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Usarova Nigora Berdiyarovna (Tashkent University of Social Innovation Senior Lecturer;
E-mail: usarovanigoraberdiyarovna@gmail.com)

CONCEPTUAL AND PEDAGOGICAL FOUNDATIONS FOR DEVELOPING PROGNOSTIC COMPETENCE IN FUTURE SPECIALISTS

Annotation. *The article examines the conceptual and pedagogical foundations for developing prognostic competence in future specialists. Prognostic competence is interpreted as an integrative quality that enables students to anticipate professional situations, assess possible outcomes and make well-grounded decisions under uncertainty. The study is based on systemic, competence-based, activity-oriented, reflective and prognostic approaches. The scientific and practical significance of the article lies in substantiating the need for the purposeful development of this competence in professional training.*

Key words: *Competence, forecasting, specialist, training, approach, reflection, modeling, strategy, development.*

Usarova Nigora Berdiyarovna (Toshkent Ijtimoiy innovatsiya universiteti katta o‘qituvchisi;
E-mail: usarovanigoraberdiyarovna@gmail.com)

BO‘LAJAK MUTAXASSISLARDA PROGNOSTIK KOMPETENSIYANI RIVOJLANTIRISHNING KONSEPTUAL-PEDAGOGIK ASOSLARI

Annotatsiya. *Maqolada bo‘lajak mutaxassislarda prognostik kompetensiyani rivojlantirishning konseptual-pedagogik asoslari yoritiladi. Prognostik kompetensiya kasbiy vaziyatlarni oldindan anglash, ehtimoliy natijalarni baholash va noaniqlik sharoitida asoslangan qaror qabul qilishga xizmat qiluvchi integrativ sifat sifatida talqin etiladi. Tadqiqotda tizimli, kompetensiyaviy, faoliyatli, refleksiv va prognostik yondashuvlarga tayaniladi. Maqolaning ilmiy-amaliy ahamiyati bo‘lajak mutaxassislarni o‘zgaruvchan kasbiy muhitga tayyorlashda prognostik kompetensiyani maqsadli rivojlantirish zaruratini asoslash bilan belgilanadi.*

Kalit so‘zlar: *kompetensiya, prognostika, mutaxassis, tayyorgarlik, yondashuv, refleksiya, modellashtirish, strategiya, rivojlanish.*

Усарова Нигора Бердияровна (Ташкентский университет социальных инноваций, старший преподаватель; E-mail: usarovanigoraberdiyarovna@gmail.com)

КОНЦЕПТУАЛЬНО-ПЕДАГОГИЧЕСКИЕ ОСНОВЫ РАЗВИТИЯ ПРОГНОСТИЧЕСКОЙ КОМПЕТЕНТНОСТИ БУДУЩИХ СПЕЦИАЛИСТОВ

Аннотация. *В статье раскрываются концептуально-педагогические основы развития прогностической компетентности будущих специалистов. Прогностическая компетентность рассматривается как интегративное качество, обеспечивающее способность предвидеть профессиональные ситуации, оценивать возможные последствия и принимать обоснованные решения в усло-*

виях неопределенности. Методологическую основу исследования составляют системный, компетентностный, деятельностный, рефлексивный и прогностический подходы. Научно-практическая значимость статьи заключается в обосновании необходимости целенаправленного развития данной компетентности в профессиональной подготовке.

Ключевые слова: *Компетентность, прогнозирование, специалист, подготовка, подход, рефлексия, моделирование, стратегия, развитие.*

Introduction. In contemporary higher education, professional training is no longer limited to the acquisition of specialized knowledge and practical skills. It also requires the development of students' ability to anticipate professional situations, evaluate possible outcomes, make reasoned decisions and plan their future professional growth. The rapid transformation of labour market demands, digitalization and the increasing complexity of professional tasks make prognostic competence an important quality of a future specialist. The relevance of this study is determined by the need to prepare students for uncertain and changing professional conditions. Traditional models of training often focus on knowledge transmission and the reproduction of standard actions, whereas modern professional practice requires strategic thinking, reflection and the ability to foresee the consequences of decisions. Therefore, prognostic competence should be considered as an integral component of professional readiness. The scientific problem of the study lies in the fact that prognostic competence is not always sufficiently defined as an independent pedagogical construct. Although future skills, reflective thinking and competence-based education are widely discussed, the conceptual and pedagogical foundations for developing prognostic competence in future specialists remain insufficiently systematized.

The aim of the study is to substantiate the conceptual and pedagogical foundations for developing prognostic competence in future specialists. The object of the research is the process of professional training in higher education, while the subject is the development of prognostic competence through pedagogical conditions, methods and approaches. The methodological basis of the study includes systemic, competence-based, activity-oriented, reflective and prognostic approaches. These approaches make it possible to interpret prognostic competence as an integrative professional quality that combines analysis, reflection, decision-making, motivation and future-oriented thinking. The scientific novelty of the article lies in clarifying the essence of prognostic competence and identifying its role in the structure of professional readiness. The practical significance of the study is reflected in the possibility of using its conclusions to improve educational content, professional tasks and pedagogical conditions aimed at preparing students for future-oriented professional activity.

Literature Review. The development of prognostic competence in future specialists is increasingly interpreted as one of the key directions of modern professional education. Recent international studies show that higher education should prepare students not only for the reproduction of existing knowledge, but also for conscious action in uncertain, unstable and rapidly changing professional environments [1;7–18 p.]. In this context, prognostic competence may be understood as the ability to analyze a professional situation, foresee possible changes, assess risks, compare alternative decisions and choose a reasoned strategy of action. The concept of future-oriented education is directly related to this issue. UNESCO studies emphasize that learners should be prepared to work with uncertainty, imagine alternative futures and transform existing conditions through conscious action [1;7–18 p.]. This approach is important for understanding prognostic competence, because a future specialist must be able to connect current knowledge with possible professional scenarios. At the same time, this concept remains rather broad and does not fully explain how prognostic competence should be developed within a concrete system of professional training.

OECD research also highlights the need to align higher education with changing skill demands and future labour market expectations [2;11–23 p.]. From this perspective, prognostic competence becomes not only a pedagogical category, but also an important factor of professional adaptability. It enables students to evaluate possible consequences of their decisions and to act responsibly in situations where standard solutions are insufficient. However, OECD approaches are mainly focused on skill needs and educational alignment, while the internal pedagogical structure of prognostic competence requires additional clarification. Labour market studies further strengthen the relevance of the problem. According to global discussions on future jobs and professional transformation, technological change, digitalization and the restructuring of professional functions are changing the requirements for graduates [3;31–45 p.]. Therefore, the future specialist should not only master a profession, but also understand how this profession may change. This makes prognostic competence a strategic component of professional readiness, especially in

conditions where long-term professional success depends on flexibility, analytical thinking and readiness for continuous development.

The competence-based approach provides an important theoretical basis for the present study. It allows prognostic competence to be considered as a significant educational outcome that reflects the student's readiness to apply knowledge in professionally meaningful situations [4;12–26-b.]. Nevertheless, competence-based models often describe the expected result more clearly than the process of its gradual formation. For this reason, the development of prognostic competence requires not only the definition of learning outcomes, but also the identification of pedagogical conditions, methods and developmental mechanisms. Studies on futures literacy in higher education demonstrate that students' ability to think about the future develops more effectively when educational content includes reflection, scenario analysis and active intellectual participation [5;art.102814]. This position is closely connected with prognostic competence, since forecasting professional situations requires not mechanical prediction, but the meaningful interpretation of tendencies, risks and possible consequences. However, futures literacy research is often oriented toward general educational transformation, while professional training requires a more specific pedagogical framework. The reflective dimension of prognostic competence is also emphasized in recent studies. Reflection helps students evaluate their own assumptions, reconsider decisions and understand the consequences of professional actions [6; 1–10-b.]. Without reflection, forecasting may remain superficial, because the student may predict a possible result without critically analyzing the reliability of the chosen solution. Therefore, prognostic competence should be viewed as a unity of analytical and reflective processes.

Recent research on futures literacy and students' preparedness for an evolving world shows that future-oriented thinking requires a combination of cognitive flexibility, critical analysis and responsible decision-making [7; art. 2588021]. This idea is important for the present study because prognostic competence also integrates several dimensions: knowledge of professional processes, ability to analyze change, readiness to compare alternatives and motivation for professional growth. Thus, it cannot be reduced to a single skill or isolated ability. The pedagogical aspect of this problem is also reflected in studies devoted to assessment and competence development in professional education. Researchers note that the development of complex competences requires clear criteria, meaningful indicators and educational tasks that allow students to demonstrate their abilities in practice [8; art. 1608850]. This conclusion is relevant to prognostic competence, because it cannot be adequately assessed through reproductive questions alone. It requires problem-based tasks, professional cases, scenario modelling and reflective justification of decisions.

Transformative and practice-oriented pedagogies also contribute to understanding the development of prognostic competence. They emphasize that students become active agents of change when they are involved in tasks that require analysis, choice, responsibility and reflection [9; art. 103459]. In relation to prognostic competence, this means that future specialists should be placed in educational situations where they need to predict possible developments, justify decisions and evaluate their professional consequences. The future skills framework in higher education further confirms that modern professional training should develop autonomy, self-organization, strategic thinking and readiness to act in open-ended situations [10; 21–60-b.]. These qualities are conceptually close to prognostic competence, because the ability to foresee professional changes is impossible without independent judgment, reflective evaluation and long-term planning. However, future skills frameworks usually present a broad classification of competences and do not always distinguish prognostic competence as an independent pedagogical construct.

The analysis of the reviewed literature shows that several approaches are relevant to the study of prognostic competence. The competence-based approach defines it as a result of professional training; the activity-oriented approach connects it with problem-based and practice-oriented tasks; the reflective approach emphasizes self-analysis and evaluation of decisions; the futures literacy approach develops the ability to work with uncertainty and alternative scenarios. Each of these approaches reveals an important aspect of the problem, but their integration into a unified conceptual-pedagogical framework remains insufficiently developed.

Table 1

Main approaches to the development of prognostic competence

Approach	Main focus	Relevance to the study
Competence-based approach	Learning outcomes and professional readiness	Defines prognostic competence as an educational result
Activity-oriented approach	Practice-based and problem-based learning	Supports the formation of forecasting skills through professional tasks
Reflective approach	Self-analysis and evaluation of decisions	Strengthens conscious professional self-regulation
Futures literacy approach	Uncertainty and alternative futures	Develops future-oriented and scenario-based thinking
Pedagogical approach	Content, methods and conditions	Provides the basis for purposeful competence development

Thus, the main research gap lies in the insufficient systematization of the conceptual and pedagogical foundations for developing prognostic competence in future specialists. Existing studies provide valuable ideas about future skills, futures literacy, reflection and competence-based education, but they do not fully clarify prognostic competence as a distinct pedagogical construct within professional training. This article addresses this gap by interpreting prognostic competence as an integrative component of professional readiness and by substantiating the pedagogical conditions necessary for its purposeful development.

Research Methodology. The methodology of this study is based on a conceptual and pedagogical research design aimed at clarifying the essence, structure and developmental conditions of prognostic competence in future specialists. The study does not treat prognostic competence as a narrow predictive ability, but as an integrative professional quality that combines the capacity to understand changing professional situations, analyze possible outcomes, make reasoned decisions and consciously plan further professional development. Therefore, the methodological logic of the research is built on the interrelation of theoretical analysis, conceptual generalization, pedagogical modelling and comparative interpretation of scientific sources. The research design consisted of several successive stages. At the first stage, scientific literature related to future skills, futures literacy, competence-based education, professional readiness, reflection and decision-making was analyzed. This made it possible to identify the theoretical foundations of prognostic competence and determine its relevance for modern professional training. At the second stage, the main approaches to the development of prognostic competence were compared, including systemic, competence-based, activity-oriented, reflective and prognostic approaches. At the third stage, the structural components of prognostic competence were clarified and grouped according to their pedagogical functions. At the final stage, the pedagogical conditions necessary for the purposeful development of this competence in future specialists were theoretically substantiated. The methodological basis of the study includes five interrelated approaches. The systemic approach allowed prognostic competence to be considered as a complex structure consisting of cognitive, analytical, reflective, motivational and practical-decision components. The competence-based approach made it possible to interpret prognostic competence as an expected result of professional training. The activity-oriented approach emphasized the importance of involving students in professional cases, problem-based tasks and simulated situations. The reflective approach helped to reveal the role of self-analysis, reconsideration of decisions and evaluation of possible consequences. The prognostic approach directed attention to future-oriented thinking, anticipation of professional changes and readiness to act under uncertainty.

The study used theoretical and analytical research methods. Theoretical analysis was applied to identify the conceptual content of prognostic competence and its connection with professional readiness. Comparative analysis was used to distinguish different scientific approaches and reveal their strengths and limitations. Generalization made it possible to synthesize the main pedagogical ideas related to future-oriented professional training. Pedagogical modelling was used to define the internal structure of prognostic

competence and determine the conditions for its development. Interpretive analysis helped to clarify how prognostic competence may be integrated into the educational process of higher education institutions. The research material included scientific publications on future skills, futures literacy, competence-based education, reflective learning and professional training, as well as methodological ideas related to the development of students' future-oriented thinking. In addition, the study considered pedagogical tasks, professional problem situations, reflective assignments and scenario-based learning formats as potential educational tools for developing prognostic competence.

Table 2

Methodological framework of the study

Methodological element	Content	Function in the study
Research design	Conceptual-pedagogical analysis	Defines the logic of the study
Main approaches	Systemic, competence-based, activity-oriented, reflective, prognostic	Provides theoretical foundation
Research methods	Analysis, comparison, generalization, modelling, interpretation	Clarifies the essence and structure of the concept
Research material	Scientific sources, pedagogical tasks, professional cases, reflective assignments	Serves as the basis for conceptual conclusions
Expected result	Pedagogical understanding of prognostic competence	Substantiates its role in professional training

The methodological structure of the study can be expressed through the following sequence: analysis of scientific sources, identification of conceptual approaches, clarification of structural components, determination of pedagogical conditions and formulation of theoretical conclusions. This sequence ensures the internal consistency of the research and allows prognostic competence to be examined not as an abstract concept, but as a pedagogically significant component of future specialists' professional readiness.

Analysis and Results. The analysis shows that prognostic competence in future specialists should be understood not as a separate predictive skill, but as an integrative professional quality that connects knowledge, analysis, reflection, motivation and decision-making. In the context of professional training, this competence enables students to understand the dynamics of professional situations, identify possible risks, compare alternative solutions and make justified decisions in uncertain conditions. Therefore, prognostic competence may be regarded as an essential component of professional readiness, especially in educational contexts where graduates are expected to act flexibly, responsibly and strategically.

The results of the study indicate that prognostic competence has a multidimensional structure. Its cognitive dimension is reflected in the student's ability to understand professional concepts, processes and situational factors. The analytical dimension appears in the ability to identify cause-and-effect relationships, compare possible developments and interpret professional risks. The reflective dimension is expressed through the student's capacity to evaluate personal assumptions, reconsider decisions and analyze possible mistakes. The motivational dimension reflects readiness for professional growth, responsibility and conscious self-development. The practical-decision dimension is manifested in the ability to choose a reasoned course of action and justify it in relation to expected outcomes. The analysis also confirms that the development of prognostic competence cannot be achieved through reproductive learning alone. Traditional tasks that require students only to recall information or reproduce theoretical definitions are insufficient for developing future-oriented professional thinking. Prognostic competence becomes visible when a student is required to work with uncertainty, analyze a problem situation, construct possible scenarios, compare alternatives and explain the logic of a chosen decision. For this reason, professional cases, scenario-based assignments, problem-oriented tasks, project activities and reflective discussions are more effective tools for developing this competence. The pedagogical development of prognostic competence follows a certain internal logic. At the first stage, the student learns to understand the professional situation and identify its main features. At the second stage, the student analyzes the factors that may influence the further development of the situation. At the third stage, possible scenarios and consequences are considered. At the fourth stage, alternative decisions are compared and evaluated. At the final stage, the student justifies the selected decision and reflects on its expected results. This sequence allows professional training to move from passive knowledge acquisition toward active, future-oriented professional reasoning.

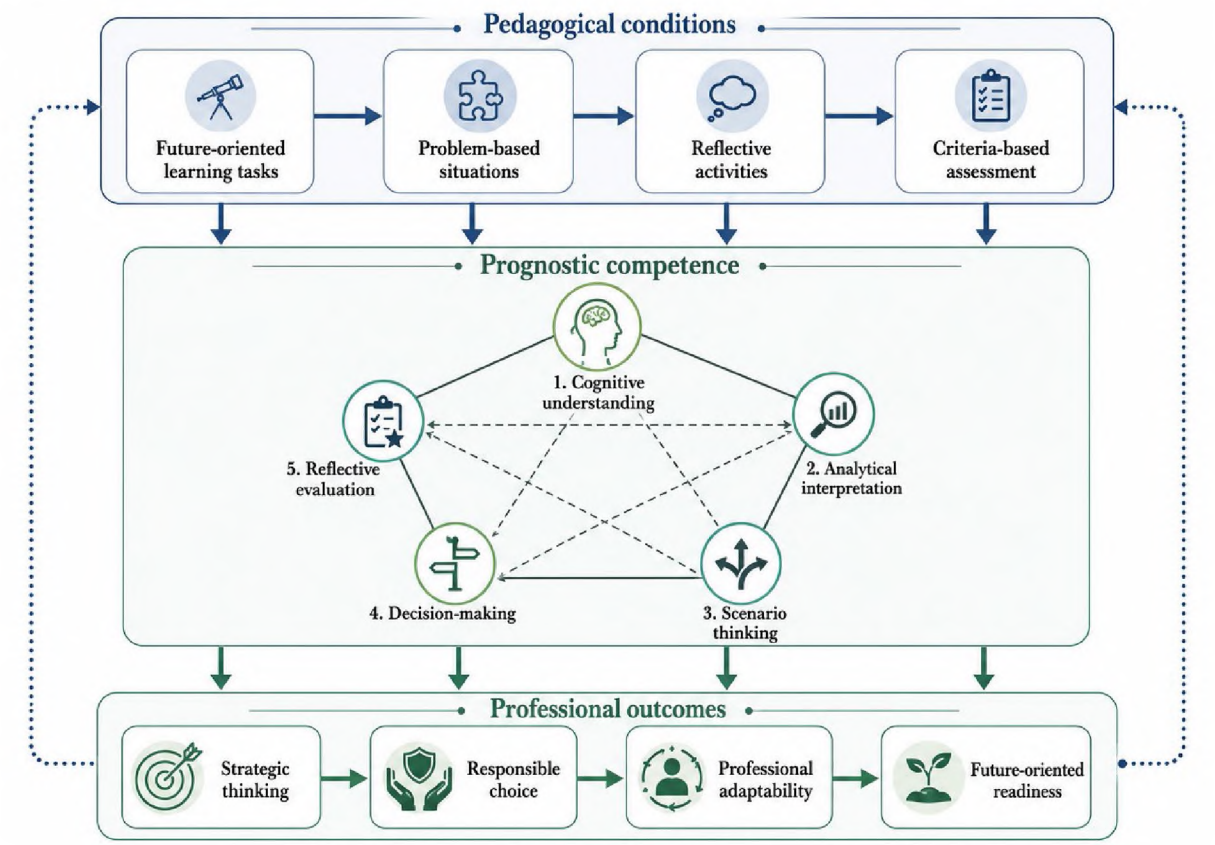


Figure 1. Logical sequence of developing prognostic competence.

The results demonstrate that prognostic competence develops more effectively when the educational process creates conditions for independent analysis, argumentation and reflection. In such conditions, students do not simply receive ready-made knowledge, but learn to use it as a tool for interpreting professional reality. They begin to understand that every professional decision may have short-term and long-term consequences. This understanding strengthens their ability to think strategically and increases their responsibility for the decisions they make. Another important result is that prognostic competence contributes to the formation of a future-oriented professional position. A student with a developed prognostic competence is able to perceive professional activity not as a fixed set of actions, but as a dynamic process that requires constant analysis, adaptation and improvement. Such a student is more prepared to respond to changes in professional requirements, technological development and social demands. Thus, prognostic competence supports not only professional readiness, but also professional resilience.

The analysis makes it possible to identify the main pedagogical conditions for developing this competence. These include the integration of future-oriented tasks into educational content, the use of professionally significant problem situations, the organization of reflective activities, and the assessment of students' reasoning rather than only final answers. In this regard, assessment should focus on how students analyze a situation, how they justify their predictions, how they compare alternatives and how consciously they evaluate possible outcomes. Overall, the study shows that prognostic competence is a strategically important component of future specialists' professional training. It enriches the concept of professional readiness by adding a future-oriented dimension. A professionally prepared graduate should not only know how to perform existing tasks, but should also be able to anticipate changes, evaluate risks, make reasoned decisions and design an individual trajectory of professional development. Consequently, the purposeful development of prognostic competence can be considered one of the key conditions for improving the quality of higher professional education.

Conclusion and Recommendations. The study confirms that prognostic competence is an essential component of future specialists' professional readiness. In modern higher education, a graduate is expected not only to possess professional knowledge and practical skills, but also to anticipate possible changes, assess risks, compare alternatives and make responsible decisions in uncertain situations. Therefore, prognostic competence should be considered an integrative quality that connects cognitive understanding, analytical thinking, reflection, motivation and decision-making. The analysis shows that the development

of prognostic competence requires purposeful pedagogical support. It cannot be formed only through traditional knowledge transmission or reproductive learning tasks. Future specialists need to be involved in educational situations that require scenario thinking, problem analysis, reflective evaluation and the justification of professional decisions. In this regard, prognostic competence becomes a significant factor in preparing students for flexible, strategic and future-oriented professional activity. The conceptual and pedagogical foundations identified in the study make it possible to understand prognostic competence as a dynamic and developmental construct. Its formation depends on the integration of several pedagogical conditions: future-oriented learning tasks, problem-based situations, reflective activities, professional cases and criteria-based assessment. These conditions help students connect theoretical knowledge with real or simulated professional contexts and develop the ability to evaluate the possible consequences of their actions.

The scientific significance of the study lies in clarifying the pedagogical essence of prognostic competence and defining its role in the structure of professional readiness. The practical significance is reflected in the possibility of applying the proposed conceptual foundations in the design of educational content, professional tasks, reflective assignments and assessment procedures aimed at preparing future specialists for changing professional environments. Based on the results of the study, several recommendations can be proposed. First, higher education curricula should include future-oriented and scenario-based tasks that encourage students to analyze possible developments of professional situations. Second, problem-based learning, case studies and project activities should be systematically used to develop students' analytical and decision-making abilities. Third, reflective assignments should become an integral part of professional training, as they help students evaluate their assumptions, decisions and expected outcomes. Fourth, assessment should focus not only on final answers, but also on the quality of reasoning, argumentation, risk analysis and justification of decisions.

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