PREPARING STUDENTS FOR THE TIMSS INTERNATIONAL ASSESSMENT SURVEY IS A FACTOR IN IMPROVING THE QUALITY OF EDUCATION

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Abstract. *In the article, the scientific-methodical features of preparing future biology teachers for international evaluation programs , the adopted regulatory and legal documents on the organization of international research, Examples of TIMSS research scopes include recommendations for developing students' creative thinking, problem solving, interdisciplinary problem solving, reading for independent living, and developing math and science literacy is brought.*

Keywords: *mathematical literacy, TIMSS, natural literacy, scientific literacy, constructive, cognitive, innovative, ICT, content area, cognitive area, "STesting" platform.*

Introduction

With the decision of the Cabinet of Ministers of the Republic of Uzbekistan "On measures to organize international studies in the field of education quality assessment in the public education system" No. 997 of December 8, 2018, the State Control of the Quality of Education under the Cabinet of Ministers of the Republic of Uzbekistan The National Center for the Implementation of International Research on the Evaluation of the Quality of Education was established under the inspection. Ensuring successful participation of general secondary education institutions in international research; Comparative comparison of the results recorded by the Republic of Uzbekistan in international assessment programs with the results of other countries; to carry out systematic monitoring of the introduction of international assessment programs into the educational process, popularize the best experience in this field and participate in the development of recommendations and manuals for educational institutions based on it; Among the main tasks and activities of the National Center, such as the preparation of educational and methodological recommendations for improving the qualifications of pedagogues in reading, mathematics and natural sciences using innovative methods of teaching. The organization of international research on the following international assessment programs was established:

PIRLS - 4th grade students the text reading and to understand level assessment ;

TIMSS- 4th and 8th grade students natural-scientific direction from the sciences literacy assessment ;

TALIS is a leader and pedagogue of personnel common medium education in institutions teaching and education get environment and of teachers the work conditions study ;

PISA-15 years old of students reading , mathematics and natural direction from the sciences literacy level evaluation .

This projects of students creative and critical thinking skills, possessed knowledge in life apply get ability different different assignments through price to give and later on this skills development impulse to give service does

Research result and discussion

Must [1]have good scientific literacy skills and the principles of lifelong learning , science has a major impact on people's personal lives and the global economy. Science is very important for the development of the quality of human resources[2]. The study of biology seeks to develop students as human beings with scientific literacy capital, who are self-aware, examine, filter, apply, and contribute to the development of science and technology for the betterment and well-being of society. .

Adnan, Mulbar, U, Sugiarti, & Bahri A. (2021) Students' Science Literacy Skills in Secondary Schools in South Sulawesi, Indonesia Adnan, Mulbar, U, Sugiarti, & Bahri A. (2021) Research on the Problem of Teaching Biology in Secondary Schools in South Sulawesi, Indonesia that the scientific literacy skills of the schoolchildren are still low, the natural scientific literacy of the students determined on the basis of the questionnaire was increased from 17.2% to 36.2% by working in a constructive way.

According to constructivism[3], learning is more a process of self-regulation in the resolution of cognitive conflicts that arise through concrete experiences, collaborative discourse, and interpretation. However, cognitive dissonance should be considered in depth in different situations. Schunk (2012) found that through cognitive conflict, students can be guided to organize, analyze, and interpret quantitative data and scientific information, such as: (a) correctly constructing graphs from data, (b) graphing read and interpret data appropriately, (c) solve problems using quantitative skills including basic statistics, (d) understand and interpret basic statistics, and (e) apply quantitative data based inferences, predictions and conclusions

It involves creating situations in which the teacher can actively involve students in the learning process, effective use of innovative media and educational resources, in addition to providing students with relevant experience in scientific activities, research or experiments. by helping to increase the scientific literacy of students in prospective teachers , including problem solving, analysis and creativity, are key factors to consider when preparing students for International Assessment programmes. It is necessary to develop students' pedagogical responsibility and their metacognitive abilities, the ability to set their own goals and teach constructively.

For this, there is a task to develop teachers with modern skills and innovative methods of education that can control today's students.

That future biology teachers fully master the educational materials to prepare students for International Assessment Studies, to be able to use the texts not to provide information, but to explain the essence of the academic subject, the definitions in the text to be scientific and error-free, to have the text of the subject in a language that the student understands, to ensure the connection between education and everyday life and practice, to be able to analyze the acquired knowledge, to be able to apply it in practice in unexpected situations to be formed, to be aimed at ensuring the organic connection with other academic subjects; illustrations in the form of pictures: knowledge of the use of drawings, schemes, graphs, tables and photographs, new concepts, basic expressions of science, rules, formulas, definitions, etc., are expressed in the form of a dictionary, and the student It is very important to have a good knowledge of age pedagogy-psychology and physiology, and conduct training on the subject in various forms.

TIMSS - (The Trends in International Mathematics and Science Study) - mathematics and natural of sciences fundamental knowledge in learning to evaluate directed 4th and 8th grade students monitoring of readiness , comparative assessment as well as students of achievements

different degrees defines education systems features is studied . TIMSS of the country future competitiveness about _ predictions to do opportunity gives. International comparison to the results relying on the country mathematics and natural sciences of education strong and weak sides determination can

TIMSS program himself _ the first research in 1995 started is , har four In 1999, 2003, 2007, 2011, 2015, 2019, the 8th cycle was held in 2023 .

The International Association for the Evaluation of Educational Achievement (IEA), a national research institute established in 1959, has been conducting international research assessments in mathematics and science for nearly 60 years. Today, the IEA's office in Amsterdam facilitates the participation of countries in a number of international studies, and the IEA's Hamburg office is a major data processing and research center. TIMSS as the flagship program of the IEA from the experience of cooperation presented by representatives of all countries of the world has a number of advantages in use [4].

TIMSS is administered by the TIMSS & PIRLS International Research Center at Boston College's Lynch School of Education. TIMSS and PIRLS (The Progress in International Reading Literacy Study), an international reading assessment program, together form the main periodicity of IEA studies, measuring achievement in the three main subjects (reading, mathematics and science). [5]

How the education system needs to be organized to implement the planned curricula for mathematics and science education in each country through the TIMSS curriculum and the level of mastery of the learning outcomes of the curricula Based on this, TIMSS regularly publishes the TIMSS encyclopedia at each assessment in order to formalize the educational policy and curricula of mathematics and natural sciences of each participating country. TIMSS 2015 encyclopedia-policy in education and mathematics and science curricula (Mullis, Martin, Goh, & Cotter, 2016) with special emphasis on K-8 is an important resource for understanding the teaching and learning of mathematics and science around the world. [1.8- b]

Minor updates are published in the TIMSS 2019 Encyclopedia (Kelly, Centurino, Martin, & Mullis, 2020) and reflect the curricula, standards, and frameworks of the participating countries as proposed by the TIMSS 2023 National Study Coordinators. [4.2- b] For each participating country, in separate chapters, the structure of its educational system, curricula in mathematics and natural sciences in primary and secondary grades, educational requirements for teachers, actual exams and types of assessment are summarized. In order to provide standard information that complements the country chapters, countries include their mathematics and science curricula, schooling approaches, and teaching practices.

Also, in the TIMSS study, students, their parents or guardians,

The conditions created by teachers, school principals for students to learn mathematics and natural sciences at home and at school are determined through questionnaires. The questionnaire's questions are updated at each evaluation through iterative reviews by international experts on the review committee.

The main goal of TIMSS 2023 is to take advantage of the benefits of computer-based assessment, including new and improved assessment items and

Using a fully digital questioning system, including methods, is knowing the ability to develop innovative questions that influence this system. Numerical evaluation made it possible to:

In addition to comparing the level and quality of knowledge acquired by students of the 4th and 8th grades in mathematics and natural sciences in the TIMSS program, as well as identifying differences in the national education system, the content of education in mathematics and natural sciences in schools, o Factors related to the educational process, the capabilities of the educational institution, the potential of teachers, and the students' families are studied. [6.570-p]

Below are the TIMSS 2019 assessment scopes.

TIMSS 2019 assessment frameworks will be proportionally implemented according to the updated assessment frameworks for mathematics and science. The scope includes two dimensions: a content domain dimension that indicates the topic being assessed, and a cognitive dimension that defines the thinking processes that should be assessed as students engage with the content. the usual practice of conducting assessments in classes was followed. The TIMSS 2019 assessment scopes for these assessments are summarized below.

Mathematics Content Areas

• Fourth grade: numbers, measurements and geometry, working with data

• Eighth grade: numbers, algebra, geometry, data manipulation, statistics, and probability

• Content areas of natural sciences

• Fourth Grade: Life Science, Physics, Earth Science

• Eighth grade: Biology, Chemistry, Physics, Earth Science, Mathematics and Cognitive Areas of Science

• Fourth and Eighth Grades: Knowing, Applying, and Reasoning

There are two assessment scopes for the TIMSS 2019 survey:

TIMSS natural sciences: fourth grade

• TIMSS Science: Grade Eight

The scope of the TIMSS 2019 science assessment covers two dimensions:

• measuring the content area, in which the content of the subject is clearly indicated

• measuring the cognitive domain, in which thought processes are clearly indicated.

The table below shows the target percentages of testing time allocated to each of the content and cognitive domains of the TIMSS 2019 survey for grades four through eight

Fourth Grade	
Content Domains	Percentages
Life Science	45%
Physical Science	35%
Earth Science	20%
Eighth Grade	
Content Domains	Percentages
Biology	35%
Chemistry	20%
Physics	25%
Earth Science	20%

Cognitive Domains	Percentages	
	Fourth Grade	Eighth Grade
Knowing	40%	35%
Applying	40%	35%

Reasoning	20%	30%

In fourth grade, the TIMSS science curriculum is defined by three major content areas: life sciences, physical sciences, and earth sciences. [1.32-p]

Eighth grade science majors include biology, chemistry, physics, and earth science.
four and eight is divided into three areas that describe the mental processes students perform when completing test items developed for the TIMSS 2023 study:
knowing; application; reasoning.

The first cognitive field "Knowing" is the ability of students to remember, understand, describe, concepts, methods, and provide evidence for facts, which is considered a solid foundation for natural sciences [1.54-p]

The second cognitive domain is Application, which focuses on comparing objects or data, relating science concepts to specific contexts, creating explanations, and using this knowledge to solve practical problems.

The third cognitive domain is Reasoning, which typically focuses on using evidence and scientific knowledge to analyze, synthesize, and generalize unfamiliar situations and complex contexts.

Recall/Recognize	Identify or state facts, relationships, and concepts; identify the characteristics or properties of specific organisms, materials, and processes; identify the appropriate uses for scientific equipment and procedures; and recognize and use scientific vocabulary, symbols, abbreviations, units, and scales.
Describe	Describe or identify descriptions of properties, structures, and functions of organisms and materials, and relationships among organisms, materials, and processes and phenomena.
Provide Examples	Provide or identify examples of organisms, materials, and processes that possess certain specified characteristics; and clarify statements of facts or concepts with appropriate examples.

An innovative platform including electronic systems and videos aimed at forming students' skills in working with tasks within the framework of international assessment programs (PISA, TIMSS, PIRLS) in order for Uzbekistan to take its place in international assessment studies "STesting" was launched. If we pay attention to the statistics of the "STesting" electronic platform, during the months of February-June 2022, the number of students who took the test was 4,519,500. [3.12-p]

Behind these target indicators, it is aimed to develop the national education system of Uzbekistan, increase its attractiveness, and evaluate the literacy level of students in reading, mathematics and natural sciences. Using the electronic testing platform, teachers and students "students will have the opportunity to receive methodical assistance in order to effectively develop the skills of working with assignments aimed at preparing students for PISA, PIRLS, TIMSS international studies, analyzing and interpreting and drawing conclusions.

In order to prepare students for life, to form their skills of understanding, application, and reasoning, the integration of subjects will help the student to develop holistic knowledge. [3.14-p]
Summary

Using PISA, TIMSS, "STesting" platform tasks, the basis of the monitoring models of students' natural and scientific literacy is formed by standards, social order and the need for specialists in the labor market, methodological approach, and the garden in the educational environment of the participants of the educational process. requires the presence of

Improving the methodology of using evaluation programs in the monitoring of natural and scientific literacy of students, identifying and filling gaps in the use of advanced pedagogical, information and communication technologies, psychological, didactic and methodical methods by pedagogues in the educational process according to the monitoring results , determining measures aimed at increasing the quality of the educational process, participation in the international assessment research program is an important factor for achieving the intended goal.

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