

# ADVANCED INTERNATIONAL EXPERIENCES IN TEACHING MATHEMATICS

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**Abstract:** This article analyzes the International Educational Standards, International Assessment Systems, Advanced Pedagogical Methods for Teaching Mathematics. It also provides recommendations for the application of international standards in mathematics.

**Keywords:** mathematics, international standard, PISA, methodology, education system, TIMSS, TALIS.

In order to improve the quality of education, it is necessary to continuously monitor its status and development trends, and to conduct an objective and adequate assessment of student achievement. This is especially important at the level of general secondary education, which lays the foundation for the subsequent personal and civic development of students. Resolution of the Cabinet of Ministers of the Republic of Uzbekistan dated December 8, 2018 No 997 "On measures to organize international research in the field of education quality assessment in the public education system" Assessment of the quality of education in the public education system In order to organize international research in the field of education, to establish international relations, to fully support and encourage the research and innovation activities of students, first of all, the creative ideas and creativity of the younger generation, Uzbekistan The National Center for International Research on Education Quality Assessment has been established under the State Inspectorate for Education Quality Control under the Cabinet of Ministers of the Republic of Kazakhstan.

The main tasks and activities of the National Center include: - Ensuring the successful participation of general secondary education in international research; - Comparison of the results of the Republic of Uzbekistan in international evaluation

programs with the results of other countries; - Systematic monitoring of the implementation of international assessment programs in the educational process, dissemination of best practices in this area and participation in the development of recommendations and guidelines for educational institutions based on it; - Preparation of educational and methodological recommendations for the training of teachers in mathematics, science and natural sciences using innovative teaching methods. It is planned to organize international research on the following international assessment programs: PISA - The Program for International Student Assessment - to assess the level of literacy of 15-year-old students in reading, mathematics and science; TIMSS - Trends in International Mathematics and Science Study— Assessment of 4th and 8th grade students' knowledge of mathematics and science; PIRLS - Progress in International Reading and Literacy Study - assessment of reading and comprehension of 4th grade students; TALIS - The Teaching and Learning International Survey - a study of the teaching and learning environment of managers and teachers in general secondary education and the working conditions of teachers. A “Roadmap” has been developed to prepare the Republic of Uzbekistan for participation in international research on international assessment programs, according to which - to improve students' written and oral literacy. introduction of national and international experience; - Development of e-learning for students to study independently, creating and enriching a database of questions on international research in reading, mathematics and science; - Introduce independent education for students to prepare for international research in reading, mathematics and science; - organization of trainings in the regions in cooperation with qualified teachers and trainers on international research.

PISA Research PISA (Program for International Student Assessment) is an international program to assess the knowledge of 15-year-olds in mathematics, science and mother tongue. PISA surveys have been conducted since 2000 and are conducted every three years. The results of the study show that students in the participating countries are able to identify educational achievements, changes in the education system, the main directions of secondary education reform and identify

barriers to their implementation, monitor the dynamics of change in results and critically allows analysis. The International PISA Survey Assessment Set includes: a set of test assignments; questionnaires for students of educational institutions; questionnaires for the management of educational institutions; a guide for the person conducting the test or survey; manual for the coordinator of the organization of education; a guide to test assignments, data entry, processing, and evaluation. As a result of statistical processing of the results of the study, each student is evaluated on a 1000-point scale according to the following criteria

- Identify real problems in everyday life and solve them using mathematics;
- expression of problems in mathematical language; - solve problems using mathematical knowledge and methods;
- analysis of the methods used;
- explain the solution of the problem;
- Formulation and recording of solution results.

Samples of assignments given to students

1. Climb Mount Fuji. Mount Fuji in Japan is famous for its "sleeping" volcano. Mount Fuji is only open to the public from July 1 to August 27. About 200,000 people are currently climbing Mount Fuji. On average, how many people climb Mount Fuji every day? 2. Metabolic Intensity (MI) is the energy required for the respiratory, digestive and circulatory systems. This value is determined for a person lying quietly and awake in a room with a temperature of 23 ° C.

TIMSS International Studies

TIMSS (Trends in Mathematics and Science Study) An international study called International Traditions in the Teaching of Mathematics and Natural Sciences is conducted every 4 years by the International Association for Assessing the Quality of Student Achievement. TIMSS allows 4th and 8th graders in mathematics and science to track academic achievement in participating countries by assessing their academic performance. To assess academic achievement, students are tested and students, teachers, and school administrators complete questionnaires, as well as information about the factors that affect learning outcomes. 'information is obtained.

Creating a positive attitude towards math and science is one of the most important goals of curricula in many countries. Doing homework allows students to reinforce what they have learned in school and prolongs teaching time for teachers on the topic. As a result, students with more homework are expected to perform better than students with fewer homework assignments or no homework at all. The tradition of doing homework is widespread in many countries. In some countries, in 4th grade, they are rarely asked at home, mainly for correctional purposes, to allow individual students to master the material with their peers. In general, a large amount of homework has a negative impact on the quality of student achievement. Samples of assignments for 4th graders

1. Three thousand basketball tickets are numbered from 1 to 3000. Spectators with tickets ending in 112 will win the prize. Write down the numbers of all the prize tickets.

2. There is a flag in Ivan's garden. Sometimes the flag is hoisted to the north and sometimes to the other side. What makes the flag fly?

3. Which of the celestial bodies, Earth, Mars, Moon, Sun, is the hottest?

4. If the plant adds a large amount of hot water to the river, write down what can happen to the fish and plants in the river.

Samples of assignments given to 8th graders

1. There are 30 students in the eighth grade. A student randomly selected from a class list has a  $\frac{1}{5}$  chance of being under 13 years old. How many students in this class are under 13?

2. Briefly explain how glasses and contact lenses help you look good.

3. Olya went to school with a cold. A few days later, half of her friends at school fell ill. What is the main reason why some students became ill and others did not?

TALIS (The Teaching and Learning International Survey) - studies the teaching and learning environment and working conditions of teachers in general secondary education.

PIRLS (Progress in International Reading and Literacy Study) is an international study that examines and evaluates the reading and comprehension skills of 4th graders in primary school.

## *2. STEAM TECHNOLOGIES*

Education is the mirror of the country's future. The state, seeing its strengths and development zones, adapts the national education program directly to the foundations of the education system. In the era of industrialization, literacy and work skills were important. In the postindustrial period, the technological aspects of youth development came to the fore. The result was the digital revolution - the Internet, computers, information technology. Resolution of the President of the Republic of Uzbekistan dated September 5, 2018 No PP-3931 "On the program of measures to further improve the system of public education in the Republic of Uzbekistan in 2018-2021" The task is to improve and introduce innovative educational technologies. According to him, based on the best international practices, it is planned to gradually introduce and improve new state educational standards and general secondary education curricula, including the STEAM method. In order to identify talented young people in each region of the country, Presidential schools will be opened, which will specialize in teaching in the STEAM program.

**Conclusion:** In modern education, the student has the opportunity to work on themselves, expand and deepen their knowledge outside the classroom. Mathematics, like other disciplines, studies the real being. Makes different models about the real being. If the natural sciences are based on experiments in their research, mathematics is not based on experiments. Problems related to the connection of theory in practice with mathematics are not based on experience in understanding and imagining. To distinguish what we need from the multifaceted properties of mathematics, we have to ignore some of these features. The most important thing for us is to leave out what is needed to express the event and process in the language of mathematics.

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