ABOUT RESEARCH CONDUCTED IN UZBEKISTAN WITHIN THE FRAMEWORK OF THE REQUIREMENTS OF INTERNATIONAL ASSESSMENT PROGRAMS TIMSS

Karimov N.A.

National Research Institute named after A.Avloni, Researcher of the scientific-research department for conducting international assessment studies and analyzing their results, Independent researcher of Tashkent State Pedagogical University named after Nizami

Abstract. *This article presents analytical information about the results of the national research organized in the Republic of Uzbekistan within the framework of the requirements of the TIMSS international program. In this national research, the questions of the international studies of TIMSS 2003, TIMSS 2007 and TIMSS 2011 were used.*

Keywords: *The International Association for the Evaluation of Educational Achievement (IEA), TIMSS Research, content domains, kognitive domains, threshold, Low, Intermediate, High, Advanced, Above advanced, Number, Data Display, Geometric Shapes and Measures, Knowing, Applying, Reasoning.*

According to the Resolution of the President of the Republic of Uzbekistan No. PF-5712 dated April 29, 2019 in the "Concept for the development of the public education system of the Republic of Uzbekistan until 2030," it is urgent to achieve the inclusion of the Republic of Uzbekistan among the first 30 advanced countries in the world by 2030 according to the International Student Assessment PISA program rating , defined as a task.

Preparing for international research programs from elementary school, participating in research will equip students with the necessary knowledge and skills to effectively participate in research when they are in high school.

TIMSS is a research program conducted by the IEA (International Association for the Assessment of Educational Achievement) among students in grades 4 and 8 every four years.

The purpose of the study, organized within the framework of the requirements of the international TIMSS program, is, first of all, to provide indicators for assessing the knowledge and skills of students in mathematics in order to recognize them as full members of "Human "Capital Index – 2019", and at the same time assess the level of preparation of educational institutions for international assessment programs. Experience in conducting PISA and PIRLS surveys and preparing proposals for the work required to successfully participate in TIMSS programs.

1.1. Brief information about the TIMSS international assessment program

TIMSS is the first program to conduct research to assess the quality of education, which has been conducted since 1995 (1995, 1999, 2003, 2007, 2011, 2015, 2019, 2023), and its eighth cycle was conducted in 2023. .

The TIMSS survey provides detailed information on overall achievement in mathematics and science, curriculum and implementation, teaching methods, school resources, and home and school environments.

TIMSS provides valuable information to help countries track and evaluate their mathematics and science education across periods and grades.

Countries participating in TIMSS have the following capabilities (TIMSS 2011 assessment systems, 14-15 pcs.):

will have internationally comparable information about the knowledge, concepts, processes and approaches learned in mathematics and science by students in grades four through eight;

will be able to compare the level of mathematics and science proficiency among fourth and eighth grade students internationally;

from fourth to eighth grades will have the opportunity to identify factors that influence the growth of students' knowledge and skills in mathematics and natural sciences;

Fourth graders will have the opportunity to track the connections between teaching and learning in math and science when they are reassessed in eighth grade;

explore the contexts in which students learn best;

will have the opportunity to assess at the international level the influence of the main factors of educational policy related to the curriculum, curriculum, manuals and other educational resources that serve to improve the educational achievements of students;

They will be able to solve problems of internal educational policy based on TIMSS recommendations.

1.2. Organization of the process of pilot testing (approbation) of fundamental research

In order to prepare for the main study, 45 problems used in the TIMSS study in 2003, 2007 and 2011 were selected by international experts and translated into Uzbek and Russian by experts. After the translated tasks were previously checked and verified by reviewers, they were printed in the form of notebooks, and in order to study the reliability and validity of the tasks, on November 13, 2019, 10 students from 9 schools in the city of Tashkent and the Tashkent region

Between 5 classes, testing was carried out according to the recommendations and instructions of international experts from the World Bank.

In order to clarify schools and classes during the trial, a two-stage selection was carried out. At the first stage, 9 schools were randomly selected from a complete list of 5-grade schools in the city of Tashkent and the Tashkent region without the participation of the human factor, using a special computer program. The selected schools were contacted and a list of fifth graders was compiled for each school. At the second stage, without the participation of the human factor, using a special computer program, 1 out of 8 schools and 2 out of 1 school were selected on the basis of random proportionality, for a total of 10 5th grades.

The experiment was supposed to involve 399 students from 10 5th grades of 9 schools in the city of Tashkent and the Tashkent region, of which 286 (71.7%) students were included. The testing process was organized in two main languages of instruction: Uzbek and Russian.

Based on the final results of the testing and testing process and the opinions of international experts, 37 of the 45 tasks included in the test pad were found worthy for the main research process, and test pads consisting of these 37 problems were prepared for the main research process. main study.

2019 Deputy Prime Minister of the Republic of Uzbekistan

In accordance with task No. 14/1-104-75 dated October 3, in order to ensure recognition of the Republic of Uzbekistan as a full participant in the "Human Capital Index-2019" rating, within the framework of the requirements of the TIMSS International Research Program for monitoring the quality of education of 5th grade students of 150 general education institutions of the republic The study was carried out on November 25-28, 2019 jointly with the State Inspectorate

and its National Center and the Ministry of Preschool Education. and school education and its regional departments.

A total of 4,051 5th grade students from 150 classes selected from 150 schools nationwide were required to participate in the assessment process, of which 3,922 (96.8%) students were included. The training was organized in two main languages of instruction: Uzbek and Russian. The study participants were selected from among 5th grade students in public schools across the country where instruction is conducted in Uzbek, Russian, or both languages.

1.3 Preparation of test materials

The Uzbekistan National Assessment used TIMSS tasks in the national assessment to ensure international comparability of results and was adapted to the assessment system used for TIMSS 2015. A total of 37 assessment tasks were used in the study (33 from TIMSS 2011, 3 from TIMSS 2007 and 1 from TIMSS 2003; the same codes were retained in the national assessment as items were coded in the corresponding years of the international assessment). In order to reduce the time for assessment and analysis, tasks with multiple answer options and only one answer were selected.

The assessment process focused on distributing items into three content domains (numbers, shapes and measurements, reading and interpreting data) and three cognitive domains (cognition, application and reasoning) based on the TIMSS 2011 research program. Similarly, the assessment included questions corresponding to four levels of mastery difficulty (low, medium, high, highest) (Table 1).

Table 1. Corresponding areas of selected tasks

Relevant areas of assignments	Classification of task areas	Number of tasks selected	Percentage of total assignments
Threshold	Low	7	19%
	Intermediate	12	32%
	High	15	41%
	Advanced	3	8%
	Total	37	100%
Content domeins	Number	18	49%
	Geometric Shapes and Measures	11	30%
	Data Display	8	21%
	Жами	37	100%
Cognitive domains	Knowing	16	46%
	Applying	15	37%
	Reasoning	6	17%
	Жами	37	100%

The table data means that:

according to the level of difficulty of development, i.e. 7 (19%) "Low Level", 12 (32%) "Medium Level", 15 (41%) "High Level" and "Majority of 3 (8%)" tasks at "High Level";

according to the cognitive domain was 16 (46%), in Application 15 (37%), and in Reflection 6 (17%) ;

according to the area of mathematical content, 18 (49%) belong to the area "Numbers", 11 (30%) belong to the area "Geometric shapes and measurements" and 8(21%) belong to the area "Reading and interpreting data") assessment notebooks with tasks have been prepared.

1.4 Brief description of the subject areas of the assignments

To have a broader understanding of the classification of tasks into domains, below we will briefly touch on the description of each domain.

Numbers are the content area.

The number content area includes understanding the positional meaning of numbers, ways to represent numbers, and relationships among numbers for fourth graders. By fourth grade, students should develop number sense and numerical fluency, understand the meaning of math operations and how they relate to each other, and be able to use numbers and operations (addition, subtraction, multiplication, and division) to solve problems. They must understand the structure of numbers, understand the relationship between the composition of numbers and the numbers used in their formation.

The numbers content area includes concepts and skills in four areas:
• whole numbers;
• fractional and decimal numbers;
• numerical expressions consisting of integers;
• structure and interdependence of numbers.

Fourth graders should be able to perform operations (addition, subtraction, multiplication, and division) with whole number units and use calculations to solve problems.

Students must also understand the relationship between units of measurement and be able to convert from one unit to another. They must be able to perform such operations in metric units as well as in units such as seconds, minutes, hours and days.

By fourth grade, students should be able to solve pre-algebraic concepts, including number expressions and simple equations involving number structure.

Students should be able to work with numerical expressions to find missing digits, reason to find the value of an unknown number, and model a numerical expression to find an unknown value using one of four operations. They must know number structure, relationships between terms, and be able to use mathematical rules to form numbers.

By fourth grade, students should understand what these numbers mean in the area of fractions and decimals and be able to compare fractions.

Geometric Shapes and Dimensions content area

The domain of geometric shapes and sizes includes properties of geometric shapes such as side lengths, angle dimensions, surface area, and volume.

Fourth graders should be able to identify and analyze the meanings of lines, angles, and various geometric shapes, including the properties of two- and three-dimensional shapes, and explain them based on geometric relationships.

The area of geometric shapes and sizes consists of the following two directions:
points, lines and angles:
• measure and calculate lengths;
• identify and draw parallel and perpendicular lines;

• comparing the sizes of angles and drawing angles (for example, a right angle, angles greater and less than a right angle);

• be able to use an informal coordinate system to place points on a plane;

two- and three-dimensional shapes:

• identify, classify and compare simple geometric shapes (eg, compare by shape, size and properties);

• be able to describe and use simple properties of geometric shapes, including the properties of lines and axes of symmetry;

• know the relationship between three-dimensional figures and their two-dimensional representations;

• calculating the surface and perimeter of a square and a rectangle, determining the surface and volumes of geometric shapes (for example, by wrapping a certain shape or filling the inside with cubes).

Reading and Interpreting Data Content Area

Fourth graders should be able to read a variety of information and be able to gather simple information or work with information collected by others. They must be able to display and present information in various forms.

The data reading and interpretation area consists of the following two areas:

reading and explanation;

• reading information from tables, pictograms and graphs;

• the ability to compare data from relevant data sets;

• in addition to directly reading this information, use it to answer questions (for example, combine information, make calculations based on it, draw conclusions and describe it);

organization and presentation:

• compare and combine the same information presented in different forms;

• organizing and presenting information using tables, pictograms and graphs.

1.5 Brief description of cognitive task domains

Knowing

Knowledge areas include the facts, concepts, and processes that students need to know.

The area of knowledge consists of the following areas:

memorization – memorizing definitions, terms, properties of numbers, geometric properties and formulas;

identification – identification of mathematical objects, such as shapes, numbers, expressions and quantities; identify mathematical entities that are mathematically equivalent (e.g., equivalent fractions, decimals, percentages, simple geometric figures);

calculation – performing four operations and algebraic expressions with integers, fractions, decimals, and natural numbers;

data collection - obtaining the necessary data from graphs, tables or other sources;

measuring – use measuring instruments, be able to choose the necessary unit of measurement;

classification/sorting - classifying or grouping objects, shapes, numbers and expressions according to their general characteristics, making the correct decision about class membership, sorting numbers and objects according to corresponding properties.

Applying

Scope focuses on assessing students' ability to apply knowledge or conceptual understanding to complete tasks or answer questions.

The scope of application consists of the following areas:

selection – selection of the most effective procedure, method or strategy for solving a problem in the presence of a certain procedure, algorithm or method for solving the problem;

presentation – presentation of mathematical data and evidence in diagrams, tables and graphs, creation of appropriate images for a given mathematical object or relationship;

modeling - creating a suitable model, such as an equation, geometric figure or diagram, to solve a given familiar problem;

execution – execution of a given set of instructions (for example, drawing figures and diagrams according to given characteristics);

simple problem solving – solving similar standard problems encountered in the classroom, the problems may be in a familiar context or purely mathematical.

Reasoning

The scope of reasoning extends beyond simple problem solving to include unfamiliar situations, complex contexts, and multi-level problems.

Mathematical thinking involves logical and systematic thinking skills. It contains patterns based on intuitive and inductive reasoning that can be used to solve unfamiliar problems. Solving unfamiliar problems requires more knowledge than solving familiar problems. Unfamiliar problems can be purely mathematical or practical.

The reflection area consists of the following directions:

analysis - identify, describe and apply relationships between variables and objects in mathematical situations and draw reasonable conclusions from available data;

generalization/specialization - expansion of mathematical thinking and problem solving, which is carried out on the basis of more general and widely applicable conditions;

integration/synthesis – establishing connections between different elements of knowledge and their related definitions and creating connections between mathematical ideas; mathematical proofs, concepts, and procedures are combined to produce a result, and results are combined to produce a future result;

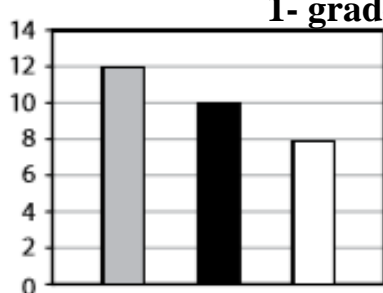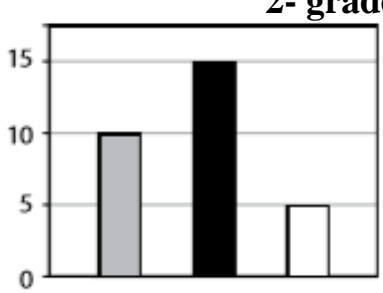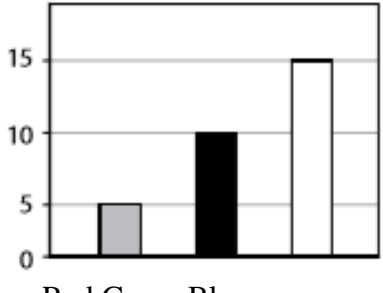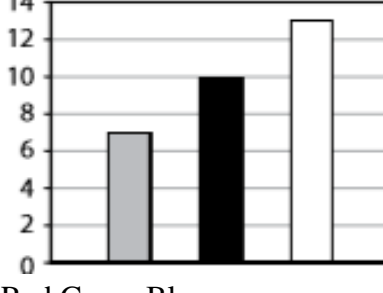justification – based on certain mathematical results or properties;

unfamiliar problem solving - applying mathematical arguments, concepts, and procedures to solve unfamiliar mathematical or real-life problems that students have not encountered before.

Analysis of the research results showed that, in terms of the level of difficulty of the tasks, 78.7% of students answered correctly the tasks of the lower level, 67.2% - the tasks of the middle level, 56.1% - the tasks of the highest level, and 46.9% - the tasks of the highest level.

Below are examples of analytical data with international results for each skill level used in the study.

In a 2011 study, a task coded M041335 was used; it is a task of the lower (low) level of complexity (reading and interpreting information belongs to the content area, the cognitive area of knowledge) in terms of the level of difficulty of mastering. .

Appointment form with code M041335:

Ahmad conducted a survey among students of 4 classes about their favorite colors.

1- grade

Red Green Blue

2- grade

Red Green Blue

3- grade

Red Green Blue

4- grade

Red Green Blue

In which class did students choose blue the least often?

A	1-grade
B	2-grade
C	3-grade
D	4-grade

The assignment required working with data in the form of a column chart, and the students' knowledge of reading and analyzing data was tested. To complete the task, the student is required to compare the corresponding bar chart. Completing this task was difficult for the students, as it turned out that the students did not have enough skills to work with bar charts. 65 percent of Uzbek students answered this question correctly.

The world average for the correct performance of this task is 76%, and 23 out of 57 countries (economic systems) have achieved a result below this average. Germany 94%, Austria 93%, Portugal 92%, Republic of Korea 92%, Japan 91% are the top countries in the world ranking, while the Russian Federation is above the world average with 88%, and Kazakhstan is 75%. is lower than the world average and Tunisia 49%, Morocco 39%, Yemen 24% have the lowest positions in the world ranking. (Chart 1).

The task with the code M051109 was used in the 2011 study, and it is a task of moderate complexity (reading and interpreting information belongs to the content area, knowledge to the cognitive area) according to the level of mastery difficulty.

Chart 1: Results of some countries for task code M041335
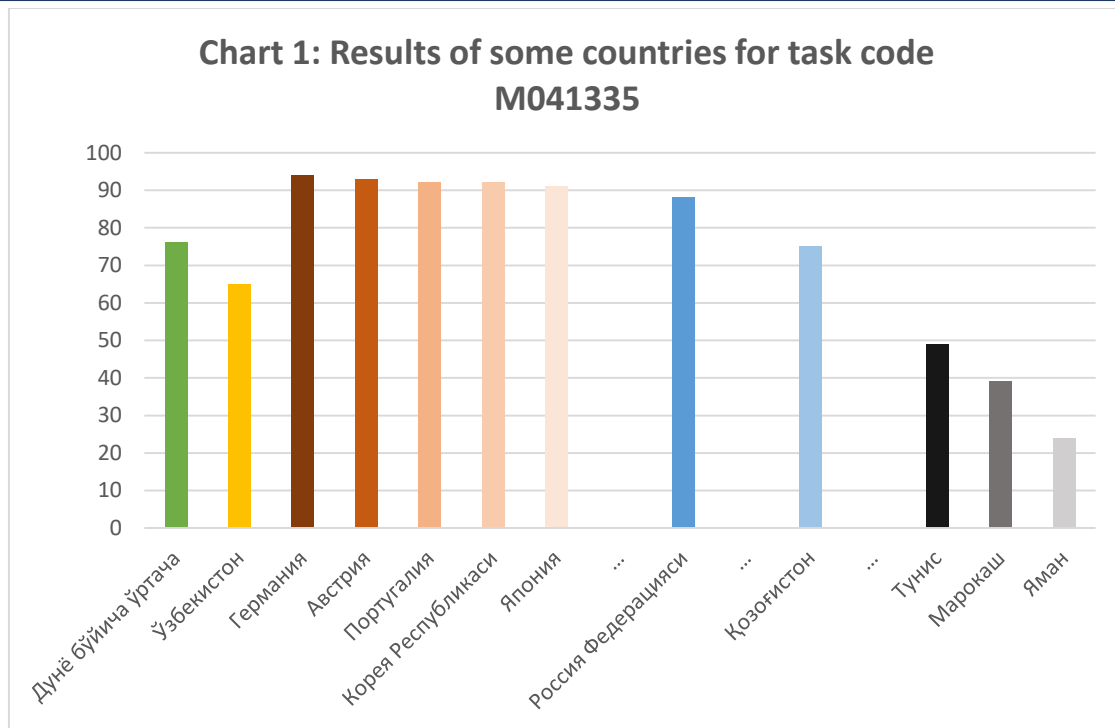
Assignment form with code M051109:

Favorite ice cream flavor		
Taste	Number of children	🍦 4 number children means
Vanillin	🍦🍦🍦	
Chocolate	🍦	
Strawberry	🍦🍦	
Lemon	🍦🍦🍦🍦	

How many children chose vanilla as their favorite flavor?
Answer:_____

The assignment required working on a picture problem and tested students' reading and data analysis skills. The assignment asks how many children choose vanilla ice cream as their favorite flavor. Completing this task was difficult for the students, because it turned out that the students did not have enough picture problem solving skills. 47 percent of Uzbek students answered this task correctly. The world average for the correct performance of this task is 54%, and 25 out of 57 countries (economic systems) achieved a result below this average. Countries such as Singapore 93%, Netherlands 89%, Portugal 87%, USA 86%, Hong Kong (China) 84% took the top ranks of the world ranking for this task, while the Russian Federation is above the world average with a result of 69%, and Kazakhstan 29 % is lower than the world average and Tunisia 16%, Morocco 10%, Yemen 5% have the lowest positions in the world ranking (diagram 2).

Chart 2: Results of some countries for assignment code M051109
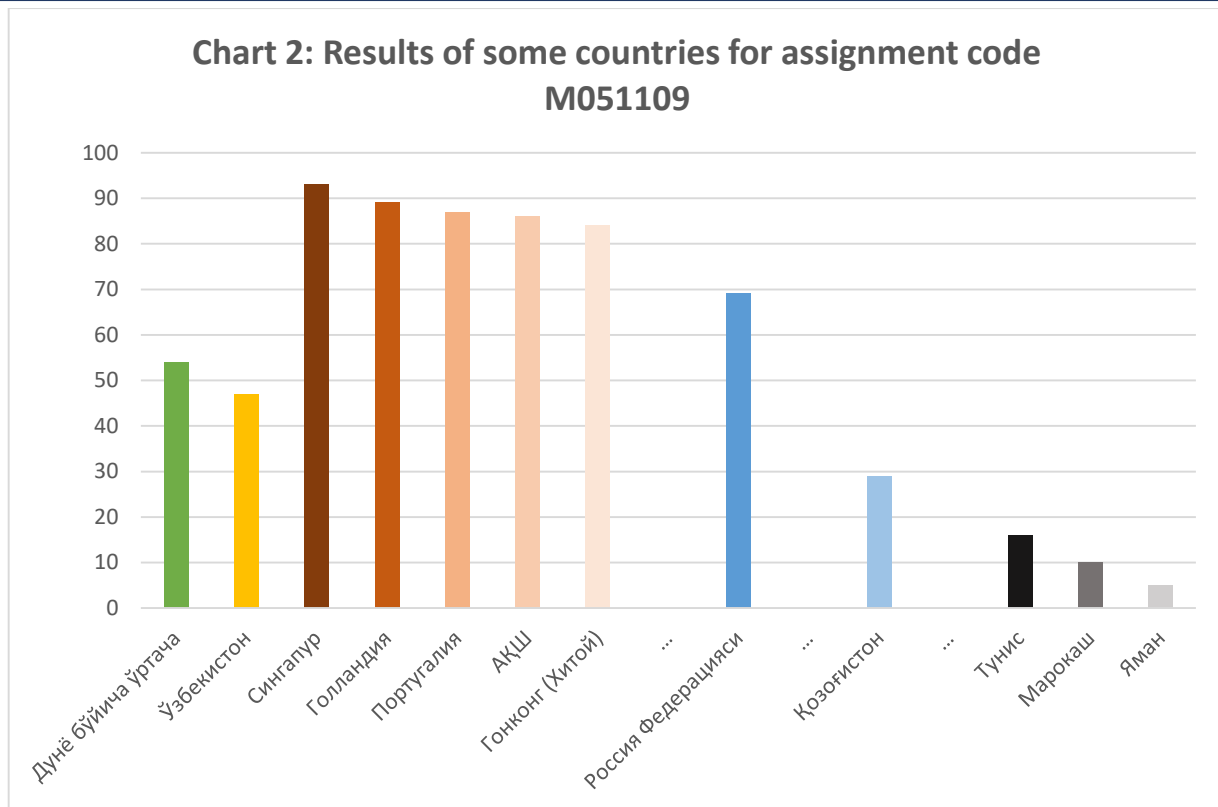
The task coded M031252 was used in the 2011 study and is a task of high complexity (numbers belong to the content domain, cognitive domain of application) according to the level of mastery difficulty.

Assignment form with code M031252:

If the sequence 3, 6, 9, 12 is continued, then which of the following numbers belongs to this sequence?	
A	26
B	27
C	28
D	29

It was required to determine the number belonging to the sequence of given natural numbers using the laws indicated in the task, and the students' application skills were tested by performing operations on natural numbers. To solve the problem, students are required to find the fifth term by continuing the four given sequences. It was difficult for the students to complete this task, because it was found that some students did not fully pay attention to the connection between the given numbers. 54 percent of Uzbek students answered this task correctly. The world average for the correct performance of this task is 62%, and 21 out of 57 countries (economic systems) achieved a result below this average. Singapore 93%, the Republic of Korea 89%, Northern Ireland (Great Britain) 84%, the USA 83%, Greece 82% are among the top countries in the world ranking, while the Russian Federation is above the world average with a result of 64%. Kazakhstan is lower than the world average with a result of 56%, and Tunisia with 27%, Morocco with 24%, Yemen with 20% have recorded the lowest positions in the world ranking. (Diagram 3).

Chart 3: Results of some countries for M031252
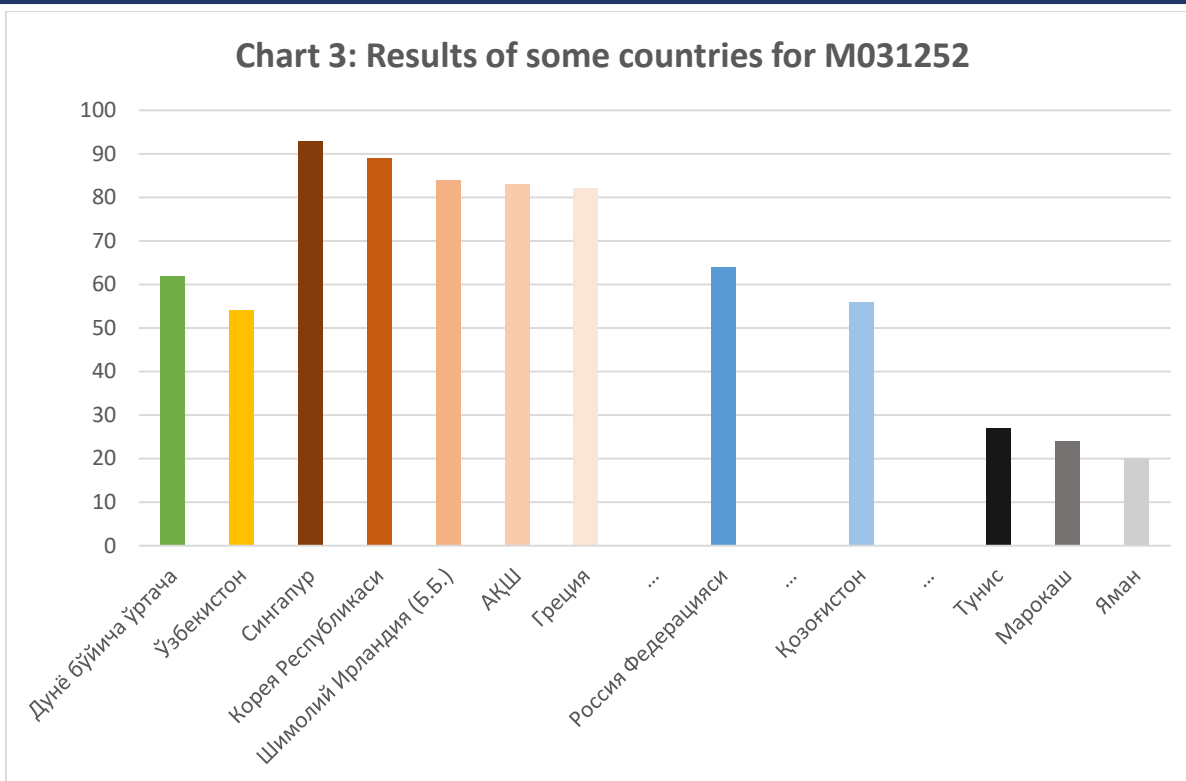
According to their cognitive fields, 64.9 percent of students answered the tasks related to "Knowing", 63.6 percent to the tasks related to "Application", and 61.6 percent to the tasks related to "Reflection" (Table 3).

Below are examples of analytical data with international results of tasks related to the cognitive process used in the study.
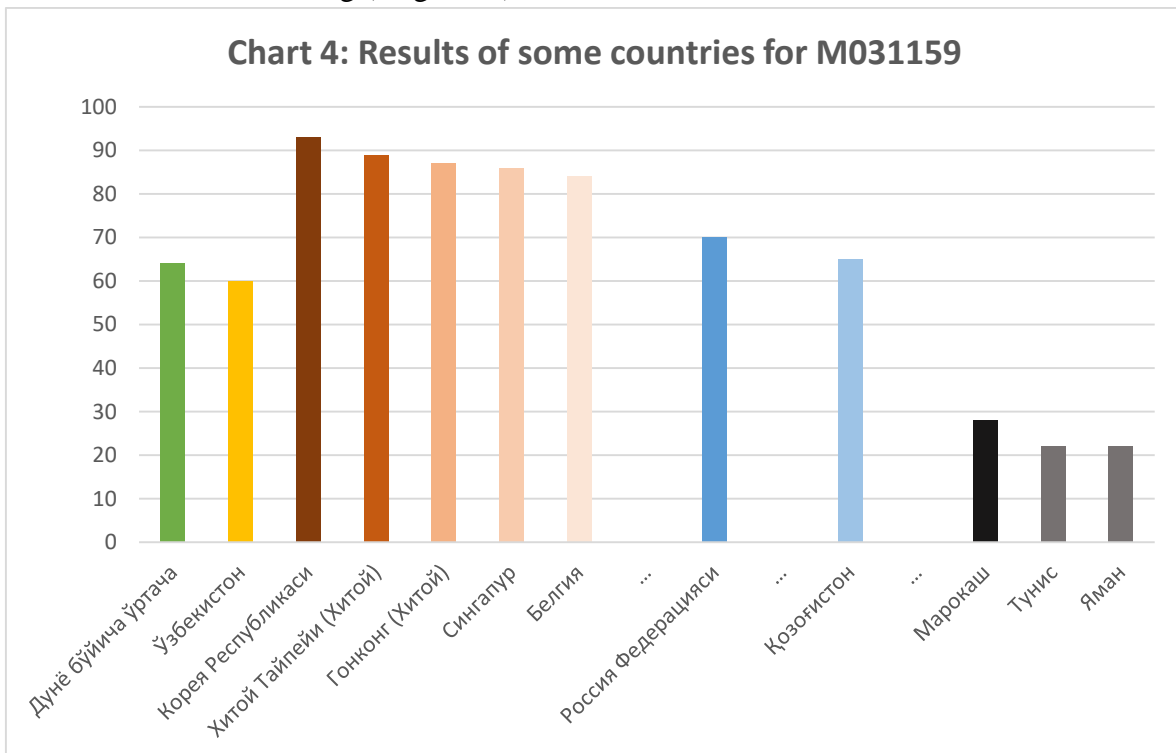
The task with the code M031159 was used in the 2011 study and is a task related to the cognitive process of knowing (high complexity according to the level of mastery difficulty, geometric shapes and measurements belong to the content area).

Assignment form with code M031159:

| The sequence rule says, "Rotate this shape ⊙ clockwise each time to $\frac{1}{4}$ r". Which sequence matches the rule?			
A		B	
C		D	

The given task required identifying the shape formed by clockwise rotation and tested the students' knowledge of geometric shapes and measurement skills. To solve the problem, the students are asked to find the sequence of clockwise rotations by a quarter. It was difficult for the students to complete this task, as it was found that some students did not have enough understanding of the stakes. 60% of Uzbek students answered this task correctly. The world average for the correct performance of this task is 64%, and 21 of 57 countries (economic systems) achieved a result below this average. The Republic of Korea 93%, Chinese Taipei (China) 89%, Hong Kong (China) 87%, Singapore 86%, Belgium 84% took the top positions in the world ranking, the Russian Federation 70% and Kazakhstan 65%. with a result higher than the world

average, Morocco with 28%, Tunisia and Yemen countries with 22% have recorded the lowest positions in the world ranking (diagram 4).

Chart 4: Results of some countries for M031159

Task code M031088 was used in the 2011 study and is a task related to the cognitive process of application (moderate complexity according to the level of mastery difficulty, geometric shapes and measurements belong to the content area).

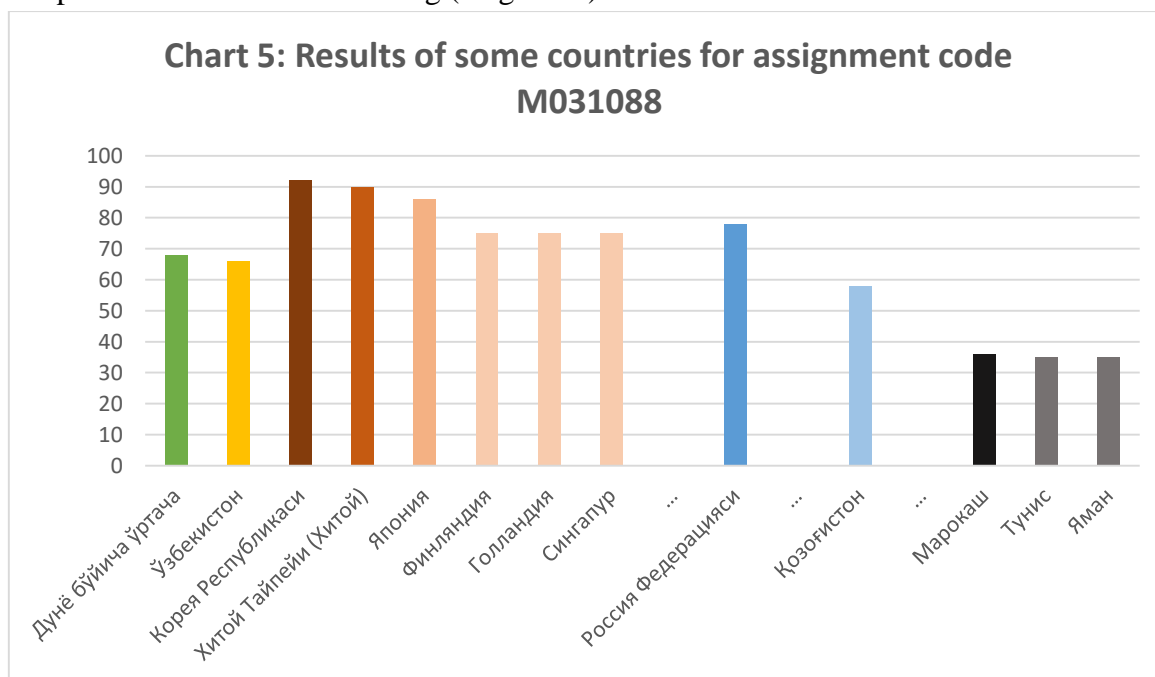Assignment form with code M031088:
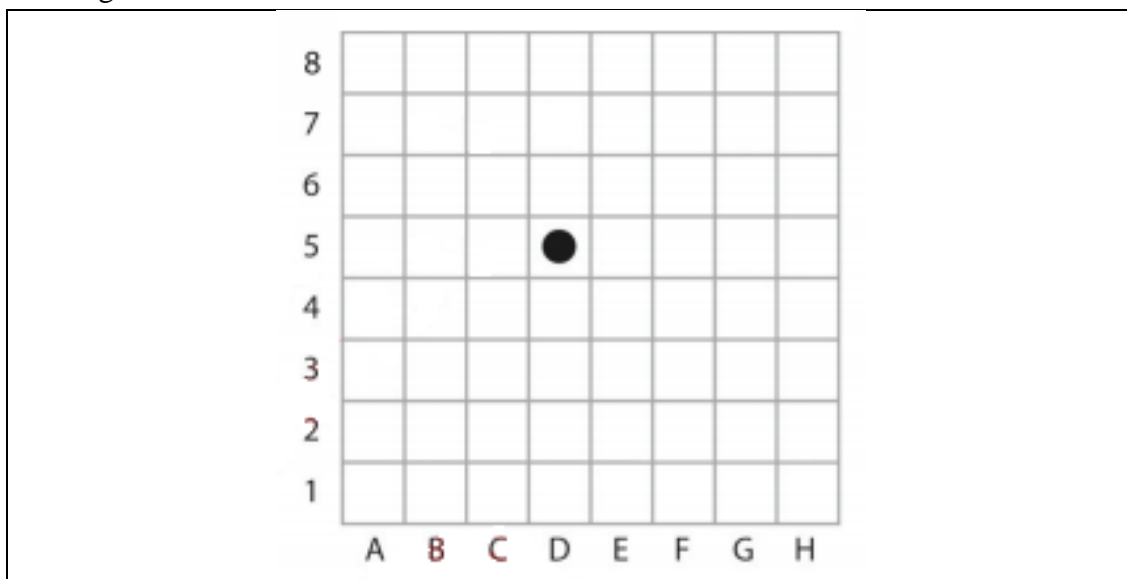
	Brave is playing a game on a checkered board. His stone is located on square D5. As a result of which of the following actions, his stone will be placed on square G7?
A	2 squares to the right and 3 squares up
B	2 squares to the left and 3 squares up
C	3 squares to the right and 2 squares up
D	3 squares to the left and 2 squares up

The assignment required finding the trajectory of a point on a gridded drawing and tested the students' application of geometric shapes and measurement skills. In order to solve the problem, the student is required to make some moves so that his stone is placed on square G7. Completing this task was difficult for students, because some students do not have a complete idea about the trajectory of the movement. 66 percent of Uzbek students answered this task correctly. The world average for the correct performance of this task is 68%, and 20 out of 57 countries (economic systems) have achieved a result below this average. Countries such as the Republic of Korea 92%, Chinese Taipei (China) 90%, Japan 86%, Finland, the Netherlands and Singapore 75% took the top positions in the world ranking, while the Russian Federation was above the world average with a result of 78%, Kazakhstan and with a result of 58% it is lower than the world average, and Morocco with a result of 36%, Yemen and Tunisia with a result of 35% recorded the lowest positions in the world ranking (diagram 5).

Chart 5: Results of some countries for assignment code M031088

Task code M041199 was used in the 2011 study and is a task in the cognitive domain of reasoning (moderately complex in terms of mastery difficulty, in the content domain of reading and interpreting information).

Assignment form with code M041199:

The teacher gave Javlon the following table and asked him to identify the diagram that correctly represents the data. Which chart should he choose?

Name	Money
Sora	22 zed
Polat	15 zed
Parizod	17 zed
Kamron	10 zed
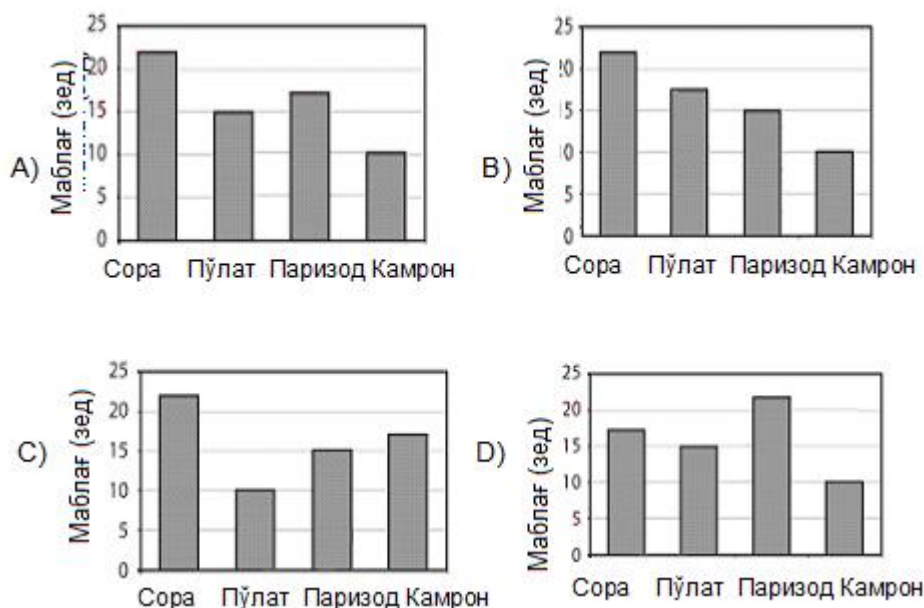
The assigned task required students to work with column charts corresponding to the data in the table, tested the students' reasoning skills by reading and analyzing data. To complete the task, the student is required to compare the column chart corresponding to the information in the given table. Completing this task was difficult for the students, as it turned out that the students did not have enough skills to work with bar charts. 71% of Uzbek students answered this task correctly. The world average for the correct performance of this task is 72%, and 16 out of 57 countries (economic systems) achieved a result below this average. The Republic of Korea 97%, Hong Kong 95%, Chinese Taipei (China) 92%, Singapore and the Netherlands 91% ranked high in the world ranking, while the Russian Federation achieved 89% and Kazakhstan 76% below the world average. high, and Tunisia and Morocco with 25%, Yemen with 23% have recorded the lowest positions in the world ranking (diagram 6).

Chart 6: Results of some countries for M041199
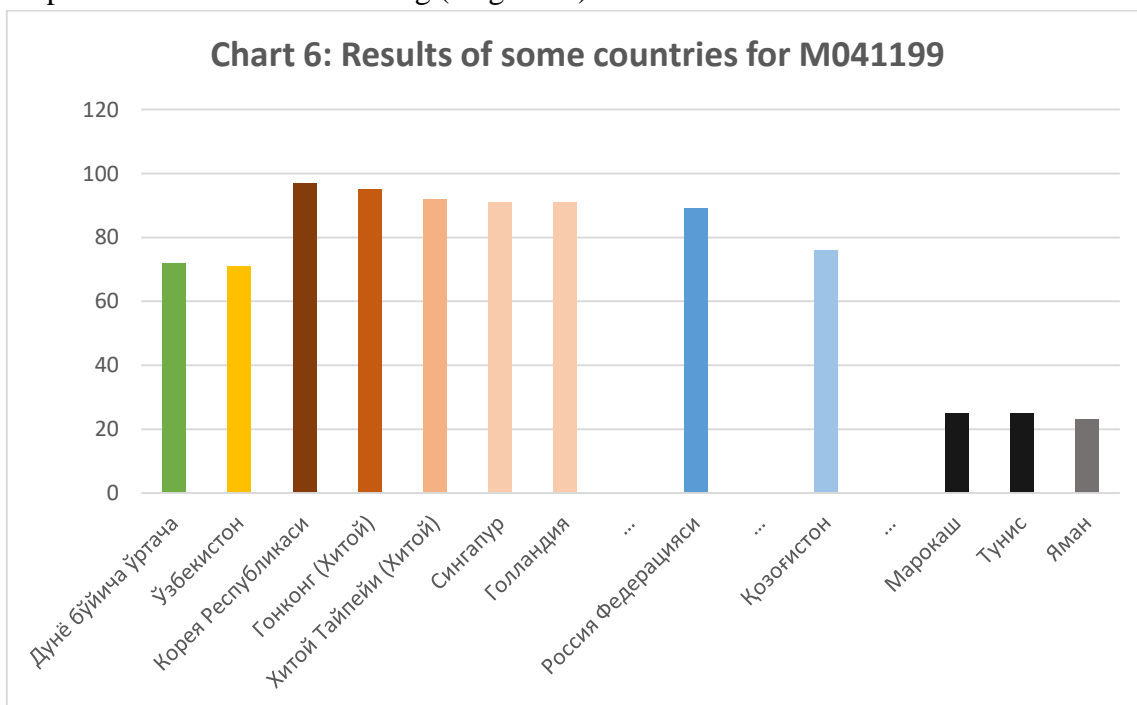
According to the area of mathematical content, 66.4 percent of the students answered the tasks related to the "Numbers" section, 60.2 percent to the tasks related to the "Geometric shapes

and measurements" section, and 63.2 percent to the tasks related to the "Data Analysis" section (Table 3).

Below we present examples of analytical data with international results of assignments related to the content area used in the research.

Task code M031346A was used in the 2011 study and is a task related to the content domain of numbers (of moderate difficulty in terms of mastery difficulty, related to the cognitive domain of application).

Assignment form with code M031346A:

There is a card shop at the city fair.

1 animal card is worth 2 animation cards.

Some children went to the store to get trading cards.

A. 5 animals to exchange for animated cards in the spring has a card. How many animated cards can he get?

Answer: _____ animation cards.

In the given task, it was required to perform a simple multiplication operation using the information in the picture, and the students' application skills were tested by performing operations on natural numbers. To solve the problem, the student is required to get how many animation cards per 5 animal cards. It was difficult for the students to complete this task, because it turned out that they had not developed the skills of working with pictures. 58 percent of Uzbek students answered this task correctly. The world average for the correct performance of this task is 62%, and 19 out of 57 countries (economic systems) achieved a result below this average. Countries such as Hong Kong (China) 88%, Singapore 86%, Chinese Taipei (China) 84%, Russian Federation and Denmark 82% have taken the top ranks of the world ranking for this task, while Kazakhstan is below the world average with a result of 56% and Morocco 24%, Kuwait 14%, Yemen 11% have the lowest positions in the world ranking (diagram 7).

Chart 7: Results of some countries for the assignment code M031346A
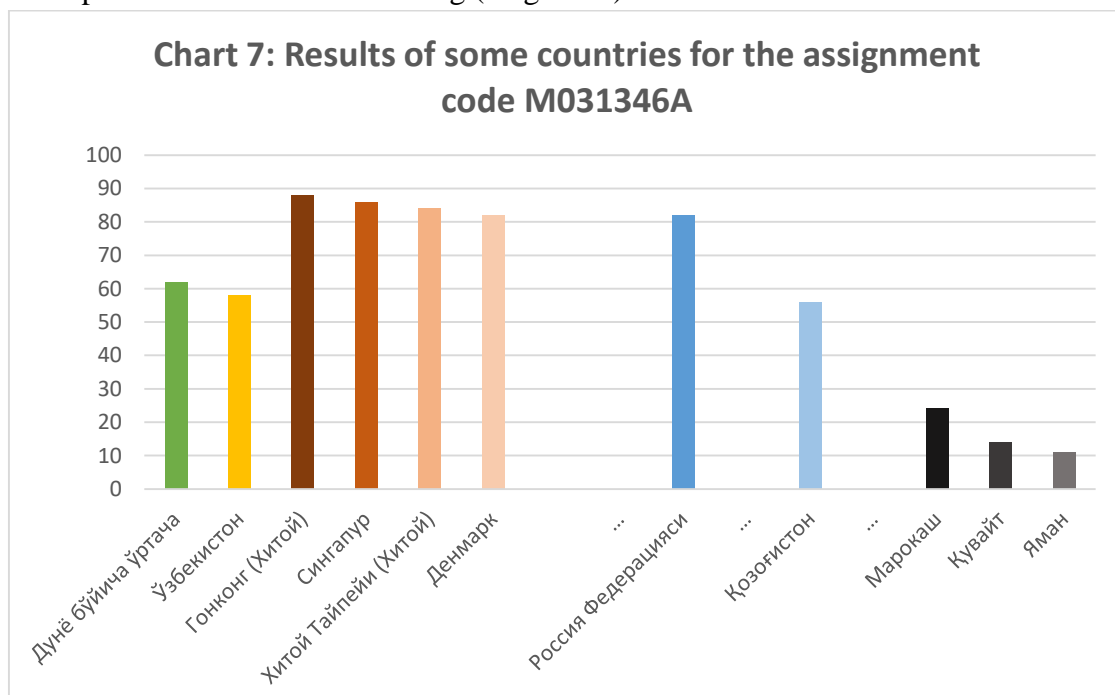
The task coded M031006 was used in the 2007 study, and it is a task related to the content area of geometric shapes and measurements (lower complexity according to the level of difficulty of mastering, related to the cognitive area of knowledge).

Assignment form with code M031006:
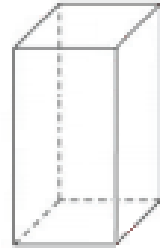
Kamron has many these kinds of tiles:	
Jasur has many these types of tiles:	
Polat has many these types of tiles:	
Bobur has many these types of tiles :	
W ho needs the fewest tiles to tile a classroom?	
A	Kamron
B	Jasur
C	Polat
D	Bobur

The given task required determining the inverse proportionality between the size and the number of shapes required to cover a given surface and tested students' knowledge skills by comparing geometric shapes and surfaces. To solve the problem, the student is required to compare the surfaces of the given tiles. Completing this task was difficult for the students, because it was found that the skills of determining the inverse proportionality between the size and the number of shapes are not enough. 61 percent of Uzbek students answered this task correctly. The world average for the correct performance of this task is 71%, and 14 out of 43 countries (economic systems) achieved a result below this average. Germany, the Netherlands, and Slovenia with results of 90%, Lithuania 89%, Hong Kong (China) 88%, and the Russian Federation with 85% and Kazakhstan with a result of 72% are above the world average, while Qatar is 43%. , Morocco 39%, Yemen 28% have the lowest positions in the world ranking (Diagram 8).

Chart 8: Results of some countries for assignment code M031006
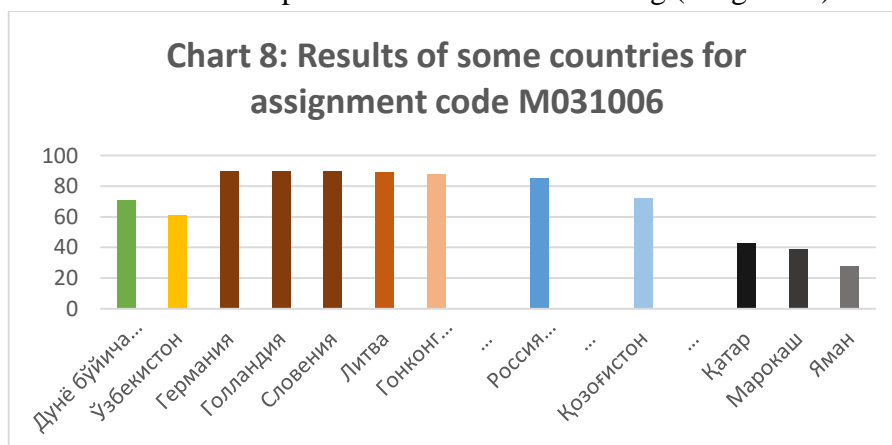
The task with the code M031083 was used in the 2011 study and is a task related to the content area of geometric shapes and measurements (of moderate complexity according to the level of difficulty of mastering, related to the cognitive area of knowledge).

Assignment form with code M031083:

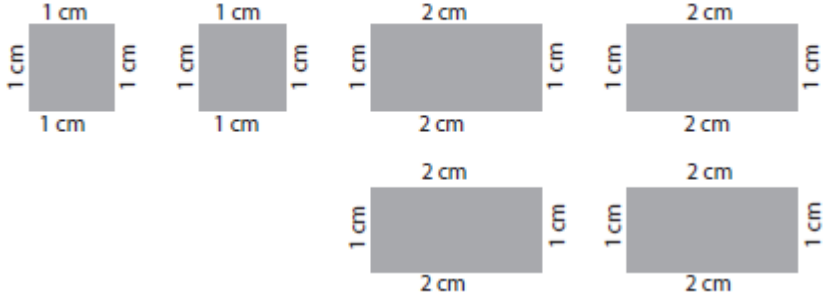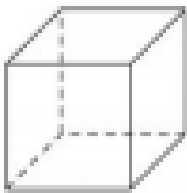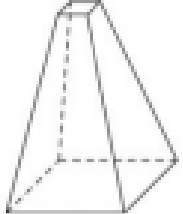Sevara has 6 pieces of cardboard as shown above. Which of the following shapes can Sevara make without cutting these six pieces of cardboard?

A		B	
C		D	

The given task required the creation of a three-dimensional spatial body consisting of the given shapes and the students' knowledge of geometric shapes and measurement was tested. To solve the problem, the student is required to make the given figure without cutting the given pieces of cardboard.
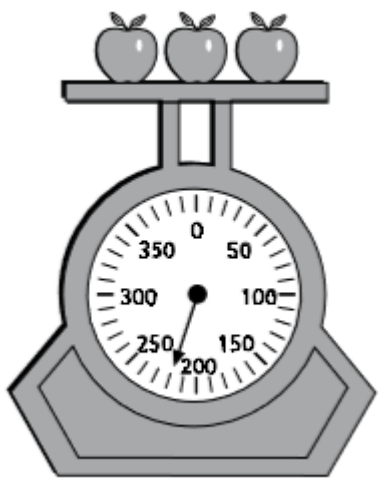
It was difficult for students to complete this task because some students do not have a complete idea about polynomials and their sides. 65% of Uzbek students answered correctly. The world average for the correct performance of this task is 69%, and 20 out of 57 countries (economic systems) have achieved a result below this average.

Portugal 93%, Hong Kong (China) 92%, Japan 90%, Singapore 88%, the Republic of Korea 85%, and the Russian Federation are above the world average with 84%. and with the result of 67%, it is lower than the world average, and Tunisia (37%, Kuwait, 32%, and Yemen, 26%) have the lowest positions in the world ranking (diagram 9).

Task code M031294 was used in the 2011 study and is a task in the content domain (higher complexity in terms of mastery level, related to the cognitive domain of reasoning) of reading and analyzing data.

Diagram 9: Results of some countries for the assignment code M031083
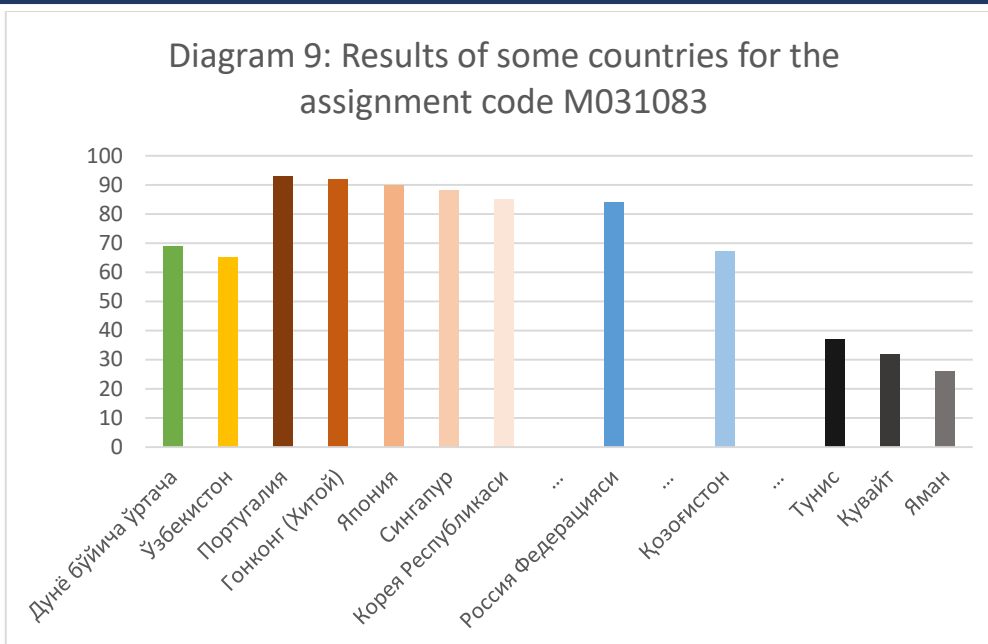
Assignment form with code M031294:

gramm

Determine the weight of the apple in grams.	
A	200
B	202
C	210
D	220

The given task required to change data in circular form to another unit of measurement and tested students' knowledge skills by reading and analyzing data. To solve the problem, students are required to determine the weight of the product on the scale in grams. Completing this task was difficult for the students, as it turned out that the students did not have enough skills to distinguish between the intermediate units of measurement on the scales. 44% of Uzbek students answered this task correctly. The world average for the correct performance of this task is 56%, and 28 out of 57 countries (economic systems) achieved a result below this average. The Republic of Korea and Singapore with the results of 90%, Hong Kong (China) (89%), Japan 88%, Chinese Taipei (China) 87% have taken the top ranks of the world ranking, while the Russian Federation with the result of 60% is below the world average. higher and Kazakhstan below the world average

with a result of 50% and Morocco with 19%, Tunisia and Yemen with the lowest results in the world ranking (Chart 10).

Chart 10: Results of some countries for M031294

(Bar chart with categories: Дунё бўйича ўртача ≈56, Ўзбекистон ≈44, Корея Республикаси ≈90, Сингапур ≈90, Гонконг (Хитой) ≈89, Япония ≈88, Хитой Тайпейи (Хитой) ≈87, ..., Россия Федерацияси ≈60, ..., Қозоғистон ≈50, ..., Марокаш ≈19, Тунис ≈18, Яман ≈18)
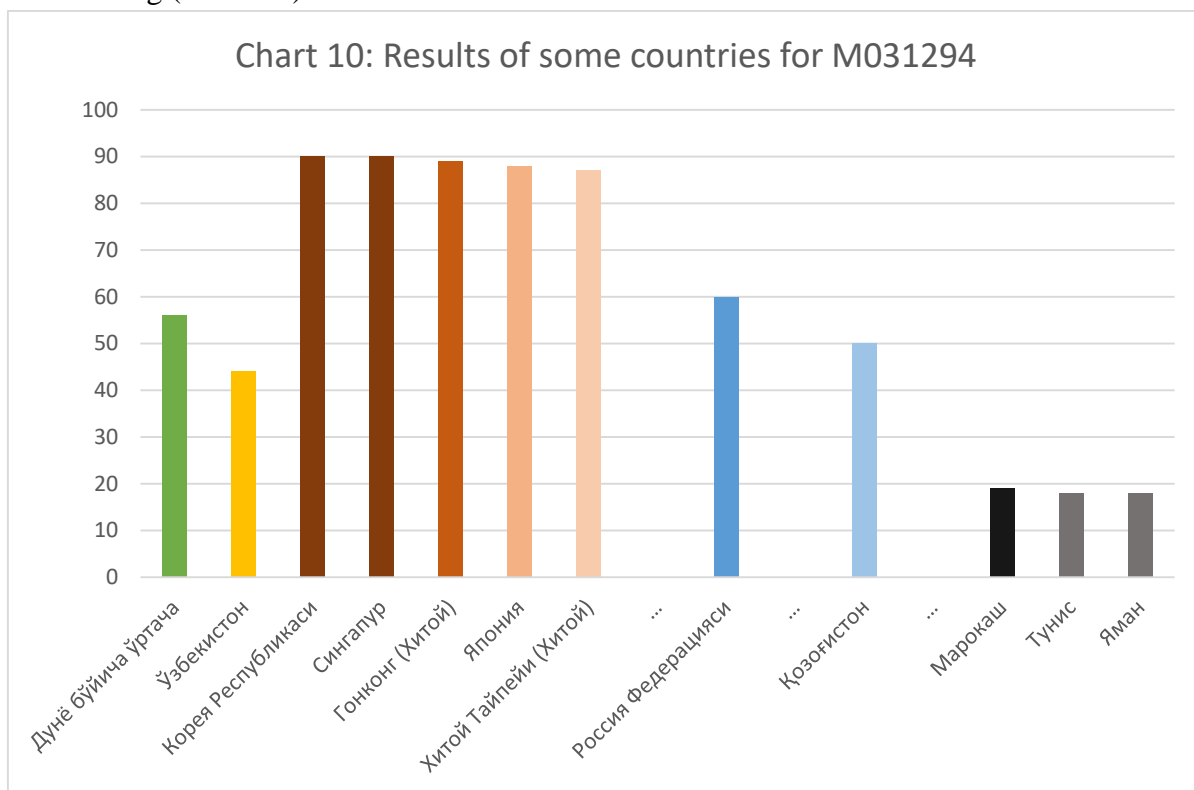
According to the analysis of 10 tasks below the world average in the above-mentioned international studies (Table 3, Diagram 11), the students of our country have more medium and high difficulty levels, in the cognitive field of knowledge and application, reading and interpreting information, and geometric shapes and measurements. felt difficulty in completing tasks in the content area. The same conclusion can be reached if we make this analysis on the example of a total of 37 assignments (Table 5).

Comparative analysis of the average results of some assignments in the World and Uzbekistan

(Grouped bar chart, Y-axis: Ўзлаштириш даражаси; X-axis: Assignment code)

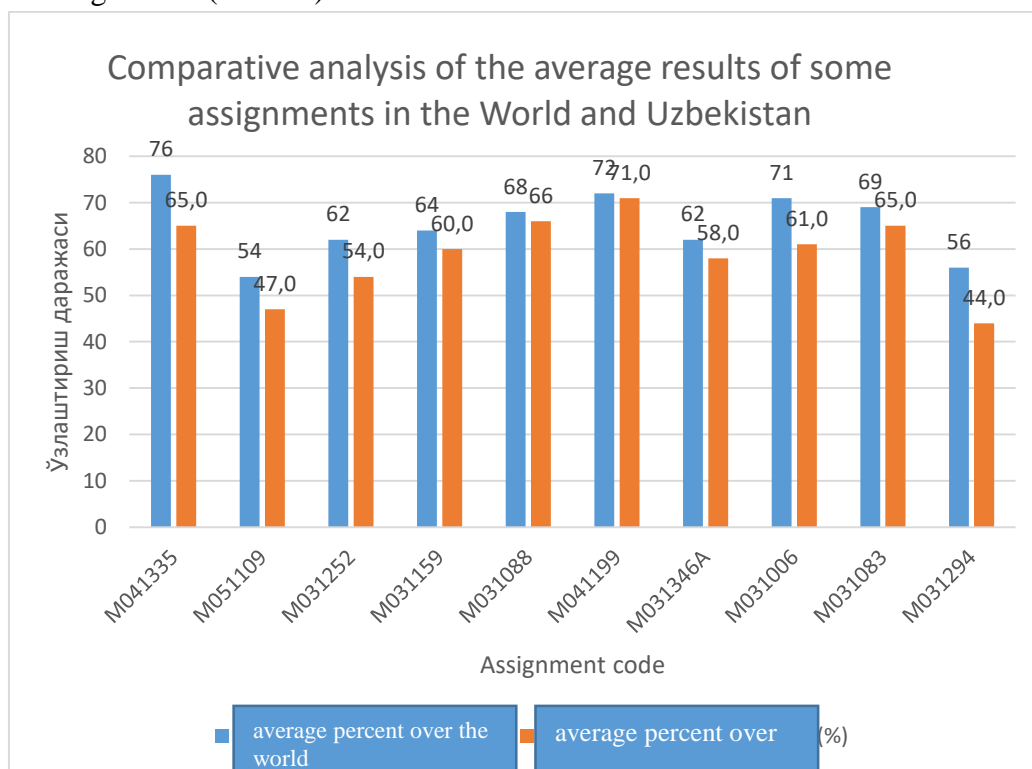| Assignment code	average percent over the world	average percent over (%)
M041335	76	65,0
M051109	54	47,0
M031252	62	54,0
M031159	64	60,0
M031088	68	66
M041199	72	71,0
M031346A	62	58,0
M031006	71	61,0
M031083	69	65,0
M031294	56	44,0

Table 2: Comparative analysis of assignments with international results by sector

Relevant fields of assignments	Classification of assignments by field	Number of assignments	Percentage of total assignments	*Percent Correct %*	*Uzbekistan %*	*Difference*
Threshold	Low	7	19	75,7	78,7	3,0
	Intermediate	12	32	65,2	67,2	2,0
	High	15	41	52,2	56,1	3,6
	Advanced	3	8	37,3	46,9	9,5
	Overall average	37	100	57,6	62,2	4,5
Content Domain	Number	18	49	59,7	66,4	6,7
	Geometric Shapes and Measures	11	30	59,0	60,2	1,2
	Data Display	8	21	64,4	63,2	-1,2
	Overall average	37	100	61,0	63,3	2,2
Cognitive Domain	Knowing	16	46	63,2	64,9	1,7
	Applying	15	37	58,8	63,6	4,8
	Reasoning	6	17	57,5	61,6	4,1
	Overall average	37	100	61,0	64,3	3,3

Table 3: Information on the performance of the 10 tasks below the world average

T/P	Item ID	Threshold	Cognitive Domain	Content Domain	Source year	Percent Correct %	Uzbekistan %
1	M041335	Low	Knowing	Data Display	2011	76	65,9

2	M051109	Intermediate	Knowing	Data Display	2011	54	47,7
3	M031252	High	Applying	Number	2011	62	54,9
4	M031159	High	Knowing	Geometric Shapes and Measures	2011	64	61,9
5	M031088	Intermediate	Applying	Geometric Shapes and Measures	2011	68	66,9
6	M041199	Intermediate	Reasoning	Data Display	2011	72	71,8
7	M031346A	Intermediate	Applying	Number	2011	62	59,5
8	M031006	Low	Knowing	Geometric Shapes and Measures	2007	71	61,3
9	M031083	Intermediate	Билиш Knowing	Geometric Shapes and Measures	2011	69	66,2
10	M031294	High	Knowing	Data Display	2011	56	44,2

REFERENCES

1. Tasks related to the international PISA study in the Decree No. PF-5712 of the President of the Republic of Uzbekistan dated April 29, 2019 "On approval of the concept of development of the public education system of the Republic of Uzbekistan until 2030".
2. TIMSS 2011 Assessment Frameworks/TIMSS 2011 Mathematics framework, pp. 19-46.
3. Public education system in the Republic of Uzbekistan on November 25-28, 2019
4. A report on the results of a national study organized and conducted among schoolchildren within the framework of the requirements of the TIMSS international program. 2021, A. Ismailov, J. Narziev, N. Karimov