

# A Future Primary School Teacher Competence Building Model through Application of Innovative Technologies

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**Abstract:** Nowadays in the context of innovations in the education system it is necessary to substantiate the organizational and pedagogical conditions for the formation of mathematical competence. These changes necessitated the development of a model for the formation of the mathematical competence of future primary school teachers by means of innovative technologies. The purpose of the article is to get acquainted with the components of primary school teachers' professional competence, to characterize the content of organizational and pedagogical conditions for implementing the model of mathematical competence of future primary school teachers by means of innovative technologies, to form our own model of mathematical competence. Realization of the purpose of the article will give an opportunity in the educational process of higher pedagogical educational institution to improve the professional training of the future specialist, in particular in the aspect of his mathematical competence formation. The educational and methodological support of the process of building mathematical competence is analyzed, in particular: a set of multimedia presentations in the courses “Mathematics” and “Methods of teaching in the educational field of “Mathematics”. a textbook “Methods of teaching in the educational field of “Mathematics”, a textbook “Fundamentals of work in the Moodle environment” and electronic methodological complexes “Mathematics” and “Methods of teaching in the educational field of “Mathematics”, created in the Moodle environment.

**Keywords:** *Contemporary potential and environment; innovative pedagogical activity of students and teachers; integrative process; ambivalence; adaptability; Moodle environment.*

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## Introduction

Achieving the purposes, tasks and conceptual bases of the research, substantiation of organizational and pedagogical conditions of building mathematical competence have caused the necessity to develop a model of building mathematical competence for a future primary school teacher through application of innovative technologies.

According to the definition of the Ukrainian pedagogical dictionary, the model is understood as a measure, criterion, standard, textbook, which represents a conventional image of an object (Honcharenko, 1997).

The modeling method is widely used in recent researches of educators, borrowing the technology of its implementation from foreign researchers and scientists. In particular, the issue of modeling educational activities is found in the works of Koval & Nikonenko (2016), Savchenko (2007), Palamarchuk et al. (2020), Nerubasska & Maksymchuk (2020), Melnyk et al. (2019), Sheremet et al. (2019), et al.

Kushner (2001, p. 90) believes that “the model is a hypothesis presented in a visualized form”. Humaniuk (2010, p. 241) considers the model as “an imaginary, symbolic or material image of the original: the reflection of objects and phenomena in the form of descriptions, theories, schemes, drawings, graphs”. According to Dakhin (2002, p. 22), a model is an artificially created object in the form of a scheme, symbolic forms or formulas, which is very similar to the studied object or phenomenon and reflects in a simpler and more general form the structure, properties and relationships between the elements of this object. At the same time, Gluzman et al. (2012) emphasize that the model is an abstract generalization of practical experience, and not just a direct result of experimental activity. Strilets (2013, p. 457) notes that “a model is a sample, a reproduction, a scheme that provides imitation of certain characteristics and behavior of an object, process, or phenomenon. The model describes structure and functions of the object under study or creation”.

A detailed analysis of different approaches to understanding the concept of “model” is found in the scientific work of Koval & Nikonenko (2016, p. 88). The researcher emphasizes that “teachers' awareness of the essence of different models of specialists' training affects the validity of the choice of content, forms, methods, tools, methods of organizing educational and cognitive activities of students in accordance with specific conditions which contributes to the innovative renewal of pedagogical education” (Verkhovna Rada Ukraine, 2014).

Given the analyzed interpretations of the scientists of the concept of “model”, sharing the views of Koval & Nikonenko (2016) and taking into account the specifics of the process of building mathematical competence of future primary school teachers, under the model of building mathematical competence of future primary school teachers by means of innovative technologies we consider schematic depiction and verbal and logical description of the structure of the process of building mathematical competence of a future primary school teacher.

There are studies devoted to the formation of the future primary school teachers' competence by means of innovative technologies, the effectiveness of information and communication technologies at lessons in contemporary educational institutions in the foreign scholars' works. In the scientific works Schäfer (2014), Kepser (1999) revealed the essence of the concept of “competence of the contemporary teacher” and outlined the contemporary process of informatization in comparison with other European countries. Boltuc (2017) proved that in the era of postmodern society the teacher must have the competencies necessary to master ICT. He paid attention to the need of borrowing foreign experience to the introduction of innovative technologies in primary education. Sorochinsky et al. (2020) motivated the expansion and borrowing of experience in the implementation of innovative and interactive technologies in primary school. Foreign researchers Vlasova et al. (2020) stressed the need for e-learning to improve the educational process in postmodern society.

### **Components of primary school teachers' professional competence**

Tkachuk (2021) identifies the following components in the structure of professional competence of primary school teachers as psychological and pedagogical, subject, methodological and personal competences.

Psychological and pedagogical competence for a primary school teacher is the basis of his professional activity. The teacher lays the foundation for the study of many disciplines and forms a worldview, attitude to themselves, to others, to educational work, which is impossible without a system of knowledge about the child of primary school age, its features, and social factors of development.

The subject competence of a primary school teacher is characterized by the presence of knowledge and skills in the subject areas necessary for a primary school teacher and the ability to operate with them.

Methodological competence is characterized by knowledge of classical and contemporary methods, forms, tools, techniques, technologies

of teaching and education in primary school, the ability to apply them, creatively rework.

Personal competence is characterized by the development of personal functions of primary school teachers (motivational, reflective, orientation, creative and transformative), high level of empathy, possession of skills of self-education and self-development, readiness to carry out professional and pedagogical activity.

Sorochinsky et al. (2020) and Barakhsanova et al. (2018), believes that the structure of professional competence of primary school teachers should include pedagogical orientation, features of the humanistic pedagogical worldview, the system of professional integration knowledge and skills, the system of diagnostic and managerial professional actions.

The most important characteristic of professional competence is “focus on the child”. The pedagogical orientation of the teacher aims to develop motivation to learn, knowledge of the world, people, his student himself. It involves caring for the child, interest, love, promoting the development of the personality and maximum self-actualization of the personality (Boltuc, 2017).

Thus, the basis of the category “professional competence” of primary school teachers is the teacher’s awareness of their pedagogical capabilities, the characteristics of the children’s group, prospects for development, the uniqueness of society. This conceptual awareness determines the professional flexibility of the teacher in the selection (rather than copying) of pedagogical technologies, methods that allow to successfully implement the main goal – to create conditions for the personality development of the junior student.

Kepser (1999) modernizes the structure of professional competence for future primary school teachers.

In her study, the concept of future primary school teachers’ professional competence is perceived as a dynamic, procedural side of the training, professional growth characteristics, professional motivational and activity changes. She considers professional competence as a gradual professionalization of the future teacher. At the same time, the “competence” concept defines the professional activities of a mature teacher.

According to Kepser (1999), the professional competence of primary school teachers is multidisciplinary. The main idea of her future primary school teacher training concept is a radical change in the role and content of her psychological training, which must be integrated with all aspects of learning in a single, professionally meaningful space for the developing

student. This future teacher's activity provides up-to-date level of professional competence, which allows to perform complex professional activities for predicting the goals and objectives of children's mental development in the learning process, creating productive conditions for their solution, developing diagnostic programs.

The structure of professional competence of the future teacher, according to Melnyk (2021), includes:

1. Motivational component, which is manifested in the gradual development of a special focus of educational and professional activities of the student.

2. Professional-activity component, which contains a system of educational and professional actions, which involves mastering:

1) specific analytical skills that allow to perceive and evaluate the pedagogical situation as a multidimensional, constantly innovative pedagogical reality;

2) special professional-diagnostic actions that allow the future teacher to turn educational subject material into diagnostic.

### **Characteristics of the content of organizational and pedagogical conditions for the implementation of the model of formation of mathematical competence of the future primary school teacher by means of innovative technologies**

Introduction of the model of building mathematical competence of a future primary school teacher by means of innovative technologies provided for definition of basic organizational and pedagogical conditions of its realization among which we will name the following:

- innovative potential of the educational establishment;
- innovative environment;
- innovative pedagogical activity of student and teacher.

Under the organizational and pedagogical conditions, we understand the totality of objective possibilities of content, forms, methods and means of building and development of mathematical competence of a future primary school teacher. The selection of organizational and pedagogical conditions was carried out taking into account the social order, analysis of scientific literature and pedagogical experience on the research problem, as well as the structure of the concept of "mathematical competence".

We consider that the first condition is *the innovative potential of the educational establishment*, i.e., the ability of the higher educational establishment

to perceive, create and implement innovations in the educational process and get rid of the outdated, pedagogically inexpedient in a timely manner.

Analysis of the scientific literature shows that the problem of innovative potential of an educational establishment is elaborated in the works of Dychkivska (2012), Polyakov (2007), Nerubasska et al. (2020), Gerasymova et al. (2019), Onishchuk et al. (2020), Maksymchuk et al. (2020a), Maksymchuk et al. (2020b), et al.

In a broad sense, the concept of “potential” (Latin “potential” - strength, power) denotes the available means, sources that can be used to achieve a certain goal. The dictionary of the Ukrainian language understands this term as “hidden abilities, energy for any activity that may appear under certain conditions” (2009, p. 348). The Law of Ukraine “On Priority Areas for Innovative Activities” (2014) treats innovation potential as “a set of scientific and technological, financial and economic, production, social, cultural and educational opportunities of the country (an industry, a region, an enterprise, etc.) necessary to ensure innovative economy development”.

Despite a considerable attention of the researchers to improvement of the educational process through implementation of innovative changes, today there is no single interpretation of the concept of “innovation potential”.

In particular, Gluzman et al. (2012) insist that the innovative potential of an educational establishment is manifested in an array of resources that are shown in scientific, informational and technical, organizational, material and financial components.

Researchers Kosinsky & Shvets (2012, p. 28) define an innovation potential as “the ability to achieve the goals of innovative development, where ability is the presence and balance of the structure of potential’s components”.

According to Dychkivska (2012, p. 28), the innovative potential of an educational establishment is “the ability of an educational establishment to create, perceive, implement innovations and dispose of the outdated, pedagogically inexpedient elements in a timely manner.”

Sharing the opinion of Dychkivska (2012), we understand the innovative potential of an educational establishment within our research as a totality of different types of resources and opportunities for their use in the process of building and development of mathematical competence, which are directly related.

Registration of a University on electronic remote platforms, prospectively focused on expanding opportunities to improve the process of training a competent specialist. Development of electronic courses in

distance environments, aimed at systematization of educational materials, improving the process of self-education of students. The advantage of such complexes is availability of grouped materials containing lectures, practical classes and independent educational activities, examination questions, methodical recommendations, a list of recommended literature on the subject, etc. Therefore, one of the important organizational and pedagogical conditions for building mathematical competence of a future primary school teacher by means of innovative technologies is development and implementation of electronic methodological complexes in the Moodle environment.

The second condition for a successful building of mathematical competence of a future primary school teacher is development of an *innovative environment*.

We believe that development of an innovative environment will allow to effectively build the mathematical competence of a future primary school teacher, in accordance with the contemporary society's demands and using our previously identified innovative learning technologies.

There is a significant interest among scientists to this category, which is due to its social significance and relevance. In particular, Katashov (2001, p. 8) defines the concept of "innovative environment" as "a set of spiritual and material conditions for functioning of an educational establishment, ensuring self-development of a free and active personality, realization of the child's creative potential". Sharing the opinion of the previous researcher Razina (2009, p. 8) this concept is interpreted as "a set of interrelated conditions that provide education for an individual, development of the teacher's personality with innovative and creative thinking, his professional competence".

Dychkivska (2012) considers the concept of "innovation environment" as a well-organized space for professional activity that promotes development of the innovative resource of an individual. According to the definition of Strilets (2013, p. 449), "the innovation environment is a pedagogically appropriately organized living space, which contributes to the development of innovative resource of an individual, an integrated means of accumulation and realization of the innovative potential of the educational institution, an integrated means of accumulation and realization of the innovative potential of an educational establishment". Sharing the opinion of Strilets (2013), we believe that the innovation environment provides a set of interrelated conditions that provide education for individuals, development of the teacher personality with innovative and creative thinking, his professional competence.

Creating an innovative environment, in our opinion, should be focused on building and development of the mathematical competence with future primary school teachers. The essential condition for creating an innovative environment is development and implementation of electronic methodological complexes. Hence we developed and introduced into the educational process of electronic methodological complexes “Mathematics” and “Methods of teaching in the educational field of “Mathematics”. For the first time the methodological complex was developed in 2013 and, over time, the number of electronic methodological complexes in the Moodle environment was brought in line with the License Agreement (2016), according to which availability of electronic resources at an educational establishment containing teaching materials on academic disciplines of the curriculum, including the system of distance learning to ensure the educational level of “bachelor” should be at least 50%, the educational level of “master” - 60%.

The third condition is *the innovative potential of the teacher*, i.e., a set of socio-cultural and creative characteristics of the teacher's personality, which expresses a willingness to improve pedagogical activities, as well as availability of internal tools and methods that ensure this readiness (Strilets 2013, p. 449).

In our opinion, the innovative potential of the teacher should include additional value-semantic understanding of the goals and significance of mathematical competence in further professional activities and a gradual formation (“Mathematics” 1st year) and development (“Methods of teaching in the educational field of “Mathematics” 2-3 year, “The Procedures of Teaching Mathematics” 5th year, “Methods of Teaching the Professional Discipline of Primary Education in Higher Education Establishment: “Methods of teaching in the educational field of “Mathematics” 5th year) of the competence in question.

To a large extent, this condition is provided by expediently introduced course “Fundamentals of work in the Moodle environment”, the purpose of which is to provide skills in creating and configuring e-courses and recommendations for their use in the educational process. The course covers the main theoretical aspects of work in the Moodle environment, combined with the direct creation of electronic methodological complexes within the practical classes' framework.

Teachers and educators are expected to acquire skills in working with electronic methodological complexes. The solution to the problem of inclusion of participants in the educational process in the innovation environment is possible through a comprehensive approach to the



development of a competent specialist who would combine the work of future primary school teachers in the Model environment and prepare future teachers to create their own electronic methodological complexes.

### **The model of building mathematical competence of a future primary school teacher by means of innovative technologies**

Analysis of the theory and practice of building mathematical competence of a future primary school teacher, study of features of professional activity, results of the analysis of curricula and educational programs allowed to develop a model of building mathematical competence with a future primary school teacher by means of innovative technologies.

Using the proposed experimental model, we determine: integrity - the relationship of all components of the model, interdependence of the proposed forms, methods and means to achieve goal; ambivalence - a combination of theoretical and practical training of future primary school teachers; adaptability - the flexibility of the model to the process of building mathematical competence.

The purpose of creating this model is to improve the process of building mathematical competence with a future primary school teacher by means of innovative technologies. Realization of the set goal in educational process of higher pedagogical educational establishment will allow to improve professional training of future experts, in particular in the aspect of building mathematical competence within them.

Given the social order (transition to a competency-based basis (implementation of the Law of Ukraine “On Higher Education” and the Concept “New Ukrainian School”)) and the defined purpose of experimental activities outlined the main tasks of developing educational and methodological support to improve building of mathematical competencies of future primary school teachers.

The development of the author's model is based on the following principles:

- scientificity (embodied in curricula and manuals, in the selection of materials for study, as well as in the fact that students master elements of scientific research);

- consistency (constant comprehensive work on improving knowledge, skills, abilities and building competencies, rational combination of traditional and innovative learning technologies, introduction of innovative technologies in all components of the process of building mathematical competence, relationship of goals, objectives, organizational

and pedagogical conditions, theoretical and practical training in the process of building mathematical competence);

- accessibility (submission of information at an accessible level, development of methodological materials aimed at facilitating the process of perception);

- consciousness (conscious assimilation of knowledge for further practical use);

- organic unity of theoretical and practical training (orientation of theoretical training on practical activity and future professional activity).

The proposed model provides for the implementation in the educational process of certain organizational and pedagogical conditions that run through all components of the proposed model and are the basis for building mathematical competence. It is the provision of organizational and pedagogical conditions that allows to organize the process of theoretical and practical training, to ensure the possibility of achieving the set goal.

We consider innovative potential of the educational establishment as the first organizational and pedagogical condition and we see implementation of this condition in creation of the textbook “Fundamentals of work in the Moodle environment”. The second condition for a successful development of mathematical competence of a future primary school teacher is creation of an innovative environment. The essential condition for creating an innovative environment, in our opinion, is development and implementation of electronic methodological complexes. We developed and introduced into the educational process electronic methodological complexes “Mathematics” and “Methods of teaching in the educational field of “Mathematics”. The third condition is the innovative potential of the teacher, it is provided by the expediently introduced course “Fundamentals of work in the Moodle environment”, the purpose of which is to provide skills for creating and configuring electronic courses and recommendations for their application in the educational process.

The structure of the model of building mathematical competence with a future primary school teacher by means of innovative technologies is considered in the unity of three components: value-target, content-activity and control-reflexive.

The value-target component takes into account demand of society, goals, objectives, sustainable professional orientation to professional and pedagogical activities, which determines the focus on the professional development of an individual. The social mandate to increase the level of development of mathematical competence of future primary school teachers contains requirements of the state and society for its development in

students. This determines the purpose and objectives of the educational process, which are implemented in accordance with the State Educational Standard.

The aim is to improve the process of building the mathematical competence of future primary school teachers by means of innovative technologies. Concretization of the purpose of the specified process allowed to define its task - to develop educational and methodical support for improving the process of building mathematical competence with future primary school teachers. We see implementation of the goals and objectives based on regulatory documents (international and national professional standards: educational standards in the field of 0101 “Pedagogical Education” and conceptual foundations) (basic approaches and principles of professional training of future primary school teachers).

The content and activity component is a system of knowledge about professional, psychological and pedagogical activities, fundamental and subject-pedagogical disciplines that reveal the content of future professional activities, a system of pedagogical and professional forms, methods and tools of innovative learning technologies that ensure successful development of mathematical competence in the context of contemporary conditions of activity. This component is the basis of the proposed model and covers the content, stages, forms, methods and means of building mathematical competence with a future primary school teacher by means of innovative technologies.

We consider it appropriate to further consider in detail individual elements of the content-activity component.

Building mathematical competence of a future primary school teacher took place within the course of “Mathematics”. However, in order to ensure dependability of this process, development of mathematical competence was continued within the courses “Methods of teaching in the educational field of “Mathematics”, “Technologies of teaching mathematics”, “Methods of teaching a professional discipline of primary education in universities: “Methods of teaching in the educational field of “Mathematics”, “Basics of working in the Moodle environment”.

We have improved a set of innovative tools for building mathematical competence, in particular, developed a system of practical tasks for the course “Mathematics”, a set of educational presentations for courses “Mathematics” and “Methods of teaching in the educational field of “Mathematics”, published a textbook on this discipline, and developed electronic methodical complexes “Mathematics” and “Methods of teaching

in the educational field of “Mathematics”, created in the Moodle environment.

Multimedia presentations that were created allowed to systematize the lecture materials and facilitate the process of its perception by students. A survey conducted among the students of the second, third and fourth year on the appropriateness of the use of presentations showed that application of multimedia software increases students' interest in educational information, improves understanding and memorization of educational materials. The students noted that due to multimedia support on lectures, the amount of learned material increased, there appeared a possibility to memorize information on a subconscious, intuitive level.

In addition to improving lecturing of educational materials, there is a need for comprehensive support of practical work of the primary education faculty students, as the available student manuals and textbooks are mostly focused on theoretical presentation of educational materials.

In order to optimize the process of building mathematical competence an electronic methodological complex of the course “Mathematics” has been created. This complex allowed to systematize the educational materials of the course, presenting in electronic form the main theoretical and practical material, multimedia presentations, additional materials aimed at developing arithmetic, algebraic, geometric, logical components of mathematical competence and the component of identical transformations.

Improvement of the previously identified components of mathematical competence takes place in the process of further activity within previously indicated disciplines and requires a careful selection of innovative technologies, which would facilitate the optimal accomplishment of the process.

The necessity to select educational material that will help students in preparation for practical classes have led to creation of a textbook “Methods of teaching in the educational field of Mathematics” (Strilets, 2013). The textbook presents: curriculum and thematic plan of the course, plans of practical classes, calendar planning in mathematics for grades 1-4, a list of curricula, textbooks and manuals recommended by the Ministry of Education and Science of Ukraine for primary school; evaluation criteria and forms of control; exam questions; recommended literature; basic concepts and terms.

The textbook “Methods of teaching in the educational field of “Mathematics” is developed in accordance with the requirements of the organization of the educational process on the credit-transfer system. The

textbook covers all aspects of student training in this discipline. A characteristic feature of the textbook is combination of theoretical material and a full range of practical work.

In order to deepen students' knowledge about the peculiarities of work in the Moodle environment, we created a textbook "Fundamentals of work in the Moodle environment" (Strilets 2013). The textbook has a clear structure, covers the basic training of a future primary school teacher to work in the Moodle environment. The manual presents: curriculum and thematic plan, theoretical material on the course topics, plans for practical classes, tasks for independent work, questions for self-control, evaluation criteria and forms for control, list of recommended reading, a sample of an electronic methodological complex developed in the Moodle environment, basic concepts and terms of the course.

In order to systematize educational information, create learning opportunities and provide interactive communication, an electronic methodological complex was developed in the Moodle environment, which is implemented in the educational process of the primary education faculty.

This complex is created in accordance with the generally defined requirements and taking into account peculiarities of the discipline. It is aimed at providing all forms of student work and has the following structure: description of the discipline (curriculum and working curriculum); theoretical support of the course (text lectures supplemented by presentations); plans for practical classes (theoretical questions, practical tasks, tasks for self-control, samples of lessons summaries in mathematics); tasks for independent work; calendar planning in mathematics for grades 1-4; list of programs, textbooks and manuals recommended by the Ministry of Education and Science of Ukraine; modular control (test system for each content module); approximate topics for abstracts (topics of reports for the annual student scientific-practical conference "Methods of teaching mathematics: history, current status, prospects"; exam questions; glossary; list of recommended reading; applications (electronic versions of current textbooks on mathematics, video lessons on mathematics).

To work in the Moodle system, students sign up, get personalized access to it and can get acquainted with the proposed materials. The test system is protected by additional passwords, which allows to ensure test performance by students at a clearly defined time. The results of training achievements are reflected in an electronic register, which allows to timely adjust the level of mastery of educational material.

A special role in the model developed by us is played by the course "Fundamentals of work in the Moodle environment", the purpose of which

is to provide skills for creation and adjustment of electronic courses and recommendations for their use in educational process. The course covers the main theoretical aspects of working in the Moodle environment, which are combined with the direct creation of electronic methodological complexes within practical classes.

Given the previously identified innovative technologies, we consider it appropriate to dwell on the main forms and means of their implementation, in particular:

- game technology – a business game, takes certain amount of time during math lessons;
- information and communication technologies - electronic methodical complexes “Mathematics” and “Methods of teaching in the educational field of Mathematics”;
- project technology - completing projects in the disciplines “Mathematics” and “Methods of teaching in the educational field of Mathematics”;
- problem-based learning technology - problem-based collective solution of problems in mathematics, problem-based presentation of educational material.

The process of building mathematical competence included theoretical, practical and personal training of a future primary school teacher. The main forms of theoretical training were multimedia lecture, distance lecture, lecture-visualization, lecture-press conference, webinar, scientific and practical student conferences.

Practical training was carried out in the process of practical classes with solution of problem situations, didactic games, problem discussion, attending and discussing mathematics lessons in primary school, project activities, pedagogical practice.

Personal development of a future primary school teacher was carried out in parallel with theoretical and practical training and consisted in building of self-awareness with a student as a future primary school mathematics teacher.

The control-reflexive component of the model of building mathematical competence of a future primary school teacher by means of innovative technologies assumes an estimation by teachers and self-estimation by students of results achieved in the course of training, their establishment according to the set tasks, identification of reasons of deviations and making adjustments to pedagogical activities if necessary. The basis of the control-reflexive component of the model is selection of criteria,

indicators and levels of mathematical competence development of a future primary school teacher.

### **Creating criteria for the mathematical competence formation of future primary school teachers**

The choice of criteria for building mathematical competence of a future primary school teacher depends on the structure of this concept, so selection of criteria, indicators and levels is possible only on the basis of defining the concept of “mathematical competence” and the structure of mathematical competence of a future teacher developed by us.

Therefore, we determined the criteria and indicators of building mathematical competence with a future primary school teacher, which are shown in Table 1.

**Table 1.** *Criteria and indicators of building mathematical competence with a future primary school teacher (The table is compiled by the authors of the article)*

<b>Criteria</b>	<b>Indicators</b>
Motivational	– motivation for professional self-development and self-improvement in the context of building mathematical competence; –interest in the theoretical foundations of mathematics and application of acquired knowledge in professional activities.
Cognitive	– completeness of theoretical knowledge and practical skills in elementary mathematics; – systematization and awareness of knowledge of mathematics.
Activity based	– possession of practical skills of using mathematical knowledge in practice; – ability to use theoretical knowledge in non-standard professional situations.
Communicative	– mastery of mathematical terminology; – competent use of basic mathematical categories.
Creative	– application of acquired knowledge in non-standard situations; – individual teaching style based on contemporary methods of initial teaching of mathematics.

Within the framework of creating the model, the levels of development of mathematical competence of a future primary school teacher are outlined:

– low level (score 1) — the student shows incomplete, unconscious knowledge of the study material; makes mistakes, unable to answer questions by oneself; answers incorrectly or does not answer the questions; performs fragments of the proposed tasks with the constant help of the teacher, the amount of correct answers is up to 60%;

– intermediate level (score 2) — the student who shows complete, conscious, correct knowledge of the curriculum in the scope sufficient for future professional work; finds it difficult to present material independently, but correctly answers to the teacher's questions; performs practical work with a certain number of errors; the number of correct answers is up to 75%;

– sufficient level (score 3) — the student knowledge is characterized by completeness, awareness, correctness, competency and systematic presentation. There may be inaccuracies in the wording, minor errors that are corrected by the student in the process of conversation with the teacher; the student correctly performs methodical task at the reconstructive-variative level; the student demonstrates ability to independently acquire and update methodological knowledge; the number of correct answers is up to 90%;

– high level (score 4) — the student demonstrates complete, comprehensive, conscious, correct knowledge of the program material and presents answer logically, competently, convincingly, realizes ways and possibilities of improvement of methods of teaching mathematics to junior schoolchildren, demonstrates maturity of necessary methodical skills at a creative level, ready for further professional improvement; systematically uses additional sources of information; has a good command of mathematical vocabulary; the amount of correct answers is up to 100%.

The presented model is considered as an effective toolkit for the process of building mathematical competence of a future primary school teacher by means of innovative technologies. It is of an open nature, constantly evolving and can be supplemented with new components.

## **Conclusions**

The article describes the content of organizational and pedagogical conditions for the model of mathematical competence formation of future primary school teachers by means of innovative technologies, and concludes that it involves determining the main organizational and pedagogical



conditions for its implementation. They are the innovative potential of the educational institution, i.e. the ability of the higher educational institution to perceive, create and implement innovations in the educational process and get rid of obsolete, pedagogically inexpedient, and innovative environment, as creating an innovative environment will effectively shape the mathematical competence, in accordance with the modern demands of society and using our previously identified innovative learning technologies; innovative pedagogical activity of a student and a teacher, which is a set of socio-cultural and creative characteristics of the teacher's personality, which expresses a willingness to improve pedagogical activities, as well as the availability of internal tools and methods that ensure this readiness.

The article analyzes the theory and practice of mathematical competence formation of future primary school teachers, presents the study of professional activities, the results of analysis of curricula that allowed to develop a model of future primary school teachers' mathematical competence by innovative technologies. The features of the proposed experimental model determine the interactivity, ambivalence, and adaptability. The purpose of creating this model is to improve the forming process of the future primary school teachers' mathematical competence by means of innovative technologies.

The article also presents the criteria for the mathematical competence forming of future primary school teachers, which depends on the structure of the concept, so the selection of criteria, indicators and levels is only possible on the basis of defining the concept of "mathematical competence" and our structure of mathematical competence.

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