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CONCEPTUAL AND METHODOLOGICAL FOUNDATIONS OF INTERNATIONAL ASSESSMENT STUDIES (PISA, PIRLS, TALIS) AND THEIR ROLE IN PRE-SERVICE TEACHER EDUCATION

Gayniddinov Shaykhislom Tolibjon ugli
Lecturer, Namangan State Pedagogical Institute, Uzbekistan
E-mail: gshayxislom@gmail.com, +998 95 001 45 95

Abstract. The article describes the emergence and development stages of international large-scale assessments and the common methodological principles that unite them, and provides a comparative analysis of the aims, conceptual frameworks, methodology and reporting of PISA, PIRLS and TALIS. The analysis reveals the complementary nature of the three studies and substantiates the requirements they impose on the content of pre-service teacher education: knowledge of assessment frameworks, working with international-style tasks, analysing results and professional reflection. Taking critical perspectives on international assessments into account, methodological conclusions on their use in teacher education are formulated.

Keywords: international large-scale assessments, PISA, PIRLS, TALIS, functional literacy, assessment framework, proficiency levels, pre-service teacher, teacher education.

Introduction

Comparative international evaluation of the quality of education became a priority of education policy in the first decades of the twenty-first century. The results of international large-scale assessments now serve as the evidence base for education reform in many countries: education standards, curricula, textbooks and the systems of initial and in-service teacher education are being revised precisely on the basis of the indicators these studies produce [1; 2]. The Republic of Uzbekistan has participated in PIRLS, PISA, TIMSS and TALIS since 2021; the Concept for the Development of the Public Education System of the Republic of Uzbekistan until 2030 sets the country's entry into the top 30 countries of the PISA ranking as a strategic goal [3].

International experience shows that in countries that have achieved sustained growth in student outcomes, the teacher is at the centre of reform [4]. Only a teacher who has a deep understanding of the philosophy of international assessment, the structure of its tasks, its proficiency levels and the methodology of interpreting its results can purposefully develop functional literacy in students. Systematically introducing pre-service teachers to international assessment studies already at the stage of their training in pedagogical higher education institutions is therefore an urgent task. A precondition for solving it is a clear definition of the conceptual and methodological foundations of these studies and of the requirements they place on teacher preparation.

The aim of the article is to carry out a comparative analysis of the conceptual and methodological foundations of the international studies PISA, PIRLS and TALIS and, on that basis, to substantiate the requirements imposed on the content of pre-service teacher education.

Literature Review and Methodology

The theoretical frameworks of international large-scale assessments are set out in detail in the official documents of the OECD and the IEA [5; 6; 7]. Their influence on education policy is examined in the works of A. Schleicher [4] and E. Hanushek and L. Woessmann [8], and their critical interpretation in the studies of S. Sjøberg, H.-D. Meyer and A. Benavot [9]. Teachers' assessment literacy is substantiated as an essential element of professional competence in the works of R. Stiggins, W. Popham and C. DeLuca [10; 11]. In the CIS countries, the analysis of international assessment results and the development of functional literacy have been advanced in the research led by G. S.

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Kovaleva [12]. In Uzbekistan, works on the methodology and results of international studies have appeared in recent years [13; 14], but they do not contain a comparative analysis of the three studies from the standpoint of teacher education.

The study employed the methods of theoretical analysis, comparison, generalisation and systematisation. The sources of analysis were the PISA 2022 and PISA 2025 assessment frameworks, the PIRLS 2021 assessment framework, the TALIS 2024 conceptual framework and the related scholarly literature. The criteria of comparison were the organising body, periodicity, target population, object of measurement, conceptual orientation, data-collection method, reporting of results and relevance for pre-service teachers.

Results and Discussion

Common methodological principles of international assessment studies. International large-scale assessments originated with the founding of the IEA in 1958–1967 and today form two major systems: IEA studies (TIMSS, PIRLS, ICCS, ICILS) are predominantly curriculum-based, whereas OECD studies (PISA, TALIS, PIAAC) are literacy-based, oriented towards competencies for life. The analysis made it possible to identify five methodological principles that unite them: a single theoretical framework; common measurement instruments that have passed rigorous translation and adaptation procedures; representative sampling; scaling based on modern test theory (IRT); and the collection of contextual data. It is these principles that distinguish international studies from national examinations: a national examination assesses the individual student, whereas an international study assesses the system. Understanding this distinction is essential for the teacher: preparing for an international assessment does not mean "drilling" students for a test but orienting the learning process towards the development of competence.

PISA. Since 2000, PISA has assessed the reading, mathematical and scientific literacy of 15-year-old students every three years. At the heart of its concept lies the notion of "literacy" – the ability to apply knowledge in real-life situations. Mathematical literacy is assessed across three processes (formulating, employing, interpreting), four content areas and four contexts; reading literacy through the processes of locating, understanding, evaluating and reflecting on information; and scientific literacy through the competencies of explaining phenomena scientifically, evaluating and designing scientific enquiry, and interpreting evidence [5; 6]. Results are reported on a 500-point scale and in six proficiency levels, Level 2 being the baseline. The test has been computer-based since 2015 and adaptive since 2018–2022. Tasks are organised in units built around a real-life situation (stimulus), and open-ended responses are scored according to detailed coding guides.

PIRLS. Since 2001, PIRLS has assessed every five years the reading literacy of students in the fourth year of primary education – the transition point from "learning to read" to "reading to learn". Its theoretical framework distinguishes two purposes for reading (literary experience; acquiring and using information) and four comprehension processes (retrieving explicitly stated information; making straightforward inferences; interpreting and integrating; evaluating and critiquing) [7]. Results are reported on a 500-point scale and described through four international benchmarks (low – 400, intermediate – 475, high – 550, advanced – 625). Student, parent, teacher and school questionnaires provide rich contextual data on the reading environment. Since 2021 the study has largely moved to a digital format.

TALIS. TALIS, conducted since 2008, is the largest international survey of the professional activity of teachers and school leaders. Unlike PISA and PIRLS, TALIS does not test students – data are collected through teacher and principal questionnaires. Its content blocks cover initial preparation and entry into the profession, continuous professional development, teaching practices, self-efficacy and beliefs, working conditions and well-being, school climate and leadership, and equity and inclusion. Results are expressed not in scores but in percentages and indices; the TALIS–PISA link

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makes it possible to analyse the relationship between teacher indicators and student outcomes. TALIS 2024 involved close to 280,000 respondents from 55 education systems [15].

Comparative analysis. A comparative description of the three studies is given in Table 1.

Table 1

Comparative characteristics of PISA, PIRLS and TALIS

Criterion	PISA	PIRLS	TALIS
Organiser / periodicity	OECD; every 3 years since 2000	IEA; every 5 years since 2001	OECD; every 5–6 years since 2008
Target population	15-year-old students	Grade 4 students	Teachers and principals (ISCED 2)
Object of measurement	Reading, mathematical and scientific literacy	Reading literacy	Teaching practices, professional development, working conditions
Conceptual orientation	Competencies for life	Curriculum-related	Professional activity and environment
Data collection	Adaptive computer-based test + questionnaires	Test + questionnaires (4 types)	Questionnaires only
Reporting of results	500-point scale, 6 proficiency levels	500-point scale, 4 benchmarks	Percentages, indices
Relevance for pre-service teachers	Context-based tasks, diagnosing proficiency levels	Methodology of reading literacy	Professional reflection

As the table shows, the three studies do not duplicate but complement one another. Although PISA and PIRLS differ in the age of the target population, the breadth of the object of measurement, their conceptual orientation and their systems of levels, they are united by common methodological principles. TALIS, in turn, studies not the outcome of education but its principal agent – the teacher. In this sense, PISA and PIRLS answer the pre-service teacher's question "what should be developed in the student, and how", while TALIS answers the question "how should the teacher organise and evaluate his or her own work".

Critical perspectives. Serious objections to international assessments have also been raised in the scholarly literature [9]: they capture only the measurable aspects of education; the tasks are not entirely culturally neutral; publication in the form of rankings creates the risk of "teaching to the test"; and small differences are exaggerated in the media. These perspectives lead to an important conclusion for the teacher: international assessments are an important but limited indicator of the quality of education, and a critical-reflective attitude towards them should be an integral part of the pre-service teacher's competence.

Requirements for the content of teacher education. The analysis made it possible to identify the following requirements that international assessment studies impose on the preparation of pre-service teachers:

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– international studies measure competence rather than the volume of knowledge, so preparation must be built on a competency-based approach;

– the theoretical framework of each study serves the teacher as a "map" for designing learning outcomes, and mastering it allows learning objectives to be formulated precisely;

– the structure of international tasks (stimulus – block of questions – cognitive levels – coding guide) provides the teacher with a model for constructing his or her own tasks;

– interpreting results (levels, benchmarks, indices, contextual factors) requires the skill of data-informed pedagogical decision-making;

– the TALIS framework offers an internationally recognised system of criteria for the teacher's professional reflection;

– knowing the limitations of international studies and interpreting their results critically is an essential element of professional culture.

Conclusion

The conceptual and methodological analysis of PISA, PIRLS and TALIS has shown that they rest on common methodological principles and are complementary in character. Taken together, the three studies cover three key aspects of the future teacher's professional activity – developing literacy in students, analysing results, and reflectively evaluating one's own practice.

The content of preparing pre-service teachers for international assessments should comprise four interrelated components: knowledge of theoretical frameworks and methodology; the skills of working with and constructing international-style tasks; the ability to analyse results and make pedagogical decisions; and a culture of critical-reflective evaluation. This conclusion provides a basis for substantiating the concept of pre-service teachers' international assessment competence and for designing a pedagogical system for its development.

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