

Monitoring of Methodical Competence of Mathematics Teachers' Indicators and Levels in the Conditions of the Partnership of Pedagogical University and School

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The article proves the effectiveness of the experimental system of the partnership between a pedagogical university and school. We suggested a personal approach to monitoring the indicators and levels of methodological competence of mathematics teachers in terms of collaboration. Methodological competence indicators in teaching pupils mathematics, the formation of which is the most possible in partnership between a pedagogical university and a school, are determined based on the analysis of 12 educational programs for mathematics teachers, thorough analysis of Ukrainian scientists' research results, based on questionnaires of students, teachers, and lecturers, as well as on our experimental research.

Keywords: development of method competence of a teacher of mathematics, collaboration of teachers, formation of method competence of a future teacher, partnership of school and university

INTRODUCTION

The international pedagogical community actively discusses mathematics teachers' professional training and assessments of teachers' competencies. Modern international publications cover current issues of teachers' knowledge and skills (Shulman, 2013; Potari, 2016; Tatto, 2012; Tatto, 2008; Hilligus, 2009); content and structure of professional development of teachers (Hoth, 2017; Hoth, 2017; Buchholtz, 2018; Ingvarson, 2013); models of development of mathematics teachers' methodical competences (Hilligus, 2009; Baumert, 2013; Kunter, 2011; Schwarz, 2019); development of professional identities of future mathematics teachers (Hilligus, 2009; Erens, 2019); pedagogical experience and its impact on the mathematics teachers' development of skills (Li, 2012; Matos, 2009; Potari, 2019; Strutchens, 2017), ect.

Analysis of scientific sources devoted to the diagnosis of mathematics teachers' methodological competence (Hoth, 2017; Hoth, 2016; Ingvarson, 2013), and the development of systems of pedagogical universities and secondary schools collaboration (Buchholtz, 2018; Thurm, 2020; Daemen, 2020; Jackson, 2018; Martin, 2015; Novotná, 2018), allowed to distinguish the main structural components of the formation of mathematics teachers' methodological competence in partnership between pedagogical university and school. They are motivational, communicative, actional, and reflexive.

Nowadays, we are researching the partnership system between a pedagogical university and a school to develop the mathematics teachers' methodological competence and the formation of their methodological competence.

To prove the partnership experimental system's effectiveness between a pedagogical university and a school, we understood the need to monitor the indicators and levels of mathematics teachers' methodological competence in this partnership. In the scientific and pedagogical literature, we have not found precise research results on changes in collaboration indicators and levels. Therefore, this article aims to present the results of their research on indicators and levels of methodological competence of mathematics teachers in partnership with a pedagogical university and a school.

METHODOLOGY

Let us consider the technology we used to determine the indicators of teachers' methodological competence in teaching mathematics to pupils who can develop in a partnership between a pedagogical university and a school. We first clarified the list of methodological competence indicators in teaching mathematics to pupils (Table 1.1), which we identified based on the analysis of the works of Ukrainian scientists (Matiash, 2020; Akulenko, 2015; Achkan, 2018; Hodovaniuk, 2020; Kuzminskyi, 2014; Kolomiiets, 2016; Matiash, 2015; Motorina, 2005).

We have compiled this summary list in obedience to the descriptors of the national qualifications framework.

TABLE 1
SUMMARY LIST OF INDICATORS OF METHODOLOGICAL COMPETENCE IN
TEACHING MATHEMATICS (BASED ON THE UKRAINIAN SCIENTISTS'
RESEARCH RESULTS)

Knowledge	Skills	Communication	Responsibility and autonomy
<ul style="list-style-type: none"> • knowledge and understanding the basic concepts of methods of teaching mathematics; • knowledge and understanding of the tasks of methodical activity of a math teacher; • knowledge of the goals and objectives of teaching math at school; • knowledge of the peculiarities of the 	<ul style="list-style-type: none"> • ability to form pupils' positive attitude to teaching math; • ability to structure educational material and develop effective systems of lessons in mathematics at school; • ability to effectively use theoretical, methodological knowledge in practice; • ability to perform logical and didactic 	<ul style="list-style-type: none"> • ability to positively influence students through the establishment of subject relations in the educational process; • readiness to communicate with colleagues on the problem of effective teaching of math to pupils; • ability to communicate with colleagues on the 	<ul style="list-style-type: none"> • understanding the essence of the methodological competence of a mathematics teacher; • awareness of the need for self-education, self-development, self-improvement in teaching mathematics to pupils; • demonstration and the ability to substantiate one's own methodological beliefs;

<p>school mathematics course construction;</p> <ul style="list-style-type: none"> • knowledge of normative documents on the organization of teaching math at school; • knowledge of the peculiarities of a calendar plan for teaching mathematics creation; • knowledge of the requirements for mathematical training of pupils; • knowledge of criteria for assessing pupils' achievement in math; • understanding of primary forms, methods, and means of organizing the educational process in mathematics; • understanding of possible structures of a mathematics lesson; • understanding of methodical systems implemented in current school textbooks of mathematics; • knowledge of innovative pedagogical technologies of teaching math at school; • understanding the ways of students' activity in the process of learning mathematics; • knowledge and understanding of different technologies of teaching math to pupils; 	<p>analysis of the educational topic;</p> <ul style="list-style-type: none"> • ability to determine the types, methods, and means of monitoring students' achievements in mathematics; • ability to organize students' learning activities while studying new concepts, theorems; • ability to organize students' learning activities in solving problems; • ability to plan a math lesson; • ability to create conditions in the process of teaching mathematics for the development of the method of pupils' mental activity; • ability to conduct a quality math lesson at school, • ability to methodically use information technologies; • ability to form and develop pupils' mathematical competence to prove mathematical statements; • ability to form and develop pupils' mathematical competence in various methods and ways of solving problems; • ability to form and develop holistic, systematic knowledge and skills 	<p>problem of organizing a modern math lesson and studying some of its topics;</p> <ul style="list-style-type: none"> • ability to present own developments of different types of mathematics lessons; • ability to carry out an extensive analysis of mathematics lessons methodically; • ability to discuss effective methods, techniques, and tools for teaching math; • ability to demonstrate readiness for self-education, methodical self-improvement, methodical self-development; • ability to cooperate with stakeholders to achieve the set prices in the teaching of mathematics to pupils; • ability to actively and creatively interact in the process of pair and group methodical activity; • ability to demonstrate flexibility and strength of methodological knowledge; • possession of speech-subject competence in the systems "teacher - pupil", "teacher - teacher", "teacher - pupil team", "teacher - teacher team", "teacher - management 	<ul style="list-style-type: none"> • desire to achieve a high level of methodological training; • understanding of the importance of methodological competence; • conscious desire to master the methodological skills; • valuable attitude to the professional ideal; • readiness to look for ways to solve educational problems that arise in connection with the education system reform in general, and mathematics education in particular; • interest in mastering new methodological knowledge and skills; • ability to critically analyze sustainable methodological views; • readiness to build a personally weighty, own methodical system of teaching math to pupils; • the ability to show confidence in the organization and in the implementation of methodological activities during the lesson of math; • the ability to analyze, identify and establish relationships between different components and factors that affect the effectiveness of
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<ul style="list-style-type: none"> • knowledge of advanced pedagogical experience of teachers-practitioners on the problems of organizing a modern lesson of math and studying its topics; • knowledge of the peculiarities of the contemporary information technologies use in the teaching of math; • understanding the essence, purpose, and principles of the organization of teaching math at school level differentiation; • understanding of the essence, purpose, and regulations of the organization of specialized differentiation of teaching math at school; • knowledge of the specifics of various teaching technologies and methods of their creation and application in the process of teaching mathematics; • knowledge of forms of monitoring, control, evaluation, and correction of pupils' academic achievements in the process of learning mathematics, • knowledge of the elective courses content for classes of different 	<p>of pupils in mathematics;</p> <ul style="list-style-type: none"> • ability to form and develop ways for successful application of knowledge and skills in mathematics for solving practical and applied problems; • ability to form and develop mathematical competence of pupils in classes of the in-depth study of mathematics. 	<ul style="list-style-type: none"> • ability to use mathematical terms correctly; • the ability to show healthy emotional reactions to professional failures or achievements. 	<p>teaching mathematics in school;</p> <ul style="list-style-type: none"> • ability to model, predict, design, and construct in the process of teaching math pupils; • ability to determine the necessary system of methodical actions in known, unknown, non-standard situations based on systematization, generalization, and analysis of facts; • ability to realize the purpose of the methodical activity in the form of the expected result; • ability to control and evaluate own methodical activity; • ability to independently and impartially perceive new methodological knowledge about the problem through the prism of their own methodological beliefs; • ability to generate new ideas aimed at improving the process of learning mathematics; • ability to creative independence and creative solution of professional tasks; • ability to creatively rethink educational material; • developed self-criticism, the ability to correctly determine the causes of failure in teaching
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specialization and features of the elective courses in mathematics organization and conduction; <ul style="list-style-type: none"> • understanding the peculiarities of the organization of pupils' educational and cognitive activities in the process of learning mathematics; • knowledge of the questions typology and their formulation features during teaching mathematics; • knowledge of the peculiarities of the organization of mathematics extracurricular at school. 	mathematics to pupils.
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At first, we should note that the vast majority of teachers' methodological competence in teaching mathematics to pupils (selected based on Ukrainian scientists' research results) relates to such descriptors of the national qualifications framework as knowledge, autonomy, and responsibility. Among indicators of methodological competence listed in Table 1, we have identified those, the formation and development of which, in our opinion, is the most possible in partnership between a pedagogical university and a school. The selected list is presented in the form of Table 2:

TABLE 2
INDICATORS OF METHODOLOGICAL COMPETENCE IN TEACHING MATHEMATICS,
THE FORMATION OF WHICH IS POSSIBLE IN PARTNERSHIP BETWEEN A
PEDAGOGICAL UNIVERSITY AND A SCHOOL

Knowledge	Skills	Communication	Responsibility and autonomy
<ul style="list-style-type: none"> • understanding the tasks of methodical activity of a mathematics teacher; • knowledge of normative documents on the organization of teaching mathematics at school; 	<ul style="list-style-type: none"> • ability to create conditions in the process of teaching mathematics for the methods of pupils' mental activity development; 	<ul style="list-style-type: none"> • readiness to communicate with colleagues on the problems of effective teaching of mathematics to pupils; • ability to communicate with 	<ul style="list-style-type: none"> • understanding the essence of the methodological competence of a mathematics teacher; • awareness of the need for self-education, self-development, self-improvement in

<ul style="list-style-type: none"> • understanding of methodical systems implemented in current textbooks of mathematics for school; • knowledge of innovative pedagogical technologies of teaching mathematics at school; • knowledge and understanding of different technologies of teaching mathematics to pupils; • knowledge of advanced pedagogical experience of teachers-practitioners on the problems of organizing a modern lesson of mathematics and studying its topics; • knowledge of the use peculiarities of contemporary information technologies in the teaching of mathematics; • knowledge of various teaching technologies specifics and methods of their creation and application in the process of teaching mathematics; • knowledge of multiple forms of monitoring, control, evaluation, and correction of pupils' academic achievements in 	<ul style="list-style-type: none"> • the ability to conduct a quality math lesson at school; • ability to methodically use information technologies; • ability to form and develop holistic, systematic knowledge and skills of pupils in mathematics; • ability to form and develop ways of pupils' activity on the successful application of knowledge and skills in mathematics for solving practical and applied problems. 	<p>colleagues on the difficulties of organizing a modern maths lesson and studying some of its topics;</p> <ul style="list-style-type: none"> • ability to present own developments of different types of mathematics lessons; • ability to methodically carry out an extensive analysis of a mathematics lesson; • ability to discuss effective methods, techniques, and tools for teaching mathematics; • ability to demonstrate readiness for self-education, methodical self-improvement, methodical self-development; • ability to cooperate with stakeholders to achieve goals in teaching mathematics to pupils; • ability to actively and creatively interact in the process of pair and group methodical activity; • ability to demonstrate flexibility and strength of methodological knowledge; • the ability to show healthy emotional reactions to professional failures or achievements. 	<p>teaching math to pupils;</p> <ul style="list-style-type: none"> • demonstration and the ability to substantiate one's own methodological beliefs; • desire to achieve a high level of methodological training; • conscious willingness to master the methodological skills • readiness to look for ways to solve educational problems that arise in connection with the education system reform in general, and math education in particular; • interest in mastering new methodological knowledge and skills; • ability to critically analyze sustainable methodological views; • readiness to build a personally weighty, own methodical system of teaching math to pupils; • the ability to analyze, identify and establish relationships between different components and factors that affect the effectiveness of teaching math in school; • ability to determine the necessary system of methodical actions in known, unknown, non-standard situations based on systematization,
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learning mathematics.	generalization, and analysis of facts; <ul style="list-style-type: none"> • ability to control and evaluate own methodical activity; • the ability to independently and impartially perceive new methodological knowledge or problems through the prism of their own methodological beliefs, • ability to generate new ideas aimed at improving the process of learning math; • ability to creative independence and creative solution of professional tasks; • developed self-criticism, the ability to correctly determine the causes of failure in teaching math to pupils.
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It is easy to see that the proposed transition from Table 1 to Table 2 allows us to formulate the hypothesis that in partnership between a pedagogical university and a school, one can theoretically provide favorable conditions for the formation and development of teachers' methodological competence indicators in teaching mathematics. These indicators mostly belong to such descriptors of the national qualifications framework as knowledge, communication, responsibility, and autonomy. To identify methodological competence indicators in teaching mathematics to pupils, the formation and development of which is the most possible in partnership between a pedagogical university and a school, we will also consider the requirements of educational and professional training programs for mathematics teachers in higher education. We conducted a detailed analysis of educational and professional training programs for mathematics teachers in twelve pedagogical universities of Ukraine: Berdyansk State Pedagogical University; Vinnytsia Mykhailo Kotsyubynsky State Pedagogical University; Glukhiv Oleksandr Dovzhenko National Pedagogical University; State Higher Educational Institution "Donbas State Pedagogical University"; Pereyaslav-Khmelnytsky Hryhoriy Skovoroda State Pedagogical University; State Institution "South Ukrainian K.D. Ushinsky National Pedagogical University"; Kryvyi Rih State Pedagogical University; Melitopol Bohdan Khmelnytsky State Pedagogical University; Poltava V.G. Korolenko National Pedagogical University; Ternopil Volodymyr Hnatyuk National Pedagogical University; Uman Pavlo Tychyna State Pedagogical University; Kharkiv H.S. Skovoroda National Pedagogical University. Based on this analysis, we have formed a generalized list of methodological competence indicators in teaching mathematics to pupils in the form of Table 3.

TABLE 3
SUMMARY LIST OF METHODOLOGICAL COMPETENCE INDICATORS IN TEACHING MATHEMATICS TO PUPILS (BASED ON THE EDUCATIONAL PROGRAMS ANALYSIS)

Knowledge	Skills	Communication	Responsibility and autonomy
<ul style="list-style-type: none"> • knows and freely operates the main categories and concepts of methods of teaching mathematics; • knows the historical mathematics stages of development and methods of teaching mathematics; • knows the conceptual foundations of school education in mathematics, goals, and objectives of teaching mathematics at school; • knows the main types and content of mathematics teachers activity; • knows and can explain the peculiarities of the organization of pupils' learning at different specific stages of the mathematics lesson, taking into account the age characteristics of students and the specifics of educational goals; • knows the forms and methods of teaching pupils in mathematics lessons and extracurricular activities; • knows and understands the 	<ul style="list-style-type: none"> • can solve problems of different levels of complexity of the school maths course; • can use recommendations on teaching mathematics methods to implement an educational program in mathematics in a secondary school; • understands and can apply the introductory theoretical provisions of the methodology of teaching math; • has a culture of mathematical thinking, logic, and algorithmics; • can implement modern innovative learning technologies; • can carry out methodical analysis of educational material of school maths textbooks; • can design and conduct a math lesson at the appropriate level; • can use the method of extracurricular activities in math; • can track the dynamics of personal development of pupils in mathlessons; 	<ul style="list-style-type: none"> • can communicate effectively in the process of teaching mathematics to pupils; • knows the basics of professional speech culture in teaching mathematics at school; • can present their own experience of teaching mathematics to pupils; • has the skills to prepare scientific and methodological materials; • can demonstrate fragments of the organization of teaching mathematics to pupils at different specific stages of a mathematics lesson; • can organize cooperation with pupils, support their activity, initiative, independence, and creative abilities. 	<ul style="list-style-type: none"> • can perceive information, creatively rethink it and apply it in the process of professional activity; • can analyze, design, implement and improve support for teaching and learning mathematics to pupils; • appreciates and can develop their own mathematical and methodological competencies and is aware of the responsibility for their level; • can find, analyze, summarize and systematize the data needed to present their own experience; • can use methodological knowledge and practical skills for research in the pedagogical field; • can distinguish, critically comprehend, use traditional and innovative approaches, principles, methods, techniques of teaching and organizing methodological activities;

features of teaching mathematics to various groups of pupils.

- can use the method of preparing pupils for math competitions and tournaments;
 - can organize remote and independent work in math using modern innovative techniques and teaching technologies;
 - can use the technology of organization in the process of educational and research activities of pupils in the lessons and extracurricular activities in math;
 - can apply modern techniques and technologies, including information and communication in class and extracurricular activities;
 - can give examples in teaching math;
 - can identify errors and shortcomings in the knowledge and skills of pupils in math, in the logic of reasoning, explain the difference between facts and consequences;
 - can apply methods of diagnosing students' achievements in math, select and develop tasks for tests, independent and control works, individual work;
 - can reveal the unique individuality and abilities to create
- can study the effectiveness of training, methods, techniques, and tools used to teach mathematics;
 - can analyze, design, implement and improve educational and methodological equipment for teaching mathematics;
 - can conclude the effectiveness of the methods, techniques, and tools used to teach mathematics;
 - recognize the need at the present stage of development of physical and mathematical education in the formation of pupils' ability to apply interdisciplinary approaches;
 - can accumulate and systematize various methods and ways of solving problems, banks of crucial problems, etc.;
 - forms the value aspect of mathematical knowledge, coordinates its emotional perception by pupils, develops and offers various forms and types of education of a positive attitude to mathematics, and motivates pupils to learn its basics and methods.
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- conditions for their development;
 - can demonstrate and apply the knowledge of mathematics necessary for the formation of mathematical competencies of pupils;
 - can form in pupils an understanding of the basics of mathematical modeling, readiness to use modeling to solve problems;
 - can establish interdisciplinary and intradisciplinary links while studying specific topics of the school course of math.
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A comparative analysis of Table 1 and Table 3 allows us to note that the summarized list of methodological competence indicators in teaching mathematics to pupils, selected based on educational programs analysis, is relatively small (45 indicators). In contrast, a similar list of chosen indicators based on Ukrainian scientists' analysis research amounts to 75 indicators. Secondly, the methodological competence indicators in teaching mathematics to pupils selected based on educational programs' analysis mostly belong to the descriptor – skills/abilities. In our opinion, this can be explained by the fact that Table 3 shows the desired program learning outcomes of future mathematics teachers, and Table 1 is created in the context of methodological activities of mathematics teachers at school. Both situations are relevant for our study, so we have identified from Table 3 those indicators of methodological competence in teaching mathematics to pupils, the formation and development of which, in our opinion, is the most possible in the partnership of pedagogical university and school (Table 4).

TABLE 4
INDICATORS OF METHODOLOGICAL COMPETENCE IN TEACHING MATHEMATICS,
THE FORMATION OF WHICH IS POSSIBLE IN PARTNERSHIP BETWEEN A
PEDAGOGICAL UNIVERSITY AND A SCHOOL

Knowledge	Skills	Communication	Responsibility and autonomy
<ul style="list-style-type: none"> • knows and can explain the peculiarities of the organization of pupils' learning at different stages of the 	<ul style="list-style-type: none"> • can implement modern innovative learning technologies; • can carry out methodical analysis 	<ul style="list-style-type: none"> • can present their own experience of teaching mathematics to pupils; • has skills in preparing scientific and 	<ul style="list-style-type: none"> • can perceive information, creatively rethink it and apply it in the process of professional activity;

<p>mathematics lesson, taking into account the age characteristics of pupils and the specifics of educational goals;</p> <ul style="list-style-type: none"> • knows and understands the peculiarities of teaching mathematics to various groups of pupils. 	<p>of educational material of school textbooks of mathematics;</p> <ul style="list-style-type: none"> • has a method of preparing students for math competitions and tournaments; • can organize remote and independent work using modern innovative techniques and teaching technologies; • has the organization technology in the educational process of educational and research activities of pupils in the lessons and extracurricular activities in mathematics; • can apply modern techniques and technologies, including information and communication, in class and extracurricular activities; • can timely reveal the unique individuality and abilities of the pupils, create conditions for their development; • can establish interdisciplinary and intradisciplinary links while studying specific topics of the school course of mathematics. 	<p>methodological materials;</p> <ul style="list-style-type: none"> • can demonstrate fragments of the organization of teaching mathematics to pupils at different stages of a mathematics lesson; • can organize cooperation with pupils, support their activity, initiative, independence, and creativity. 	<ul style="list-style-type: none"> • can analyze, design, implement and improve support for teaching and learning math to pupils; • appreciates and can develop mathematical and methodological competencies and is aware of the responsibility for their level; • can find, analyze, summarize and systematize the data needed to present their own experience; • can use methodological knowledge and practical skills for research in the pedagogical field; • can distinguish, critically comprehend, use traditional and innovative approaches, principles, methods, techniques of teaching and organizing methodological activities; • can study the effectiveness of training, methods, techniques, and tools used to teach math; • can analyze, design, implement and improve educational and methodological equipment for teaching math; • can conclude the effectiveness of the methods, techniques,
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- and tools used to teach mathematics;
 - recognize the need at the present stage of development of physical and math education in the formation of pupils' ability to apply interdisciplinary approaches;
 - can accumulate and systematize various methods and ways of solving problems, banks of crucial problems, etc.;
 - forms the value aspect of math knowledge, coordinates its emotional perception by pupils, develops and offers various forms and types of education of a positive attitude to math, and motivates pupils to learn its basics and methods.
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The transition from Table 3 to Table 4, allows us, first of all, to formulate the hypothesis that in terms of the partnership between a pedagogical university and a school, favorable conditions for the formation and development of mathematics teachers' methodological competence indicators can be provided theoretically. These indicators belong to such a descriptor of the national qualifications framework as responsibility and autonomy. Secondly, we discovered a lack of a developed partnership system between a pedagogical university and a school in future mathematics teachers' training in pedagogical universities is one of the reasons for a relatively small list of the competence indicators. The mentioned indicators belong to such a descriptor of the national qualifications framework as communication. Based on a comparative analysis of Table 2 and Table 4, we have created a united list of methodological competence indicators, the formation or development of which, according to our research, is possible in partnership with pedagogical university and school. The list resulted in the questionnaire developed by us (g2g.to/tuAK).

RESULTS

One hundred and twenty people – three groups of respondents, attended the survey: future mathematics teachers (45), working mathematics teachers (60), those who train mathematics teachers (15). Respondents who took part in the survey had the opportunity to indicate twelve fundamental, in their opinion, indicators of methodological competence in teaching mathematics to pupils, the formation or development of which

is possible in partnership with a pedagogical university and a school. In Table 5 the indicators of methodical competence of a mathematics teacher, the relevance rating of which exceeded 75%, are indicated.

TABLE 5
QUESTIONNAIRE RESULTS

№	Methodological competence indicators	Relevance rating R,%
1.	Knowledge of mathematics teachers' advanced pedagogical experience.	84,61%
2.	Knowledge of innovative pedagogical technologies of teaching mathematics at school.	83,75%
3.	Knowledge and understanding of the organization of pupils' learning at different specific stages of the mathematics lesson peculiarities, taking into account pupils' age characteristics and the specifics of educational goals.	79,65%
4.	Ability to use information technologies methodically.	85,34%
5.	Organization technology skills in the educational process of educational and research activities of pupils in the lesson and extracurricular activities in mathematics.	83,91%
6.	Ability to form and develop holistic, systematic knowledge and skills of pupils in mathematics.	79,43%
7.	Ability to organize remote and independent work in mathematics using modern innovative techniques and teaching technologies.	79,37%
8.	Willingness and ability to present their own methodological experience.	86,23%
9.	Willingness and ability to communicate with colleagues on effective teaching of mathematics to pupils problems.	83,68%
10.	Willingness and ability to prepare teaching materials	82,57%
11.	Willingness and ability to work with stakeholders to achieve goals in teaching mathematics to pupils.	81,93%
12.	Ability to demonstrate readiness for self-education, methodical self-improvement, methodical self-development.	79,48%
13.	Ability to organize cooperation with pupils, support their activity, initiative, independence, and their creative abilities.	78,39%
14.	Ability to show healthy emotional reactions to professional failures or achievements.	77,94%
15.	Awareness of the need for self-education, self-development, self-improvement in teaching mathematics to pupils.	86,65%
16.	Ability to independently and impartially perceive new methodological knowledge or problems through the prism of their own methodological beliefs.	85,87%
17.	Ability to critically comprehend and draw conclusions about the effectiveness of the methods, techniques, and tools used to teach mathematics.	84,97%
18.	Ability to generate new ideas aimed at improving the process of learning mathematics.	84,12%
19.	Ability to substantiate their own methodological beliefs.	79,87%
20.	Ability to control and evaluate own methodical activity.	78,63%
21.	Interest in mastering new methodological knowledge and skills.	78,11%
22.	Readiness to look for ways to solve educational problems arising in connection with the education system reform in general, and mathematics education in particular.	77,25%

The relevance rating of indicators R we determined by the formula (1):

$$R = \frac{n \cdot 100\%}{N}, \quad (1)$$

where n – the number of respondents who indicated the relevance of a particular indicator, N – the total number of answers of respondents who took part in the survey.

Thus, to prove the effectiveness of the created system of partnership between a pedagogical university and a school, we have identified the following 12 indicators of methodological competence of teachers in teaching mathematics to pupils:

Knowledge:

- knowledge of innovative pedagogical technologies of teaching mathematics at school;
- knowledge of the advanced pedagogical experience of mathematics teachers.

Skills:

- ability to use information technologies methodically;
- organization technology skills in the educational process of educational and research activities of pupils in the lesson and extracurricular activities in mathematics.

Communication:

- willingness and ability to present their own methodological experience;
- willingness and ability to communicate with colleagues on effective teaching of mathematics to pupils problems;
- ability to prepare teaching materials;
- willingness and ability to work with stakeholders to achieve goals in teaching mathematics to pupils.

Autonomy and responsibility:

- awareness of the need for self-education, self-development, self-improvement in teaching mathematics to pupils;
- ability to independently and impartially perceive new methodological knowledge or problems through the prism of their own methodological beliefs;
- ability to critically comprehend and draw conclusions about the effectiveness of the methods, techniques, and tools used to teach mathematics;
- ability to generate new ideas aimed at improving the process of learning mathematics.

DISCUSSION

Monitoring of indicators and levels of methodological competence of mathematics teachers is a systematic tracking of qualitative indicators and levels that characterize teachers' methodological activity in teaching mathematics to pupils. The main purpose of this monitoring is to "take indicators" of the state of methodological competence of mathematics teachers; identify trends in the development of this competence in a partnership between university and school; to provide practical directions of partnership interaction for the increase of levels of methodical competence in mathematics training. In our opinion, the system of identification, support, and development of methodological competence of future and working teachers of mathematics in the partnership of pedagogical university and school can and should be well thought out, motivated, and scientifically-proved. For those capable of methodical activity and not quite capable, with a high level of methodological competence and a low level, conditions should be created that would promote their methodological development and stimulate professional growth.

We consider the concept of differentiation of methodical preparation and methodical activity as search and usage of methodical competence development means, which would lead teachers to a desirable level of acquisition of methodical knowledge, abilities, experience, and beliefs. To create conditions for improving the mathematics teachers' methodological competence levels, it is essential to diagnose these levels in the partnership system between pedagogical university and school. Differentiation of participants in partnership, in our opinion, is possible at the following levels:

- by the level of methodological knowledge (K1, K2, K3);
- by the level of methodological skills (S1, S2, S3);
- by the level of professional communication (C1, C2, C3);
- by the level of methodological autonomy and responsibility (R1, R2, R3).

K1, S1, C1, R1 – these are, respectively, the highest levels of these characteristics, as they are assigned rank 1. The ranking system, in this case, allows you to read any possible combination. For example, if a set is defined as K1 S2 C3 R2, this means that it is characterized by a high level of methodological knowledge, an average level of methodological skills, a low level of communication, and an intermediate level of methodological autonomy and responsibility. Levels of methodical competence formation and development in terms of the university-school partnership are defined by the ranks sums in the specified characteristics. Consider four groups of sums of levels:

- 4-5 - a high level of methodological competence;
- 6-7 - a higher intermediate level of methodological competence;
- 8 - an intermediate level of methodological competence;
- 9-10 - a lower intermediate level of methodological competence;
- 11-12 - a critical level of methodological competence.

Thus, we distinguish five levels of methodological competence, for example, at the beginning of the partnership: high (4-5), higher intermediate (6-7), intermediate (8), lower intermediate (9-10), critical (11-12). The organizers' task of the partnership between university and school is to build a partnership system with maximum consideration of the quantitative and qualitative composition of the participants in each event. It is vital to create the content and technology of partnership, taking care of the favorable conditions for the formation and development of methodological competencies of each subgroup's participants.

CONCLUSION

Under the differentiated approach in the formation and development of mathematics teachers' methodological competence in the system of the partnership of pedagogical university and school, we understand the identification and consideration of indicators and levels of methodological competence of partners to create the most favorable conditions for their improvement. The subjective experience of the one who is studying, improving, or developing must be identified, disclosed, and then coordinated with the partnership's content. The author's system of determination of mathematics teachers' methodical competence levels in terms of the partnership of pedagogical university and school in our experimental research is considered appropriate.

Personality-oriented methodological training or advanced mathematics teachers' training should not aim to form a teacher with predetermined methodological characteristics. The purpose should be to create favorable conditions for the full identification and development of relevant indicators or methodological competence levels for each participant in the partnership. Therefore, it is crucial for the university-school partnership organizers to monitor changes in the partnership participants' indicators and levels of methodological competence.

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