



UDC 378.147, 371.14, 371.13
DOI 10.35433/pedagogy.1(112).2023.47-59

PRACTICAL TRAINING IN MATHEMATICS TEACHER EDUCATION OBTAINED IN THE CONDITIONS OF DUAL FORM: ROLE, PLACE, TASKS, FEATURES

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In the article, we analyze the traditional conditions, goals, and tasks of pedagogical practical training in mathematics teacher education at the master's level of higher education and highlight the features of the organization of practical training at the workplace in the conditions of dual education. The article emphasizes that pedagogical practical training acquires new roles and significance in the conditions of dual education. Training at the workplace creates new opportunities in setting practical tasks and using means for assessment. On the contrary, a number of tasks, that are traditional for the pedagogical practical training of full-time master's students, are not relevant. To consider the peculiarities of the organization of pedagogical practical training in the conditions of a dual form of education, an individual approach in developing an individual program for practical training at the workplace is necessary. In the individual program of pedagogical practical training such tasks should be clarified and specified with respect to the individual conditions of training at the workplace, the requirements and needs of a specific institution of general secondary education, the needs of individual methodical development of each student. It is also stressed that in order to meet the purpose, tasks, content of practical training and other requirements of the educational programme in the conditions of dual form of obtaining education, it is important to develop requirements for workplaces, material, technical and information resources, requirements for mentors, as well as clear criteria for evaluating the quality of training at the workplace (in particular, indicators for mentoring efficiency) and procedures for monitoring the quality of training at workplaces (including surveys of students and practical training supervisors from the university, etc.).

Keywords: dual education, mathematics teacher education, quality of math teacher education.

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ПРАКТИКА В НАВЧАННІ ВЧИТЕЛІВ МАТЕМАТИКИ В УМОВАХ ДУАЛЬНОЇ ФОРМИ ЗДОБУТТЯ ОСВІТИ: РОЛЬ, МІСЦЕ, ЗАВДАННЯ, ОСОБЛИВОСТІ ОРГАНІЗАЦІЇ

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У статті проаналізовано традиційні умови, цілі та завдання педагогічної практики у підготовці вчителів математики на магістерському рівні вищої освіти та висвітлено особливості організації практичної підготовки на робочому місці в умовах навчання за дуальною формою здобуття освіти. У роботі підкреслюється, що в умовах дуальної освіти педагогічна практика набуває нових ролей і значення. Навчання на робочому місці створює нові можливості для постановки практичних завдань і використання засобів оцінювання. Навпаки, ряд завдань, традиційних для педагогічної практики магістрантів денної форми навчання, не є актуальними. Для врахування особливостей організації педагогічної практики на робочому місці в умовах дуальної форми здобуття освіти, необхідним є індивідуальний підхід при розробці індивідуальної програми педагогічної практики. Запропоновано приклад орієнтованих завдань активної педагогічної практики для всіх видів діяльності в процесі навчання на робочому місці. В індивідуальній програмі педагогічної практики такі завдання мають бути уточнені, конкретизовані з урахуванням індивідуальних умов навчання на робочому місці, вимог і потреб конкретного закладу загальної середньої освіти, потреб індивідуального методичного розвитку кожного студента. Також наголошується, що для відповідності меті, завданням, змісту практичної підготовки та іншим вимогам освітньої програми в умовах дуальної форми здобуття освіти важливо розробити вимоги до робочих місць, матеріально-технічної та інформаційної бази, вимоги до наставників, а також чіткі критерії оцінювання якості навчання на робочому місці (зокрема, показники ефективності роботи наставників) та процедури моніторингу якості навчання на робочому місці (зокрема опитування студентів, керівників виробничої практики від ЗВО тощо).

Ключові слова: дуальне навчання, освіта вчителя математики, якість освіти вчителя математики.

Introduction of the issue. The dual form of higher education is a method of obtaining it by full-time students, which involves training at the workplace at enterprises, institutions, and organizations to acquire a specific qualification in the amount of 25% to 60% of the educational programme, based on the contract. Work based learning involves fulfilling job duties in accordance with the employment contract ([21], 2014, art. 49, p. 6).

The possibilities and advantages of teaching mathematics teachers in the dual form of education are highlighted in [13]. They include, in particular:

- guaranteed support and accompaniment of young teachers at the stage of entry into the profession (due to special requirements for the first workplace);
- shortening the period of graduates' adaptation to the conditions of actual practical activity;
- quick updating of the content and methods (technologies) of teacher education thanks to the close

cooperation of the institution of higher education with institutions of general secondary education, and a deeper understanding of the needs and conditions of modern schools);

- an opportunity for the institution of general secondary education to train a specialist in accordance with its requirements and needs, who is familiar with the school peculiarities (profile, specialization, etc.);
- preserving the succession of generations through the introduction of the "mentorship" institute, the formation of an atmosphere of mutual assistance and mutual responsibility in the general secondary education institution;
- an opportunity for the higher education institution not only to participate in the training of young professionals, but also to completely control the entire process of a teacher's professional growth (training, lifelong learning, constant support and cooperation);
- high level of students' study motivation since knowledge becomes demanded.

The results of a survey conducted in 2021 among the general secondary educational institutions being partners of the National Pedagogical Dragomanov University, which are bases for pedagogical practical training and have last five years graduates in the teaching staff, are described in [18]. Out of 28 respondents, 24 (85.7%) were ready to cooperate in the framework of training mathematics teachers in the dual form of education. Employers noted that it is important for them to participate in developing the content of education, to have the opportunity to get a teacher who is trained in accordance with the requirements of a general secondary education institution, is familiar with the school's peculiarities, the school staff and working conditions, and does not need additional training. The results of the survey showed that employers are interested in specific practical skills. Their opinions regarding the part of practical training were divided (40%, 50%, 60%, even 80%), but none of the respondents chose the answer options with the part of practical training less than 40%.

In dual education, when a student is employed in a general secondary education institution as a teacher, and is a part of the school community, bears personal responsibility for the quality of teaching mathematics to pupils, practical training acquires new roles and significance. Training at the workplace creates new opportunities for setting tasks and using different means of diagnosing the degree of formation of the student's professional qualities, abilities and skills.

Current state of the issue. The problem of organizing pedagogical practical training in mathematics teacher education is considered by Ukrainian researchers periodically. It is worth paying attention to Z.I. Slepcan's article [15] emphasizing pedagogical practice as a significant component of the professional development of a mathematics teacher. In addition to describing the content and tasks of practical training, the actual problems of its organizing and conducting are pointed out in [15]. Other Ukrainian authors (S.L. Zahrebelnyi [20],

N.M. Myronchuk [10], S.V. Muzychenko, L.H. Filon [8], O.M. Boldarieva, K.V. Nedyalkova [7], O.A. Zhernovnykova [6]) reveal their vision of the organization and conduct of pedagogical practical training mostly in teaching manuals and methodical recommendations. At the level of scientific publications, the problem of organizing pedagogical practical training is relatively often discussed in relation to future primary school teachers, physics, physical education, and other specialties. There are few articles on the organization of pedagogical practical training in mathematics teacher education at the current stage of reforming Ukrainian mathematics education. These are, in particular, O.S. Chashechnykova's article [2] considering practical training as one of the ways to implement the principles of multicultural education; L.F. Mykhailenko's & M.B. Kovalchuk's article [9] on the formation of methodological competence during practical training; V.V. Achkan's article [1] explores practical training as a component of the methodical system of forming the readiness of mathematics teachers for innovative pedagogical activity. The problems related to the organization of practical training at school are also analyzed by foreign researchers [3; 4; 19]. The specific features of the practical training in teacher education obtained in the conditions of dual form in Ukraine have not been outlined yet.

Aim of research is to analyze the traditional conditions, goals, and tasks of pedagogical practical training in mathematics teacher education at the master's level of higher education and to highlight the features of the organization of practical training at the workplace in the conditions of dual education.

Results and discussion. Pedagogical practical training is one of the forms of methodological training for mathematics teachers. In terms of goals and content, pedagogical practical training is a component of the methodological competence formation model. In the process of pedagogical practical training, all

components of the content of methodological teacher training (theoretical, analytical, practical, activity) are formed and developed, the student acquires real practical experience of the methodological activity, his/ her personal attitude to the teaching profession, a special style of methodical activity, independent work skills, that are necessary for further professional activities, etc. Pedagogical practical training is a necessary condition for the formation of the readiness and ability of the mathematics teacher to solve competently a set of problems of methodological activity related to the formation of pupils' mathematical competence.

Pedagogical practical training in mathematics teacher education is entrusted with a number of functions. *The educational function* of pedagogical practical training involves the actualization, deepening and application of theoretical knowledge, and the presence of special conditions of the real educational process for the developing methodological skills of the future mathematics teacher. *The developmental function* consists in the conditions of cognitive and creative activity of future teachers, in the development of their methodological thinking. *The diagnostic function* provides an opportunity to identify the level of mathematical and methodological literacy of future teachers, and the degree of their readiness and ability for methodological activity [5: 243-244].

The purposes of pedagogical practical training in mathematics teacher education are:

- practical learning of various aspects of the professional and pedagogical activities of a mathematics teacher;

- development of ability to form pupils' mathematical competence, using acquired knowledge and methods of teaching mathematics, as well as pedagogical and psychological knowledge;

- ensuring the ability for students to get acquainted with methodological activities in practice, to master the

means of organization educational process, and techniques for solving specific tasks of the teacher's methodological activities in the real conditions of teaching mathematics at school;

- promoting the formation of students' needs to deepen their knowledge of mathematics and methods of teaching mathematics, as well as to apply them creatively in practical activities.

Pedagogical practical training in mathematics teacher education in Ukrainian higher education institutions has mostly continuous and phased character. The content of pedagogical practical training is determined by the requirements of a specific educational programme, and the list of types of practical training is established by the developers of the educational programme. However, the analysis of educational programmes in mathematics teacher education shows that higher education institutions of Ukraine mainly follow the sequence that was determined by the Sectoral Standards of Higher Education (used in Ukraine until 2015) and single out the following basic types of pedagogical practical training:

- *educational (propaedeutic) pedagogical practical training* (observation of the pedagogical activity of mathematics teachers, familiarization with the real educational process at school, observation of pupils' activities at the mathematics lessons);

- *on-job (active) pedagogical practical training I* (acquiring the first experience of teaching at the level of basic secondary education);

- *on-job (active) pedagogical practical training II* (acquiring experience of teaching at the level of specialized secondary education).

The Professional Standard of Teacher of general secondary education institution [11] defines that the documents confirming professional and educational qualifications for the profession "Teacher of general secondary education institution" are: bachelor

diploma (6th level of the National Framework of Qualification – NFQ) and master diploma (7th level of NFQ), but the requirements for the level of qualifications at the 6th and 7th levels of the NRC of Ukraine are not demarcated, the developers of educational programmes determine them in accordance with the NFQ and orientation of the educational programme.

The key tasks at different levels of pedagogical education are defined by the Concept of the Development of Pedagogical Education [12]. The special task of the first (bachelor) level of higher pedagogical education is "training of pedagogical workers to provide the needs of basic secondary education". The special task of the second (master) level of higher pedagogical education is "training of pedagogical workers to provide, first of all, pedagogical, specialized education, professional higher, post-graduate and specialized secondary education of academic and professional direction". In the Project of the Standard of Higher Education for bachelor's training in the specialty 014 Secondary education (by subject directions) (2018), it was also indicated that the object of study at the educational level "bachelor" is "the educational process in secondary education institutions (level of basic secondary education) according to subject specialty". Accordingly, at the first (bachelor) level of higher education, students undergo propaedeutic pedagogical practical training and on-job pedagogical practical training I at the level of basic secondary education. On-job pedagogical practical training II at the level of specialized secondary education is a component of the educational programme at the master's level.

Traditionally, on-job pedagogical practical training takes place during the time free from classes at the higher education institution. Necessary conditions for the effectiveness of pedagogical practical training are: a comprehensive approach to defining tasks, content, forms and methods of its organization and implementation; ensuring continuity and systematicity at various stages of its implementation, consistency of practical training tasks with

the content of psychological, pedagogical and methodological disciplines.

Among the main tasks of on-job pedagogical practical training at the level of specialized secondary education is to form:

1) the ability to plan and conduct mathematics lessons at school using modern methods and techniques to activate pupils' educational and cognitive activities;

2) the ability to single out the problems of forming pupils' mathematical competence at school and to determine ways to overcome them;

3) the ability to carry extracurricular work in mathematics with students of the appropriate age category;

4) sustained interest in the creative methodological activity, need for pedagogical self-education, development of professionally significant personality qualities;

5) consolidate, deepen and synthesize knowledge of psychology, pedagogy, and mathematics teaching methods in the process of using them to solve specific tasks of the teacher's methodological activity;

6) the ability to carry out self-control, self-analysis and objective self-evaluation of one's own methodological activity;

7) the ability to analyze the state of teaching mathematics in a specialized school, one's own methodological activity and progressive pedagogical experience.

In the methodological development of the mathematics teacher, an important role is assigned to every possibility to purposefully observe the methodological activity of experienced teachers who have successful experience in teaching mathematics. One of the necessary skills of a future mathematics teacher is high-quality preparation for a mathematics lesson, which includes writing an extended plan of the lesson. The formation of the corresponding skill requires a complete system of conditions, techniques and means to convince the student of the need for a deep understanding of each stage of the lesson, the need for a thorough selection of means to achieve the educational goal of the lesson and the usefulness of creating each mathematics lesson in the form of a high-quality extended plan. The corresponding ability to prepare a high-

quality extended plan of a mathematics lesson should be formed at the stage of active pedagogical practical training at school. Students can immediately compare their own idea of a lesson with the idea of the same lesson given by an experienced mathematics teacher or another student. In such conditions, students really rethink important components of methodical activity. In this case, the principle of consistency and centrism is used in the formation of the professional skill of preparing for a mathematics lesson, since at the previous stage, during the classes on the methodology of teaching mathematics, the conditions were created for the first attempts to write extended plans of lessons, conduct, and discuss their fragments by students.

Thus, the set of practical tasks that each master student should perform within the framework of pedagogical practical training, most often has the following form: preparation and design of extended plans of mathematics lessons, which are expected to be attended at school; attending and discussing mathematics lessons conducted by teachers in real school conditions; selection of specialized literature on the topic of the attended mathematics lessons; written analysis of attending mathematics lessons at school. Most students will feel the shortcomings of their own preparation for the same lesson as a result of attending and discussing the lesson of an experienced mathematics teacher. Critical understanding of one's own activity during the lesson and the activity of an experienced mathematics teacher reaches a qualitatively higher level if the student needs to carry out a written analysis of the attended mathematics lesson at school. As our experience shows, the first attempts at such written analyzes are quite difficult for students. The painstaking work of students in acquiring the skills to carry out a written analysis of the attended mathematics lesson at school is a prerequisite for the development of the methodological competence of the future mathematics teacher in presenting and justifying his own methodological ideas and beliefs.

The content of the student's *educational work* during on-job pedagogical practical training consists of the following types of activities:

- familiarization with the conditions of teaching mathematics in a specific school;
- modelling of learning content in accordance with the mandatory learning outcomes of students, planning the educational process and conducting lessons, extracurricular activities in mathematics;
- attendance and subsequent analysis of lessons and extracurricular activities in mathematics conducted by teachers and student trainees;
- active independent work on replenishing knowledge on the methodology of teaching mathematics;
- solving a significant number of problems in the school course of mathematics, understanding the methodological aspects of solving a mathematical problem.

The content of the student's *research work* during on-job pedagogical practical training consists of the following components:

- study and analysis of real conditions and problems of formation of pupils' knowledge and skills in mathematics at school;
- study and analysis of psychological and pedagogical, scientific and methodological literature on ways to increase the effectiveness of the formation of pupils' knowledge and skills in mathematics;
- analysis and generalization of the pedagogical experience of teaching mathematics in a specific school;
- scientific and pedagogical observations, approbation of methodological materials of course and qualification (master) works.

For example, in the *Vinnitsia Mykhailo Kotsiubynskyi State Pedagogical University* (VSPU) and in the *Mykhailo Dragomanov Ukrainian State University* (former – National Pedagogical Dragomanov University, NPDU) the practical activity of a student during active pedagogical practical training includes the following types of activities:

Table 1

**Types of activities in the framework of pedagogical practical training
in VSPU and NPDU**

Activities of a student-intern	VSPU	NPDU
Conducting lessons (students are allowed to conduct lessons only if they have an extended plan of the mathematics lesson, signed by the mathematics teacher or practical training supervisor)	At least 4 mathematics lessons per week	At least 10 mathematics lessons totally
Attending lessons and participating in their analysis (lessons are conducted by mathematics teachers and other students according to the schedule of visits and mutual visits to lessons)	At least 4 lessons per week	2 days per week, 2-3 lessons per day, the practical training report includes a full analysis of 2 lessons
Preparation and implementation of extracurricular activities in the direction of mathematics teaching methods, attendance and analysis of relevant extracurricular activities conducted by teachers and student-interns	At least 2 conducted events	1 extracurricular event, 1 educational event, 1 analysis of the educational event

In education obtained in the dual form, pedagogical practical training is at the workplace. It is clear that the best traditions of organizing and conducting pedagogical practical training should be preserved. At the same time, in the conditions of training at the workplace, new opportunities appear, and a number of tasks lose their relevance.

In order to implement training in the conditions of the dual form of education, a higher education institution has to develop a curriculum that takes into account the peculiarities of such a form of education and the schedule of the educational process. Different models of the distribution of the study load are possible: the split-week model (several days during the week the study takes place at the university, the rest of the days at the workplace), the split-day model (several hours of the study day take place at the university, the rest at the workplace), block model (the entire period of study is divided into blocks (blocks of study at a higher education institution and blocks of study at the workplace), each block lasts from 2 weeks to a semester, blocks alternate), a combination of models also is possible.

In the applied research project "Dual form of education and blended learning in the system of training mathematics teachers", which was implemented by the National Pedagogical Dragomanov

University in 2021-2022 (0121U001009), a split-week model was chosen as a model for organizing mathematics teacher education at the master's level [16]. This model involves combining several days of theoretical training at the university and 1-2 days of practical training in a general secondary education institution within each week. The split-week model takes into account the specifics of a mathematics teacher's work and the needs and opportunities of general secondary education institutions (schedule of the educational process in a general secondary education institution). The structure of the educational programme includes the professional seminar "Basis of the teacher's professional skills", which provides methodological and psychological support for the young teacher, provides qualified, effective and timely assistance in the organization of the educational process, in the development of curriculum documentation, the implementing new pedagogical and computer technologies, promotes the formation of a creative approach, forms the need for continuous self-education [14; 17].

The organization of pedagogical practical training in the conditions of dual education has the following characteristics:

- those practical training bases (schools) are used, in which students are employed and relevant contracts are signed;

- the time of training at the workplace is the time of pedagogical practical training;

- according to the suggested model of distribution of the educational load – the split-week model, pedagogical practical training is end-to-end and consists of three components: pedagogical practical training 1 (1 semester of master's studies), pedagogical practical training 2 (2 semester), pedagogical practical training 3 (3 semester); this approach allows to try the theoretical provisions in practical training immediately, analyze and discuss the results of the approbation not only with the mentor and the practical training supervisor, but also within the framework of the professional seminar "Basis of the teacher's professional skills", and then to try them again taking into account the results of the analysis and discussion;

- summaries of students' activities are conducted for each type of pedagogical practical training (pedagogical practical training 1, pedagogical practical training 2, pedagogical practical training 3);

- during summing up the results of each type of pedagogical practical training, a student studying in the dual form of education (due to the conditions of combining education and professional activity, the presence of specific conditions for experimental activity) is able to prepare a report or the text of an article based on the results of research activities.

Let us analyze some specific conditions for pedagogical practical training for master's degree students studying in the dual form of education.

1) Among the students who have chosen to study in the dual form of education at the master's level, there could be ones who entered the master's level having several years of practical teaching experience. Such students are already integrated into the school team, know the pupils well, and have some experience in performing the work functions of a teacher of a general secondary education institution. Some tasks of

pedagogical practical training, that are traditional for full-time students, are not relevant to them. This concerns, for example, the tasks of the first week: familiarization with the material and technical resources of the school, adaptation in the teaching staff community, the study of the teaching documentation (calendar and thematic plans, methodological recommendations, etc.), getting acquainted with the class and studying individual characteristics of pupils.

2) On the contrary, there could be students who obtained a bachelor's degree with a teacher's qualification in another subject specialty (in particular, many years ago), have got practical experience as a teacher, but the general secondary education institution has a great need in a mathematics teacher, hence they need requalification. (We know cases when teachers with more than ten years of teaching experience (geography, physics, etc.) chose the specialty 014 Secondary education (Mathematics)). Such students did not study the methodology of teaching mathematics at the level of basic secondary education. Compensatory courses are included in their individual training plan. At the same time, the practical training program should include the tasks performed by undergraduate students as a part of pedagogical practical training.

Taking into account the differences and peculiarities mentioned, it is already possible to assert the need for an individual approach when developing a pedagogical practical program for each master's student studying in the dual form of education. However, each school has its own characteristics. The dual form of obtaining education gives every institution of general secondary education the opportunity to participate in teacher training in accordance with its requirements and needs. Therefore, the peculiarities of the institution of general secondary education should be taken into account during developing an individual program of pedagogical practical training.

The issue of workplace requirements is relevant. In most cases, a master's student with no teaching experience will not be allowed to teach mathematics at the level of specialized secondary

education, they are given grades 5-8. This means that it is not possible to perform practical training tasks that are aimed specifically at the senior professional school directly at the workplace (the same is for specialized classes with in-depth study of mathematics). In this case, we see the solution in the analysis of the possibilities to achieve the learning outcomes of the practical training program at the workplace for each specific student; if individual tasks cannot be performed, then a part of the tasks is performed at the workplace: other tasks are either at another workplace or within the traditional practical training.

We see *the goal of pedagogical practical training* in the conditions of dual education at the second (master's) level of higher education in the implementation of the integration of pedagogical education, science, and practical training; acquisition and improvement of practically significant abilities and skills in conducting educational and extracurricular work, development of professional qualities and psychological skills.

The main tasks of pedagogical practical training for master's students in the conditions of a dual form of education:

- deepening the connection between theoretical knowledge and the real pedagogical process based on real professional activity,
- use of knowledge and skills in solving specific educational and educational tasks;
- mastering current modern methods and forms of organizing pedagogical activity;
- mastering effective learning and educational technologies;
- formation of students' ability to make independent decisions, the need to systematically renew knowledge and skills;
- formation of a creative research approach to pedagogical activity.

When developing an individual program of pedagogical practical training for each master's student studying in the dual form of education, it is important to take into

account the task of forming integral competence in master's graduates according to level 7 of the NFQ: specialized conceptual knowledge, including modern scientific achievements in the field of professional activity or field of knowledge and is the basis for original thinking and conducting research, critical understanding of problems in the field and on the border of the fields of knowledge. Therefore, we suggest separating the research, training, and educational activities of the student in the process of training at the workplace. Each student of the master's degree in the specialty 014 Secondary Education (Mathematics) performs a qualification study aimed at analyzing the actual problems of teaching mathematics and substantiating the relevant methodical recommendations. Therefore, one of the directions of research activity during pedagogical practical training is the organization of certain experimental studies on the subject of qualification investigation.

Given below is an example of indicative tasks of active pedagogical practical training for all types of activities in the process of training at the workplace:

Research activity:

Pedagogical practical training 1

- to analyze the calendar and thematic plans of different mathematics teachers, plans for extracurricular work and plans for the organizational and educational work of different class teachers at the level of specialized secondary education;
- to improve, with the help of the university practical training supervisor and the mentor, plans of various types of pedagogical work for all period of pedagogical practical training 1;
- to conduct purposeful observation of the best pedagogical experience in specialized secondary schools;
- to study the individual characteristics of students who have different levels of educational achievements in order to study the reasons for some pupils to be not able to keep up with mathematics and the needs for expanding and deepening the knowledge and skills of others.

Pedagogical practical training 2

- to comprehensively analyze and improve own plans for various types of pedagogical work for the period of pedagogical practical training 2;
- to carry out a psychological and pedagogical analysis of the best pedagogical experience in a specialized secondary school;
- to carry out the selection, analysis and systematization of effective methods and means of teaching mathematics at school based on own and analyzed pedagogical experience;
- to carry out approbation of methodical developments and recommendations on the subject of qualification investigation.

Pedagogical practical training 3

- to present with psychological and pedagogical justification (at the university department or professional seminar) the plans of various types of pedagogical work for the period of pedagogical practical training 3;
- analyze and improve own pedagogical experience, test innovative learning technologies;
- to try out different methods of stimulating students' interest in learning;
- to analyze the expediency and possibility of using information technologies to improve the effectiveness of teaching mathematics at school;
- to carry out experimental verification of methodological developments and recommendations, identified in the process of carrying out one's own qualification work.

Training activity:

Pedagogical practical training 1

- to prepare at least 8 extended plans of lessons explaining the new material and submit them for analysis to the practical training supervisor and the mentor;
- to actively attend the mentor's lessons;
- to prepare and conduct lessons in accordance with job duties;
- to prepare and conduct at least four mathematics lessons with a mentor being present at the lesson;
- to conduct extracurricular work in mathematics (additional classes for those

who can't keep up with mathematics, individual classes for talented pupils);

- to carry out monitoring activities (monitoring and assessment of student achievements in class, checking independent, control and homework assignments).

Pedagogical practical training 2

- to prepare at least 6 extended plans of mathematics lessons for students of the specialized school (2 – combined; 2 – application of knowledge, abilities and skills; 2 – systematization and generalization of knowledge) and submit them for analysis to the practical training supervisor and the mentor;
- to actively attend mathematics lessons of different school teachers;
- to prepare and conduct lessons in accordance with job duties;
- to prepare and conduct at least six mathematics lessons with a mentor being present at the lesson;
- to form systems of exercises for correcting students' typical mistakes;
- to conduct extracurricular work in mathematics (optional classes, group classes);
- to monitor the success of students' learning (testing, questionnaires).

Pedagogical practical training 3

- to prepare at least 4 plans-summaries of lessons in mathematics for students of the specialized school with active, but methodologically balanced, use of current information and communication technologies and submit them for analysis to the practical training supervisor and the mentor;
- to prepare and conduct lessons in accordance with job duties;
- to prepare and conduct an open mathematics lesson at school followed by its discussion in the conditions of the methodological association of school subject teachers;
- to test the methodology of preparing students for research work, mathematical Olympiads and tournaments;
- to organize pupils' project activity;
- to test the formative assessment in teaching mathematics at the specialized secondary school.

Educational activity:

- to organize and regulate educational interaction with students;
- to find out the interests and preferences of the pupils of the class regarding educational and extracurricular work on the subject;
- to analyze and evaluate the process and results of educational interaction;
- to organize and carry out frontal, collective, group and individual work with students and their parents;
- to carry out pedagogical reflection;
- to prepare and conduct at least two educational activities with a mentor being present (each semester).

We emphasize that the above tasks of pedagogical practical training in a specialized secondary school for all types of student activities are indicative and generalized. During developing an individual program of pedagogical practical training for each master's student, such tasks should be clarified, and specified considering the individual conditions of training at the workplace, the needs of individual methodical development of each student. The choice of a split-week model for the implementation of education in a dual form of education requires, when developing an individual program of pedagogical practical training, a particularly careful analysis of the content of the programs of disciplines (first of all, psychological, pedagogical and methodological disciplines) with the aim of harmonizing weekly tasks with weekly theoretical material.

Conclusions and research perspectives. Pedagogical practical training connects methodological training of future teachers with practical activities at school, equips students with the experience of a teacher's professional activity. Different types of pedagogical practical training create real opportunities to form students' readiness for teaching, the need to acquire and apply knowledge and skills regarding the methodology of teaching mathematics, to study and analyze the pedagogical experience of teaching mathematics at school, to understand the actual problems of the formation of mathematical competence of pupils.

Pedagogical practical training acquires new roles and significance in the conditions of dual education. Training at the workplace creates new opportunities in setting practical tasks, using means of diagnosing the degree of formation of the student's professional qualities, abilities and skills. On the contrary, a number of tasks, that are traditional for the pedagogical practical training of full-time master's students, are not relevant.

Taking into account the peculiarities of the organization of pedagogical practical training in the dual form of obtaining education, the peculiarities of the contingent of master's students who have not only the wish but also the need to study in the dual form, one of the ways of effective organization of pedagogical practical training is an individual approach in developing each individual program of pedagogical practical training.

As the authors' experience shows, institutions of general secondary education, with which the institution of higher education has long-term cooperation, may have interest, the necessary resources (material, technical, informational, personnel), but may not have vacancies this moment, that implies no opportunities to implement training at the workplace. Interested in cooperation in teacher training in dual form are schools that have a great need for a teacher. Such cooperation is likely to be often initiated by students. The partner institution of general secondary education must meet the purpose, tasks, content of practical training and other requirements of the educational programme, therefore it is important to develop requirements for workplaces, for material, technical and information resources, requirements for mentors. At the same time, requirements for the workplace must be brought to the attention of applicants (students) before the beginning of the academic year.

To organize pedagogical practical training properly, in addition to methodological recommendations and instructional materials on the implementation of dual education, criteria for evaluating learning results and procedures for monitoring the implementation of an individual program

of practical training at the workplace, it is necessary to develop clear criteria for evaluating the quality of training at the workplace (in particular, indicators for mentoring efficiency) and procedures for

monitoring the quality of training at workplaces (including surveys of students, practical training supervisors from the university, etc).

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Received: February 21, 2023

Accepted: March 17, 2023