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THE STRUCTURE OF METHODOLOGICAL COMPETENCE OF UNIVERSITY TEACHERS AND THE LEVELS OF ITS DEVELOPMENT

Abstract: The development of methodological competence among university instructors is a key factor in improving the quality of higher education and adapting to modern educational challenges. This study explores the structure, components, and levels of methodological competence, emphasizing the need for continuous professional development. A mixed-methods approach was employed, combining theoretical analysis with a review of the best global practices. The findings suggest that methodological competence encompasses pedagogical knowledge, research skills, adaptability, and innovation. The study also proposes a five-level classification system to assess instructors' methodological competence. Enhancing this competence through targeted professional development and digital learning strategies is crucial for improving teaching effectiveness and student outcomes in higher education.

Keywords: Methodological competence, university instructors, pedagogical knowledge, professional development, digital learning, higher education, assessment strategies, teaching innovation, blended learning, student-centered learning.

Introduction

The mission of education evolves in response to changes in the system of social values adopted by society. Along with the established notions of the patterns through which human development occurs via education, these changes have defined the content, forms, and methods of teaching and upbringing, pedagogical thinking, the position of educators and students, and the very structure of educational institutions—in other words, the essence of a given educational paradigm.

Kazakhstan’s higher education system is currently facing the challenge of implementing a new paradigm – “higher education as the formation and development of personality”. All necessary prerequisites for this transition have been established: the shift to a competency-based model of professional training, the introduction of a modular structure for educational programs, student-centered learning, teaching, and assessment, as well as a credit-based rating system for evaluating students' academic achievements.

The new paradigm of higher education is educationally oriented toward meeting the need for lifelong personal development in an ever-changing modern world. In reality, lifelong education (including self-education) is a continuous process of expanding an individual’s personal, cultural, and professional potential throughout life. Therefore, learning and teaching strategies must take this phenomenon into account.

In this regard, the teaching strategy in higher education is based on the principle that learning and teaching should be inclusive, aimed at upholding and promoting academic integrity and respect, and rooted in a rich research environment that fosters the principles of “research-based learning” and service to society. This approach enables students to conduct research, generate new knowledge, and develop critical thinking skills. At the same time, the learning context should shape students' perspectives on the importance of continuous professional development and skill enhancement, including those focused on personal growth.

Additionally, the teaching and learning strategy should be directed toward achieving excellence in education through evidence-based approaches that foster active, interactive, and innovative teaching and assessment methods, instructional design, and the development of partnerships.

The tools of this strategy include teaching methodology, learning and teaching methods, assessment systems, and evaluation techniques.

When shaping the academic environment, the learning strategy should be based on a comprehensive approach that considers the availability of appropriate educational laboratories, integrates aligned teaching and assessment technologies, and places special emphasis on the functional adaptability of the learning space to the goals and objectives of education.

Thus, the relevance of developing university instructors' methodological competence is determined by factors such as the advancement of educational technologies, the improvement of education quality, graduate preparedness for the labor market, and the modernization of educational and academic programs. It should encompass components and subcomponents that describe the presence of specific competencies.

Methods and organization of the study.

The research is based on a constructivist approach, as it is grounded in the understanding that the same phenomenon or process does not have a single objective interpretation. Overall, the study employs a mixed research methodology that combines both quantitative and qualitative research methods.

At the first stage, an analysis of scientific literature and regulatory legal acts was conducted (Kassenov et al., 2022).

For the literature review, filters were applied using key terms such as "methodological competence", "teaching methodology", "higher education teaching methodology", "didactic competencies of a teacher", and "personal competencies of a teacher" to search for articles and journals available in open-access sources within the fields of social sciences and education. Articles published in open-access scientific journals, including both theoretical and empirical studies, were selected. To ensure the effectiveness of the strategy, the largest multidisciplinary databases, such as Web of Science (WoS) and Scopus, were utilized. When analyzing domestic scientific experience, publications recommended by the Committee for Quality Assurance in Science and Higher Education were primarily used. To systematize the reviewed academic works, an annotated bibliography was compiled based on key terms.

The selected scientific works were studied according to the following hierarchy: review studies – theoretical and conceptual works – empirical studies.

As a result of this analysis, the level of research on the problem in academic literature was determined, and the components of teachers' methodological competence were standardized.

The next stage of the study involved an analysis of global best practices in developing teaching strategies in higher and postgraduate education. The first level of this stage consisted of a theoretical study of the concept of methodological competence. To achieve this, logical and dialectical analysis methods were applied, allowing for the systematization and structuring of the examined approaches. The second stage involved reviewing strategic documents from universities ranked in the top 50 of global university rankings. The outcome of this stage was the systematization of various approaches to understanding teachers' methodological competence and the development of its structure using synthesis and forecasting methods, simplifying its further application in the study.

Literature review

The concept of methodological competence among university teachers has gained increasing attention in educational research, particularly in the context of higher education reform and the demand for improved teaching methodologies. This review examines relevant literature on the structure, components, and development levels of methodological competence, drawing from contemporary pedagogical theories and empirical studies.

Methodological competence is broadly defined as a teacher's ability to apply pedagogical methods effectively to facilitate learning, conduct educational research, and integrate innovative teaching techniques. According to Shulman (1986), pedagogical content knowledge (PCK) is a critical element of a teacher's expertise, encompassing both subject knowledge and an understanding of how to teach it effectively. The studies (Darling-Hammond, 2017; Mukhatayev et al., 2024; Agnihotri, 2024) further emphasize the role of reflective practice in enhancing methodological competence, where educators continuously assess and refine their teaching strategies.

Methodological competence is a critical attribute for educators and researchers, encompassing a range of skills and knowledge areas that enhance teaching effectiveness and academic inquiry. This competence is built on several core components that collectively shape an educator's ability to design, implement, and evaluate teaching and learning processes effectively. Firstly, pedagogical knowledge refers to an educator's understanding of teaching principles, curriculum development, instructional design, and assessment strategies. It includes familiarity with various teaching models, learning theories, and student-centered approaches that enhance engagement and comprehension. Scholars such as Mishra & Koehler (2006) emphasize the integration of technological, pedagogical, and content knowledge as an essential framework for modern educators, ensuring effective teaching in digital and traditional classroom settings.

Methodological competence also requires proficiency in educational research, encompassing the ability to design studies, collect and analyze data, and apply research findings to practice. Research skills enable educators to:

- Develop research questions and select appropriate methodologies.
- Conduct qualitative and quantitative research to explore educational challenges.
- Interpret data to make evidence-based improvements in teaching.
- Publish findings and contribute to the academic discourse on educational best practices.

As noted by Creswell (1994), strong research skills empower educators to adopt a scientific approach to pedagogy, ensuring that their teaching methods are based on empirical evidence rather than intuition alone.

Innovation in education involves the integration of technology, active learning methodologies, and interdisciplinary approaches to enhance student engagement. Effective educators employ innovative teaching strategies such as: combining traditional face-to-face instruction with online resources and interactive tools; encouraging students to review learning materials before class, enabling more interactive discussions and problem-solving during lessons; using game-based learning techniques and real-world simulations to reinforce concepts; enabling teamwork and peer discussions to develop critical thinking and problem-solving skills. Williams J.K. (2008) highlight the importance of digital learning environments and adaptive technologies in enhancing methodological competence, ensuring that educators remain at the forefront of instructional innovation.

Continuous professional development and self-evaluation are key aspects of methodological competence. Educators who engage in reflective and adaptive practices:

1) Regularly assess their teaching effectiveness and make necessary adjustments.
2) Seek feedback from students and colleagues to identify areas for improvement.
3) Stay updated on the latest research and advancements in educational methodologies.

4) Engage in lifelong learning through workshops, conferences, and professional learning communities.

Brookfield (1996) underscores the significance of critical reflection in teaching, arguing that self-awareness and adaptability allow educators to refine their approaches and respond effectively to changing educational landscapes.

Effective communication and collaboration are essential for fostering knowledge exchange and improving pedagogical practices. Educators must be able to communicate complex concepts clearly to students and colleagues; work collaboratively with peers, researchers, and industry professionals to enhance learning outcomes; engage in interdisciplinary cooperation to develop comprehensive educational programs; participate in academic networks, conferences, and online communities to stay informed about emerging trends. Hargreaves & Fullan (2012) emphasize the role of professional learning communities in enhancing methodological competence, as collaboration among educators leads to shared knowledge and improved instructional strategies.

Methodological competence is a multifaceted skill set that requires a balance of pedagogical expertise, research proficiency, innovation, adaptability, and collaboration. By continuously developing these components, educators can enhance their teaching effectiveness, contribute to academic knowledge, and ultimately improve student learning outcomes. As the educational landscape evolves, methodological competence remains a foundational pillar for educators committed to excellence and lifelong learning.

Based on the components of the teacher's methodological competence, we further consider the levels of its development. The development of methodological competence among university teachers follows a structured progression, reflecting an educator's growing mastery of teaching methods, research integration, and pedagogical innovation. Scholars have proposed various models to assess this development, with one widely accepted framework classifying it into four levels: Basic, Intermediate, Advanced, and Expert (Korthagen, 2004; Gibbs, 1988; Tondeur et al., 2012; Lunenberg et al., 2006). Each level represents an increasing degree of proficiency, autonomy, and contribution to the academic community.

The increasing digitalization of education necessitates a reevaluation of methodological competence in higher education. Different studies highlight the importance of digital pedagogy, online learning platforms, and artificial intelligence-assisted teaching as emerging domains requiring methodological expertise (Selwyn, 2010; Caena & Redecker, 2019). The COVID-19 pandemic further accelerated the adoption of blended and online learning models, underscoring the need for university educators to develop digital competencies alongside traditional teaching skills (Hodges et al., 2024).

The development of methodological competence is a dynamic and lifelong process that progresses through distinct levels, from basic instructional skills to expert-level educational leadership. Each stage builds upon the previous one, encouraging educators to refine their teaching strategies, integrate research-based methods, and contribute to pedagogical advancements. By recognizing where they currently stand and identifying areas for growth, university teachers can take intentional steps to enhance their methodological competence, ultimately improving student learning outcomes and advancing the field of education.

The literature underscores that methodological competence is a multifaceted construct encompassing pedagogical knowledge, research skills, adaptability, and innovation. Its development follows progression from basic to expert levels, influenced by continuous professional learning and technological advancements. Future research should explore strategies for effectively enhancing methodological competence among university educators in an evolving educational landscape.

Results and discussion

In the context of student-centered learning, teaching, and assessment, the primary focus of a university's development strategy is the enhancement of the academic environment, including learning spaces and infrastructure, particularly digital infrastructure. A crucial factor in this strategy is ensuring the high quality of faculty performance.

In this regard, the teaching and learning framework should structurally reflect three fundamental principles:

1. The evolution of student-centered teaching and learning approaches;
2. The transformation of curricula and assessment systems based on inclusivity and integrity;
3. The development of students' professional skills and personal growth competencies.

In a student-centered learning environment, teaching approaches should be focused on meeting students' needs, interests, abilities, and opportunities, which is dictated by the inclusive nature of education. Higher education institutions should implement adaptive learning approaches, effectively combining face-to-face interactions between students and instructors with online learning. A blended learning approach adds flexibility to the teaching and learning process, allowing instructors to reconsider where and how they focus educational activities while enabling students to develop independent learning skills and digital literacy.

Blended learning necessitates that both instructors and students acquire IT competencies.

This restructuring of teaching modifies the learning process, encouraging students to engage more deeply with their subjects during face-to-face sessions by interacting with peers and refining their understanding of course materials. Teaching should leverage educational technologies to create blended learning approaches that enhance students' comprehension of course content in both face-to-face and online settings.

It is also essential to adopt an interdisciplinary approach—not only in designing curricula but also in forming teams where students collaborate on academic tasks, known as team-based learning.

This approach has several positive effects on personal development:

- Firstly, it enhances the diversity of contributions from different categories of students, faculty, and other staff members;
- Secondly, it provides students with opportunities to interact with their peers and build relationships essential for overall well-being;
- Thirdly, it fosters both personal responsibility for learning and teamwork skills necessary for group work and collaborative learning.

Additionally, summative and formative assessments should be redesigned to align with real-world challenges within the broader transformation of educational programs. Assessment strategies should address global social issues, uphold the values of inclusivity and integrity, draw on best practices in teaching and assessment, and integrate work-related, professionally recognized learning opportunities for students.

A key focus of the learning strategy is the development of two skill categories:

- Disciplinary knowledge and skills, with in-depth mastery leading to professional certification opportunities;
- Soft skills, including attributes, dispositions, and competencies that contribute to academic and career success.

Therefore, a core goal of the teaching and learning strategy is the development of instructors' methodological competencies necessary for effective teaching in their respective disciplines. Achieving this goal requires aligning faculty professional competencies with the educational needs of institutions and students while fostering motivation and engagement in continuous professional development.

By doing so, we will ensure the effective application of knowledge in educational program development, pedagogy, and best practices, enabling faculty to become highly effective educators. This includes demonstrating key teaching and learning skills such as lesson planning, assessment, addressing special needs and inclusion, designing high-quality instructional resources, and effectively using diverse evaluation strategies and tools to monitor student performance and progress based on planned learning outcomes.

The conducted research has allowed us to construct a framework for university faculty's methodological competence, identifying its components and subcomponents accordingly.

In the evolving landscape of higher education, particularly in technical and rapidly developing fields such as information technology, the methodological competence of university instructors plays a critical role in ensuring the quality of teaching and student learning outcomes. Methodological competence, in this context, refers to a complex, multi-component system of professional knowledge, skills, and attitudes that allow educators to design, deliver, and improve the learning process in alignment with modern pedagogical requirements and technological advancements. Based on the conducted research, this chapter presents a structured model that outlines the key components of methodological competence for IT discipline teachers.

The **knowledge component** serves as the foundation of methodological competence. It encompasses a thorough understanding of national and institutional curricula, educational standards, and the broader goals of instruction. Teachers must not only master their subject matter but also be proficient in a variety of teaching methods and strategies that accommodate diverse student needs and classroom dynamics. Moreover, this component includes awareness of cultural and social factors that affect education—an essential skill in multicultural and international learning environments. Continuous professional development and the ability to stay updated on new research, teaching trends, and interdisciplinary linkages are also integral to this dimension.

The **didactic component** relates to the practical aspects of teaching, including curriculum development, lesson planning, classroom management, and assessment. Instructors must be able to design coherent learning programs with well-defined objectives and logically sequenced content. Effective lesson planning requires the ability to adapt teaching methods to learner needs while maintaining a structured, goal-oriented approach. Furthermore, a supportive and stimulating learning environment—both physical and virtual—is essential to foster engagement and motivation. The ability to manage classrooms, whether in-person or online, and implement a range of assessment techniques is equally important in this component.

Closely tied to didactic practice is the **design component**, which focuses on the strategic planning and implementation of educational projects and programs. Teachers must be able to define clear goals, develop meaningful content, and structure educational activities in a way that maximizes learning outcomes. Flexibility is a key aspect here; instructors should adapt their plans to accommodate students with varying learning needs, preferences, and backgrounds. Collaboration is another essential element, as educational success often depends on effective teamwork with colleagues, administrators, and industry stakeholders.

The **informational component** reflects the teacher's capacity to interact with a constantly evolving knowledge environment. IT instructors must be adept at searching for, evaluating, and organizing educational content using a wide range of sources—from textbooks and scholarly articles to digital platforms and multimedia tools. In addition, they need to be capable of translating complex information into accessible, student-friendly formats. This includes supporting the development of students' information literacy, enabling them to navigate, analyze, and interpret data independently and critically.

Effective teaching also hinges on strong communication abilities, which form the **communicative component** of methodological competence. Instructors should possess skills

in active listening, oral and written expression, and non-verbal communication. The ability to understand students' perspectives, empathize with their experiences, and provide meaningful feedback is crucial for building trust and maintaining a productive learning atmosphere. Moreover, conflict resolution skills are essential for managing interpersonal challenges that may arise within academic settings.

The **reflexive component** involves the teacher's capacity for self-assessment and continuous improvement. This includes introspection, or the ability to critically evaluate one's own teaching practices, as well as openness to peer feedback and professional dialogue. Documenting reflections through journals or teaching portfolios allows instructors to monitor their progress and identify areas for development. Commitment to lifelong learning and a proactive approach to professional growth underscore the importance of this component.

Equally important is the **monitoring component**, which relates to the teacher's ability to define learning objectives, measure student progress, and adjust instruction accordingly. Competent instructors employ a variety of assessment tools to collect meaningful data on student performance. They analyze this data to identify trends, challenges, and areas for intervention. Importantly, they provide students with timely, constructive feedback and use the results to enhance instructional strategies and learning outcomes.

Finally, the **personal and motivational component** addresses the internal qualities that support effective teaching. These include pedagogical empathy—the ability to understand and respond to students' emotional and academic needs—as well as strategies for motivating learners through relevant, engaging tasks. Teachers must also demonstrate emotional resilience, ethical behavior, and a collaborative spirit in their interactions with colleagues and students alike. These traits contribute to a professional climate that fosters trust, innovation, and student-centered learning.

Together, these eight components form a holistic model of methodological competence that is essential for IT discipline instructors in higher education. The model underscores the integration of theoretical knowledge, practical skills, reflective practice, and interpersonal attributes. By developing and reinforcing these elements, educators can enhance their teaching effectiveness, respond to the dynamic demands of the digital age, and contribute meaningfully to the advancement of academic quality and student success.

Based on analysis and conducted research, we have identified the levels of methodological competence development among university faculty. The determination of the level of methodological competence skills can be made using five levels: advanced, high, medium, acceptable, and low. The assignment of a specific level to a percentage range will depend on the context and specific assessment criteria. Below is the proposed scheme for defining levels and their percentage distribution:

Expert Level (95-100%): At this level, the educator possesses a highly advanced level of methodological competence. They demonstrate a deep understanding of methodological principles and possess a wide range of skills across all components of methodological competence. The educator is capable of applying teaching methods and approaches innovatively and creatively, effectively using various methodological techniques and technologies, and adapting them to different learning contexts.

High Level (85-94%): An educator at this level demonstrates high methodological competence. They have in-depth knowledge and a broad range of skills in most components of methodological competence. The educator successfully applies various teaching methods, adapts instructional materials and resources to students' needs, effectively assesses learners, and analyzes learning outcomes.

Medium Level (75-84%): At this level, the educator possesses solid foundational knowledge and skills in methodological competence. They are capable of applying basic

teaching methods and techniques, selecting and creating instructional materials, adapting them to students' needs, and conducting fundamental learner assessments.

Acceptable Level (50-74%): At this level, the educator has limited knowledge and skills in some components of methodological competence. They can apply basic teaching methods and techniques but with limited flexibility and innovation. The educator requires further development of methodological skills and an increase in knowledge in the field of teaching methodology.

Low Level (1-49%): At this level, the educator has very limited or no knowledge and skills in many components of methodological competence. They struggle with applying teaching methods and techniques, selecting and adapting instructional materials, and assessing learners. The educator requires significant training and support to develop their methodological competence.

It is important to note that the percentage assignment for each level is relative and may be contextual. This scheme presents a general concept for assessing levels of methodological competence and can be adapted according to the specific criteria and expectations of an educational organization or system.

Conclusion

The development of methodological competence among IT discipline instructors plays a key role in ensuring high-quality education and preparing future specialists in the field of information technology. Given the rapid advancement of the IT sector, the demand for professionals with deep knowledge and skills, and the need to adapt educational programs to modern labor market requirements, the issue of improving instructors' methodological training has become particularly significant.

This section analyzes the factors influencing the need for methodological competence development, examines the key components of instructors' methodological training, and proposes a phased improvement concept. Special attention is given to the integration of advanced national and international experiences, as well as scientific-pedagogical approaches that can contribute to more effective teaching and learning of IT disciplines.

Key Research Findings:

- A structured ranking of methodological competence components for IT discipline instructors has been developed, with a detailed description of the required knowledge and skills corresponding to each component.

- Five levels of methodological competence development for IT instructors have been identified: expert, high, medium, acceptable, and low, along with a clear description of each level.

In the future, based on the proposed structure and levels of development, as well as the analysis of advanced domestic and international experience in the system of training and professional development for personnel in the pedagogical field, it will be possible to develop a concept for enhancing the methodological competence of university faculty. The goal is to further develop faculty members' methodological competencies necessary for the successful teaching of disciplines in their respective fields.

The concept will enable the targeted development of the following competencies:

- The ability to effectively apply knowledge in the design of educational programs and utilize appropriate pedagogical methods and practices for successful teaching;

- Advanced demonstration of key teaching and learning skills, including lesson planning, assessment, and consideration of special needs and inclusion;

- The capability to develop high-quality teaching and methodological materials for disciplines with the integration of information and communication technologies, as well as the effective use of diverse assessment strategies and tools to monitor students' academic

performance and progress in accordance with planned learning outcomes.

The limitations of the study include its theoretical nature, as well as the assessment of the development process within a narrow group of faculty (primarily IT discipline instructors). In the future, the practical application of the conceptual foundations for the development of university faculty's methodological competence is planned, along with its dissemination at the national level.

Conflict of Interest Statement

The authors declare no potential conflicts of interest regarding the research, authorship, or publication of this article.

Author Contributions

Aidos Mukhatayev: Conceptualization, Methodology. Serik Omirbayev: Data curation, Writing - Original draft preparation. Andrii Biloshchytskyi: Methodology, Writing - Original draft preparation. Khanat Kassenov: Visualization, Investigation. Sapar Toxanov: Supervision. Saulesh Mukanova: Software, Validation. Zhekibayeva Botakoz: Writing- Reviewing and Editing,

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