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Practical aspects of the use of new teaching methods at the university for the development of professional competency of future mathematics teachers

Mariyam Abisheva*

Sh. Ualikhanov Kokshetau University
020000, 76 Abay Str., Kokshetau, Republic of Kazakhstan

Nina Stukalenko

Sh. Ualikhanov Kokshetau University
020000, 76 Abay Str., Kokshetau, Republic of Kazakhstan

Zhadyra Yermekova

L.N. Gumilyov Eurasian National University
010008, 2 Satpayev Str., Astana, Republic of Kazakhstan

Aisulu Shayakhmetova

Sh. Ualikhanov Kokshetau University
020000, 76 Abay Str., Kokshetau, Republic of Kazakhstan

Gulsara Zhussupbekova

Sh. Ualikhanov Kokshetau University
020000, 76 Abay Str., Kokshetau, Republic of Kazakhstan

Abstract

Relevance. The study's relevance is based on significant changes in the higher education system. The Ministry of Education now requires clear outcomes and organisation of the educational process. Transitioning to innovative methods reflects the goals of educational reform, making the selection of teaching methods for future mathematics teachers crucial.

Purpose. The paper aims to substantiate the practical aspects of using modern forms and methods of teaching students due to introducing new educational standards based on a competency-based approach.

Methodology. The leading methods of studying this problem include analysis and synthesis, classification, deduction, generalisation, and comparison of approaches. These methods help identify and highlight the main innovative teaching technologies and their use in universities.

Results. The study analyses and clarifies interactive and innovative teaching methods, highlighting their advantages over conventional methods. It develops a teaching technique to enhance critical thinking and professional competency and presents findings on teachers' perspectives and student-teacher attitudes towards new methods.

Conclusions. The study concludes that interactive and innovative teaching methods significantly improve the quality and efficiency of education for future mathematics teachers. These methods foster critical thinking, enhance professional

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*Corresponding author



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competencies, and create a more engaging learning environment. The transition to these methods is beneficial and necessary for meeting modern educational standards and demands.

Keywords: mathematics teacher; higher education; innovative methods; competency-based approach.

Introduction

The volume of research related to teacher education is huge and focuses on a variety of unresolved aspects, such as quality education and professional development. The problem of practical application and management of innovative processes in the field of education has its difficulties. Special attention is focused on the fact that an innovative approach to teaching future mathematics teachers should be systematic and cover all aspects of the educational process. The development of future specialists' professional competency is also important. It is worth considering theoretical and practical approaches to the content of the educational process and teacher training, and the development of new forms and methods of teaching.

The system of teaching students at the university developed over the years, worked out and honed to the smallest detail, is based on three minimum conditions: students' motivation; the personality of the teacher, who is a unique carrier of knowledge and culture; the textbook and the level of its understanding by future teachers [1]. One of the main requirements for future teachers' training is the interactivity of learning, which is based on the use of new methods. The transition to a competency-based approach in the organisation of the learning process provides for the widespread use of active and interactive technologies for conducting classes in combination with independent work. Classes based on new methods and forms of education should make up at least 20% of classroom studies. According to I.Yu. Tarkhanova [2], productive interaction consists of value-oriented unity, the presence of purposes, tasks, and technologies of interaction.

E.B. Nastuev [3] believes that improving the professional competence of a teacher plays an important role in the educational system and affects its quality. The search for ways to optimise it remains one of the most relevant areas of pedagogy. In the process of acquiring theoretical and practical skills by students, it is important to consider that knowledge is a complex and multifactorial phenomenon. They are not in material things, documents, books, or information technologies but in society [4]. There is no doubt that the development of competencies takes place gradually and systematically. Professionals develop their competencies and skills in various ways depending on the contextual issues affecting their practice and how they understand the practice. Progress will be achieved only if university teachers use new methods and key knowledge extracted from research in various fields [5]. Many scientists believe that the development of the desired competency is possible within the context of contextual learning, where much attention is paid to the development of professional mathematical and communicative culture [6].

The purpose of the paper is to theoretically substantiate the essence of interactive learning technologies and their practical use in the educational process. It aims to study aspects of the transformation of knowledge, experience, and belief systems into professional competence through progressive professional development. The paper also

considers the methodological aspects of organizing new educational technologies in the educational process and describes recommendations for their use. Furthermore, it diagnoses the advantages of interactive learning in the development of students' professional competencies.

Education is a strategic basis for the development of the individual, society, and the state. The relevance of the study is that the transition of post-industrial society into a global information society is an important aspect of education, which increases the importance of using innovative teaching methods for teachers. In modern society, the knowledge and competency of specialists play an important role. As a result, very high requirements are put forward for the educational system, where the main thing is the training of specialists for life and activity in a wide, dynamic world, where a person is constantly faced with non-standard tasks and problems, the solution of which depends on one's skills and the diagnosis of one's own actions. It is innovative methods of training mathematics teachers that will become an important aspect of the development and implementation of Kazakhstan's innovation policy.

Theoretical foundations of the practical application of innovative methods in professional competency development

Modern changes taking place in society's socio-economic life put forward new requirements for the professional training of future mathematics teachers and teaching staff for universities. Many scientists, researchers and practitioners now recognise interactive forms, methods, techniques, and technologies of teaching as effective. The study and application of innovative methodological approaches in practice are conditioned upon the rapid pace of globalisation of society, and, consequently, the reform of the educational system. This is the reason for the improvement of long-known and the introduction of new methods of work to increase the efficiency of the educational process and the level of student's knowledge. The transition to new forms and methods of teaching enriches the content of the subject, changes the learning conditions, sets new requirements for the educational process, and contributes to the creation of better cooperation between teachers and students [7].

Among the learning models, one can distinguish conventional or classical, active and interactive [8]. The specific feature of the conventional one is that students perceive and assimilate the material from the words of the teacher or from written material. The basic idea is that students demonstrate only reproductive knowledge and skills. The active model provides for the stimulation of cognitive activity and independence of students, where most of the study is based on problematic and creative tasks. This method includes such types as conversations, quizzes, open mic, information search, implementation of individual creative projects, etc. The interactive form provides for the creation of comfortable learning conditions, where teacher-student interaction takes place

based on modelling life and professional situations. The leading methods are role-playing games, search situations, empathy, introspection, and joint problem-solving. The teacher in interactive learning is not only a carrier of information but also actively stimulates the student to independent creative work. In addition, interactive activities provide for the creation and development of such communication, which leads to mutual understanding and joint solution to common problems. The most well-known methods are interactive learning methods (new technologies): case method, discussions, project method, role-playing and business games, training sessions, team competitions, etc.

The main principles of using new methods in the development of future mathematics teachers' professional competency are as follows: The principle of activity involves gaining knowledge through experience. The principle of openness shows the boundaries of knowledge and presents problematic tasks that require research to solve. The principle of freedom of choice allows individuals to choose forms and opportunities to present their opinions. The principle of feedback includes monitoring the learning process, summing up, evaluating seminars, and discussing the learning process [8].

As is known, the basis of new educational technologies should be the social mandate, professional qualities and interests of future mathematics teachers, and their characteristics [9]. When teaching and training specialists at universities, the use of innovative forms and methods should be combined with a pragmatic awareness of the goals and objectives of professionals' training. In modern psychological and pedagogical literature, it is noted that new technologies and forms are reflected in the development of the learning process, its improvement, and the preparation of mathematics teachers for professional activity in various spheres of modern society [10]. Their functions consist in the development and consolidation of professional knowledge, skills and abilities of students, the development of professional qualities of a future teacher. Teachers' use of innovative methods in the learning process will help to overcome stereotypes and create new approaches to professional situations, and the development of students' creative abilities. An effective form of educational work for the development of key professional

competencies of future mathematics teachers is the use of various active teaching methods: creating projects, preparing public speeches, discussing important issues, teaching in pairs, creating problem tasks, preparing presentations, etc.

There are three conditions for an effective educational process: 1) optimal use of study time (effective structuring of teaching time); 2) encouragement of cognitive activity, which includes cognitive activation; and 3) constructive support.

In particular, three groups of knowledge were identified for future mathematics teachers. These include methodological knowledge, which encompasses knowledge of the methodology of teaching mathematics, understanding of the subject's content, proficiency in solving problems of varying complexity, and awareness of how students absorb specific topics. Pedagogical knowledge involves foundational pedagogical knowledge and interdisciplinary insights crucial for enhancing the learning process. Special knowledge entails a deep understanding of individual topics [11].

For effective training of students, teachers not only need to have a solid knowledge base but also be motivated to use a variety of new teaching methods. Interest and enthusiasm in professional activity can be decisive in determining the forms of work in the audience, readiness for the introduction of new technologies.

Classification of new methods of training future teachers of mathematics

Interactive learning manifests itself in the subjective position of students, and their activity in achieving educational goals. It is this understanding of the essence of learning that corresponds to the principles of competency-oriented professional education. A.I. Timonin [12] argues that has become a subject of professional education, a person can purposefully master professional qualities and knowledge, use technologies for carrying out activities, understand the values of their activities, and ensure their individual career growth.

The classification of interactive teaching methods plays an important role in the author's research (Table 1).

Table 1. New teaching methods

Groups of methods	Examples
Methods of intensification of intellectual resources	The following forms are used in the educational process: the method of brainstorming, and case-study. A distinctive feature of this group of methods is the active involvement of the student and the presence of interactivity. Therewith, all subjects of the process of cognition and creativity are equal since there is an interaction between students and teachers, where everyone can equally take part in the discovery of new knowledge and combine experience in solving professional and problematic tasks.
Methods of creating a communicative environment	The following technologies can be used in training: projects, role-playing games, contests, etc. This group of methods assumes that all subjects of the educational process will be included in a single space (scientific, educational, communicative). An important feature of these methods is the deepest immersion of participants in the communication process, where all the existential characteristics of a person are manifested: bodily, mental, intellectual, value, aesthetic, and worldview.

Methods of "enabling" virtual reality	This group of methods assumes that the centre of the communicative system is not the object (knowledge, task) but the student himself. Accordingly, the entire educational process is aimed at the student. In a computer environment, one can use different capabilities and software tools to simulate a particular professional (technical, economic) situation, problem, or task.
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Note: the table shows the main interactive and innovative methods of forming the future teachers' professional competency.

Source: [13].

Thus, it can be concluded that with all the variety of approaches to understanding new teaching methods, their focus on organising the interaction of future mathematics teachers with the field of learning experience remains unchanged. This feature allows referring to the versatility of these forms and technologies of education because their use allows forming not only professional but also general cultural competencies of university students.

Research stages and results

The conduct of this experiment involved the following stages of work:

- study of literature and research devoted to the development of future teachers' professional competency based on the use of new teaching methods; substantiation of conceptual ideas and methodological foundations of teachers' professional competency development;
- diagnosis of the level of positive aspects and frequency of use of innovative methods for the development of professional competency of a teacher; demonstration of graphical processing of research results;
- formalisation of recommendations for the development of mathematics teachers' professional competency.

The study allowed for the identification and analysis of the attitude of university teachers towards interactive teaching methods, which are being actively introduced into the educational process of higher educational institutions. The author used the test "Modern technologies and interactive forms and methods of teaching in higher education" [14]. In addition, the experiment was based on the observation of future teachers in the conditions of training and practice, and a conversation with teachers. In particular, the author's research focuses on establishing the attitude of the teaching staff and students to new teaching methods and showing their effectiveness or inefficiency. In total, 156 students and teachers were covered by the study, but the direct participants of the experiment were 98 participants who passed the test and took part in the discussion, which helped to discover the strengths and weaknesses of the use of interactive methods.

Analysis of the results of the diagnostic examination allowed the conclusion that the majority of university teachers use innovative teaching methods in the process of teaching their disciplines (45%). Teachers of social and humanitarian disciplines most often used these forms of teaching, but representatives of natural science disciplines did not often resort to such technologies and were more inclined to the conventional approach of teaching. This can be explained from the standpoint of the importance of the theoretical part of natural sciences study and the individual character of performing practical tasks on them. Approximately 53% of students and teachers believe that interactive methods contribute to the development of their professional, and general cultural competencies, influence the development of interest in the teaching profession, form skills for non-standard problem-solving and informed decision-making, the desire for self-demonstration and self-improvement (Figure 1).

The advantages of interactive learning in developing future mathematics teachers' professional competencies include several key aspects. It facilitates productive interaction with the world (27%), fosters an atmosphere for individual expression (22%), and encourages introspection and reflection on educational experiences (19%). Additionally, it promotes subjectivity (15%) and enhances motivation through engaging technologies and methods (17%). However, 34% of respondents struggle to evaluate these methods' impact on professional competency, and 13% believe only traditional methods are effective in preparing teachers. Students do not like classes using new methods because the conventional lecture-seminar form of education is closer to them. Interestingly, the last group of survey participants identified the motivating effect of the methods as a negative trait. They expressed the opinion that interactive methods are not effective in the development of competencies because they have no specific features and are based on play, and entertainment, which is not related to solving professional tasks. In addition, the low management capabilities of the interactive learning process, including the discipline of students, were highlighted.

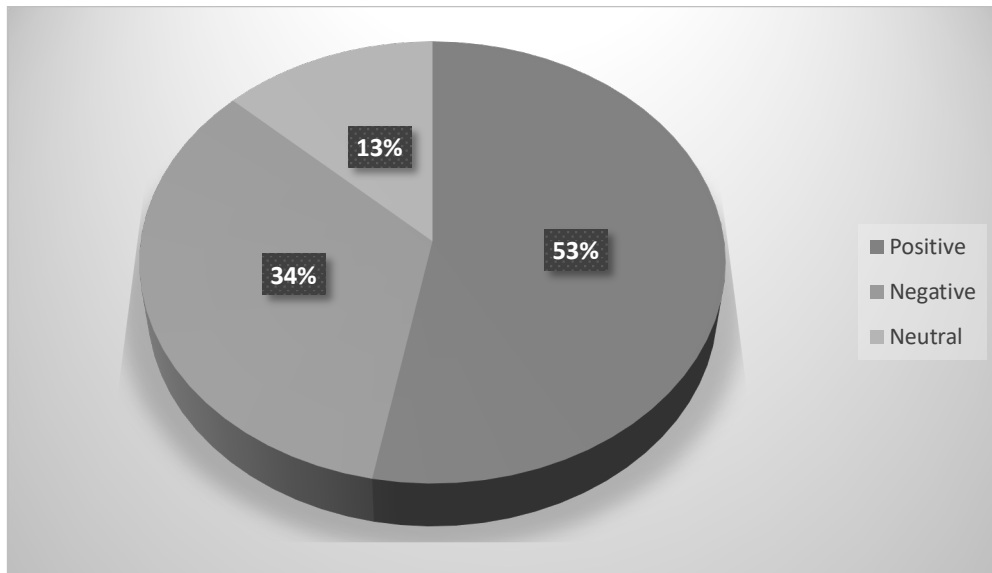


Figure 1. Attitude to new methods and their practical application in universities

To solve the tasks of forming professional competencies, teachers most often use the following innovative methods and forms: round table, discussion, debate (33%); brainstorming (34%); situational analysis (14%); and business and role-playing games (19%).

Thus, after analysing the answers of teachers and students, it can be concluded that new methods of professional competency development are being actively introduced into the educational process and are considered effective among scientific and pedagogical workers, which is proved by their effectiveness in competency-oriented education, although conventional methods are also important. The negative attitude towards the use of these forms of education is associated with the conservatism of teachers and the belief in the priority of knowledge over competency. There is a well-established opinion that these methods are not serious and have nothing to do with solving the problems of professional training, but such an approach is unreasonable.

Having analysed the methods and forms of teachers' professional training, it is worth identifying aspects that will contribute to the development of mathematics teachers' professional competency:

1) creation of conditions for effective design and implementation of the educational process involves identifying gaps and shortcomings in mathematical knowledge and skills, as well as in logical reasoning. It includes explaining the distinction between facts and consequences, studying the effectiveness of teaching methods, techniques, and educational tools. Furthermore, it entails developing an understanding of the fundamentals of mathematical modeling and preparing to apply modeling to problem-solving, along with enhancing skills in analysis and design;

2) development of advanced training programmes for mathematics teachers not only by specialisations but also by interdisciplinary programmes, which is based on the modern needs of school education; creation of an educational programme for organising and conducting qualifications of teaching staff will help to clearly define

knowledge, skills, attitudes, professional qualities, values that can be measured and demonstrated;

3) creating conditions for the development of individual professional development;

4) systematic updating of the content of advanced training courses to meet the rapidly changing educational requirements of society;

5) advanced training of experienced teachers based on their involvement in the organisation and conduct of students' pedagogical practice;

6) the use of various innovative forms and methods of teacher training, which are focused on competency-based, personality-oriented, activity-based approaches through interactive technologies, problem-based, design, and research methods based on integrated and information support of the educational process;

7) strengthening of cooperative and research orientation in the development of professional competency; changing the conventional role of the teacher;

introduction of new organisational forms of advanced training of mathematics teachers;

9) development of cooperation between higher pedagogical education institutions and schools for the development of mathematics teachers' professional competency;

10) disclosure of the requirements for the teaching methodology of a mathematics teacher;

11) organisation of supervisors' training who are responsible for the process of adaptation of teachers to the conditions of professional activity in an educational institution; selection and organisation of training of mentors [11].

Analysis of research on the subject

The problem of the practical use of new methods of teaching and training mathematics teachers in pedagogical universities is constantly in the zone of increased attention of researchers who are engaged in the study of issues of mathematical education. Nowadays, it is important not only to teach the subject well and know its theoretical foundations but also to develop the mathematical abilities

of schoolchildren. To stimulate development, a highly qualified teacher should be able to effectively apply knowledge, life experience, and personal and professional values. In Kazakhstan and Russia, it is urgent to improve the methodological training of teachers since the importance of pedagogical personnel who will be able to set new purposes and fulfil the tasks of modernisation of education is growing in society. The system of training a mathematics teacher is of particular importance since several problems can be traced: the low level of knowledge of applicants; the formal quality of future mathematics teachers' training; not a particular popularity of the teaching profession among young people. Notably, with a low level of mathematical training of students, there is no improvement in educational programs, and math teachers and supervisors are not always motivated to provide high-quality assistance to the intern; many students work as teachers at school and skip classroom studies at the university, including according those in the methodology of teaching mathematics [15].

V.G. Zakirova et al. [16], W.H. Al-Hilli [17], Y.A. Wassie and G.A. Zergaw [18] considered and studied the possibilities of creating various software tools to facilitate the learning process and solve complex problems of mathematics. They formulated methodological recommendations on individual issues of teaching students, but only some narrow issues of teaching methodology were touched upon. This disorients the teacher's work and demotivates the student's activity because processing a large amount of information to achieve a logical presentation of the material requires a lot of time. This problem becomes especially relevant in distance learning due to the epidemiological situation and emphasises the need to create educational materials suitable for both teachers and students from the standpoint of self-education.

Pedagogical research shows that the development of mathematics teachers' professional competency is effective if new teaching methods are used. This includes increasing the level of mathematical and methodological knowledge of teachers and their direct practical application. Additionally, it involves developing skills to notice and analyse the thinking of schoolchildren, the ability to understand, interact, and communicate effectively with them, and improving the critical thinking and cognitive skills of teachers. Furthermore, it includes creating productive mental skills, fostering creativity, and enhancing the ability to introduce modern and innovative forms and technologies of learning. Finally, it encompasses establishing collegial relationships that support ongoing professional development. In addition, to form the professional readiness of teachers, it is worth developing students' motivation for creative pedagogical activity and forming their psychological readiness for professional self-development; creating comfortable and effective conditions for active self-improvement and continuous professional development; systematic support from the school management; the possibility of receiving financial assistance [19-21].

It is worth highlighting various methods of developing the professional readiness of future teachers. Based on this, it is worth distinguishing several methods in the development of professional competency: Firstly, the

reproductive method involves developing knowledge and skills through clear sequences, where mastery is achieved through exact reproduction and repetition. This method is often used in classical lecture-seminar systems, where students independently work on material presented in lectures. Secondly, the method of problem presentation transitions from performance to creative activity. Teachers use various information sources to formulate cognitive tasks, encouraging students to explore different viewpoints and arguments to solve problems. Problem lectures are frequent, focusing on exploring new and unknown concepts. Thirdly, the explanatory and illustrative method actively develops professional competency by providing students with extensive knowledge and information in universities [22-25].

A study on the specific features of interactive learning in universities should be noted [17]. The results have shown that many teachers do not accurately understand and know the characteristics and features of interactive learning, which is due to their lack of experience in participating in active educational activities since in professional and pedagogical activities teachers try to use only familiar forms, means, and technologies of learning. Consequently, the organisation of advanced training courses, master classes, and seminars is important enough to familiarise teachers with innovative methods, which will help them to boldly use these forms of training in the educational process. The attitude of students to the use of interactive teaching methods in the classroom was established. The results have shown that 52% of students appreciate classes conducted in interactive mode because they motivate and spark interest, aiding in better assimilation of the material. Conversely, 24% of students do not favour interactive learning due to its perceived difficulty and energy consumption. Another 17% of students remain neutral towards the methodology used in interactive classes. Lastly, 7% of students hold a negative attitude towards interactive methods, preferring traditional lectures and seminars.

It is relevant to study the development of students' mathematical competency during the school year, where this problem was studied in two aspects: basic education (mathematics for life) and curriculum (mathematics for school). All motivational aspects of students' professional competency were recorded using questionnaires of their advertising. Some questionnaires included questions of interest in mathematics, expectations of instrumentality in mathematics, expectations of self-efficacy in the subject, experience of competency in education, and experience of independence in mathematical education. Because of the study, the following conclusions were drawn. The level of teachers' professional competency varies based on the school environment.

Higher levels of professional knowledge tend to foster more constructivist teaching beliefs. Interestingly, teachers' motivation and their ability for self-regulation show little correlation with their professional knowledge. Effective indicators of high-quality lessons include cognitive engagement, classroom leadership, and individualized student interaction, all of which significantly affect mathematics teaching quality and competency development. Additionally, students exhibit higher mathematical and professional knowledge

compared to practising teachers. It was also established that future mathematics teachers considerably outperformed schoolchildren in mathematical and general types of knowledge. This may mean that studying at the university improves the student's skills, which increases the importance of university pedagogical education in the development of future teachers' knowledge.

Notably, when assessing competencies, it is possible to identify problems in students with the development of professional readiness [26; 27]. Once such problems are identified, systematic and proactive efforts can be made to eliminate them. Such methods will be most effective in a learning culture based on competency-based and communicative approaches. The paper offers practical guidance on three key components of the process of professional competency development: 1) creation of individual work plans; 2) implementation of corrective interventions or strategies; 3) assessment of progress and results, and decision-making. A detailed example was provided, which helps to concretise the three components of the process of improving the readiness of future mathematics teachers. The paper concludes with recommendations that will become important for the development of professional training.

In a study conducted by L.M. Dibkova [28], various factors influencing the effectiveness of future mathematics teachers' professional competency development were examined. The study investigated how success in educational activities depends on the development of motivation, self-esteem, and subjective perception among future teachers. Additionally, the study contributed to the formation of a technology aimed at utilizing individualized approaches in developing future teachers' professional competencies. The results of the pedagogical experiment confirmed the hypothesis that the introduction of technology for the implementation of forms and methods of individual approach into the educational process can improve the effectiveness of future teachers' professional competency development, where each student is considered as a person who has a unique set of individual characteristics.

When forming competencies, it is worth correcting the manifestation of certain positive qualities and reducing the level of negative ones, effectively applying appropriate pedagogical technologies. New forms and methods of an individual approach incorporate several key components. These include monitoring educational activities, assessing students' previous knowledge and readiness, and analysing the development of teachers' personal qualities such as motivation, self-assessment, and subjective perception. The approach also involves diagnosing the influence of group opinions and correcting them, ensuring professional orientation of educational material, using diverse tasks and tests, and applying assessments based on clear criteria. Additionally, it includes creating individual advisory work, employing motivational factors, encouraging students' self-assessment of their educational results, and providing comprehensive technological and informational support for the educational process [29-31].

All these components are based on certain criteria and factors (motivation, self-assessment, subjective analysis), the high level of which contributes to the effective development of future mathematics teachers' professional

competency. These forms and methods can be implemented when teaching various disciplines in universities.

The use of methods related to the sustainable development of professional competency requires not only personal motivation from teachers but also possession of a variety of skills. The importance and purpose of a teacher's competency in a multicultural space were investigated, which shows the sustainable development of the teaching staff in several higher educational institutions [32; 33]. Based on the results, gaps were identified and some needs were shown that are important for improving competency, which can contribute to the transformation of education and society. The study emphasises the value and necessity of competencies in the field of progressive development and illustrates some aspects and the basis for the development of mathematical competency in universities. The professional development of the teaching staff is becoming an increasingly relevant issue in higher education, although there is still insufficient data on how it helps teachers to develop their professional skills. Notably, flexibility in learning is a common requirement, where knowledge and basic beliefs about the teacher's skills play an important role. One study presented data on 73 German university teachers who completed a comprehensive academic teaching curriculum [34; 35]. The collected data indicate self-efficacy, self-esteem, and subjective knowledge of the teaching and learning system, which were collected at the beginning of the programme and after it. Over time, an improvement was established in all three parameters.

It is worth considering the most popular interactive methods that will be relevant when teaching various disciplines in professional educational institutions for the development of professional competence [36-38]. Given the lack of time when studying additional subjects, it is important to use innovative technologies to organise classroom studies or generalise the studied material and integrate knowledge based on interdisciplinary connections. The research, discussion form of classes and the "brainstorming" technology are the most effective methods of competence development. Therewith, it should be borne in mind that the project method and the case method contribute to the development of skills and abilities to diagnose a problem and find ways to solve it, evaluate one's own activities. When designing innovative pedagogical technologies, it is possible to ensure the proper training of highly qualified professional personnel.

Based on the above material, it can be concluded that it is important for a teacher to combine various methods and forms of organising the educational process to achieve the greatest effect from their use. It is important for teachers to have a considerable amount of knowledge, information, and resources, use conventional and innovative teaching technologies; have developed communication skills; engage in science and systematically implement modern approaches and ideas.

Conclusions

Thus, based on the analysis of methodological and pedagogical literature, as well as practical experience in applying active and interactive teaching methods, it can be concluded that the use of new technologies and forms of

education in training future mathematics teachers has several beneficial effects. These include activating students' cognitive activity, fostering their independence in problem-solving, developing their communicative skills and critical thinking, and nurturing their personal and professional ideals. Ultimately, this approach aims to achieve a high level of conscious professional competency among future educators. Using the proposed teaching methods, the university teacher will create all conditions for the development and establishment of students' methodological competency, and their ability to reflect, which will help them find their style of professional activity, predict and analyse the results of their work, improve the level of self-organisation, and achieve adequate professional and personal self-esteem.

This paper indicates that the author's research has considerably improved the understanding of the essence of interactive and new teaching methods and their practical application. In the development of professional competency, several aspects are crucial. Firstly, there is the development of future teachers' methodological competence. Secondly, improving the quality and content of educational programs for training and advancing teachers and future educators is essential. Thirdly, focusing on the professional needs of teachers and enhancing the forms of student training are key priorities. Additionally, developing cooperation between teachers of pedagogical universities and practising educators plays a vital role. Lastly, increasing the prestige of the teaching profession is also a significant factor in fostering professional competency among educators.

The materials of the author's paper can be useful and relevant for students, future mathematics teachers, and scientists who need to learn the basics of quality education, new forms and methods of teaching; improve their cognitive activity, and teamwork skills; form their own opinion and professional readiness to reach the level of conscious professional competency. It is worth continuing the research, extending the study of the professional training of mathematics teachers, covering aspects and new methods of its development and teaching future teachers forms of professional training. The conducted research does not exhaust all aspects of the problem of the implementation of interactive forms and methods in the development of professional competency. Further research is required on the following issues: analysis and classification of factors influencing the effectiveness of future specialists' professional competency development; training of teaching staff in the field of personality-oriented and individual approaches; and scientific and methodological support, which is aimed at individualising the educational process.

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Conflict of Interest

None.

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Практичні аспекти використання нових методів навчання в університеті для розвитку професійної компетентності майбутніх учителів математики

Маріям Абішева

Кокшетауський Університет імені Шокана Уаліханова
020000, вул. Абая, 76, м. Кокшетау, Республіка Казахстан

Ніна Стукаленко

Кокшетауський Університет імені Шокана Уаліханова
020000, вул. Абая, 76, м. Кокшетау, Республіка Казахстан

Жадира Єрмекова

Євразійський національний університет імені Л.Н. Гумільова
010008, вул. Сатпаєва, 2, м. Астана, Республіка Казахстан

Айсулу Шаяхметова

Кокшетауський Університет імені Шокана Уаліханова
020000, вул. Абая, 76, м. Кокшетау, Республіка Казахстан

Гульсара Жусупбекова

Кокшетауський Університет імені Шокана Уаліханова
020000, вул. Абая, 76, м. Кокшетау, Республіка Казахстан

Анотація

Актуальність. Актуальність дослідження ґрунтується на значних змінах у системі вищої освіти. Міністерство освіти вимагає чітких результатів та організації навчального процесу. Перехід на інноваційні методи відображає цілі освітньої реформи, що робить вибір методів навчання для майбутніх вчителів математики надзвичайно важливим.

Мета. Метою статті є обґрунтування практичних аспектів використання сучасних форм і методів навчання студентів у зв'язку із запровадженням нових освітніх стандартів на основі компетентнісного підходу.

Методологія. Провідними методами дослідження даної проблеми є аналіз і синтез, класифікація, дедукція, узагальнення, порівняння підходів. Ці методи допомогли виявити та виокремити основні інноваційні технології навчання та їх використання в університетах.

Результати. У дослідженні проаналізовано та уточнено інтерактивні та інноваційні методи навчання, виокремлено їх переваги над традиційними методами. Розроблено методику викладання, спрямовану на розвиток критичного мислення та професійної компетентності, а також представлено результати опитування щодо поглядів викладачів та ставлення студентів і викладачів до нових методів викладання.

Висновки. Дослідження показало, що інтерактивні та інноваційні методи навчання значно підвищують якість та ефективність підготовки майбутніх учителів математики. Ці методи сприяють розвитку критичного мислення, підвищують професійні компетенції та створюють більш зацікавлене навчальне середовище. Перехід до цих методів є корисним і необхідним для задоволення сучасних освітніх стандартів і вимог.

Ключові слова: вчитель математики; вища освіта; інноваційні методи; компетентнісний підхід.