Core Quality Components in Contemporary Teacher Education Systems

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Abstract
The rapid digitalisation of education, the expansion of artificial intelligence, and the global shift towards competence-based pedagogies have fundamentally transformed the priorities of modern teacher education systems. This study aims to develop a multi-level analytical framework for evaluating the quality of teacher education by integrating global policy models, national education reforms in Azerbaijan, and institutional practices at Azerbaijan State Pedagogical University (ASPU). A qualitative-analytical research design was employed based on document analysis of international frameworks (OECD, UNESCO, World Bank, ESG, CAEP), national strategic policy documents, and institutional quality assurance instruments at ASPU.
The findings indicate that teacher education quality is shaped through the interaction of five core dimensions: digital competence, research-oriented pedagogy, personalised learning design, outcome-based curricula, and sustainable internal quality assurance mechanisms. At the national level, Azerbaijan's education reforms demonstrate a strong transition towards competence-based governance, professional accountability, and digital transformation. At the institutional level, ASPU operationalises these reforms through PDCA-based quality assurance, STEAM-integrated teacher training, digital learning platforms (LMS, Moodle, virtual laboratories), and multi-criteria academic staff evaluation systems.
The study concludes that digitalisation and AI alone do not guarantee improved teaching quality; their effectiveness depends on institutional culture, leadership capacity, professional development ecosystems, and transparent quality indicators. The ASPU case confirms that future-oriented teacher education requires systemic coherence, strong governance, and a sustained culture of quality.
Keywords: *teacher education, quality assurance, AI, quality components, higher education reform*.

1. Introduction

In the modern era, the rapid digitalisation of education systems, the expansion of artificial intelligence, and the global transformation of learning environments make teacher education a strategic priority. These changes are moving the teaching profession away from its traditional role as a “transmitter of knowledge” toward a new professional identity as a pedagogical designer, data analyst, and organiser of the learning ecosystem, with broader functional responsibilities (OECD, 2019; UNESCO, 2021). The growing attention in the academic literature to the quality of teacher education indicates that digital competence, personalised teaching approaches, research-oriented pedagogy, and outcome-based curricula have become key drivers of transformation in teacher education (López-Núñez et al., 2024; Basilotta-Gómez-Pablos et al., 2022).

Research shows that this transformation is not happening evenly across national education systems. While some countries are making progress in terms of digital infrastructure and quality assurance, others face institutional constraints in implementing the normative framework (World Bank, 2022). This picture suggests that teacher education is shaped not only by pedagogical changes, but also by technological, institutional, and managerial factors.

The article aims to analytically reveal the gaps between global and national policy documents and the actual practices of educational institutions, and, in particular, to present a multi-level model of the quality of contemporary teacher training based on the example of the Azerbaijan State Pedagogical University (ASPU). This model aims to make a new methodological contribution to both academic discourse and educational policy.

2. Aim

The main goal of this study is to systematically analyse the quality components of contemporary teacher training in the context of global trends, national education reforms, and institutional practice. The Hypothesis is that the interaction of global standards, national policies, and institutional reforms creates a multi-level model of teacher education quality.

3. Significance

The scientific and practical significance of this study lies in its reframing of the current discourse on the quality of teacher education with a multi-level analytical approach. Previous studies have typically examined either global trends, national strategies, or institutional practices in isolation. This article integrates these three levels and shows that the quality of teacher education depends not only on pedagogical skills but also on governance mechanisms, digital infrastructure, quality assurance, and institutional culture.

From a scientific perspective, the research strengthens the systems approach to teacher education. It provides a broad theoretical framework for concepts such as digital literacy, AI-based pedagogy, and outcome-oriented curriculum. From a practical perspective, this work advances current transformative directions in Azerbaijani education policy through academic analysis and presents a transferable institutional model based on the ASPU example.

The main innovation of this study is that it explains teacher preparation through an ecosystem approach and shows that quality is shaped not only by normative documents but also by institutional strength, managerial efficiency, and the real application of digital skills. This is a valuable new contribution to both the literature and the policy discourse, as well as to practical teacher preparation.

4. Theoretical framework

In the new twenty-first-century knowledge economy, teacher education has emerged as essential to national development. The Fourth Industrial Revolution, characterised by artificial intelligence, big data, automation, and digital platforms, is not only changing how knowledge is created but also transforming how it is learned and taught. In this new model, the traditional role of the teacher as merely a content transmitter is no longer sufficient. Teachers are more than just facilitators of traditional learning pathways; they are now being recognised as designers of dynamic learning environments, facilitators of personalised learning pathways, and advocates of higher-order thinking, creativity, and lifelong learning (Jafarov, 2016). International organisations consistently emphasise the importance of teacher quality as a school-linked determinant of student achievement, equity, and long-term social progress. OECD (2019) identifies improved early-career teacher preparation and training, and support for early-career teachers, as among the strongest policy tools to improve national education institutions. Similarly, UNESCO's (2021) humanistic education framework positions the teacher as the primary agent of sustainable social development. In contrast, the World Bank (2022) identifies teacher effectiveness as the strongest factor in eliminating "learning poverty" internationally. However, in the present world, teacher quality cannot be reduced to mere content knowledge or traditional pedagogical skills. The recent rapid digital transformation has introduced new layers of professional competence. Digital competence is increasingly a significant aspect of contemporary teachers' professionalism and is evidence-based in its association with teaching effectiveness and student achievement (Basilotta-Gómez-Pablos et al., 2022; Revuelta-Domínguez et al., 2022; López-Núñez et al., 2024). It has been shown that the pedagogically meaningful use of digital tools, learning platforms, and data-informed instruction enhances teaching practices and learning results. Simultaneously, recent scholarship emphasises that the sustainable growth of these skills depends on cohesive institutional strategies rather than fractured professional development efforts. For instance, Trujillo-Juárez et al. (2025) demonstrate that aligning university teachers' digital competence with the DigCompEdu standards significantly contributes to the development of micro-courses and modular professional learning programs. Consistent with this perspective, Betancur-Chicué (2023) provides evidence that microlearning frameworks offer substantial pedagogical benefits for integrating digital tools into university teaching. This implies that digital transformation in teacher education requires long-term, system-wide planning rather than isolated technological initiatives.

In addition to these skills, the current perspective on teacher education quality is viewed as a composite comprising competence-based curriculum development, research-based pedagogy, continuous professional development, and institutional quality assurance systems (López-Núñez et al., 2024; Basilotta-Gómez-Pablos et al., 2022). This shift is likely to lead to a transition from input-based teacher education to outcomes-based, performance-oriented frameworks, with a focus on classroom impact, graduate employability, and a culture of quality.

Many national education systems continue to face inherent challenges in aligning traditional teacher-training practices with contemporary global norms, despite widespread agreement. This issue is particularly severe in rapidly changing and technologically advancing societies. Teacher education reform in Azerbaijan is a cornerstone of enhancing human capital; however, aligning international quality standards with national governance structures, institutional capacities, and labour market expectations remains a challenging and continuously evolving process. In Azerbaijan, academic literature is increasingly framing this concept in terms of quality. Sharifov (2022) provides evidence that staff rating and performance evaluation systems strongly influence the professional behaviour, academic productivity, and pedagogical performance of university professors. In line with this view, Sharifov and

Mammadzade (2022) emphasise that integrative institutional evaluation systems are increasingly important for improving governance efficiency and accountability, and promoting a quality culture in higher education. These studies suggest that the quality of teacher training cannot be separated from overall institutional governance and internal quality improvement frameworks.

At the policy level, digital transformation and teacher qualifications are evident in Azerbaijan's national education strategy, legislation, and laws. The strategic orientation of teacher education is clearly stated in the "State Strategy for the Development of Education in the Republic of Azerbaijan" (President of the Republic of Azerbaijan, 2013), which highlights the enhancement of teacher selection, quality of teacher preparation, continuous professional development, university-school collaboration, and the infusion of new technologies into teaching practice as national priorities. These strategic directions were also consolidated in the "Azerbaijan 2030: National Priorities for Socio-Economic Development" (President of the Republic of Azerbaijan, 2021), which identifies highly qualified human capital, modernisation of the education system, and the establishment of flexible, innovation-driven education systems as important national priorities. Simultaneously, the national teacher certification framework (Cabinet of Ministers of the Republic of Azerbaijan, 2020) has established an organised mechanism for sustaining professional accountability by linking pedagogical competence, measuring and evaluating teachers' performance, and promoting teachers' professional advancement to well-defined, harmonised quality standards. Concurrently, recent curriculum reform, aligned with the competency-based education model, is increasingly focusing on learning outcomes, digital literacy, and interdisciplinary integration. In this policy framework, the conception of teacher education is slowly shifting from fragmented training interventions to a holistic approach to quality development that integrates digital competence, professional ethics, innovative pedagogy, institutional responsibility, and sustainable organisational growth. Despite these developments, the teacher education system in Azerbaijan still faces an intricate structural challenge: harmonising international quality frameworks (OECD, UNESCO, ESG, CAEP) with modern digital-age competencies, long-standing educational traditions, governance mechanisms, and evolving labour-market needs. Without holistic alignment between policy narratives and institutional implementation, there is a risk of systemic fragmentation unless this is addressed through a coordinated, sustained agenda for change. To address this challenge, this study seeks to:

- focus on global trends regarding contemporary teacher education, including digital competence, competence-based pedagogy, research-oriented instruction, and international quality assurance frameworks.
- analyse the reform initiatives in national teacher education in Azerbaijan, focusing on the evaluation mechanisms of institutions, certification processes for teachers, digital transformation procedures, and the growth of quality governance models.
- draw the institutional quality model of Azerbaijan State Pedagogical University (ASPU) as an illustration of system-level alignment of global, national, and institutional standards with national and local strategy and institutional actions, illustrating how internal quality assurance, digital infrastructure, STEAM integration, and school–university partnerships collectively influence the sustainability of teacher education quality.

The article adopts a comprehensive theoretical perspective and integrates international and national institutional investigations to analyse contemporary teacher education practice through a multi-tier framework, which is a coherent, interrelated, multi-faceted, holistic, and systemic quality system and model rather than multiple, isolated practice elements.

Global challenges and emerging trends in contemporary teacher education. Global education systems have undergone profound structural and pedagogical changes over the last decade and a half, driven by technological, social, and economic transformations. Recent studies by the OECD, UNESCO, and the World Bank have demonstrated that new challenges exist for teacher training in the global education context. The OECD's "Future of Education and Skills 2030" conceptual learning framework on student agency (OECD, 2019) suggests that teachers should have not only subject knowledge but also a complex of cognitive, social-emotional, and technological skills. UNESCO's 2021 report "Reimagining our futures together: A new social contract for education" (International Commission on the Futures of Education, 2021) assesses teachers as key actors in social development and highlights the transition to a humanistic educational model. The World Bank's "State of Global Learning Poverty: 2022 Update Conference Edition" policy research working papers (World Bank, 2022) indicate that teacher quality is the most important determinant of student achievement. The common conclusion of these reports is as follows:

The contemporary profile of the teacher extends far beyond the traditional function of instruction. The modern teacher must design effective learning environments, understand educational data, meet the needs of individual learners, and integrate digital technologies intentionally into pedagogical practice. This is an educational

revolution: it is not about the transmission of subject knowledge as it used to be, but about creating and planning a learning context during instruction. The modern teacher:

- analyses the arguments presented by students,
- guides them to work with various information sources,
- forms a culture of questioning,
- investigates multi-stage, complex problems together with the student.

According to UNESCO's ICT Competency Framework for Teachers (2018), digital literacy is no longer perceived merely as a set of technical skills; instead, it is conceptualised as an integral pedagogical competence embedded in modern teaching and learning practices.

A contemporary teacher also needs to be able to embed digital resources into lesson planning, support the development of visualisation, simulation, and interactive learning environments, enhance students' digital competence, and lead e-learning workflows. Modern educational contexts are shifting towards a hybrid instructional model, in which learning occurs in both conventional classroom settings and digital environments. Teachers play a dual role, providing quality instruction both in person and online. Under UNESCO's 2030 vision for education, rigid, uniform teaching models must be replaced with flexible models that are responsive to learners' varied abilities and needs (Jafarov, 2019). Under these circumstances, personalised teaching involves teacher-led, systematic diagnosis of students' prior knowledge, interests, and developmental paths, and the purposeful planning and delivery of learning tasks, resources, and projects aligned with a particular level of knowledge. Such a method not only supports students' autonomy in decision-making but also supports different learning styles.

At the same time, recent advances in generative artificial intelligence have begun to reshape educational practices at multiple levels. As highlighted by the World Bank's analytical report on artificial intelligence in education (Molina et al., 2024), AI-based systems are increasingly shaping instructional design, assessment practices, and teacher professional development. Review identifies four primary areas of impact of AI for teachers:

1. AI as a "mentor" for teachers,
2. AI-based feedback for professional development,
3. Support for lesson plans/content creation,
4. Automation of administrative routines.

Therefore, today's reality is that artificial intelligence can help the 21st-century teacher:

- to design tests and assignments,
- create differentiated resources,
- prepare a lesson plan and a process implementation mechanism,
- creating visual aids and simulations for the lesson,
- analyse the quality of lessons with analytical reports provided by artificial intelligence,
- to improve their methodology,
- It saves the teacher's valuable time by supporting them in tasks such as following international methodological trends, etc. This reduces the teacher's resource fatigue and allows them to focus on more creative processes.

Another interesting aspect of the teaching and learning process is artificial intelligence for learners:

- facilitates individual learning,
- plays a guiding role in strengthening weak skills,
- gives suggestions, new ideas,
- summarises the lesson material, etc.

AI does not replace the teacher; rather, it strengthens, enhances, and deepens the teacher's effectiveness and analytical capacity.

These global trends indicate that teaching is no longer merely a profession; it is among the most strategic in the modern world. The central driving force behind this transformation is the standard of teacher preparation itself. One of the most critical challenges currently confronting global education systems is the growing shortage of well-qualified teachers. This challenge is no longer confined to developing regions alone but has become increasingly pressing for countries with advanced economic structures, including members of the OECD and the European Union.

It is sometimes argued that the teaching profession is no longer as attractive to young people as it once was in the global labour market. This is due to factors such as the digital sector's attraction of young people with higher salaries and flexible working hours, the high emotional burden and stress of teaching, the increasing public expectations of the education system, and the further complexity of the teaching process following the pandemic. This reality is now a key strategic issue determining the future of education.

For this reason, contemporary teacher education increasingly prioritises STEM-based instructional methodologies, the use of digital laboratory environments, and the pedagogical integration of simulation technologies, coding, and robotics. In parallel, modern teachers are expected to cultivate students' problem-solving abilities, project-based learning competencies, and research skills, which collectively foster essential 21st-century competencies. This also indicates that teachers with STEM competencies are becoming the most strategic cadre in teacher training worldwide.

The global teacher shortage trend and the radical transformation of the teacher image show that:

- The teaching profession needs to be redesigned,
- teacher training should be based on new skills,
- university-school cooperation should be further strengthened,
- The modern teacher profile should be digital, integrative, and research-oriented.

In this context, curriculum innovation, quality assurance, research orientation, and digital transformation, in light of ASPU's reforms to teacher training, align with the country's strategic needs.

In modern times, quality assurance in teacher training is no longer just an internal control procedure, but also a key indicator of international competitiveness. When we consider reforms implemented worldwide, three major trends stand out.

Today, the assessment of the quality of pedagogical education programs has gone beyond the classic "document review" approach.

The standards put forward by international organisations, especially the EU ESG (European Standards and Guidelines), the CAEP (Council for the Accreditation of Educator Preparation), which evaluates teacher training in the United States, and the YÖKAK (Higher Education Quality Council), which is the leading institution for quality assurance in higher education in Turkey, show that:

- Universities should not just have a curriculum, but also think about and implement how the curriculum works;
- Realistic measurement of learning outcomes is required in teacher training.
- Assessment of students' practical training based on specific indicators has become a key requirement.
- educational institutions must demonstrate a functioning mechanism for continuous improvement of their systems;
- Graduate employment rates, feedback from school principals and mentors are now accepted as objective evidence in accreditation.

The ESG (European Standards and Guidelines) standards emphasise that quality in higher education is not only about the outcome, but also about ensuring transparency in the process.

The new standards of the Higher Education Commission of Azerbaijan are grounded in strategic management, internal quality culture, and internationalisation. These trends indicate that teacher training has become part of a global accreditation system rather than a national one.

Thus, quality assurance in teacher training in the world is formed in three main centres:

1. International harmonisation of accreditation standards;
2. Practical training based on university-school integration;
3. Flexible and competency-based curriculum design.

Universities that implement these three trends not only produce high-quality teachers but also establish themselves as competitive institutional actors in the global education space.

National reforms in teacher education in Azerbaijan: policy, certification, and curriculum innovation. Azerbaijan is among the countries that have implemented large-scale reforms in its education system over the past decade. Against the backdrop of globalisation, digital transformation, and changing labour-market demands, teacher training has become a strategic priority of state policy.

The work undertaken is presented across four main areas: strategic documents and the regulatory framework; educational reforms implemented in 2021-2026; the teacher recruitment and certification system; and curriculum reforms.
The approach to teacher training in the Republic of Azerbaijan has been shaped in recent years not only in the field of education, but also as an integral part of the country's long-term socio-economic development strategy. Several fundamental documents have established a conceptual framework for improving the quality of teacher training.

The "State Strategy for the Development of Education in the Republic of Azerbaijan", approved by the Decree of the President of the Republic of Azerbaijan dated October 24, 2013, proposes a new model in teacher training and identifies five critical priorities:

1. Improving the quality of teacher selection and training;
2. Creation of a system of continuous development of pedagogical staff;
3. Strengthening university-school cooperation;
4. Improving assessment and certification mechanisms;
5. Application of technology and innovation in education.

This document emphasises that the quality of pedagogical education is shaped not only in higher education institutions but also at the ecosystem level, through interactions among schools, the ministry, universities, and society.

The document "Azerbaijan 2030: National Priorities for Socio-Economic Development", approved by the Decree of the President of the Republic of Azerbaijan dated February 2, 2021, characterises teacher training as one of the main pillars of the development of the country's human capital (President of the Republic of Azerbaijan, 2021). Two important directions stand out here:

1. Enriching the educational process with modern technologies,
2. Formation of a competitive, flexible and creative teacher training system.

The content of teacher training in the Education Law was reframed around the principle of "competency-based pedagogical training". These changes include:

- phasing of teachers' professional development,
- strengthening practical components,
- shifting the educational process towards results-oriented instruction.

A new stage of teacher training began in Azerbaijan in 2021. These reforms are grounded in the principles of international benchmarking, digital transformation, and the strengthening of human capital.

As a result of changes made in the last 3 years, the admission score for pedagogical specialities has increased, and the share of experience-based learning has increased.

The digital infrastructure in teacher training in Azerbaijan has been significantly strengthened, especially with the widespread implementation of the "Digital Skills" project, the creation of virtual laboratories, the integration of hybrid and online lesson design into pedagogical training, and the use of electronic assessment platforms, which have given a serious impetus to improving quality in this area.

Certification is one of the primary mechanisms for quality assurance in Azerbaijani education. It is implemented in accordance with the Rules approved by the Cabinet of Ministers Resolution No. 155 dated April 30, 2020 (Cabinet of Ministers of the Republic of Azerbaijan, 2020). The purpose of certification is to objectively assess teachers' pedagogical and methodological skills, stimulate their continuous professional development, and foster quality-based human resource management in schools. This model aligns with international practice and ultimately increases transparency, strengthens the culture of professional development, and establishes uniform standards for teacher activities.

Azerbaijan's general education system has transitioned to a curriculum-based approach since 2006, and in recent years, further steps have been taken to adapt it to contemporary requirements.

Dear colleagues, these reforms place greater responsibility on higher education institutions, including a specific mission for the Azerbaijan State University of Education, which is the leading university in training pedagogical personnel in our country.

Institutional implementation of teacher education quality at ASPU: digital transformation, quality assurance, and research-oriented training. ASPU is a higher education institution with a history of 104 years. This university, which began operations in 1921 with several faculties and a small number of teachers, quickly became a leading centre for pedagogical education in the country. Against the backdrop of the ideological and political changes of the 20th century, ASPU remained a fulcrum for the training of pedagogical personnel and continues that mission with honour today.

Today, the vast majority of teachers working across the country are graduates of the Azerbaijan State University of Education. The 100,000 teachers who graduated from the university over the past century constitute the main human capital of the Azerbaijani education system. Teachers who hold children's first textbooks in their hands, leading school principals of the country, academicians and scientists were formed in the scientific and pedagogical environment of the Azerbaijan State University of Education.

The importance of ASPU to national education lies in its role in training teachers and educating individuals who shape society's future. In this sense, each ASPU graduate is a key contributor to the country's intellectual security and sustainable development.

ASPU maintains its status as the country's leading teacher-training university not only through its historical traditions but also through a modern management model, innovative approaches, and adaptation to new-generation pedagogical technologies. In addition, ASPU is no longer merely a "teacher training university" but a leading force in innovation, research, and a culture of quality in modern education.

In the 21st century, a teacher's digital skills are integral to their professionalism. ASPU has taken the most advanced steps in this direction:

- The e-learning platform has been expanded, and the LMS system and MOODLE platform are actively used for all teachers and students.
- Virtual laboratories for physics, chemistry, biology, and STEAM have been put into operation.

One of the most critical reforms at ASPU is the restructuring of the quality assurance system. The university now has an internal quality system based on the PDCA cycle (Plan – defining strategic goals; Do – implementing activities; Check – monitoring and evaluating; Act – implementing corrective actions). In this context:

- A 3-year tracer study is being conducted on graduates.
- Multi-criteria evaluation of teacher performance is applied in all faculties.
- Student satisfaction surveys regarding the teaching process are conducted, and the results are presented to the faculty.
- The annual activity plans of the structures are measured with objective indicators.

As a result, the quality culture at ASPU has now become a systematic mechanism.

In recent years, internationalisation has become a priority for ASPU:

- Erasmus+, Mevlana, and DAAD (German Academic Exchange Service) projects have expanded.
- Cooperation with institutions such as YÖKAK and TKTA (Agency for Quality Assurance in Education) has been further strengthened.
- The number of foreign professors and joint seminars has increased.
- Students' access to internships abroad has been increased.

5. Literature Review

Teachers' digital competence, modern teacher training models, and the transformation of global education policies have become major topics in academic discourse in recent years. The literature indicates that digital competence is a multidimensional concept that encompasses not only technological knowledge but also pedagogical innovation, research skills, and curriculum design (Basilotta-Gómez-Pablos et al., 2022; López-Núñez et al., 2024). Several systematic reviews show that there is no single model for assessing teachers' digital competence and that approaches vary significantly between countries and higher education institutions (Domínguez-González et al., 2025; Karimi & Khawaja, 2025).

Analyses by international organisations such as UNESCO and OECD present digital transformation as one of the main pillars of teacher preparation and formulate frameworks that integrate the social, cognitive, ethical and technical components of teacher competencies (International Commission on the Futures of Education, 2021; UNESCO, 2018; OECD, 2019). Recent World Bank reports highlight the impact of digital inequality and teacher competency gaps on learning outcomes and underscore the importance of structural reforms for developing countries (World Bank, 2022).

Other studies have examined the impact of digital competence on pedagogical outcomes and have shown that when teachers have high digital skills, students' academic self-confidence, engagement in learning, and self-regulation significantly increase (Luo et al., 2025). Microlearning and microcourses are emerging, flexible approaches to developing teachers' digital readiness and are widely used, particularly in higher education (Betancur-Chicué, 2023; Trujillo-Juárez et al., 2025).

Research conducted in the Azerbaijani context shows that national curriculum reforms, "Azerbaijan 2030" priorities, and teacher certification regulations support the transition to competency-based models. However, at the institutional level, problems include uneven implementation of quality assurance mechanisms, resource shortages, and the formal nature of pedagogical innovations (Sharifov, 2022). This creates gaps between global standards and national realities.

Overall, the literature shows three main results:

1. There is no single standard for defining and measuring digital literacy. Different countries use different assessment approaches.
2. Although digital transformation has a positive impact on pedagogical outcomes, for this, institutional support and sustainable development opportunities are crucial.
3. There is a lag between global policy documents and national-level implementation**,** especially in developing countries.

While the existing literature extensively describes global digital competency models, there is little research that systematically examines their integration with national reforms and university-level quality assurance mechanisms. There is a lack of empirical or conceptual research on how the implementation of global standards interacts with real-world institutional dynamics, particularly in pedagogically oriented higher education institutions such as ASPU. This article fills this gap by presenting an integrative model that links the global, national, and institutional levels.

6. Methodology

This study uses a complex, multi-level methodological framework to explain the formation of the contemporary teacher training system at the global, national, and institutional levels. The methodology combines the systematisation of theoretical concepts with the empirical, material analysis of policy and structural reforms implemented in the Azerbaijani education system over the past decade. The structure of the study covers the following analytical directions:

The study is of a theoretical-constructive nature, grounded in a qualitative, conceptual-analytical framework. The model is built on a three-level analysis structure:

1. Global level– Normative models and recommendations on teacher training from organisations such as OECD, UNESCO, and the World Bank are examined; international trends, digital transformation, and contemporary theoretical approaches to the competency-based teacher profile are summarised.
2. National level– The normative framework for teacher training in the Republic of Azerbaijan, including legislation, state strategies, certification and curriculum policies, institutional reforms, and digital transformation, is systematically analysed.
3. Institutional level– The governance model, digital transformation, STEAM integration, internal quality assurance, and structural components of teacher training implemented by the Azerbaijan State Pedagogical University (ASPU) in recent years are examined; the university example is used as an analytical framework that illustrates a practical implementation model of national policy.

The research data sources consist of four categories:

1. International documents and analytical reports: Documents such as OECD (2019), UNESCO (International Commission on the Futures of Education, 2021; UNESCO ICT-CFT), World Bank's "The State of Global Learning Poverty" (2022) and "AI in Education" (Molina et al., 2024) have been the primary sources of information for identifying global trends in modern teacher training.
2. Academic literature: International studies published in the last 5 years on teachers' digital competencies, microlearning, digital transformation and quality assurance in higher education were analysed (Basilotta-Gómez-Pablos et al., 2022; Betancur-Chicué, 2023; López-Núñez et al., 2024; Trujillo-Juárez et al., 2025, etc.).
3. National normative documents: Education Strategy (President of the Republic of Azerbaijan, 2013), the National priorities (President of the Republic of Azerbaijan, 2021), the Certification Rules (Cabinet of Ministers of the Republic of Azerbaijan, 2020), and the Curriculum Frameworks (Cabinet of Ministers of

the Republic of Azerbaijan, 2010) and other state documents were used to determine the national conceptual foundations of teacher training.

4. Institutional data on ASPU: Data on the university's structural reforms, implementation of digital platforms, internal assessment system, STEAM projects, international cooperation, and teacher performance monitoring served as the basis for the analysis of the institutional model.

The following methods were used in the study:

1. Document Analysis**:** More than 60 strategic documents, reports, legal acts, and academic sources on teacher education at the global, national, and institutional levels were systematically analysed.
2. Thematic Content Analysis: Thematic coding was conducted on conceptual categories extracted from the obtained texts - digital literacy, quality assurance, pedagogical competence, certification, university-school cooperation, outcome-oriented curriculum, etc.
3. Comparative analysis: The ASPU model was compared with international quality standards (ESG, CAEP, UNESCO ICT-CFT), and areas of compliance, gaps, and development directions were analytically identified.
4. Institutional assessment framework: ASPU's PDCA-based internal quality assurance system, teacher performance evaluation, implementation of digital platforms, and establishment of the STEAM model were examined through institutional analysis.

Since this study does not aim to collect extensive empirical data, its main limitation is its theoretical and documentary orientation. However, the study aims to systematise and present an analytical model of the relationship among global policy trends, national strategies, and institutional reforms, rather than to conduct empirical measurement. Therefore, the methodological limitation does not hinder the study's purpose but rather strengthens the conceptual explanation of the problem.

This methodological framework enables us to bridge the gap between global normative trends and national policy and institutional practices, while accounting for the multilevel and multifactorial nature of the teacher training system. Based on the synthesis of the presented approaches, the author builds an integrative quality model for contemporary teacher training and presents the ASPU example as a practical application of this model.

7. Findings & Discussion

The study's results indicate that the modern teacher training system is rapidly transforming globally, and these changes are also reflected in the institutional development of the Azerbaijani education system and ASPU. The study reveals close interactions between international documents and academic sources (Basilotta-Gómez-Pablos et al., 2022; López-Núñez et al., 2024; Trujillo-Juárez et al., 2025), as well as reforms at the national and institutional levels.

Reports from international organisations indicate that the teaching profession is shifting away from the traditional framework toward a digital, design-oriented, and research-based model. The approaches of UNESCO, OECD and the World Bank highlight three strategic lines in teacher training:

- Digital pedagogy– the ability to use technology in a purposeful, pedagogical way.
- Personalised learning– adaptation to the student's individual development trajectory.
- AI-assisted teaching– artificial intelligence ecosystems that reduce teacher workload and expand their creative possibilities.

These global changes are summarised in Table 1.

Table 1. Global contemporary teacher training trends

Global direction	Description	Mechanism of action
Digital literacy	The teacher's ability to apply technology for pedagogical purposes	Lesson planning, teaching on digital platforms, and online assessment
AI-based teaching support	Artificial intelligence helps teachers with planning, assessment, and differentiation.	Reduced workload, more opportunity for creative activity
Personalised training design	Teaching adapted to the student's knowledge level and learning style	Increased student agency and motivation to learn
Research-oriented pedagogy	The teacher's application of inquiry-based and problem-solving-oriented learning	Developing critical thinking and 21st-century skills
Hybrid teaching models	Integration of traditional and online forms of education	Lesson-design flexibility and resource expansion

Global trends indicate that teacher education is no longer merely a knowledge-transfer process but a multi-layered professional ecosystem that integrates digital competence, AI support, personalised learning, and research-driven pedagogy. Each of these directions expands the teacher's role, making them a key agent of transformation who extends beyond the classroom, fosters innovation, and strategically directs the learning environment.

The analysis shows that national documents – Education Strategy (President of the Republic of Azerbaijan, 2013), the National priorities (President of the Republic of Azerbaijan, 2021), and the Certification Rules (Cabinet of Ministers of the Republic of Azerbaijan, 2020) and curriculum reforms (Cabinet of Ministers of the Republic of Azerbaijan, 2010)– reframe teacher training with a systems approach. The main lines of the national model are as follows:

- Competency-based training– result-oriented pedagogical preparation.
- Certification and objective assessment– strengthening the professional responsibility of teachers.
- Expansion of digital infrastructure– "Digital skills", virtual laboratories.
- University-school integration– real practice-based training.

These trends are shown more clearly in Table 2.

Table 2. National policy framework for teacher training in Azerbaijan

Policy component	Main content	Expected impact
Education Strategy (President of the Republic of Azerbaijan, 2013)	Quality in teacher training, selection mechanisms, and modernisation of training	Strengthening teacher selection and efficiency in the preparation process
National priorities (President of the Republic of Azerbaijan, 2021)	Human capital, innovation, digital transformation	Adapting teacher training to the labour market
Certification (Cabinet of Ministers of the Republic of Azerbaijan, 2020)	Objective assessment of professional activity	Increasing teachers' responsibility and motivation
Curriculum reform (Cabinet of Ministers of the Republic of Azerbaijan, 2010)	Results-oriented, digital and research-based training	Development of modern pedagogical skills
Digital Development Concept (President of the Republic of Azerbaijan, 2025)	Virtual labs, LMS, and online assessment	Systematic application of digital pedagogy

These findings indicate that national policy is aligned with global trends and that a quality-centred teacher training model is emerging.

An analysis of the institutional reforms carried out at ASPU shows that a systematic quality model has been formed along three strategic lines:

1. Development of pedagogical and digital competencies: STEAM centres develop both methodological and innovative skills of students.
2. Internal quality assurance system: Reality-oriented mechanisms based on the PDCA model – teacher performance evaluation, student satisfaction, and monitoring.
3. Innovation and internationalisation
   Programs such as Erasmus+, Mevlana, and DAAD strengthen the university's integration into the global educational space.

The main components of ASPU's institutional model are summarised in Table 3.

Table 3. ASPU's institutional quality model

Quality component	Application at ASPU	Compatibility with strategy
Pedagogical competence	TRE trainings, methodological seminars	Education Strategy – Modernisation of Teacher Training
Digital literacy	LMS, MOODLE, virtual laboratories	Azerbaijan 2030 – digital transformation
STEAM and project-based learning	Interdisciplinary learning through the STEAM centre	Global Trends – 21st Century Skills
Academic performance assessment	Rating system, Scopus support program	ESG – transparency and results orientation
Quality assurance system	PDCA cycle, internal monitoring	Compliance with accreditation criteria

International cooperation	Erasmus+, foreign internship programs	Global harmonisation and institutional development

The analysis shows that the modern teacher training system is no longer a single-level or curriculum-oriented process. On the contrary, this system has been established as a multi-level ecosystem that develops in parallel, complements, and interacts at the global, national, and institutional levels. The harmonious functioning of this ecosystem becomes one of the most important factors determining the quality of teacher training.

Analysis of global models indicates that digital literacy, personalised teaching methodologies, and the integration of artificial intelligence into pedagogical practice are defining new standards for the teaching profession across the world's leading education systems. The modern teacher is no longer merely a transmitter of knowledge; they serve as a lesson designer, data analyst, organiser of learning environments, and pedagogical adapter of technological innovations. The conceptual frameworks of organisations such as UNESCO and OECD establish this new role of the teacher as a normative standard on a global scale.

At the national level, Azerbaijan's education policy provides a strategic basis for implementing these global standards. The Education Strategy (President of the Republic of Azerbaijan, 2013), the National priorities (President of the Republic of Azerbaijan, 2021), and the Certification Rules (Cabinet of Ministers of the Republic of Azerbaijan, 2020) constitute a unified quality vision for teacher training and place digitalisation, a competency-based curriculum, and objective assessment mechanisms at the centre of state policy. Thus, global trends are systematically reflected in national legislation and integrated into the education ecosystem. This process demonstrates that Azerbaijan is not only adapting to teacher training but also developing a sustainable policy framework consistent with international standards.

At the institutional level, ASPU presents the most complete practical model of this policy. The PDCA-based quality assurance system, digital learning platforms, STEAM centre, methodological training, rating and performance assessment mechanisms, and international cooperation programs implemented by the university demonstrate that the goals set in national policy documents are being translated into practice. The reforms implemented at ASPU strengthen both the culture of innovation in teacher training and the efficiency of academic management, thereby turning the university into an institution that plays a strategic role in the country's educational ecosystem.

Determining the quality indicators for teacher training and integrating them into the teaching process have become strategic priorities in higher education.

The main components that determine the quality of modern teacher training cover several strategic directions. These include the development of professional-pedagogical competencies; the acquisition of innovative and digital teaching skills; the creation of an interdisciplinary, research-oriented learning environment; internal quality assurance and objective assessment of academic performance; and systematic monitoring of graduate employment indicators. Each component determines both the content and outcomes of the teacher training process and forms the strategic development line of higher education institutions in this area.

The 1st component is the formation of professional and pedagogical competencies. A modern teacher, in addition to having in-depth knowledge of his subject, must also master the methods and psychology of teaching. The Training and Education Centre at ASPU operates in this direction. The centre organises regular training to develop the pedagogical, methodological, and digital skills of university teachers. Teachers participating in these training sessions learn to apply new teaching technologies, assessment methods, and modern lesson models, such as the 7E and 5E models. As a result, teachers demonstrate more innovative, student-oriented approaches in the training process.

The 2nd component is digital and innovative teaching skills. The STEAM Centre, operating in this direction at ASPU, aims to develop interdisciplinary thinking among students and to encourage learning through practical projects that combine physics, mathematics, engineering, art, and technology. Thanks to this centre, future teachers are armed not only with theoretical knowledge but also with project-based teaching skills. This also serves the development of "creativity and problem-solving skills", which is one of the quality indicators.

The 3rd component is an objective assessment of teacher performance. For several years, ASPU has used a teacher rating system based on specific indicators across pedagogical, research, and social domains. Through this system, a healthy competitive environment is formed among teachers, and the dynamics of their professional development are continuously stimulated. The rating results affect the university's personnel policy and, at the same time, increase academic staff's motivation for self-development. In addition, to stimulate scientific activity, teachers

receive financial rewards for articles published in the Scopus and Web of Science databases. This initiative has increased scientific productivity and enhanced the university's international image.

The 4th component is international cooperation and exchange of experience. In this regard, ASPU has established cooperative relations with several foreign universities. Teachers and doctoral students participate in internship programs at universities in Turkey, Denmark, Poland, Germany, Lithuania and other countries. This international experience creates conditions for integrating new approaches into the country's education at both the methodological and academic levels.

The 5th component reflects graduates' employment levels and their success in professional activities. In this regard, the university has monitored graduates over the past three years and conducted specific analyses. Thus, in recent years, the percentage of ASPU graduates employed in educational institutions has increased significantly. This finding indicates that the university's educational programs are aligned with labour-market requirements and that the teacher-training system delivers measurable results.

The 6th component is the formation of an internal quality culture. The measures implemented in this direction at ASPU, including monitoring the educational process, conducting student surveys, and preparing pre-accreditation self-assessment reports, are continuously being developed at the university under the PDCA (Plan, Do, Check, and Act) principle.

Modern teacher training cannot be limited to traditional theoretical knowledge. For this reason, a curriculum reform at ASPU was conducted in two directions:

The first direction is a new competency-based curriculum. All curricula have been updated in line with the competency model. In addition, the program for first-year master's students in the "Pedagogy" speciality has been fundamentally changed and redesigned in accordance with labour-market requirements since 2025.

The second direction is adaptation to international standards. The programs have been adapted to ESG requirements. Structural changes have been made in accordance with the Higher Education Commission's accreditation criteria and the TKTA. Internal and external experts have evaluated some ASPU programs through peer review. The main factor determining the quality of teacher training is real school experience. We have made significant breakthroughs in this direction over the last three years. Thus, cooperation agreements have been signed with more than 100 schools in Baku and the regions.

Overall, the parallel development of these three levels indicates that modern teacher training is no longer limited to curricular content. The concept of quality requires the formation of a digital ecosystem, the efficiency of management processes, and the creation of a culture of continuous development grounded in performance indicators. Thus, teacher training has become a multi-level, interactive and dynamic ecosystem. In this ecosystem, innovation, digital transformation, management, and quality assurance converge to shape the future profile of teachers.

Conclusion

The findings of this study show that global teacher education is no longer driven solely by isolated pedagogical reforms, but by complex power interactions between technology, policy, institutions, and human capital. While digital tools are often seen as neutral and democratic, and teacher education reforms are frequently viewed as universally promoting equality, this research indicates that the landscape of teacher education is far from level. The same international standards, national governance mechanisms, and institutional capacities do not work at the same pace worldwide. The ASPU institutional model shows that, to be fully aligned with global systems such as ESG and UNESCO, formal compliance cannot be achieved without fundamental structural change, dedicated leadership, and a sustainable internal culture of quality. Without these elements, international frameworks risk becoming merely symbolic rather than truly transformative.

Notably, the study's multi-tiered methodological framework—combining global document analysis, thematic coding of national reform policies, and institutional-level evaluation—demonstrated that quality in teacher education arises from the interplay of structural forces rather than from standalone interventions. The comparison of these layers revealed that meaningful transformation depends not only on the presence of standards but also on the institutional capacity to interpret, adapt, and operationalise them within specific sociocultural contexts. This methodological insight reinforces that reforms become effective only when they are translated into institutional practice through coherent governance and continuous quality assurance.

The study further indicates that digitalisation and artificial intelligence do not automatically ensure pedagogical equity. Conversely, teachers and institutions that lack digital skills, research-oriented abilities, and institutional support are increasingly marginalised within the evolving educational landscape. Like online communication, teacher education today reveals the underlying hierarchies of competence, access, and institutional influence. While digital platforms strengthen the capabilities of the already privileged, they expose the structural deficits of teachers and institutions undertaking this transformation in the absence of appropriate scaffolding, training, and safeguards. The real question is not so much whether there is digital transformation as who gains from it and under what institutional circumstances. As such, this study confirms that national reforms in Azerbaijan are a landmark step towards competency-based teacher training, certification-focused professional accountability, and improved digital infrastructure. However, the effectiveness of such reforms remains contingent on the institutional mechanisms which bring state policy into day-to-day academic practice. ASPU's internal quality assurance model, based on PDCA cycles, multi-criteria staff evaluation, graduate tracer studies, and international benchmarking, shows that quality is not achieved solely through regulation, but through ongoing institutional reflection. Without such mechanisms, certification risks becoming merely procedural, curriculum reform may turn formalistic, and digitalisation may remain superficial.

A key implication of this research is that teacher education cannot be designed solely as a technical system. It is inherently a social, cultural, and institutional process influenced by power relations, professional identities, and organisational cultures. The modern teacher is expected to be digital, reflective, research-oriented, ethically responsible, and adaptable. However, expecting such an ideal without robust institutional support systems in place fosters structural inequality within the profession. Therefore, institutions have an ethical duty not only to demand performance based on outcomes but also to create protective academic environments that enable teachers to develop into these complex professional roles.

Finally, this study challenges the myth that contemporary teacher education reforms automatically lead to democratic, equitable, and universally effective learning systems. Equal participation, high-quality teaching, and sustainable professional learning require well-planned, well-defined institutional rules, transparent quality indicators, and long-term investment in academic cultures. The ASPU case demonstrates that when global standards, national reforms, and institutional governance collaborate, teacher education is not only a training apparatus but an intelligent, strategically integrated, sound ecology of quality. Such an ecosystem model offers a transferable framework for other countries seeking to harmonise global teacher education standards with national priorities and institutional realities in the age of artificial intelligence and digital transformation.

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