Развитие у учителей начальных классов навыков сопровождения учащихся в проектной и исследовательской деятельности

Введение. Учителя испытывают трудности в организации и поддержке проектной и исследовательской деятельности школьников на всех этапах, начиная с формулирования проблемы, решаемой в проекте или исследовании, и поэтому не обеспечивают формирование у детей навыков и умений для выполнения такой деятельности.

Цель статьи – анализ особенностей апробации инновационной модели процесса повышения квалификации, обеспечивающей формирование и развитие у учителей навыков педагогического сопровождения проектной и научно-исследовательской деятельности учащихся.

Методология и методы исследования. Исследовательскую выборку составила группа из 57 учителей Республики Казахстан. Содержательная интерпретация показателей качества работы участников проводилась ежедневно, сравнивались данные за соседние дни, а также данные, полученные до начала первого сеанса курсов развития, с данными, полученными после окончания второго сеанса этих курсов. Математические методы: статистический критерий $\chi^2$-Пирсона.

Результаты. В исследовании используется оригинальная модель повышения квалификации учителей, включающая три функциональные подсистемы: обеспечение ценностно-смысловой основы развития учителей; содействие оптимальному развитию их сознания; организация полноценной совместной деятельности, значимой для участников. Получено, что распределения вероятностей освоенности учителями базовых понятий понятий до курсов и после них различаются статистически значимо на уровне $p=0,01$.

Обсуждение и заключение. Настоящее исследование представляет модель наставничества и интерактивного профессионального развития учителей. Такая система может стать действенной частью механизма непрерывного педагогического образования.

Ключевые слова: учителя начальных классов, курсы профессионального и личностного развития, исследовательская и проектная деятельность учащихся, сопровождение деятельности учащихся, развитие навыков сопровождения деятельности учащихся

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Development of primary school teachers’ skills to accompany pupils in projects and research

Introduction. It is known that teachers experience difficulties in organizing and accompanying the project and research activities of schoolchildren. This happens at all stages, starting with the formulation of a problem that must be solved in a project or research. Teachers do not know how to accompany the project and research activities of pupils and therefore do not provide the formation of their skills and abilities to perform such activities.

Aim. The purpose of the article is to analyze the features of approbating an innovative model of the advanced training process, which ensures the formation and development of teachers' skills in pedagogical accompaniment of project and research activities of pupils.

Methodology and research methods. The research sample consisted of a group of 57 teachers of the Republic of Kazakhstan. A meaningful interpretation of the performance indicators of the participants was carried out on a daily basis. To analyze the significance of the results obtained, the Pearson's statistical criterion $\chi^2$ was used. When processing daily assessments, data for adjacent days were compared. In addition, a comparison was made between the data representing the grades before the start of the first session of the development courses with the data characterizing the grades immediately after the end of the second session of these courses.

Results. The study uses an original model of teachers' professional development, which includes three functional subsystems: providing a value-semantic basis for the development of teachers; promoting the optimal development of their consciousness; organization of full-fledged joint activities that are significant for the participants. A program of courses for the professional and personal development of teachers has been developed. The results of diagnostics at the final stage of the experiment demonstrated the development of primary school teachers' skills to accompany the project and research activities of pupils. Pearson's $\chi^2$ criterion was used to determine if participation in the courses influenced teachers' mastery of basic concepts. It was found that the probability distributions of the assimilation of these concepts before and after courses differ statistically significantly at the level $p=0.01$.

Discussion and conclusion. This study presents a model of mentoring and interactive professional development of teachers in an innovative process of improving their qualifications. This model is an alternative to the cascade model most often used in practice. Such system can become an effective part of the mechanism of lifelong pedagogical education.

Keywords: primary school teachers, courses of professional and personal development, research and project activities of pupils, accompaniment of pupils’ activities, development of skills to accompany pupils’ activities

For Reference:
The Recommendation on the Development of Adult Education (1976), developed by the United Nations General Conference [24], proclaimed the orientation of professional development towards the development of: a) a critical understanding of the main problems of our time and social change; b) the ability to acquire – independently, in groups or in the conditions of organized training in educational institutions specially created for this purpose – new knowledge. Accordingly, of particular value are targeted programs for improving the qualifications of teachers, aimed at developing a reflexive attitude to their skills, aimed not only at increasing competencies, but at developing the ability of teachers to educate themselves in a particular area.

Modern problems of training primary school teachers are highlighted in the works of M. Sultanbek, [29], T. Vasіutina [31]. There is evidence of the lack of general pedagogical competence of teachers (learning skills, communicative, research competence, etc.) [27].

The value of the project method, methodology and the role of the teacher in the implementation of project activities of students are described in the work of V. Bilyk et al. [2].

An analysis of the educational practice of the Russian Federation and the Republic of Kazakhstan shows that graduates of pedagogical specialties most often do not carry out design and research activities. At the same time, the normative documents indicate that graduates of pedagogical specialties should be able to ensure "the formation of ... the foundations of a culture of research and project activities and skills for developing, implementing and publicly presenting the results of research, subject or interdisciplinary educational projects aimed at solving a scientific, personal and (or) socially significant problem" [8; 10].

The results of the researches indicate that teachers often do not know how to identify the problems that should be addressed by the project or research. It is difficult for them to form hypotheses. Teachers do not know how to choose diagnostic tools, how to plan and conduct an experiment. This means that teachers are poorly familiar with the system of research and project competences [26]. There are difficulties in describing the research results [18].

Trying to comply with the normative requirements, in their educational practice, teachers “build in” some fragments of educational and research activities into the learning process. However, in this case, students participate in reduced and distorted research activities and find themselves in the role of objects of external influence. Basically, the teacher and / or parents formulate topics for the project (research), identify problems, set a specific goal and formulate tasks that need to be solved.

In the previously published work [13], an innovative theoretical model of the process was presented. It ensures the formation and development of the primary school teachers' skills to accompany the project and research activities of pupils. This model is based on the use of an anthropological approach to lifelong education [28]. According to O.G. Yaroshenko, lifelong education of teachers is a systematic and purposeful activity "to develop professional competence both in specially organized conditions and through self-education" [32]. This activity is aimed at maintaining and optimally expanding the field of personal autonomy of
participants and "provides renewal and growth of knowledge, improvement of professional skills, development of interest in the process and result of teaching and is based on the principles of "democracy, mobility, outrunning education, openness, continuity" [32].

In the context of the research line under consideration and taking into account the problems in the field of research and project competencies of teachers indicated in modern periodicals, a number of questions arose: "What are the principles of advanced training for primary school teachers to implement the project method?" "What methods and organizational features of professional development are most effective in the advanced training system?" "What methodologies can be used to assess this effectiveness?"

Based on these questions, the purpose of the article is formulated as "an analysis of the features of approbating an innovative model of the advanced training process, which ensures the formation and development of teachers' skills in pedagogical accompaniment of project and research activities of pupils, as well as a detailed assessment of the results obtained and the effectiveness of this approbation".

**Literature Review**

There are various organizational and technological models for the professional development of teachers. Cascade learning models are used in the educational systems of many countries in the organization of advanced training courses, adult education and professional continuing education [21]. At the heart of the waterfall model is the training of a group of leaders who then train their colleagues, and this chain of learning extends further to other colleagues, etc.

The cascade model provides training for a large number of full-time teachers in a short period of time. The basis of this model is the involvement of trainers, but the success or failure of this model depends on how it is implemented by these trainers [21].

The effectiveness of the cascade model is being challenged by M.D. Mpho & L.M. Matseliso. A significant plus of this model is the ability for teachers to learn on the job, but at the same time, the study showed that it insignificantly increases the efficiency of their work [20]. Similarly, a study by A. Moulakdi & Y. Bouchamma concluded that “the cascade model of professional development does not improve pupils achievement [19]. Although the advantages of such training are obvious, but, as the analysis of practical activities shows, the implementation of this model does not always correspond to the professional needs of teachers.

Models based on the consultations of experts or experienced colleagues contribute to the personal growth and professional development of teachers. They are a means of preventing teachers' professional burnout. These models use the mechanisms of mentoring (O. Kazarinova et al. [17]), sharing knowledge and experience in organizing a learning or self-learning organization (G. Ignatieva et al. [11]), mechanisms of "feedback" [5], individualization of the educational trajectory [25], interaction with professionals in a distance format using modern information and communication technologies (V.P. Vaidt et al. [33]).

While forming the model presented in [13], the authors substantiated a set of psychological, pedagogical and organizational conditions. During special courses of the
teachers’ development such conditions contribute to the formation of the teachers' ability to accompany the activities of the participants. These conditions are implemented with the pedagogical support of the course participants. In particular, at the stage of courses initiation, the interests and motivation of their participants are diagnosed, the value-semantic guidelines of pedagogical support of participants are specified.

At all stages of these development courses, it is necessary to ensure:

- improvement of communication skills, development of independence and expansion of the field of teachers' personal autonomy;
- polysubjective nature of the participants' activities — in such activities, each participant is active, determines the goals of his activity himself; he is conscious, freely makes a choice and is responsible for it; he is aware of his own uniqueness and recognizes the right of other participants to have the same qualities as he has;
- organization of reflexive activity of participants, contributing to their professional self-development;
- coaching, implemented in a full-fledged joint activity of the course organizers and their participants.

These conditions were used in various studies separately and in some combinations. For example, initiation and pedagogical support, professional development and professional self-development, technologies of adult education and continuing education of teachers were considered in the studies of O.G. Yaroshenko et al. [32].

The conditions allowing to replace traditional training sessions (lectures, practical work, seminars, etc.) with a system of meetings were investigated in the works of P. Phillips [22], L. Darling-Hammond [4]. During such Meetings participants acquired unique communication experience, reflect on their own activities and on professional development. The components that contribute to the effective professional development of teachers were identified: active adult education, the use of expert support, coaching, maintaining an atmosphere of cooperation during the lesson, feedback and correction of joint activities of participants. The organization of meetings contributed to the constant improvement of professional knowledge of teachers, the development of critical thinking. The work was carried out in the forms of mentoring, instructing, professional development, reflexive research, etc. At the same time, such meetings also helped the organizers of the courses to find optimal adjustments to the methods of work of professional development courses, including the use of innovative technologies.

L.V. Climbay studied the influence of usage interactive technologies and problem-based learning (seminars, lectures, talks, workshops) on the development of teachers' skills to accompany the students' activities. "The result can be a product of teachers' work on personal growth courses – guidelines, structure of the work program, didactic material, plan of an event, seminar, consulting" [14].

In the study of V.N. Varaksin [30], it is noted that the formation of motivation for the teachers' personal development, the creative orientation of classes and the participants' cooperation is facilitated by maintaining.

According to T.F. Esenkova [7], the main role in the organization of full-fledged joint activity of teachers belongs to the features and possibilities of pedagogical
technologies that are used in adult education and the organization of professional development courses:

- information and development orientated;
- activity-based,
- problem-searched;
- personality-oriented;
- distance learning.

The conditions that form the productive interaction of participants during training are described by A. Bautista, R. Ortega-Ruiz [1]. The researchers paid special attention to the need for a variety of types and forms of professional development of teachers, providing the possibility of joint training and the exchange of knowledge and practical skills. Similar conclusions are presented by I.A. Yudina, A.P. Oreskho [33], E. Ekinci, F. E. Acar [6], who see the effective solution of professional development in taking into account the opinions of all participants of the courses and the cooperation of teachers in online communities.

A new vision of the issues of professional and additional education is formed in the studies devoted to the organization of training courses in the conditions of the world pandemic of coronavirus infection. V.F. Gabdulkhakov, A.F. Zinnurova [9] analyze the advantages and disadvantages of distance learning, propose to revise the evaluation criteria, forms of work. This is due to the abundance of various forums, tasks, cases, tests designed to work online, which are very voluminous and can excessively overload participants. G.U. Lutfullaev [16], concretized the positive aspects of online courses. The need for effective management of training courses, timely assessment and stimulation of students, as well as the implementation of feedback was noted.

The innovative model presented in [13] was tested during special courses for the formation and development of the primary school teachers' skills to accompany the project and research activities of students. The general results of the approbation were described in [12].

A review of publications led to the following conclusions:

- the model of mentoring and interactive professional development is promising in terms of improving the qualifications of primary school teachers, since it is based on the use of active and interactive methods, the principles of developing additional professional education, and at the same time mechanisms of mentoring, exchange of knowledge and experience with colleagues are implemented;
- important conditions for the professional development of primary school teachers in the field of research and project activities is the provision of "feedback", individualization of the educational trajectory based on the interests and motivation of participants;
- in modern conditions, it is advisable to use formats that ensure interaction with professionals remotely using modern information and communication technologies.

The specification of the provisions highlighted in the course of the theoretical analysis of the problem should contain: 1) the design and approbating of an innovative model of the advanced training process, which ensures the formation and development of teachers' skills in pedagogical accompaniment of project and research activities of pupils; 2) taking into account a detailed assessment of the results obtained to ensure the effectiveness of this approbation.
Materials and methods

A group of 57 teachers of the Republic of Kazakhstan (primary school teachers – 45 people, undergraduates of pedagogical specialties – 5 people, teachers of colleges and universities – 7 people) took part in the work of experimental courses on the development of teachers’ skills to accompany the project and research activities of pupils and students.

A meaningful interpretation of the indicators of the participants’ quality of work was carried out on a daily basis. At the same time the final assessments of the approbation’s effectiveness was formed within five days after the completion of the second session of the courses. To analyze the significance of the results of the data obtained, the \( \chi^2 \) – Pearson statistical criterion was used. When processing daily assessments, data from adjacent days were compared. In addition, a comparison was made between the data representing the grades before the start of the first session of development courses with the data characterizing the grades immediately after the end of the second session of these courses.

Each day of the course work ended with oral reflection and questionnaires. During the survey, the participants evaluated four indicators on a ten-point scale (the maximum score is 10 points, the minimum score is 1 point):

a) the volume and quality of the proposed material;
b) productivity of the work performed;
c) emotional comfort in the course of study;
d) satisfaction with participation in the work.

For each of these indicators, the specific weights of daily ratings that fell into one of three groups were determined: 1 – "high scores" (8, 9 and 10 points); 2 – "average scores" (4, 5, 6 and 7 points); 3 – "low scores" (1, 2 and 3 points).

To find out to what extent participation in the courses contributed to the development of teachers' ability to accompany pupils' project and research activities, two surveys of participants were conducted (the first – before the start of the courses, the second – immediately after their completion). The participants assessed the mastery of each of the nine basic terms (concepts) of the courses: 1-cognitive and search activity; 2-project activity; 3-research activity; 4 educational and project activity; 5-educational and research activity; 6-the subject of design or research; 7-pedagogical accompanying or support; 8-technologies for supporting pupils' activities; 9-diagnostic methods and tools for pedagogical accompanying or support.

Results

The author's model was approbated during special courses of professional and personal development of teachers "Pedagogical accompaniment of extracurricular project and research activities of primary school pupils". The work of these courses was of a complex design and research nature:
• the embodiment of the value and semantic foundations of pedagogical accompaniment of participants;
• productivity of cooperation, co-existence, pooling of resources and efforts of participants in the course of joint activities;
• the possibility of building an advancing prospect, consciously formed as the goal of the activity;
• the reality of the impact on the participants of the "potential difference" between the actual state of the object of research or design and its target perspective;
• the effectiveness of gradual, step-by-step movement from the current state of the object to its target state;
• the multiplicity of development trajectories and directions of activity of participants that arise when performing joint actions [15].

The organization of the course participants' work was aimed at ensuring the transition from the normally training sessions, which are usually carried out during advanced training, to the system of Meetings – educational events. During such events, participants gain a unique experience of full-fledged "living" in various educational situations. Since the Meetings were held without breakaway the main activity, the total duration of classes for one school day was limited and ranged from 140 minutes to 165 minutes. At the same time, there were no traditional classes lasting 90 minutes. with a five-minute break in the middle. This made it possible to form a full-fledged Meeting during the school day, which provided the necessary pace of joint activity was provided.

The perception of each Meeting by the participants of the courses was formed in their minds as a corresponding coherent hypertext. At the same time, its temporality played the role of an important text-forming category, since it directly influenced the formation of the integrity, connectivity, informatively, understandability and acceptability of such a hypertext [23]. To ensure the required temporality, the course organizers planned the participants' activities as a dynamic sequence of four or five classes lasting from 30 minutes to 45 minutes. The content of each class was built according to temporal logic.

An alternation of different types and forms of joint activity with a wide use of interactive technologies was performed: a problem lecture, a binary lecture, a round table, a brainstorming session, an expert workshop, a master class, a discussion "at the crossroads of opinions", etc. At the same time, the polysubjective nature of the activities of the course participants was ensured and supported. In addition, they were regularly given time to discuss, analyze and reflect on the topics considered. Classes were held every other day, creating a potential opportunity to comprehend the past Meeting and perform a small "homework".

It is known that the meaning and purpose of the processes that ensure the humanitarian nature of education is to reorient the content of education from abstract issues of cognition to the problems of human life. Taking into account the complexity of solving such problems, in the joint activities of the participants, it was created such conditions that facilitate the assimilation not so much of the volume of ready-made knowledge, but of the methods and processes for obtaining it.

At the same time, the cognitive independence of the participants was formed, their personal and professional culture was increased. Therefore, any questions and topics were
considered by the participants of the approbation as problems, the understanding and solution of which implies a difference in approaches. In general, the educational activities of the participants were problematic in nature.

In parallel with the mastering the problematic content, the implementation of the "developing" function of the courses took place. It was not explicitly stated in the subject of classes or in their implementation, but was embodied latently as a result of the participants' activities. Thanks to such activities they naturally formed personal increments that are important for life and professional activity.

The courses were organized in an electronic on-line format using the ZOOM platform. Throughout the activities of the participants a complex of various feedbacks was implemented, which allowed it possible to track and correct the activities of the participants of the approbation. In addition, diagnostics and self-diagnostics of professional and personal changes of all participants were performed.

In the context of approbation performed, the educational activities of the course participants were organized so that any of its participants felt like an active side of the process and understood their role in it. To the extent that personal meanings were acquired in the course of the classes, these classes became an events. Therefore, ideally, the educational activity itself was not routine, but eventful in nature, which is impossible without reflection. In addition, the reflexive function of the organizers was not only supposed to provide a situational response and soft, non-violent adjustment of the ongoing work's program, but also to allow to perform analysis and development (correction) of the program of upcoming educational activities of the session.

The approbation of this program was complex, system and included design and research components. The current diagnostics of the project implementation in the daily feedback mode made it possible to quickly assess the impact of the participants' activities on their interest in participating in the courses and proactive participation in it.

In addition to the scores, each participant answered questions what the most valuable for him in the classes was of this day, and what the least successful was. Teachers could also make comments and suggestions.

A meaningful interpretation of the performance indicators of the participants, carried out on a daily basis, showed that more than 90% of the responses received were positive (Fig. 1.). At the same time, negative ratings were not associated with courses, but with interruptions in the Internet.

The assessments are presented according to the following criteria: the volume and quality of the proposed material (Fig. 1. a); productivity of the work performed (Fig. 1. b); emotional comfort in the course of study (Fig. 1. c); satisfaction with participation in the work (Fig. 1. d).

A special scale was used for the assessment. This scale contained:

- 3 value judgments characterizing the measure of mastering knowledge about basic concepts (1 – I have some representations; 2– I know and can tell about it; 3– I can give an interpretation and explain);

- 3 value judgments that characterize the degree of formation of skills to use basic concepts (4– I can apply them in known situations; 5– I can use them when analyzing a situation; 6– I can develop a methodology for using them).
Figure 1 Dynamics of the specific weights of daily ratings for three groups: 
1 – "high ratings"; 2 – "average ratings"; 3 – "low ratings"
Figure 2 shows the estimates basic concepts ownership received from participants before the start of the courses and after their completion.

![Graph showing probability distribution of estimates, with bars for before and after the courses at different levels of mastery.]

**Figure 2** Comparison of assessments of the mastery of basic concepts received from participants before the start of the courses and after their completion

From fig. 2 it can be seen that the estimates basic concepts ownership received from participants after the completion of the courses differ from such estimates received before the start of the courses.

After the end of the second session, another survey was conducted. The participants of the courses indicated the events that caused a bright positive reaction and the events that caused a feeling of dissatisfaction. In addition, they assessed their own "involvement" in the work of the courses, the degree of their psychological fatigue from participating in the work of the courses and the feelings that they experience after completing the work of the courses.

Analysis of the information received showed that the participants named events that caused a strong positive reaction 3.5 times more often than events that caused a feeling of dissatisfaction. At the same time, the sources of dissatisfaction were most often objective problems (employment at school during classes, distance learning conditions, Internet interruptions, etc.).

The authors have developed a model of this system (see [13]). This article describes the approbation of this model. During this approbation from January to July 2021, five stages of accompany for teachers' self-development were implemented.

At the first stage (January - February 2021), the accompany system was set up. The values and meanings necessary for teachers to accompany the project and research activities of pupils were comprehended by a group of tutors. The technology components for accompany the development of teachers were selected.

Tutors (5 lecturers of the Department of Preschool and Primary Education) were trained for "mentoring", consulting and supporting the activities of participants. Ten training meetings were organized for them. The main purpose of these meetings was to get acquainted with the conceptual provisions of pedagogical accompanying, to discuss typical problems that tutors would have to solve.
A program for organizing their further activities has been devised. A group of teachers was formed who wished to participate in the work. Participants' requests were identified. Expectations related to this participation were determined. Half of the responses received formed a group of concretely expectations:

- I hope to find out how to initiate the design and research activities of pupils;
- I hope to learn how to provide pedagogical assistance to pupils in their activities;
- master the algorithm of actions, methods and forms of support for pupils' activities;
- master the skills to organize and accompany the project and research activities of pupils;
- I hope to obtain confidence in their abilities to accompany the project and research activities of pupils;
- gain knowledge of what is needed to work on a project;
- gain knowledge on how to set goals and hypothesize in design and research activities;
- form the ability to rely on my experience of such activities and on the experience of colleagues, etc.

Another 40% of the answers contained generically formulated expectations of the respondents: to expand their knowledge, learn interesting and innovative educational methods, improve their professional competencies, gain new ideas and inspiration, etc. And 10% of teachers indicated formal expectations (such as getting an official certificate of the professional development).

At the second stage (March 01 - March 13, 2021), during the first session of development courses, was ensured the formation of a value and semantic basis, which is necessary for the development of teachers' skills to accompany the project and research activities of pupils. Conditions were created for the formation and development of the motivational basis of the participants' activities.

The topics of the work covered the issues of subjectivity of the younger pupils, the quality of primary education, the essence of pedagogical support of their activities. The foreign experience of supporting and accompanying the students' research and project activities was considered. During the course, specific studies and projects carried out by primary school pupils were analyzed.

The organizing group performed an analysis of the participants' daily assessments of their work in the courses. These estimates, presented in Figure 1, indicate that the participants can be divided into 2 groups. The first of them included those teachers whose grades were systematically high. The number of such teachers was slightly more than two-thirds of the course participants. The ratings of the other participants were average and low.

Daily feedback and communication with the participants showed that the second group was formed due to several reasons. Firstly, some of those who decided to participate in the courses think and speak mainly in Kazakh. It was difficult for them to perceive the material presented in Russian. Secondly, the technology of the courses was aimed at the open nature of the participants' communication. This created discomfort for those teachers who are introverts, and for some ambiverts. Therefore, the system of diagnostics of all those who want to participate in the courses, as well as the formation of more homogeneous groups based on the results of diagnostics can change the situation for the better.
At the third stage (March 14 – April 25, 2021), course participants were solved the problems of initiating and accompanying the project and research activities of their pupils. Within one month, the course participants independently implemented the mastered methodological recommendations and tried to initiate and accompany the initial phase of pupils' research and project activities. Each teacher tried to independently cope with the difficulties of transition from the position of a teacher who is studying to the position of a teacher who really applies new knowledge.

The course organizers group and individual consulting support to the participants was provided. Particularly productive were the group discussions, during which the teachers jointly analyzed the problem situations that had arisen and looked for ways to resolve them. Each participant tried to independently cope with the difficulties of transition from the position of a teacher who is studying to the position of a teacher who really applies new knowledge.

The friendly atmosphere of discussion of the difficulties encountered in practice contributed to the formation of the experience of understanding and overcoming them. The established mutual trust motivated the participants to actively work together. In the course of reflexive discussions, participants in this activity developed a stable interest in its continuation.

At the fourth stage (April 26 – May 25, 2021), during the second session of development courses, the experience gained by the participants at the previous stage was generalized and comprehended. It was discussed how much to managed to initiate the project and research activities of the pupils. The reasons for the bad experience were analyzed. Concrete ideas were generated on how to resolve the difficulties encountered by the participants.

Each of them highlighted the strengths of his practical experience, identified unused opportunities, outlined the prospects for further development of the prepared project. The practical orientation of the work, characteristic of the content of the second session, was evaluated by the participants higher than the theoretical one, which dominated the content of the first session (see Figure 1).

After the completion of second session, the participants described what they had mastered:

- knowledge about the differences and similarities of project and research;
- knowledge about accompanying pupils in the implementation of projects and research;
- understanding the pupils' need of the space for the free searching;
- understanding the need to provide pupils with the opportunity to independently determine the topic of the project and research;
- the ability to conduct a purposeful search of information, highlight the main thing in it, find connections and structure the available information;
- the ability to assist pupils in solving any unfamiliar topic;
- the ability to respond to changes in the current situation flexibly and, if necessary, adjust the behavior;
- the ability to accompany the project and research activities of pupils;
- experience in analyzing various projects and participating in discussions;
• the desire and willingness to accompany the projects and research of the pupils;
• positive emotions from communication with lecturers and with course organizers, etc.

When the participants were asked to what extent the results of the courses correspond to the initial expectations, 78.9% of them chose the answer "completely", and 21.1% - "exceeded expectations".

A comparative analysis of the data presented in Figure 2 showed that, before the start of the courses, more than 70% of the assessments characterized the minimum level of mastery of basic concepts (the participants had only some ideas about what the course content would be). After completing the courses, there were less than 7% of such assessments, and there were more than 50% of the assessments indicating the formation of skills in using basic concepts.

To determine whether there are significant differences between the probability distributions of estimates of the mastery of basic concepts before and after the courses, the Pearson criterion $\chi^2$ was applied. It was tested the hypothesis that these distributions do not differ statistically significantly. Using the frequencies of the distributions under consideration, it was obtained that $\chi^2=217.4$. Comparing this value with the tabular $\chi_{np}^2 (p=0.01)=15.1$ for five degrees of freedom, we get that $\chi^2 > \chi_{np}^2 (p=0.01)$. Consequently, at the level of $p=0.01$, the distributions under consideration differ statistically significantly. This means that participation in the courses has led to a significant change in the level of assimilation of basic concepts by teachers.

The participants highly appreciated their "involvement" in the work of the courses: in 70% of cases, scores of 8 points or more were obtained. As for the feeling of psychological fatigue from working on the courses, 66% of participants indicated that there was no such feeling at all. In addition, almost all participants reported that they experience only positive emotions after completing the courses and at the same time regret that the work of the courses is completed.

In general, teachers characterized participation in these courses as a way to develop their competencies to accompany pupils' research and project activities.

Fifth stage (May 26 – June 30, 2021) has completed the approbation of the model of pedagogical accompaniment for the professional and personal development of teachers. During this stage, the International Summer School "Design and Research for the Future" was held. Participants showed videos of pupils defending their projects or research. The real experience of accompanying projects and research carried out by pupils was discussed. In addition, projects and studies of the teachers themselves were presented and an expert analysis of the relevant activity was performed.

**Discussion**

First of all, we note that the presented approbation implements an active approach to the personal and professional development of teachers. As is well known, this approach assumes that the activity of teachers is accompanied, which is aimed at their own personal and professional development (see, for example, [3]).

However, full-fledged development is a concrete process that is realized in time. Such a process has its own stages, each of which allows you to solve your specific tasks. It is clear
that these stages cannot be fully provided within the framework of short-term refresher courses. This requires a system of accompany that in practice creates conditions for the development of teachers in the process of updating their professional competences.

The results of the analysis of the approaches used to improve the qualifications of teachers indicate the effectiveness of the mentoring model and interactive professional development [17], developing additional professional education [11], exchanging of knowledge and experience in a learning or self-learning organization (G. Ignatieva et al. [28]), interaction with teachers in a distance format using modern information and communication technologies [33]. At the same time, these studies are consistent with works that describe modern problems of training primary school teachers [27; 29].

At the same time, this study presents the approbation of an innovative model of advanced training, in which a process that ensures the formation and development of teachers’ skills in pedagogical accompaniment of project and research activities of pupils or students is implemented. This model is an alternative to the cascade model most often used in practice [21].

**Conclusion**

The performed approbation confirmed the practical significance of the pedagogical system developed by the authors, focused on the formation of teachers' abilities to accompany the project and research activities of pupils. Such system, implemented in the form of courses for the development of school teachers, lecturers of colleges and universities, can become an effective part in the mechanism of continuous pedagogical education.

The performed analysis showed that there is an invariant a set of conditions that provide the possibility of productive system integration of the efforts of the organizers and lecturers of the courses. This set includes:

- a model that includes three functional subsystems of the educational system (ensuring value-semantic foundations for the development of teachers; promoting the optimal development of their consciousness; organizing full-fledged joint activities that are significant for participants);
- based on this model, the development of a program of professional and personal development courses aimed at abilities’ formation of primary school teachers to provide pedagogical accompany for pupils' project activities and their research activities;
- cooperation, co-existence, combination and connection of resources and efforts of participants in joint activities, that has a polysubjective nature, as a driving force of the educational process, which is implemented during the development courses;
- technology of educational activities and pedagogical accompany of course participants, agreed in the organizational group of courses and focused on ensuring the reality of various development trajectories and areas of activity of participants.

The results also indicate that it is possible to system integration capability the activity of the organizers and teachers of the courses, even if they are located in different cities and countries. In conditions of the unfolding pandemic, such courses for teachers of the
Republic of Kazakhstan from Almaty, Almaty region, Nursultan, Temirtau, Pavlodar and other cities were held remotely on the on-line Zoom platform using modern interactive educational technologies. At the same time, highly qualified specialists in the field of education of the Republic of Kazakhstan (Almaty) and the Russian Federation (St. Petersburg, Khabarovsk and Birobidzhan) accompanied the activities of the participants and conducted classes.

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