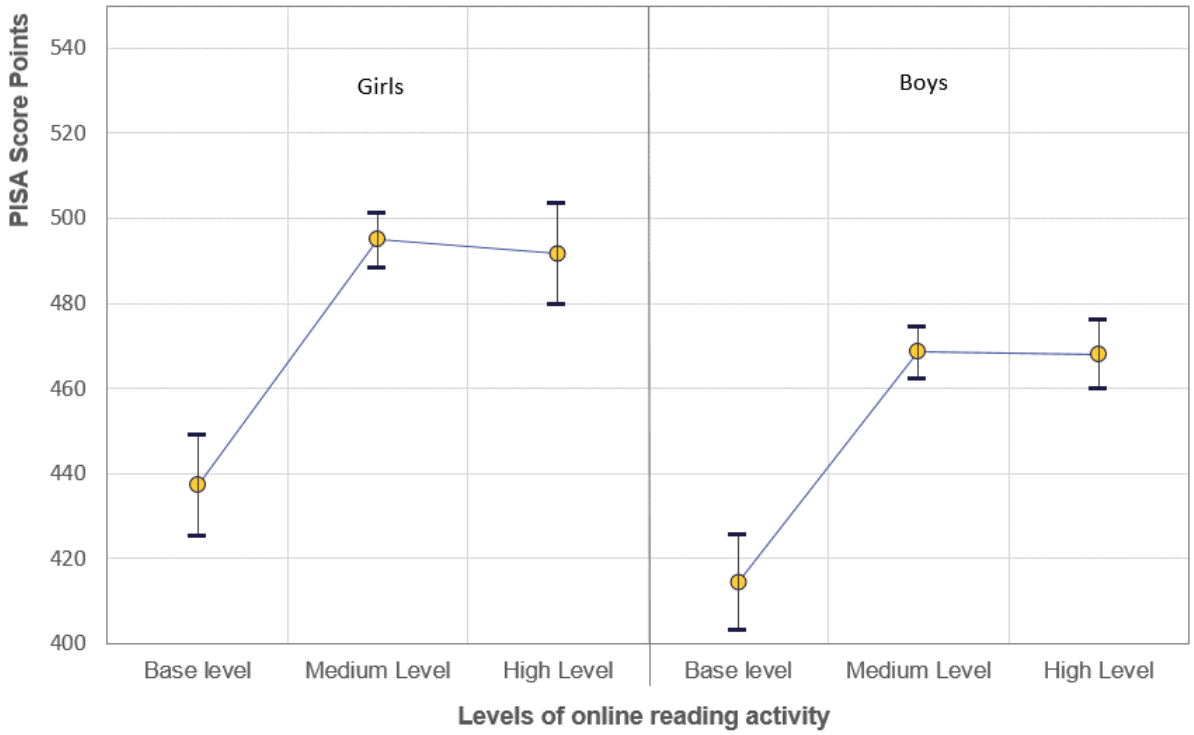


Figure 9. Girls' and boys' mean Reading scores with confidence intervals for different levels of online reading activity

- In Ukraine, 37.3% of the students do not normally read for pleasure, which negatively affects their Reading performance, as evidenced by PISA. Girls read more for pleasure than boys. Girls performed better in Reading than boys and had less difficulty in the reading process.

- Those students who reported that they read for pleasure had higher scores in Reading than the students who answered that they did not read for pleasure or read for pleasure occasionally. The difference in average PISA scores between students who often read for pleasure and those who hardly ever did is about 75 points, which corresponds to 2.5 years of schooling on the PISA scale.

- The majority of Ukrainian students (91%) preferred reading feature fiction works for pleasure to reading informational and official business texts (80%) or newspapers and magazines (50%). In 4 out of 10 cases, during the month prior to the PISA assessment day, students never read texts that included graphs and tables, or online texts with hyperlinks.

- Online reading of any materials, communication in online chats and searching for practical information on the Internet had a positive effect on the results of the assessment of students' Reading literacy. Both girls and boys read online materials almost equally, but those who read more often had higher PISA Reading scores.

WELL-BEING, ATTITUDE TO EDUCATION AND ASPIRATIONS OF 15-YEAR-OLD UKRAINIANS

THE UKRAINIAN STUDENTS' WELL-BEING

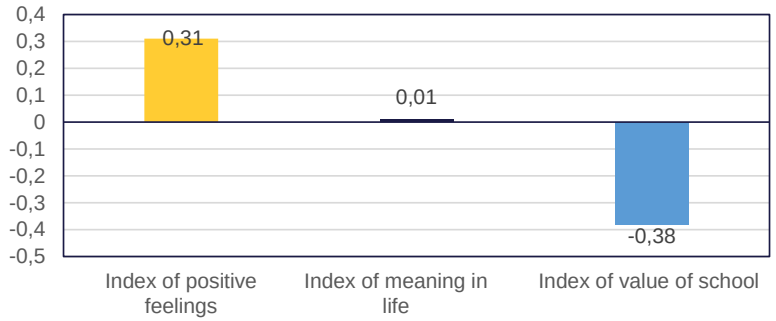


Figure 10. The index of Ukrainian students' well-being (the average values of indices for OECD countries are equal to or close to 0.00)

- The Ukrainian students generally felt more satisfied with life (82% of students were satisfied or completely satisfied) than their peers in OECD countries (67%). The 15-year-old Ukrainians who studied in rural schools felt more satisfied with life than their peers who went to school in towns and cities, while students with low socio-economic status looked at life less positively than students with high socio-economic status.

- The Ukrainian students felt positive more often than students from OECD countries, but at the same time, they did not always have a positive attitude towards their schools and studying there, which is why they differred to a certain extent from students from OECD countries.

15-YEAR-OLD UKRAINIANS' ASPIRATIONS

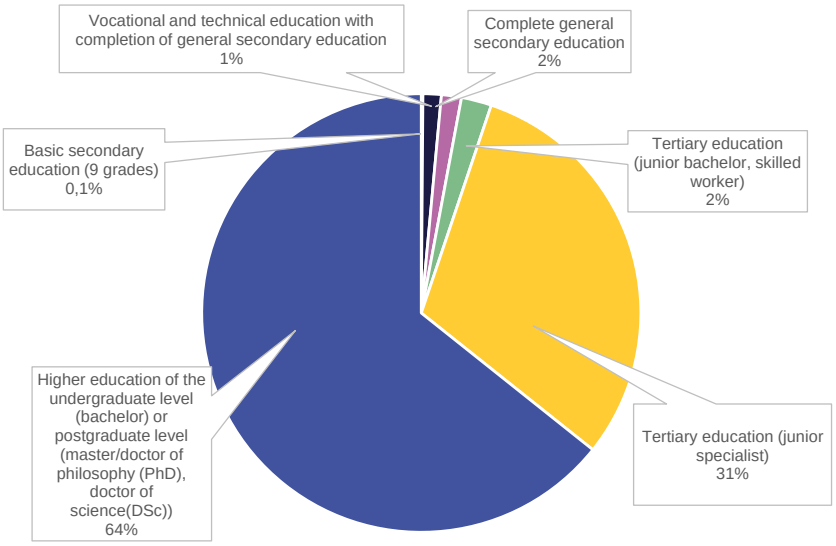


Figure 12. The level of education Ukrainian students' want to pursue

UKRAINIAN STUDENTS' LEARNING ENVIRONMENT

The academic performance of Ukrainian students is significantly affected by their inefficient use of study time (we are talking about disruptive behaviour in class, being late for classes, school absenteeism, etc.). Bullying, which sometimes occurs in schools, and the low level of students' feeling of belonging at their schools do not improve the students' academic achievements either.

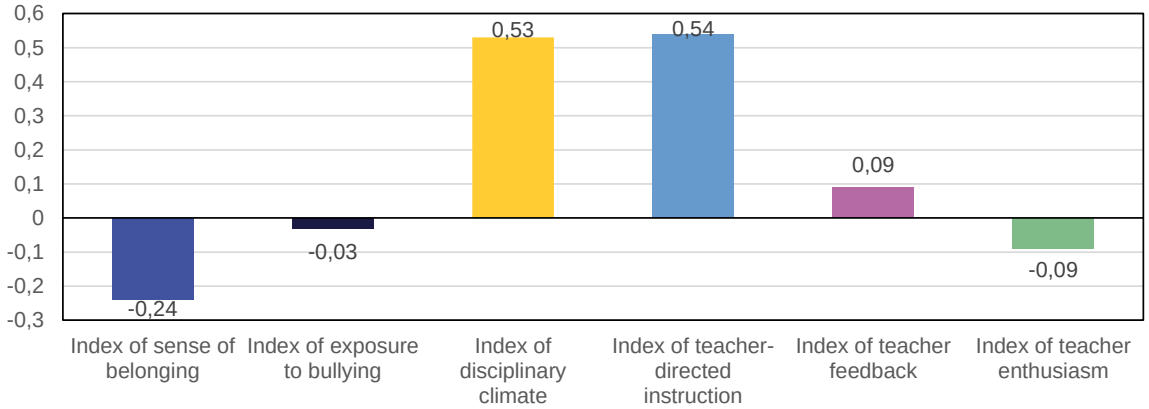


Figure 13. Indices that reflect the learning environment of Ukrainian 15-year-old teenagers (average values of indices for OECD countries are equal to 0.00)

FEELING OF BELONGING AT SCHOOL AND BULLYING

- The indicator of the Ukrainian students' feeling of belonging at their school was lower than the average for OECD countries. 78% of Ukrainian students disagreed or completely disagreed with the fact that they felt lonely in their school (on average, 85% for OECD countries).

- Bullying among Ukrainian 15-year-olds is not more common than among their peers from OECD countries. In Ukraine, 22% of the students experienced bullying at least several times a month, compared to 23% across OECD countries, on average. At the same time, 83% of the students in Ukraine (and 88% of students in OECD countries, on average) agreed or strongly agreed that it is necessary to help those students who cannot protect themselves.

- The boys and the students with low socio-economic status faced bullying more often than other categories of students and had a weaker feeling of belonging at their school.

MISBEHAVIOUR, BEING LATE TO SCHOOL AND SCHOOL ABSENTEEISM

- About 13% of the students in Ukraine (26% for OECD countries, on average) reported that in all or most language and literature classes, their teacher had to wait a long time for the students to quiet down. Those Ukrainian students, who reported that during every class or most classes the teacher had to wait a long time for the students to quiet down, scored 27 points less in reading than those of their peers, who reported that they either never observed such phenomena during their classes or observed them only occasionally (after considering the socio-economic status of students).

- The students in Ukraine were much more likely (on average, by 20 percentage points) to be absent from classes for the whole day, miss some classes or be late for them, than their peers in OECD countries, on average: in OECD countries, 21% of students missed a whole school day, and 48 % of students were late for school within the two-weeks' period prior to the day of PISA assessment, and in Ukraine, these figures are 38% and 62%, respectively.

- Improper behaviour and absenteeism (or truency) significantly affected the students' performance, regardless of their socio-economic status. There is a certain relationship between the number of study hours (classes) per week and the results of academic performance: each additional study hour increases the students' mean score by approximately 10 score points. Even after accounting for the factor of socio-economic status, it is necessary to state that wasting time significantly affects students' learning outcomes.

STRUCTURED LESSONS AND STUDENTS' PERFORMANCE

- According to the PISA results, 80% of Ukrainian language and literature and foreign literature classes were clearly structured, teachers consistently managed the process and had clear plans for organizing work in the classroom.

- The students studying in lyceums, gymnasiums and specialized schools in big cities reported that their teachers were less inclined to strictly regulate students' work during classes.

- The students with middle and low level of socio-economic status performed significantly higher when their teachers used structured teaching practices during every class or most classes. The difference in mean Reading scores for students with high level of socio-economic status was not significant. After accounting for the socio-economic status of students, it is obvious that the use of structured teaching helps to improve students' performance in Reading by an average of 16 points.

TEACHER AND PARENTAL SUPPORT OF STUDENTS

- According to PISA Student Questionnaire results, most teachers support their students in their studies, i.e. teachers help them see their weaknesses and catch up for things that are unclear for various reasons. At the same time, a fairly large share of students (25%) reported that teachers never or almost never tell them about their strengths in learning, and only 43% of teachers show concern for students during every class or most classes (71 % for OECD countries, on average).

- In Ukraine, on average, almost 90% of 15-year-old students reported that their parents gave them moral support. Those students, whose parents did not encourage their studies, even after considering additional factors affecting students' performance, scored on average 10 points lower in all PISA domains than their peers whose parents were interested in their children's learning.

- Parents of the Ukrainian 15-year-olds more often than parents of their peers in OECD countries volunteered in activities that required physical power (approximately 32% in Ukraine and 12.3% in OECD countries) as well as in the schools' management activities (24% in Ukraine and 17% in OECD countries).

- In Ukraine, approximately the same percentage of parents discussed their children's performance at school on their teacher's initiative as in the OECD countries (55% in Ukraine and 57% in OECD countries), on the other hand, parents initiated discussing their children's performance at school with their teachers more often in Ukraine than on average for OECD countries (57% in Ukraine and 41% for OECD countries). At the same time, parental involvement in school activities did not directly affect the increase in the students' PISA scores.

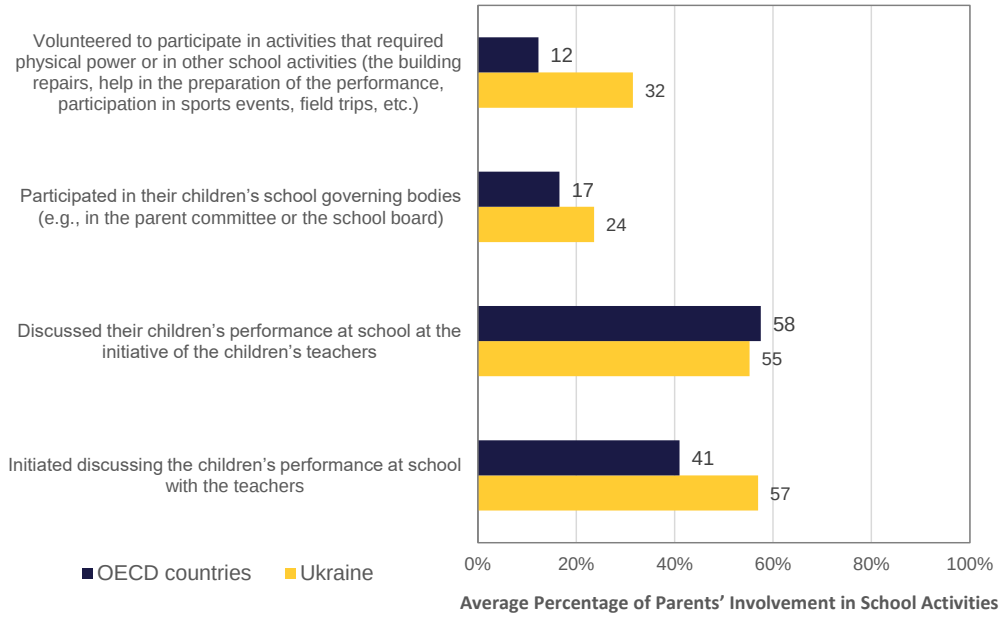


Figure 14. Parental involvement in school activities and their children's learning process (according to school administrators' reporting)

EDUCATIONAL RESOURCES IN UKRAINE

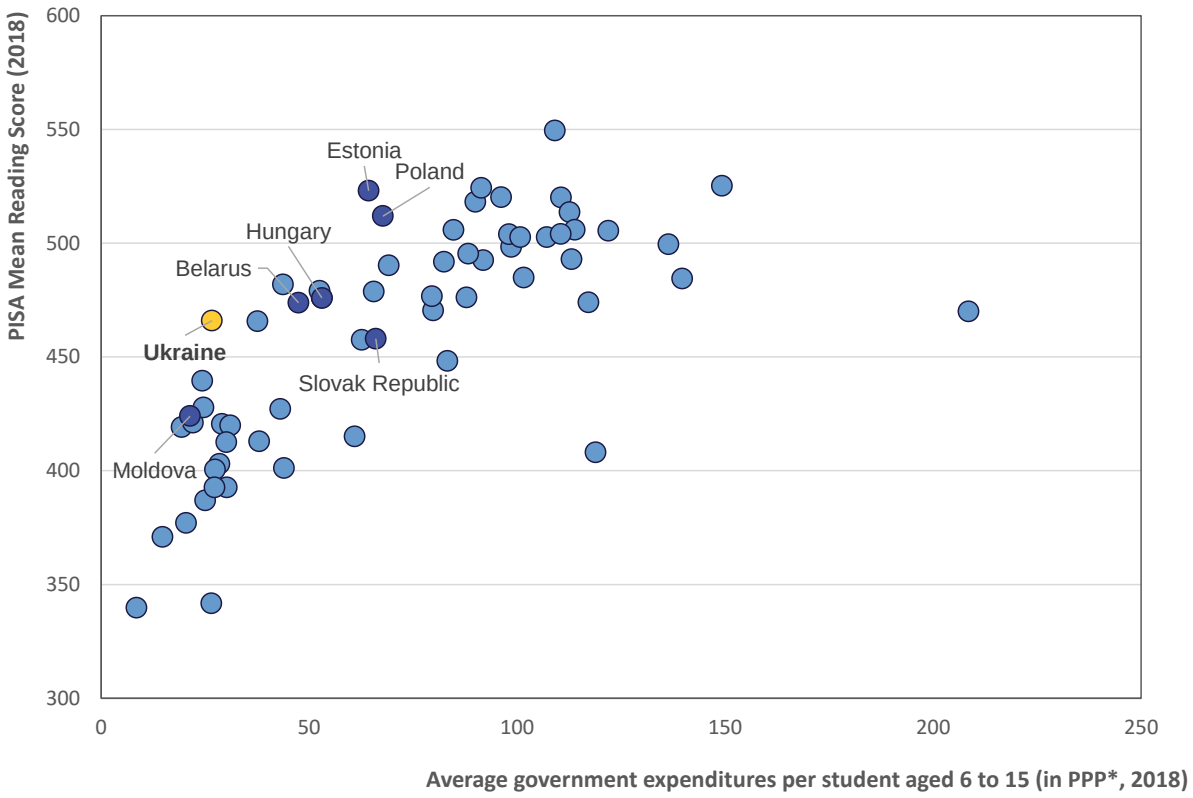


Figure 15. Government expenditures per student aged 6 to 15 and students' performance in Reading[5]

- In 2015, expenditure on government-funded education in Ukraine accounted for more than 13% of total state expenditures, which is equal to 5.4% of GDP and almost meets international requirements. However, the total education expenditures per student aged 6 to 15 (the total education expenditure per person from 1st to 10th grade) in Ukraine was 26,647 USD, which is significantly less than in most developed countries where it is more than 50,000 USD.

- According to PISA results, the most important resource in education is the teaching personnel. The study shows that the higher the level of teacher qualification is the better students' learning outcomes are. In Ukraine, the average 15-year-old student goes to school where each teacher works with an average of 12 students, which corresponds to the average number for OECD countries. This indicator, however, varies significantly depending on the specifics of the educational institution.

[5] Each triangle represents a country that participated in PISA 2018. * PPP (Purchasing Power Parity) is an indicator of purchasing power parity, which makes it possible to compare the expenditures of different countries in a single measurement scale.

- In Ukraine, 70% of the surveyed school administrators believed that their schools did not have enough digital equipment and software for teaching, and at the same time, 80% of them said that their school teachers had enough necessary skills to work with digital equipment. Schools in large cities had better material and technical support, a higher rate of availability of educational materials and digital technologies, and ICT than schools located in rural areas and small towns.
- According to school administrators of 75% of Ukrainian schools participating in PISA 2018, the lack or inadequate quality of teaching aids/learning resources (textbooks, computer equipment, library or laboratory materials) most hindered the educational process in their schools.
- There is no direct association between the level of the students' performance and the resource allocation for schools (financial, material, technical, and personnel provisions) in Ukraine. However, compared to the OECD average, Ukrainian schools are poorly supplied, and Ukrainian teachers have the lowest salary starting rates.

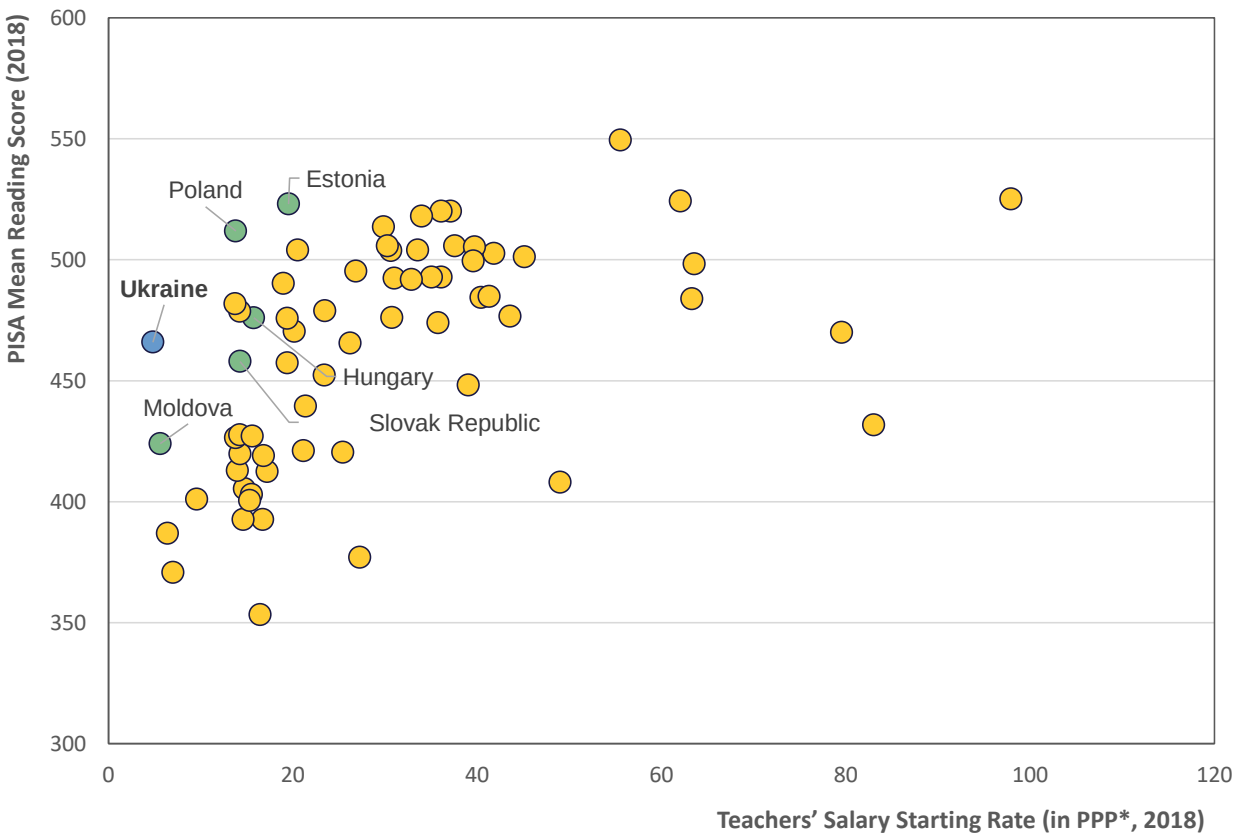


Figure 16. Teachers' salary starting rates and students' performance in Reading (in different countries)

CONCLUSIONS ON EDUCATIONAL STRATEGIES

- The results of PISA 2018 showed that today there are certain problems in Ukrainian education, which are manifested primarily in the fact that a significant proportion of Ukrainian 15-year-old students does not have a sufficient level of competency in Reading, Mathematics and Science, and there is a significant gap between academic achievements of students with different backgrounds (socio-economically advantaged and disadvantaged students; from different types of school or types of settlement).
- The main strategic decisions based on the findings of PISA 2018 in Ukraine should be aimed at increasing the level of students' Reading, Mathematics and Science competencies. Only setting clear global goals for the development of the educational system, revising and improving educational programs, tracking student learning outcomes, raising the status of teaching staff and investing in their training, providing assistance to students and educational institutions with low results, can contribute to the achievement of this goal. The adoption of certain decisions should be preceded by a study of the causes of the problems that exist today and the potential effectiveness of taking certain measures at the national level aimed at overcoming the relevant problems.
- PISA results not only showed the problems that currently exist in the educational system of Ukraine, but also confirmed the fidelity of the reforms that are currently being implemented in the field of national general secondary education. Most of the political decisions proposed on the basis of the PISA results and that have shown their effectiveness in various countries at certain stages are now introduced in Ukraine as a series of reforms, but this is only the beginning. These reforms should be continued, based on objective data.

PISA 2018: Main Results and Conclusions. What Ukrainian 15-year-old Students Know and Can Do / M. Mazorchuk, T. Vakulenko, V. Tereshchenko, H. Bychko, K. Shumova, S. Rakov, V. Horoh; Ukrainian Center for Educational Quality Assessment. Kyiv: UCEQA, 2023. 17 p.

For more information, contact the PISA team of the Ukrainian Center for Educational Quality Assessment: pisa.ukraine@testportal.gov.ua

The full version of the National Report on PISA 2018 results can be found here: http://pisa.testportal.gov.ua/wp-content/uploads/2019/12/PISA_2018_Report_UKR.pdf

You can work with the research data here: https://www.oecd.org/pisa/data/