



ALIGNING THE NATIONAL ASSESSMENT SYSTEM OF UZBEKISTAN WITH TIMSS 2023 STANDARDS: PSYCHOMETRIC AND INSTITUTIONAL IMBALANCES

Darvishhujayev Abdurashid Abdulkhakimovich

National Institute of Pedagogical Skills Named After A. Avloni,

Leading Specialist at the International Research Center,

Independent Researcher Tashkent, Uzbekistan.

Email: abdurashid.abdulxakimovich@gmail.com

Abstract

This article presents an analysis of the results of experiments conducted to determine the biological effectiveness of chemical preparations against root pests of pear seedlings - cockchafer (Scarabaeidae) beetles. Bifstar 10% em.k (bifenthrin) was selected as the chemical preparation, which was used at a consumption rate of 1 l/ha. This article explores the alignment of Uzbekistan's national education quality assessment system with the requirements of the TIMSS 2023 international program. Within the scope of the study, national assessment criteria and institutional management mechanisms were examined using systematic analysis and gap analysis methods. The results of the analysis revealed a significant imbalance among cognitive domains within national assessment tests. Furthermore, the insufficient application of psychometric tools (specifically the Item Response Theory model) and the prevalence of vertical management styles were identified as key factors hindering the effectiveness of educational management. To address the identified disparities, the study concludes with strategic recommendations focused on enhancing the legal framework, the phased implementation of modern psychometric models, and the capacity building of professional staff.

Keywords: education quality, TIMSS 2023, cognitive domains, psychometrics, Item Response Theory (IRT) model, educational management, gap analysis, cognitive imbalance.

Introduction

Education quality is a fundamental driver of development in modern society. In an environment of intensifying global competition, enhancing the effectiveness of the



educational system, aligning it with international standards, and implementing results-based management have become urgent priorities. From this perspective, the education quality assessment system is viewed not merely as a tool for determining student knowledge, but as a critical mechanism for shaping educational policy, allocating resources efficiently, and making informed management decisions.

In the Republic of Uzbekistan, improving education quality and integrating into international assessment systems have been established as key priorities of state policy. Despite the reforms implemented in recent years, it is observed that the alignment of the national assessment system with the requirements of international programs such as TIMSS remains insufficient. Specifically, existing challenges include imbalances among cognitive domains within assessment criteria, the inadequate application of psychometric tools, and the limited scope of institutional management mechanisms.

Literature Review

The education quality assessment system is a vital component of educational management, serving as the primary data source for monitoring instructional effectiveness, decision-making, and resource allocation. International experience indicates that the psychometric reliability and institutional adaptability of assessment systems are key determinants in shaping educational policy [1]. Global standards for educational assessment are prominently reflected in the TIMSS program. According to the TIMSS 2023 Assessment Frameworks developed by Mullis, Martin, and von Davier (2021), the cognitive domains of assessment are categorized into three levels: "Knowing," "Applying," and "Reasoning" [2].

International results from TIMSS 2023 have demonstrated that weaknesses in the "Reasoning" domain negatively impact overall education quality in many countries [3]. In this study, where Uzbekistan participated for the first time, the country's average scores were below the international mean, confirming systemic issues within the assessment framework. As noted by von Davier et al. (2024), the underutilization of psychometric tools reduces the objectivity of results and complicates the consideration of contextual factors, such as teacher qualifications, school resources, and socio-economic status [3].

From a psychometric perspective, the TIMSS assessment system is based on sophisticated statistical models, namely Item Response Theory (IRT) and Plausible



Values. These tools, detailed in the TIMSS 2023 User Guide for the International Database by Fishbein, Taneva, and Kowolik (2025), enable the calibration of item difficulty, accurate estimation of students' latent abilities, and minimization of measurement errors [4]. While these models are successfully integrated into national assessment systems in many developed nations, Classical Test Theory (CTT) remains predominant in developing countries, including Central Asia. This reliance on CTT diminishes the reliability of results and constrains data-driven decision-making in educational management.

Regarding institutional governance, the effectiveness of the assessment system depends on the balance between vertical management and horizontal approach mechanisms. The OECD (2016) study, *Education Governance in Action*, indicates that in centralized systems where informal institutions (culture of control, authoritarian styles) persist, vertical management weakens information flow and leads to inefficient decision-making [1]. This issue is particularly relevant in educational management: when assessment results are used solely as a top-down control mechanism, the system loses its capacity for self-improvement. Examples provided in the OECD report (e.g., experiences from Norway and the Netherlands) demonstrate the effectiveness of feedback mechanisms and multi-level governance. In the context of Uzbekistan, the status of the national assessment system was analyzed in depth by Darvishkhodjayev (2026), revealing that the "Knowing" domain accounts for 68%, while the "Reasoning" domain constitutes only 7%. These figures contrast sharply with international standards (where "Reasoning" is typically 25%), indicating a severe cognitive imbalance [5].

In the Uzbekistan chapter of the TIMSS 2023 Encyclopedia, Ismailov et al. (2024) described the country's assessment policies and curricula, noting that internal assessment is largely conducted through self-evaluation [6]. Although the Decree of the President of the Republic of Uzbekistan No. UP-76 (2025) established additional measures for ensuring education quality and transitioning to international standards, specific mechanisms for the precise standardization of assessment criteria and the mandatory integration of TIMSS standards remain underdeveloped.

Methods

The methodological foundation of this study is built upon systemic analysis and gap analysis methods. The primary objective of the research is to identify psychometric



and institutional imbalances within Uzbekistan's national assessment system in relation to TIMSS 2023 requirements and to develop strategic recommendations from an educational management perspective. Consequently, the methodology was structured along two primary dimensions: theoretical-documentary analysis and comparative analysis of empirical data.

Content analysis and comparative analysis were employed as the core research methods. Gap analysis was selected as the fundamental tool for identifying disparities between TIMSS 2023 international standards and the national system. This approach is based on the methodology successfully utilized by von Davier et al. (2024) in analyzing TIMSS 2023 results [3]. The analysis was conducted across four key dimensions:

1. Institutional Imbalances: The interaction between formal and informal institutions and decision-making mechanisms;
2. Legal-Regulatory Imbalances: The existence and adequacy of TIMSS integration mechanisms within national legislation;
3. Psychometric Imbalances: The alignment of assessment tools with international psychometric standards;
4. Cognitive and Content Gaps: The distribution of "Knowing," "Applying," and "Reasoning" domains within assessment criteria.

The results of the content analysis conducted by Darvishkhodjaye (2026) served as the empirical basis for this study [5]. These data were compared against the TIMSS 2023 Assessment Frameworks [2] and the international TIMSS 2023 results for Mathematics and Science [3].

Results and Analysis

The research findings confirm the existence of specific imbalances within Uzbekistan's national assessment system relative to the TIMSS 2023 requirements. Institutional Imbalances. While formal institutions in the national assessment system have undergone rapid transformation, informal institutions—specifically the culture of control and vertical management styles—remain unchanged. Consequently, horizontal information flow and feedback mechanisms remain weak [1]. In educational management, this restricts the effective utilization of assessment results and diminishes the system's capacity for self-improvement.



Legal-Regulatory Imbalances. The Law "On Education" and the Decree of the President of the Republic of Uzbekistan No. UP-76 (2025) establish general requirements for ensuring education quality and transitioning to international standards. However, mechanisms for the precise standardization of assessment criteria and the mandatory integration of TIMSS standards are insufficient. This indicates a regulatory imbalance that complicates the alignment of the national system with international requirements.

Psychometric Imbalances. The national assessment system is dominated by basic classical statistical analysis, while the Item Response Theory (IRT) model and the Plausible Values method are not utilized. In contrast, these tools are fully integrated into TIMSS 2023 to ensure the objectivity of results [4]. Consequently, national assessment outcomes are less reliable, and the ability to fully account for contextual factors—such as teacher qualifications, school resources, and socio-economic status—is limited.

Cognitive and Content Gaps. The most significant disparity is observed within the cognitive domains. In national assessment tests, the "Knowing" domain accounts for 68%, while the "Reasoning" domain occupies a mere 7% [5]. According to the TIMSS 2023 Assessment Frameworks, the distribution for Grade 8 Mathematics should be 35% for "Knowing," 40% for "Applying," and 25% for "Reasoning" [2]. This creates a substantial cognitive gap, hindering the development of creative thinking, analysis, and problem-solving skills.

The following table clearly illustrates these gaps and imbalances:

Table Primary Psychometric and Institutional Imbalances Between the National Assessment System and TIMSS 2023

Imbalance Type	National System (Current)	TIMSS 2023 Requirement	Key Consequences
Cognitive Domain Balance	"Reasoning" domain at only 7%	"Reasoning" domain at 25% (Grade 8 Mathematics)	Cognitive Stagnation: Creative and higher-order thinking skills are not sufficiently developed among students
Psychometric Tools	Classical Test Theory (CTT)	Item Response Theory (IRT) model and Plausible Values	Lack of Equating Capabilities: Inability to equate difficulty levels across different test forms or administration cycles
Institutional Mechanisms	Predominance of vertical management; weak horizontal approach	Multi-level governance and feedback loops	Systemic Rigidity: The system lacks the capacity for autonomous self-improvement and adaptive development



Sources

Darvishhujayev (2026); Mullis et al. (2021); von Davier et al. (2024); OECD (2016). The analysis indicates that the primary causes of the identified imbalances are the lack of TIMSS integration mechanisms within the legal framework, weak feedback loops in functional components, and the obsolescence of assessment criteria (predominance of the "Knowing" domain). This situation diminishes the effectiveness of monitoring and managing education quality, as assessment results are neither sufficiently reliable nor useful for data-driven decision-making in educational management.

Recommendations

To address the psychometric and institutional imbalances identified within Uzbekistan's national assessment system in relation to TIMSS 2023 requirements, the following strategic recommendations have been developed. Their implementation is expected to significantly enhance the effectiveness of education quality assessment and management.

1. Enhancing the Legal and Regulatory Framework. The adoption of a specialized supplementary regulatory act is essential. This document should clearly define the mechanisms for the phased mandatory integration of TIMSS standards, specify timelines for aligning assessment criteria with international requirements, and designate responsible institutions. This will serve as the primary and foundational step in eliminating regulatory imbalances.

2. Developing Institutional Mechanisms. To reduce the predominance of vertical management and strengthen horizontal approach mechanisms in educational management, the following actions are recommended:

Establishing permanent platforms (focus groups, monitoring councils) at the school and district levels to discuss assessment results and formulate proposals;

Implementing specialized training programs for teachers and administrators aimed at fostering a results-based management culture to replace informal institutional practices;

Defining a clear functional division between the National Center for Quality Assessment and the Ministry of Preschool and School Education, while legally reinforcing feedback mechanisms.

3. Implementing Psychometric Tools. The phased introduction of modern psychometric models into the national assessment system is necessary:



Pilot-testing the Item Response Theory (IRT) model and commencing the calibration of test items during the 2027–2028 academic years;

Developing a mechanism for applying the "Plausible Values" method in accordance with the TIMSS 2023 User Guide for the International Database [4];

Establishing a dedicated psychometrics department within the Assessment Agency and launching a professional development program for specialists.

4. Aligning Assessment Criteria with TIMSS 2023 Requirements. To eliminate cognitive and content gaps:

Gradually increasing the share of the "Reasoning" domain in assessment tests to 25% (between 2026 and 2030);

Increasing the proportion of real-life context and interdisciplinary tasks to 40%;

Implementing a mandatory standard for applying TIMSS assessment framework requirements during the development of test items [3].

5. Integrating Monitoring and Assessment Results into Educational Management. Creating a mechanism for the mandatory integration of assessment results into the decision-making process at the school, district, and national levels;

Annually analyzing survey data on contextual factors (teacher qualifications, socio-economic status, school resources) and incorporating these findings into strategic planning;

Developing a system for the public disclosure of results to ensure community engagement and transparency.

The implementation of these strategic recommendations should be planned in stages (2026–2030), with clearly defined responsible institutions and performance indicators for each phase. Consequently, the national assessment system can evolve from a mere control tool into an effective mechanism for improving education quality and advancing educational management.

Conclusion

In terms of practical significance, the proposed strategic measures can be implemented in a phased manner, serving to align the national assessment system with international standards and enhance the overall quality of education.

In conclusion, aligning Uzbekistan's national assessment system with the requirements of TIMSS 2023 is one of the most pressing tasks in educational management. The imbalances identified and the strategic recommendations



developed in this study can serve as a crucial step toward elevating the national education system to an international level.

References

1. OECD. (2016). Education Governance In Action: Lessons from case studies. (T. Burns, F. Köster, & M. Fuster, Eds.). // OECD Publishing. <https://doi.org/10.1787/9789264262829-en>
2. Mullis, I. V. S., Martin, M. O., & von Davier, M. (Eds.). (2021). TIMSS 2023 Assessment Frameworks. // TIMSS & PIRLS International Study Center, Boston College. <https://timssandpirls.bc.edu/timss2023/frameworks/>
3. von Davier, M., Kennedy, A., Reynolds, K., Fishbein, B., Khorramdel, L., Aldrich, C., Bookbinder, A., Bezirhan, U., & Yin, L. (2024). TIMSS 2023 International Results In Mathematics And Science. // Boston College, TIMSS & PIRLS International Study Center. <https://doi.org/10.6017/lse.tpisc.timss.rs6460>
4. Fishbein, B., Taneva, M., & Kowolik, K. (2025). TIMSS 2023 User Guide for the International Database. // Boston College, TIMSS & PIRLS International Study Center. <https://timss2023.org/data>
5. Darvishhujayev, A. A. (2026). The national assessment system of Uzbekistan and the TIMSS international program: Conceptual approaches and key differences. // Universal Journal of Academic and Multidisciplinary Research, 4(3). <https://sr-journals.org/index.php/UJAMR/article/view/973>
6. Ismailov, A., Palvannazirov, S., Karimberdiev, K., & Kholmiraev, F. (2024). Uzbekistan. In K. A. Reynolds et al. (Eds.), TIMSS 2023 Encyclopedia. // TIMSS & PIRLS International Study Center, Boston College. <https://timss2023.org/encyclopedia>