



SYSTEM OF FORMATION OF PROFESSIONAL COMPETENCE OF FUTURE TEACHERS IN HIGHER EDUCATION INSTITUTIONS

SISTEMA DE FORMACIÓN DE LA COMPETENCIA PROFESIONAL DE FUTUROS DOCENTES EN INSTITUCIONES DE EDUCACIÓN SUPERIOR

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ABSTRACT

The article has established the sociocultural significance of shaping the professional confidence of future teachers in the context of current transformations of the educational environment and advancements possible before professional activity. Teacher the methodological objectives of the investigation have been identified, the conceptual and terminological apparatus has been clarified, which reveals the place and structure of the phenomenon of professional reliability of the teacher. A historiographical analysis of the problem of reliability in pedagogical science has been carried out, which made it possible to follow the evolution of scientific approaches to its interpretation and, therefore, the main direct observations of it. Spheres. The professional reliability of a teacher is considered as a complex integrative characteristic of a particularity, which combines professional knowledge, intelligence, value orientation, psychological stability and development to the effective implementation of pedagogical functions in different minds of professional activity. Particular respect is given to the role of self-regulation as an important mechanism for ensuring the professional reliability of the teacher, which supports the stability of activity, reliability and pedagogy. Effectiveness. The study identified

pedagogical methods for shaping the professional reliability of future teachers, including the development of a specially organized educational environment, reflective practices, training technologies and skills development self-regulation. A structural-functional model of the system for shaping the professional confidence of future teachers has been developed, which includes goal-oriented, spatial, procedural and effective components. The effectiveness of the proposed system was verified in the process of pre-experimental work, the results of which confirmed the usefulness of its implementation in the training of future teachers.

Keywords:

Professional Reliability of the Teacher, Future Teachers, Pedagogical Education, Self-Regulation, Pedagogical Tools, Structural-Functional Model, Professional Training.

RESUMEN

El artículo establece la relevancia sociocultural de la formación de la confiabilidad profesional de los futuros docentes en el contexto de las transformaciones contemporáneas del entorno educativo y de las nuevas exigencias de la actividad profesional. Se definen los objetivos



metodológicos de la investigación y se precisa el aparato conceptual y terminológico que permite determinar el lugar y la estructura del fenómeno de la confiabilidad profesional del docente. Asimismo, se realiza un análisis historiográfico del problema en la ciencia pedagógica, lo que permite rastrear la evolución de los enfoques científicos sobre su interpretación. La confiabilidad profesional del docente se concibe como una característica integradora compleja de la personalidad, que combina conocimientos profesionales, capacidades intelectuales, orientaciones valorativas, estabilidad psicológica y disposición para la implementación eficaz de funciones pedagógicas en diversas condiciones de la actividad profesional. Se presta especial atención al papel de la autorregulación como un mecanismo fundamental para garantizar dicha confiabilidad, ya que permite mantener la estabilidad, la consistencia y la eficacia de la actividad pedagógica. El estudio identifica un conjunto de medios pedagógicos orientados a la formación de la confiabilidad profesional de los futuros docentes, entre los que se incluyen el diseño de un entorno educativo специально organizado, las prácticas reflexivas, las tecnologías de formación y el desarrollo de habilidades de autorregulación. Además, se desarrolla un modelo estructural-funcional del sistema de formación de la confiabilidad profesional, que integra componentes de carácter objetivo, contenido, procesual y evaluativo. La eficacia del sistema propuesto fue verificada mediante un estudio experimental preliminar, cuyos resultados confirman la pertinencia y efectividad de su implementación en el proceso de formación de futuros docentes.

Palabras clave:

Confiabilidad Profesional del Docente, Futuros Docentes, Educación Pedagógica, Autorregulación, Medios Pedagógicos, Modelo Estructural-Funcional, Formación Profesional.

INTRODUCTION

A teacher's professional competence can be understood as the capacity to effectively carry out pedagogical functions in accordance with established educational norms and standards, while professional mastery refers to the ability to creatively transcend these normative boundaries. Within this conceptual framework, professional reliability emerges as a higher-order integrative construct. It encompasses the teacher's capacity to sustain the quality and effectiveness of professional performance under both internal and external constraints, while preserving psychological balance, personal integrity, and coherence of the inner world. From this perspective, professional reliability constitutes a central dimension of pedagogical professionalism in contemporary education systems. Its

relevance is further intensified in the context of ongoing transformations in higher education driven by artificial intelligence and interdisciplinary integration, where pedagogical practice increasingly demands adaptability, cognitive flexibility, and the capacity to harmonize technological, emotional, and ethical dimensions of teaching (Cáceres-Mesa, 2026).

Recent research highlights that one of the fundamental determinants of reliability in human activity is self-regulation. The experience of self-regulation has a direct and measurable impact on the nature and outcomes of teachers' professional actions, particularly in complex and unstable situations. Empirical evidence demonstrates that a significant proportion of teaching staff and future teachers recognize the importance of professional reliability when dealing with uncertainty, time pressure, emotional stress, and challenging interactions within the educational environment. In this context, studies on the use of distance learning technologies emphasize that digital environments require a higher level of self-regulation, autonomy, and adaptability from future teachers, as they must effectively manage both instructional processes and their own professional behavior in technologically mediated settings (Cherkasov et al., 2023).

Furthermore, research on models for the formation of professional competence highlights that self-regulation is a core component of pedagogical professionalism, as it enables future teachers to integrate knowledge, skills, and reflective practices in order to respond effectively to diverse educational challenges (Marushko et al., 2023). Similarly, the development of scientific and innovative potential in teacher education is closely linked to the capacity for self-directed learning, creativity, and the ability to regulate one's cognitive and professional activities in dynamic and uncertain contexts (Polatbekova et al., 2025).

At the same time, existing studies point out that one of the main problems in the formation of professional competence in future teachers is the insufficient development of self-regulatory mechanisms, which limits their ability to act effectively in real pedagogical situations and to maintain professional stability under pressure (Khalilova, 2020). In addition, research in the field of artistic and pedagogical training demonstrates that the development of professional skills, including performance and interpretative competencies, is inseparable from the formation of self-regulation, emotional control, and reflective abilities, which together contribute to the overall reliability of professional activity (Zelinka et al., 2021).

At the same time, statistical data reveal a discrepancy between the recognized importance of this quality and its actual level of development among practicing teachers

(Narimani, 2026), which indicates a substantial gap in teacher training systems. In this regard, contemporary approaches to quality assurance in higher education emphasize the importance of developing competencies related not only to knowledge acquisition but also to self-regulation, reflective practice, and professional accountability as key elements of teacher training.

The need to develop professional reliability in future teachers through the enhancement of their self-regulation experience is further confirmed by the analysis of professional teaching standards. These standards increasingly emphasize not only subject knowledge and methodological competence but also the ability to act effectively in unpredictable and complex pedagogical situations. Consequently, the formation of professional reliability should be considered a priority direction in the modernization of teacher education (León-González & Pire-Rojas, 2025).

The sociocultural significance of this issue is determined by the growing demand for education systems to respond to the needs of society, the state, and the individual simultaneously. Modern education requires teachers who are capable of flexible adaptation, responsible decision-making, and maintaining professional effectiveness under conditions of rapid change. Survey results indicate that both practicing teachers and students, future educators consider the development of professional reliability a crucial component of their professional readiness.

At the same time, a content analysis of research in the field of vocational and pedagogical education demonstrates an imbalance in the focus of scholarly attention. The majority of studies concentrate on the acquisition of knowledge, skills, and competencies, while significantly fewer works address the development of value orientations and even fewer examine personal and professional qualities such as reliability (Bray, 2007; Iasechko et al., 2021). This situation underscores the necessity of rethinking the priorities of teacher education and focusing on the mechanisms that support the formation of integrative professional qualities.

The theoretical foundations for addressing this problem have already been partially established in contemporary pedagogical science. Research in the field of educational development and innovation emphasizes the importance of integrating technological, managerial, and cultural dimensions into teacher training (Alexander et al., 2019; Iasechko & Iasechko, 2024). At the same time, studies on educational reform and institutional development highlight the need to align teacher competencies with the broader processes of social and economic transformation (Pellini & Bredenberg, 2015). In addition, recent works focusing on digital transformation and teacher preparation for the

modern educational environment stress the importance of developing new competencies related to cybersecurity, digital ethics, and adaptive learning (Termenzhy et al., 2025; Wolfe & Andrews, 2014).

In a similar vein, contemporary research considers professional reliability as an essential component of teacher professionalism, particularly in the context of leadership, institutional development, and partnership-based educational models (Chovriy et al., 2024; Moskalenko et al., 2025). These studies emphasize the role of self-control, responsibility, and reflective practice in ensuring effective pedagogical performance. However, despite these contributions, a comprehensive theoretical framework that systematically explains the structure, functions, and mechanisms of professional reliability in teaching remains underdeveloped.

The relationship between self-regulation and the formation of subjectivity has also been substantiated in recent studies, which demonstrate that students' ability to regulate their own learning and professional behavior is closely linked to their development as autonomous and responsible subjects of educational activity (Fabian et al., 2025; Kozhevnikova et al., 2021). These findings highlight the importance of incorporating self-regulation into the core of pedagogical training, not only as a skill but as a fundamental component of professional identity.

Despite the accumulation of significant theoretical and empirical material in pedagogy and psychology, previous studies have not developed a holistic system for fostering professional reliability in future teachers. Existing approaches often address isolated aspects of this phenomenon without integrating them into a coherent model that reflects the complexity of modern educational realities. This gap in the literature indicates the need for a comprehensive and systematic approach to the development of professional reliability.

Thus, the relevance of the present study is determined by a set of contradictions. These include the discrepancy between the increasing societal demand for teachers capable of maintaining effective professional performance under complex conditions and the limitations of traditional teacher training systems; the existence of theoretical and sociocultural prerequisites for developing professional reliability and their insufficient implementation in educational practice; the requirements of professional and educational standards and the lack of methodological tools for achieving them; and the need for practical transformations in higher pedagogical education in the absence of a well-defined model for developing professional reliability.

Addressing these contradictions requires a reconsideration of the goals, content, and methods of teacher

education, as well as the development of innovative pedagogical approaches that integrate cognitive, emotional, and behavioral components of professional activity. In this context, the concept of professional reliability, grounded in self-regulation and supported by a systemic pedagogical framework, offers a promising direction for both theoretical research and practical implementation in the field of teacher education.

MATERIAL AND METHODS

The present study is grounded in the conceptualization of several key constructs that define the theoretical and methodological foundation of teacher education research. In particular, the system for developing professional reliability in future teachers is understood as a coherent set of interrelated structural components operating within the holistic educational environment of a higher education institution. This system is oriented toward the formation of students' readiness to demonstrate professional reliability in complex pedagogical situations through the activation and development of self-regulation experience, in accordance with current professional and state educational standards.

Within this framework, the professional reliability of a teacher is defined as an integrative personal-professional quality that reflects the unity of individual characteristics and professional competencies. It determines the teacher's ability to maintain pedagogical appropriateness, stability, and effectiveness in diverse and often unpredictable educational contexts, including challenging or crisis situations. Self-regulation of pedagogical activity is conceptualized as a dynamic process of managing one's own professional actions in order to achieve pedagogical objectives under varying environmental and situational conditions.

The self-regulation experience of future teachers represents a multidimensional construct that includes knowledge, practical skills, value orientations, creative aspirations, and volitional resources. Together, these elements ensure sustained effectiveness in pedagogical activity across different educational situations. This experience is considered a central mechanism for the development of professional reliability in future educators.

The object of the study is the process of teacher training within institutions of higher pedagogical education, while the subject is the theoretical foundations underlying the development of a system aimed at fostering professional reliability in future teachers. The primary purpose of the research is to provide a theoretical and methodological justification, design, and empirical validation of such a system.

The research is based on a multi-level methodological framework that integrates systemic, synergetic, subjective, personality-developmental, and situational approaches. The systemic approach conceptualizes the development of professional reliability as an integrated and goal-oriented process, where readiness to act reliably in complex situations serves as a system-forming principle. The synergetic approach emphasizes the nonlinear and self-organizing nature of this process, highlighting the importance of internal developmental dynamics and external pedagogical influences. The subjective approach focuses on the learner as an active agent in the construction of professional experience, while the personality-developmental approach emphasizes the formation of value-semantic structures of personality. The situational approach enables the design of educational conditions that simulate real pedagogical challenges requiring professional reliability.

The theoretical foundation of the study incorporates ideas related to activity-based professional education, the development of pedagogical professionalism, and the role of self-regulation in maintaining professional effectiveness. It also draws on concepts of subjectivity development, self-creative personality formation, and the integration of personal experience into educational content. Additionally, it includes theoretical positions on personality-oriented education, situational and contextual learning technologies, and simulation-based pedagogical methods aimed at developing practical professional competencies.

To achieve the research objectives and test the proposed hypothesis, a comprehensive methodological toolkit was employed. Theoretical methods such as analysis, synthesis, comparison, abstraction, classification, modeling, and extrapolation were used to construct the conceptual framework of the system and interpret empirical findings. Empirical methods, including pedagogical observation, surveys, diagnostic testing, expert evaluation, and pedagogical experimentation, were applied during the experimental phase. Mathematical-statistical methods were used to process quantitative data and determine relationships between variables. Finally, predictive methods such as scenario modeling and prospective analysis were used to identify potential trajectories of professional development and transformation of teacher reliability over time.

RESULTS AND DISCUSSION

A theoretical analysis of the current state of teaching has shown that the pedagogicalization of many areas of human activity obliges teachers to master new areas and forms of professional activity. The increasing complexity of pedagogical content and pedagogical communication, combined with the extreme conditions of their implementation

(permanent educational innovations, significant informational and psycho-emotional loads, new developments in the psychology of students, etc.), transforms teaching into a space of increased stress, necessitating its compliance with the requirement of reliability.

The sociocultural significance of developing the professional reliability of future teachers is dictated, firstly, by the modern realities of society associated with the increasing demands of the labor market for the quality of teaching personnel; the need for the education system to meet the complex educational needs of the individual, society, the state, and the education system itself; and secondly, by transformations in pedagogical education caused by changes in the professional activity of teachers: the adoption of changing educational standards, its new content, and fundamentally different teaching and training technologies. At the same time, an analysis of contemporary higher pedagogical education has revealed a clear predominance of attention to subject-matter knowledge and standard professional skills, rather than to the professional and personal qualities of teachers, which determine their readiness to act in non-standard situations. Under these conditions, there is a recognized need to change the goals, content, and process of pedagogical education to bring it closer to the modern realities of teaching.

Today's content of pedagogical education is presented not only as the acquisition of norms and models of pedagogical activity, but also as the development of the future teacher's personal experience, which reflects the degree of their value acceptance of these norms and models. Recognition of the priority of the personal element in pedagogical activity and pedagogical education, in which future teachers, mastering a variety of general cultural and specialized fields, gain experience in constructing a «signature system» expressing their own professional position, has led to the inclusion of a system for developing the professional reliability of future teachers among promising areas of holistic professional training for teaching staff at universities.

The use of a systems approach, according to which the functions of complex objects are determined by their composition and structure, and the place of their components within the whole, allowed us to identify subsystems, their constituent structural components, and the functions of a teacher's professional reliability.

In accordance with the principle of integrity, an analysis was conducted of the process of developing self-regulation experience in pedagogical activity as the integrative effect of all structural components of this quality, resulting from accumulated pedagogical experience.

The synergetic principle of self-organization, which determines the ability of systems to self-renew by overcoming the contradictions of their development, was used as a principle explaining the process of developing professional reliability in future teachers as the functioning of complex nonequilibrium systems. Based on this principle, the study revealed that the professional reliability of teaching staff is determined by self-regulation, which ensures system preservation, resilience to external influences, and goal orientation. The need to study the development of professional reliability in future teachers as a personally developing pedagogical process prompted the use of a humanitarian methodology based on subjective and personally developing approaches focused on actualizing the conditions that shape teachers' positions as subjects of pedagogical creativity and sustainable and reliable mechanisms for self-realization.

The principle of subjectivity explains the role of self-regulation in ensuring teachers' professional reliability. Self-regulation of pedagogical activity is the implementation of a teacher's subjective position in maintaining and improving their «authorial system,» and it is through regulatory actions that their system maintains reliability.

In accordance with the personally developing approach, reflected in concepts of the content and process of education, which presupposes the acquisition of experience in performing specific personal functions associated with self-organization, the development of future teachers' readiness to demonstrate professional reliability in challenging situations in pedagogical activity was carried out through the acquisition of a special type of experience—the experience of self-regulation, «responsible» for maintaining pedagogical appropriateness and sustainable effectiveness.

The principle of humanization, reflecting the way a subject organizes their cognitive activity, aimed at holistically mastering sociocultural reality and understanding their place in the world, guided the study toward identifying the content of pedagogical education as a source of self-regulation experience for future teachers. Relying on cultural concepts allowed for the development of a framework for future teachers' self-regulation experience based on the humanities-based transformation of the content of general professional disciplines.

A systems approach allowed the author to define the concept of a teacher's professional reliability as an integrative quality reflecting the unity of personal characteristics and professional skills, which determines the ability to maintain pedagogical appropriateness and the effectiveness of actions in various situations, including difficult ones.

An analysis of the materials presented in the literature and the results of surveys of students and teaching staff conducted by the authors in 2023-2025 allowed us to identify the criteria of a teacher's professional reliability: 1) awareness of the teacher's mission - an understanding of the purpose of the teaching profession, compliance with the norms of pedagogical activity; 2) a structured methodological arsenal - organizing the accumulated pedagogical methods and techniques into a system united by a pedagogical idea that meets the requirements of necessity and sufficiency; 3) the appropriateness of pedagogical actions - their construction with a focus on the set pedagogical goal; 4) the efficiency and variability of pedagogical actions - a timely response to the current pedagogical situation, an independent and effective choice of pedagogical means. 5) pedagogical reflexivity – the ability to critically analyze and value one's own pedagogical actions, states, and personal qualities.

In an experimental study conducted by the author in 2025, the hypothesis of a relationship between indicators of professional reliability and indicators of personal characteristics and professional skills of education specialists, identified in accordance with existing scientific data on the internal determinants of teacher professionalism, was tested. The study involved teaching staff with 5-15 years of practical experience. Indicators of personal characteristics of the teaching staff were determined through testing, indicators of professional skills – through self-assessment, and indicators of professional reliability – by experts using a diagnostic chart developed. The experts were university faculty members. A factor analysis revealed three subsystems of teacher professional reliability and their constituent components: personal reliability is defined by a focus on providing pedagogical support to students, an internal locus of control in interpersonal relationships, a motivation to achieve success, and creative pedagogical thinking; activity reliability is defined by the ability to recognize changes in students, select an effective pedagogical communication style, develop a system of pedagogical goals and means, implement self-education, and self-regulate pedagogical activity; and functional reliability is defined by the ability to adapt to stress and maintain a stable physical and mental state.

The functions of the subsystems of a teacher's professional reliability reflect its role in maintaining the effectiveness of pedagogical activity: the role of personal reliability is to ensure the content of pedagogical activity targets and individual methods for solving pedagogical problems; the role of activity reliability is to ensure the adequacy of mental processes and states in the content and structure of pedagogical activity; the role of functional reliability is to ensure the dynamic stability of the teacher's body systems

and the adequacy of their response to factors in the work process.

An analysis of the works of researchers revealed that the extent and forms of a teacher's professional activity are regulated by a set of norms. Moral norms of pedagogical work include norms of pedagogical morality, pedagogical ethics, pedagogical deontology, pedagogical axiology, and pedagogical measure. Praxeological norms of pedagogical work include the main types of norms governing the functioning and development of education (paradigms, patterns, principles, methods, technologies, etc.). Legal norms of pedagogical work are defined by documents regulating labor relations, determining the development of education and its constitutional guarantees in the state, and standards and norms for the competence of teaching staff. Ergonomic standards for teaching work constitute sanitary and hygienic standards for the organization of the educational process in educational organizations, as set out in legislative and regulatory acts. These standards constitute standards of professional reliability for teachers.

A theoretical analysis of the literature devoted to the study of negative teaching experiences and an analysis of real-life practices of this kind allowed us to understand a violation of a teacher's professional reliability as the inability to maintain effective teaching in various situations and to identify the following forms of violations of professional reliability: pedagogical conflicts, professional personality deformations, pedagogical errors, and functional disorders.

To date, a significant amount of research has been conducted in the field of self-regulation, both in our country and abroad. It has been proven that self-regulation realizes the subject's position and ensures productive individual activity. The concept of voluntary self-regulation as a «systemically organized process of internal human mental activity for initiating, building, maintaining, and managing various types and forms of voluntary activity that directly contribute to the achievement of adopted goals» has been developed. The functional links in the structure of the self-regulation process in any type of activity are the regulatory actions of goal setting, modeling conditions, programming actions, evaluating results, and adjusting them.

Psychologists have proven that a subject's typical individual characteristics in implementing regulatory actions are accumulated in an individual's self-regulation style. Success in mastering a specific activity largely depends on the subject's ability to develop a self-regulation style characterized by a highly developed and closely interconnected regulatory actions.

In an experimental study conducted by the author in 2025, a correlation analysis revealed positive relationships between the indicators of professional reliability of teaching staff and the regulatory actions of goal-setting, modeling conditions, programming actions, and evaluating performance. An analysis of the relationships between the studied variables showed that teaching staff with high professional reliability are distinguished by an effective style of self-regulation of pedagogical activity (high indicators of the development of all regulatory actions). At the same time, teaching staff with average and low professional reliability are characterized by an ineffective style of self-regulation of pedagogical activity (the development of only certain regulatory actions or their underdevelopment). Thus, a relationship was discovered: the more developed the regulatory actions, the higher the professional reliability of a teacher.

Three possible scenarios for the development of professional reliability of teachers were identified: a highly productive scenario assumes that teachers independently maintain a high level of professional reliability under the condition of continuous improvement of their regulatory actions; a moderately productive scenario assumes periodic professional development of teachers in order to improve the «sagging» components of self-regulation experience; a low-productivity scenario requires management support and mentoring from the administration of educational institutions for teachers who demonstrate a low level of professional reliability in difficult situations. A set of pedagogical tools for developing the professional reliability of future teachers was theoretically substantiated, developed, and tested in experimental work (table 1).

A technology for simulating difficult situations in pedagogical activity has been developed. It involves the following actions by the teacher: 1) formulating a learning assignment that encourages the future teacher to identify conflicts; 2) selecting methods for motivating the future teacher to use personal resources in pedagogical activity; 3) selecting teaching methods that promote the comparison of individual and social experience of pedagogical activity; 4) defining tactics for supporting the subjective position of the future teacher in pedagogical activity.

The situations of difficult pedagogical activity simulated in the educational process represented a set of factors and means that generate in future teachers a personally significant attitude towards pedagogical activity and the actualization of regulatory actions that ensure the management of their own activity. The following types of situations were simulated as difficult:

- 1) a lack or excess of pedagogically significant information;
- 2) the presence of inclusion and multiculturalism in the educational environment;
- 3) the absence of a holistic picture of the pedagogical process;
- 4) a lack of time to make deliberate pedagogical decisions.
- 5) the effects of unfavorable environmental factors;
- 6) one's own mental state and health;
- 7) one's own emotional frustration and lack of motivation for pedagogical activity;
- 8) the rapid change of standards and content-methodological priorities in education;
- 9) the inadequate response of students, their parents and the environment to pedagogical influence.

This model serves, firstly, to solve research problems, and secondly, to design organizational and methodological documentation, as well as educational and extracurricular activities related to updating the goals, content, and process of higher pedagogical education (table 1).

Table 1: Components of innovative potential

Components of innovative potential	Measures within an extensive approach	Measures within an intensive approach
Human (a)	Increase in the amount of labor used for producing innovations	Improvement in labor quality through raising the level of knowledge, skills, and competencies
Natural-resource (m)	Acquisition of larger quantities of raw materials, supplies, and components for innovation activities	Reduction of waste and resource intensity in production; transition to new resources
Technical-technological (t)	Increase in production capacities in the sphere of innovation	Introduction of resource-saving and resource-substituting technologies; increased utilization of core production capacities

Components of innovative potential	Measures within an extensive approach	Measures within an intensive approach
Institutional (ins)	Increase in the number of rules, norms, and regulations governing enterprise innovation activities	Optimization of rules, norms, and regulations governing the enterprise's internal innovation activities to eliminate contradictions, duplication, gaps, etc.
Organizational (o)	Increase in the number of organizational measures and structural units related to innovation activities	Optimization of the organizational structure; improvement in the quality of organizational measures for managing innovation activities
Informational (inf)	Increase in the quantity of information units related to innovation activities	Improvement in indicators of information use (e.g., completeness, accuracy, timeliness, and relevance of information)

According to the expert assessment of case studies following the pedagogical experiment, a high level of professional reliability was demonstrated by 59% of future teachers in the experimental group and 23% in the control group. Assessment of the personal characteristics and professional skills of the experimental group participants, expert assessment of their work products, and observations of their work during teaching internships confirmed an increase in their professional reliability indicators, enabling them to maintain the appropriateness and effectiveness of their teaching activities under any circumstances.

Calculation of the Fisher's test revealed that the empirical values of all the studied indicators in the two compared samples after the experimental work were greater than the critical values. This led to the conclusion that there were statistically significant differences between the experimental and control groups and, accordingly, the effectiveness of the experimental intervention.

Scientific novelty of the research results: 1. The methodological basis for studying the system for developing professional reliability in future teachers is a set of approaches defining the principles and methods of scientific inquiry, as well as ways to implement knowledge about the essential characteristics of this system into the practice of higher pedagogical education.

According to the systems approach, the system for developing professional reliability in future teachers is defined as a set of interconnected structural components functioning within the holistic educational process of a university, united by the common goal of developing future teachers' readiness to demonstrate professional reliability in challenging situations by relying on self-regulation experience in accordance with professional standards for pedagogical activity and state educational standards.

The synergetic approach explains the process of developing professional reliability in future teachers as the functioning of a complex, nonequilibrium system, which is ensured by external influences that are consistent with the internal tendencies of change within this system. The subjective approach makes it possible to interpret the process of formation of professional reliability of future teachers as a transition: firstly, from unconsciousness to awareness (from an irrational way of carrying out pedagogical activity to a rational way that brings actions into line with pedagogical values); secondly, from meaning to sense (from the culturally derived social experience of pedagogical activity to the search for the meaning of pedagogical activity «for oneself,» the manifestation of the author's position.

The personal development approach allows us to identify the condition for the formation of professional reliability in future teachers—the experience of self-regulation—describe it as a meta-subject personal component of the content of higher pedagogical education, and identify didactic forms of presenting this content.

The situational approach serves as a tool for developing a technology for simulating difficult situations in pedagogical activity in the educational process at a university. Overcoming these situations helps future teachers acquire the experience of self-regulation and demonstrate their professional reliability.

2. The professional reliability of a teacher is an integrative quality reflecting the unity of personal characteristics and professional skills, which determines the ability to maintain pedagogical appropriateness and the effectiveness of actions in various situations, including difficult ones.

The professional reliability of a teacher is made up of three subsystems. The personal reliability of a teacher is comprised of a focus on pedagogical support for students, an internal locus of control in interpersonal relationships, a drive to achieve success, and creative pedagogical thinking; activity reliability – the ability to diagnose changes in students, choose an effective style of pedagogical communication, build a system of pedagogical goals and means, implement

self-education, and self-regulate pedagogical activity; functional reliability – the ability to adapt to workloads and maintain a stable physical and mental state.

The functions of the subsystems of a teacher's professional reliability reflect its role in maintaining the effectiveness of pedagogical activity: the role of personal reliability – ensuring the content of target guidelines for pedagogical activity and individual methods for solving pedagogical problems; the role of activity reliability – ensuring the adequacy of the teacher's mental processes and states to the content and structure of pedagogical activity; the role of functional reliability – ensuring the dynamic stability of the teacher's body systems and the adequacy of their response to factors of the work process.

Criteria for a teacher's professional reliability: 1) awareness of the teacher's mission – understanding the purpose of the teaching profession and adhering to pedagogical norms; 2) a structured methodological arsenal – organizing accumulated pedagogical methods and techniques into a system united by a pedagogical idea,

Meeting the requirements of necessity and sufficiency; 3) appropriateness of pedagogical actions – their organization with a focus on the stated pedagogical goal; 4) responsiveness and variability of pedagogical actions – timely response to the current pedagogical situation, independent and effective selection of pedagogical tools; 5) pedagogical reflexivity – the ability to critically analyze and value-based understanding of one's own pedagogical actions, states, and personal qualities.

The norms of a teacher's professional reliability are the moral, praxeological, legal, and ergonomic norms for the implementation of pedagogical work, reflected in educational regulations and standards.

A teacher's impaired professional reliability is the inability to maintain effective teaching in various situations and manifests itself in the form of pedagogical conflicts, professional personality deformations, pedagogical errors, and functional disorders.

A factor in a teacher's professional reliability is self-regulation of teaching, which is the process of managing one's own activity aimed at achieving adopted pedagogical goals in any environmental conditions.

A teacher's regulatory actions are those actions that ensure the management of pedagogical activity: pedagogical goal setting and goal "maintenance" under any circumstances; determining the means and conditions for achieving pedagogical goals and adhering to pedagogical logic despite obstacles; flexible programming of actions and adjustments to the program based on the evolving situation; demonstration of moral and volitional efforts to maintain one's actions and emotional reactions within the

bounds of pedagogical appropriateness and proportion; critical evaluation of one's actions in various situations.

Teachers with high professional reliability are distinguished by an effective style of self-regulation of teaching (high indicators of the development of all regulatory actions); teaching staff with average and low professional reliability are characterized by an ineffective style of self-regulation of teaching activity (development of only individual regulatory actions or their lack of development).

The condition for the manifestation of professional reliability of future teachers in difficult situations in teaching activity, carried out in reality, simulation, or mentally, is the experience of self-regulation – a complex of knowledge, skills, value orientations, creative aspirations, and volitional efforts that ensure the maintenance of effective teaching activity in various situations. The self-regulation experience of future teachers is a five-component structure, including: value experience – the experience of an emotional and value-based attitude toward the teaching profession; operational experience – the experience of applying knowledge about the nature and mechanisms of teaching; the experience of activation – the experience of prompt adaptation to changing working conditions, calculating the necessary efforts; the experience of pedagogical creativity – the experience of transforming pedagogical reality; the experience of reflection – the experience of correlating knowledge about possible transformations in oneself and pedagogical reality with one's capabilities, the requirements of pedagogical activity, and the tasks to be solved.

3. The development of professional reliability in future teachers is the result of aligning individual teaching experience with the requirements of the teaching profession being mastered. This process relies on the psychological mechanisms of identification and reflection and is structured in accordance with the patterns of mastering subjective functions (awareness of the need for self-regulation, mastery of self-design and self-control skills, and the transformation of self-regulation into an attributive behavior pattern).

The set of pedagogical tools for developing professional reliability in future teachers includes: types of independent work that encourage future teachers to identify conflicts associated with the need to achieve pedagogical goals; techniques for motivating future teachers to productively use their personal resources in teaching; teaching methods that encourage future teachers to compare their individual and social teaching experiences; and tactics for supporting the subjective position of future teachers in teaching. 4. The structural and functional model of the system for developing professional reliability in future teachers is an abstract characteristic, a simplified image

reflecting the main components of the specified pedagogical system, their functions, and connections.

The function of the target component is system-forming: defining the content and means of achieving the goal – developing in future teachers a readiness to demonstrate professional reliability in difficult situations through reliance on self-regulation experience in accordance with the standard of professional activity and the state educational standard.

The function of the content component is structuring the content of education in accordance with the goal and value-semantic guidelines, the substantive filling of educational situations that present difficulties for future teachers, as well as didactic forms of presenting the content of education – educational tasks for the development of regulatory actions, which include: 1) tasks for formulating, correcting, and “retaining” the pedagogical goal in a changing educational environment; 2) tasks for justifying the means of achieving the pedagogical goal, programming the actions necessary for this, anticipating possible variations in the pedagogical process plan, taking into account the types of difficult circumstances; 3) tasks to predict the development of the pedagogical situation and select a strategy for maintaining the effectiveness of the pedagogical process; 4) tasks to gain experience in psychological self-regulation in pedagogical situations of varying complexity; 5) tasks to self-analyze one’s activities and develop a self-development program.

The function of the organizational-activity component is to reflect the method and means of achieving the goal. This method is the technology of simulation modeling in the educational process of the university, situations that future teachers face in their pedagogical activity, the resolution of which contributes to the acquisition of self-regulation experience and, accordingly, the demonstration of professional reliability. This technology involves the following actions of the teacher: 1) formulating an educational assignment that encourages future teachers to identify conflicts; 2) selecting techniques to motivate the future teacher to use personal resources in pedagogical activity; 3) selecting teaching methods that activate the future teacher’s comparison of individual and social pedagogical experience; 4) defining tactics to support the subjective position of the future teacher in pedagogical activity, carried out in reality, simulation, or mentally. The goal is achieved through educational situations that explore the difficulties that future teachers face in their teaching activities. The following situations are simulated as challenging: a lack or excess of pedagogically relevant information; the presence of inclusion and multiculturalism in the educational environment; a lack of a holistic picture of the pedagogical process; a lack of time to make informed pedagogical

decisions; the impact of unfavorable environmental factors; one’s own mental state and health; and the inadequate response of students, their parents, and the environment to pedagogical influence.

The function of the assessment and performance component is to determine the levels (high, medium, low) and criteria for the effectiveness of the system (knowledge of self-regulation, regulatory actions, and professional reliability in various situations during teaching internships and postgraduate studies).

The connections between the external environment and the components of the system for the formation of professional reliability of future teachers ensure the emergence and maintenance of the functions of this system.

CONCLUSIONS

The present study provides a comprehensive conceptualization of teacher professional reliability as an integrative quality that reflects the unity of personal characteristics and professional competencies, determining the capacity to maintain pedagogical effectiveness and appropriateness across diverse, including challenging, educational contexts. Within this framework, the research advances the theoretical understanding of professional reliability by systematizing its criteria, structure, functions, normative foundations, and potential deviations, thereby contributing to the refinement of the conceptual apparatus of pedagogical science.

A significant contribution of the study lies in the development of a structural and functional model for fostering the professional reliability of future teachers. This model integrates target, content, organizational-activity, and evaluative-result components, establishing their interrelations and functional roles within the educational process. The findings demonstrate that the level of professional reliability is directly related to the development of regulatory actions, which ensure the effective performance of pedagogical tasks under varying conditions. In this regard, the study identifies developmental trajectories of professional reliability in the postgraduate period, based on the degree of readiness for enhancing self-regulation capabilities.

The concept of self-regulation experience is further elaborated as a multidimensional construct encompassing knowledge, skills, value orientations, creative potential, and volitional efforts. This construct serves as a fundamental mechanism for sustaining pedagogical effectiveness. The research also defines the structure and content of self-regulation experience and substantiates didactic forms for its development, particularly through the use of educational tasks aimed at strengthening regulatory actions.

In addition, the study proposes a system of pedagogical tools designed to support the development of professional reliability in future teachers. These include structured independent work, motivational strategies, instructional methods, and targeted support mechanisms. The process of development is conceptualized as occurring in two key stages: the recognition of the need for self-regulation and the internalization and mastery of self-regulatory practices. This process is grounded in psychological mechanisms such as identification and reflection and is aligned with broader patterns of personality development, including the formation of self-control, self-projection, and the integration of self-regulation as a stable behavioral attribute.

Particular attention is given to the design and implementation of challenging pedagogical situations that require the application of self-regulation and contribute to maintaining professional reliability. The study develops and tests a simulation-based approach for modeling such situations within the educational process, thereby creating conditions for experiential learning and the development of adaptive professional competencies. Furthermore, criteria for evaluating the effectiveness of the proposed system are substantiated and empirically tested, including indicators related to knowledge of self-regulation, the execution of regulatory actions, and the demonstration of professional reliability in practical teaching contexts.

From a theoretical perspective, the research expands the conceptual framework of teacher professional development by incorporating the notions of professional reliability and self-regulation experience. It enriches the theory of pedagogical education by integrating insights into the psychological mechanisms underlying personality transformation and by proposing innovative approaches to embedding self-regulation within the content of higher education. The study also contributes to the theory of quality assurance in teacher education by introducing criteria for assessing the effectiveness of systems aimed at developing professional reliability.

Methodologically, the research demonstrates the effectiveness of a комплексный approach that combines systemic, synergetic, subject-oriented, personality-centered, and situational perspectives. This integrative methodology enables a deeper understanding of causal relationships and developmental trends in the formation of teacher professional reliability, providing a robust foundation for further research and practical implementation.

Overall, the findings underscore the importance of developing professional reliability as a core component of teacher training, highlighting its role in ensuring the

adaptability, effectiveness, and sustainability of pedagogical activity in the context of contemporary educational challenges.

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