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CUADERNOS DE SOFÍA
EDITORIAL

DYNAMICS OF FUTURE TEACHERS' COGNITIVE READINESS DEVELOPMENT TO ORGANIZE STUDENTS' DIALOGIC LEARNING

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Abstract

The results of the empirical research of forming teachers' cognitive readiness to organize dialogic learning of students are described in the article. Methods of research: survey, pedagogical experiment (N = 294), methods of pedagogical statistics. The experiment revealed the level of cognitive readiness of future school teachers to organize a classroom dialogue. These indicators were analyzed in the control (CG) and experimental (EG) groups. Results: as a result of the experimental work the diagnostics of indicator formation of future primary school teachers' cognitive readiness for the organization of dialogic learning has been carried out. A significant part of future teachers (according to the results of the ascertaining stage of the experiment) has been proved to be focused on directive and knowledge based learning and subject division of the content of education, do not always prefer innovations in terms of interactive and problem-based learning, have insufficient skills of organizing classroom educational dialogue. Having implemented our proposed educational model in vocational training a positive trend in the levels of cognitive

readiness of future teachers to organize educational dialogue was observed. In particular, at the formative stage of the experiment we noticed the growth of the number of students with a high level of formation (39.7%, dynamics + 17.7%) of the cognitive component of professional readiness for the organization of dialogic learning in the EG. Statistically significant changes occurred mainly due to a decrease in the number of respondents who showed a low level of readiness for the experiment (31.7%, dynamics - 14.7%). In the control group, these changes are significantly smaller. Therefore, the methodological support of the process of primary school teachers' training for the organization of dialogic learning is effective. It includes: dialogization of the content of pedagogical education, creation of an interactive educational environment for professional training; diversification of methods and forms of teaching in higher education, formation of educational student groups for constructive dialogue; development of critical thinking skills and pedagogical reflection.

Keywords

Future Teachers – Pedagogical Activity – Dialogic Learning – Teacher Training – Primary School

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Introduction

Fundamental training of the future teacher is the basis for the formation of his/her professional competence, readiness to accomplish pedagogical tasks in the educational process. It is important to abandon traditional methods of teaching and to start implementing innovations, experiential learning[1], educational dialogue with students (for example, in small groups) for educational research[2]. To do this, the teacher needs skills of critical thinking, the ability to use selective attention, interest in the subject of discussion, and others[3]. Quality teaching in the classroom leads to the increase of "student cognitive and non-cognitive outcomes"[4]. The interactive teaching approach stimulates development of students' creative abilities and cognitive initiative. As "active learning produces gains to both lower- and higher-order cognition at levels equal to, and more often, greater than the use of passive learning methods"[5]. The organization of dialogic learning at school serves as a pedagogical tool for personal development, gaining social skills[6] and emotional intelligence. "There is widespread debate about whether dialogue can be defined as a special form of communication with internal connections to designing knowledge and academic learning, or it is better served as an umbrella term for all human interaction"[7]. Supporters of dialogic education consider classroom dialogue to be "central to the meaning making process and thus central to learning"[8]. Modern scholars convincingly prove the influence of teacher's communicative culture on the quality of dialogic learning, because "learning is a dialogic activity shaped by language activity"[9]. The issues of using digital resources and tools to organize a productive learning dialogue in the classroom are also relevant. The concept of technology 'affordances'[10] is considered in the pedagogy of

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[1] P. Burnard, Teaching interpersonal skills: A handbook of experiential learning for health professionals (London: Chapman & Hall. 1989).

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dialogue today. Scientists suggest the introduction of a "micro-blogging tool developed to support classroom dialogue (Talkwall)" in the educational process, because "the idea of 'affordances for dialogue' enables a reinterpretation that may helpfully inform researchers, practitioners and developers interested in the role of digital technology in dialogic contexts"[11].

Therefore, modern challenges raise the issue of cognitive readiness of teachers capability to use educational innovations[12], best teaching practices in the organization of educational dialogue.

The purpose of the research is:

1. To analyze the level of cognitive readiness of future teachers to organize primary school students' dialogic learning.
2. To compare the obtained results in the control and experimental groups before the experiment and after testing the proposed educational model (methodological support for improving teachers' cognitive readiness).

Methodology of Research

Empirical methods – psychodiagnostic (questionnaire, pedagogical observation, comparison) to study the cognitive readiness of students (future teachers) to organize educational dialogue; pedagogical experiment (ascertaining and formative stages) to check experimentally the effectiveness of the proposed methodical support to raise teachers' level of cognitive readiness.

Methods of mathematical statistics: quantitative and qualitative analysis of the results obtained on the basis of measures of central tendency (mode, median, arithmetic mean), assessment of statistical reliability of the revealed differences in the distributions of respondents according to the levels of formation of cognitive readiness for the organization of dialogic learning using the non-parametric statistical Pearson's chi-squared test ($\chi 2$).

Instruments and Procedures

The experimental work was carried out at the following higher educational institutions: Vasyl Stefanyk Precarpathian National University, Bohdan Khmelnytsky National University of Cherkasy, Ivan Franko National University of Lviv (Ukraine).The total sample size was 294 students, the control (CG, 151 persons) and experimental (EG, 143 persons) were formed. To identify the status and changes in the levels of future teachers' readiness for the organization of dialogic training in both groups, procedures were

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implemented using the author's questionnaire. The subject of the experimental work was the methodological support of the process of primary school teachers' training for the organization of dialogic learning, which included dialogization of the content of pedagogical education, diversification of methods and forms of teaching in higher education, creation of an interactive educational environment for moral and psychological comfort and professional training; formation of educational student groups for constructive dialogue; development of critical thinking skills and pedagogical reflection.

Results of Research

Teachers' cognitive readiness for dialogic learning is awareness of the methods of effective organization of dialogic learning in school, the latest technologies for the formation of an appropriate educational environment; professional pedagogical competence in monitoring and improving the educational process and activating the dialogic primary school students' activity. This component of the readiness of future primary school teachers to organize dialogic learning of students involves primarily the formation of their knowledge about the nature and features of educational dialogue and dialogic learning, dialogic forms, methods, means, conditions under which there is an effective dialogic interaction in the classroom[13]. We define the following variants of dialogic interaction in the educational environment: teacher – student, student – teacher, student – student, etc.

Thus, future teachers' cognitive readiness to organize dialogic learning presupposes his/her knowledge of the personality's cognitive sphere, basics and methods of organizing the development environment in primary school, awareness of the psychological features of the development of primary school children's cognitive processes, ways of influencing students' personal cognitive competence. To identify the state of students' preparation for the organization of dialogic learning according to cognitive criteria, a few priorities were highlighted choosing forms of teaching, understanding the basics and content of the concept of *dialogic learning*, understanding what kind of knowledge is necessary for teachers to organize dialogic learning in primary school. The authors' questionnaire was implemented for this purpose. The generalization of students' answers regarding their priorities in the choice of teaching forms made it possible to form the distributions presented in Table 1.

Levels of development	Before the experiment		After the experiment	
	CG	EG	CG	EG
Law	28.7	26.8	26.0	15.7
Average	41.7	39.7	44.9	31.2
High	29.6	33.5	29.1	53.1

Table 1
Distribution of CG and EG students by levels of determining priorities regarding their choice of teaching forms in primary school (%)

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The analysis of the data presented in Table 1 makes it possible to conclude that before the experiment a significant part of students of the control (41.7%) and experimental (39.7%) groups declared to be supporters of traditional forms of teaching in primary school (the average level of determining priorities regarding the choice of teaching forms in primary school). Also at the ascertaining stage of the experiment in CG and EC, correspondently 28.7% and 26.8% of respondents answered that they prefered strict regulations of the educational process (low level). Opportunities of implementation of interactive and dialogic forms of learning are underestimated, as a small number of them noted that the use of these forms of learning is a priority for them in working with younger students (high level). In general, we can say that a significant part of future teachers is focused on the implementation of traditional paradigm of the educational process in future professional activities, which involves the formation of students' knowledge, skills and abilities. However, nowadays school education is required to up-bring an adapted personality capable of critical thinking, producing non-traditional ideas, with the ability of successful communication with others, be creative at work, switch to other activities. It is impossible to achieve these goals under conditions of traditional education. So, it is necessary to change younger generation's approaches to education. After all, principles of modern education require changing of directive-cognitive learning and subject division of educational content to the introduction of personality-oriented paradigm, activity, reflective competence approaches in children's education (model "Education for Life").

Due to reviewing of the results of the observational experiment, a model of teacher training for the organization of dialogic teaching of primary school students was developed and introduced into the educational process of experimental institutions of higher education. According to its results in EG after the formative experiment, a part of students who remain supporters of traditional (31.2%, dynamics – 8.5%) and directive (15.7%, dynamics – 11.1%) forms of education of primary school children decreased. The number of students who support interactive and dialogical forms of education increased by 19.6%.An important fact in the context of study is that the number of EG students who realized that the use of dialogic forms of learning provides not only students' acquisition of knowledge, skills, but also independence, self-development, reflection, analysis of the situation from their own point of view, comparison and correction of their interests and capabilities, emotional management, building partnerships capacity, the ability to productively and interpersonally interact significantly increased (by 12.1%). In the control group (where this model was not implemented) there were no significant changes in students' priorities regarding focusing on the choice of forms of education in primary school (redistribution of the number of students occurred within the statistical error + 3%).

To assess the statistical reliability of the identified changes in the priorities of CG and EG students regarding the choice of forms of primary school students education (as well as other indicators and components of primary school teacher preparation for dialogic learning), we used Pearson's χ2 test of homogeneity. This method is quite productive both when comparing the frequency distributions of the same feature measured in two groups, and when comparing the frequency distributions formed by the results of two measurements of the studied feature conducted in the same group.

As a result of the comparison, calculated on the basis of frequency distributions of CG and EG students according to their priorities regarding the choice of forms of education in primary school, the empirical values of Pearson's criterion with critical values, we came to the following conclusions:

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1. Before the experiment, the differences between CG and EG students in their priorities regarding the choice of forms of education in primary school are random. The changes in the distributions of CG students formed before and after the formative experiment are remarkably the same. To summarize, the existing primary teachers training program does not allow students to realize opportunities, disadvantages and advantages of different forms of teaching of primary school students.

2. After the formative experiment, we observed statistically reliable changes of EG students' priorities regarding the choice of forms of primary school education in favor of use of interactive and dialogic forms as opposed to traditional and directive.

One of the indicators, which is an integral part of the cognitive component of teacher training for the organization of students' dialogic learning, is their knowledge, understanding of the essence and content of "dialogic learning" concept. In the process of finding out conditions and changes in the levels of formation of this knowledge, as well as in the process of conducting ascertaining and formative stages of the experiment, students were asked to answer the following questions: What is your definition of the concept of *dialogic learning*? Respondents' answers to this question are presented in Table 2.

	Before the experiment		*After the experiment*	
Definition of the concept of "dialogic learning"	*CG*	*EG*	*CG*	*EG*
A form of interpersonal communication in which two communicators take part, as a result of which there is an exchange of thoughts, ideas, the potential of each is revealed.	32.6	36.6	35.9	18.2
Training aimed at solving problem situations in the process of communicative activity	26.0	31.8	23.2	19.3
Joint activities of teachers and students in the form of dialogue	19.1	17.1	23.1	33.6
Type of learning through dialogue, when creative tasks are solved	22.3	18.1	17.8	28.9

Table 2
Distribution of CG and EG students according to their understanding of the concept
of "dialogic learning" (%)

As can be seen (Table 2), before the formative stage of the pedagogical experiment, students' understanding of the concept of "dialogic learning" did not differ significantly in the experimental and control groups. Almost a third in CG (32.6%) and 36.6% in EG considered it to be a form of interpersonal communication, another 26.0% of CG students and 31.8% in EG identified it with communicative activity.

After the formative experiment, the CG students' understanding of the essence of this category have not changed significantly. This fact is confirmed by the results of checking the statistical reliability of changes in the distribution of CG students as for their understanding of the concept "dialogic learning" before and after the experiment: the empirical value of the criterion χ2 is less than its critical values (Table 3), which means that these changes are random. After the formative experiment the EG students were redistributed – an increased share of those (62.5%) who considered dialogic learning to be the creation of appropriate psychological and pedagogical conditions, the organization of teachers' and students' activities in the form of dialogue and cooperation, where the

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dominant position is occupied by the student, taking into account the teacher's interests, abilities, expectations, creating a common context of communication, joint formulation of tasks and designing ways of solving them. Before the formative experiment, the share of such students in EG was 35.2%. The identified changes are statistically reliable, because when comparing the empirical value of Pearson's criterion, calculated on the basis of data from the distributions of the EG students as for their understanding of the meaning of "dialogic learning" before and after the formative experiment, the correlation is given in Table 3.

Indicator	CG and EG before the experiment	CG and EG after the experiment	CG before the experiment and CG after the experiment	EG before the experiment and EG after the experiment
Priorities in the choice of forms of education	0.522	17.693	0.386	11.946
Understanding the meaning of the concept of "dialogic learning"	0.564	12.158	1.714	16.568
Understanding the need for special knowledge for the organization of dialogic learning	1.393	6.192	0.886	14.972
The component as a unity	0.249	9.882	0.128	13.747

* Differences in distributions are considered statistically reliable if the accuracy is proved:

$$\chi_e^2 > \chi_\text{к}^2$$

Table 3
Empirical values of the criterion χ2, calculated on the basis of data from the distributions of future teachers according to levels of cognitive readiness for the organization of dialogic learning

The introduction into the educational process of the developed model of primary teacher training system for the organization of dialogic learning has a positive effect on the formation of students' clearer understanding of internal mechanisms and features of dialogic learning. The generalizing from research findings has proved that a teacher must have the following skills (presented in histograms in Figures 1 and 2) to organize this type of learning.

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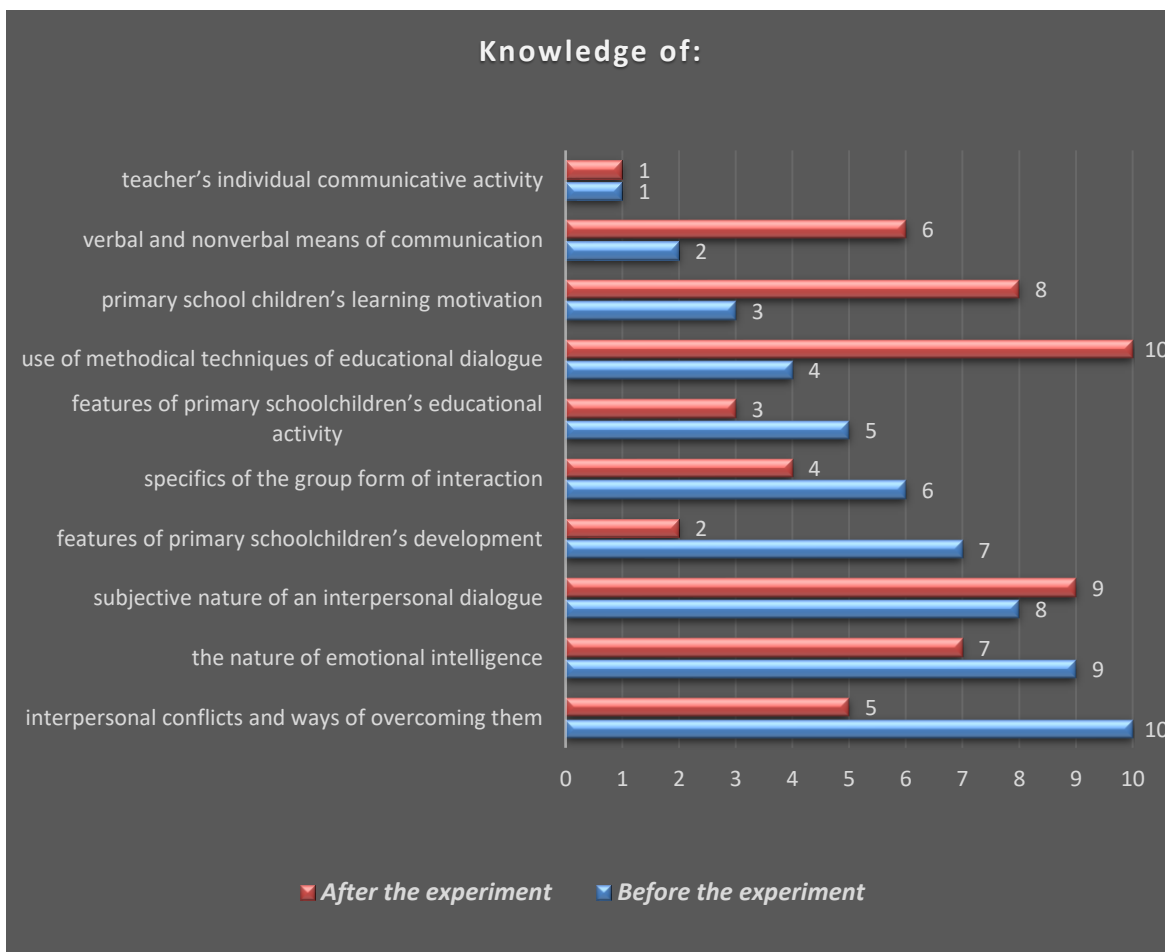
Figure 1
The results of CG ranking of knowledge necessary for the teacher
for organizing dialogic learning

As can be seen from Figures 1 and 2, before the experiment, students of CG and EG expressed the opinion that the most important knowledge for the organization of dialogic learning is the knowledge of teacher's individual communicative activity, verbal and nonverbal means of communication, primary school children's learning motivation (they were given ranks 1-3 as the most important).

This correlates with the fact that at the stage of the ascertaining experiment research findings has proved that that many students of CG and EG are focused on the implementation of the traditional paradigm in the primary school educational process, which provides a leading role of teachers, their interaction with students within the subject-object model, the use of traditional and directive forms of learning.

Accordingly, within this approach, knowledge of the subjective nature of an interpersonal dialogue (rank 8 in CG and 9 in EG), specifics of the group form of interaction (rank 6 in CG and 7 in EG), use of methodological techniques of educational dialogue (rank 4 in KG and 7 in EG), according to students' opinions, are less important for the organization of dialogic training.

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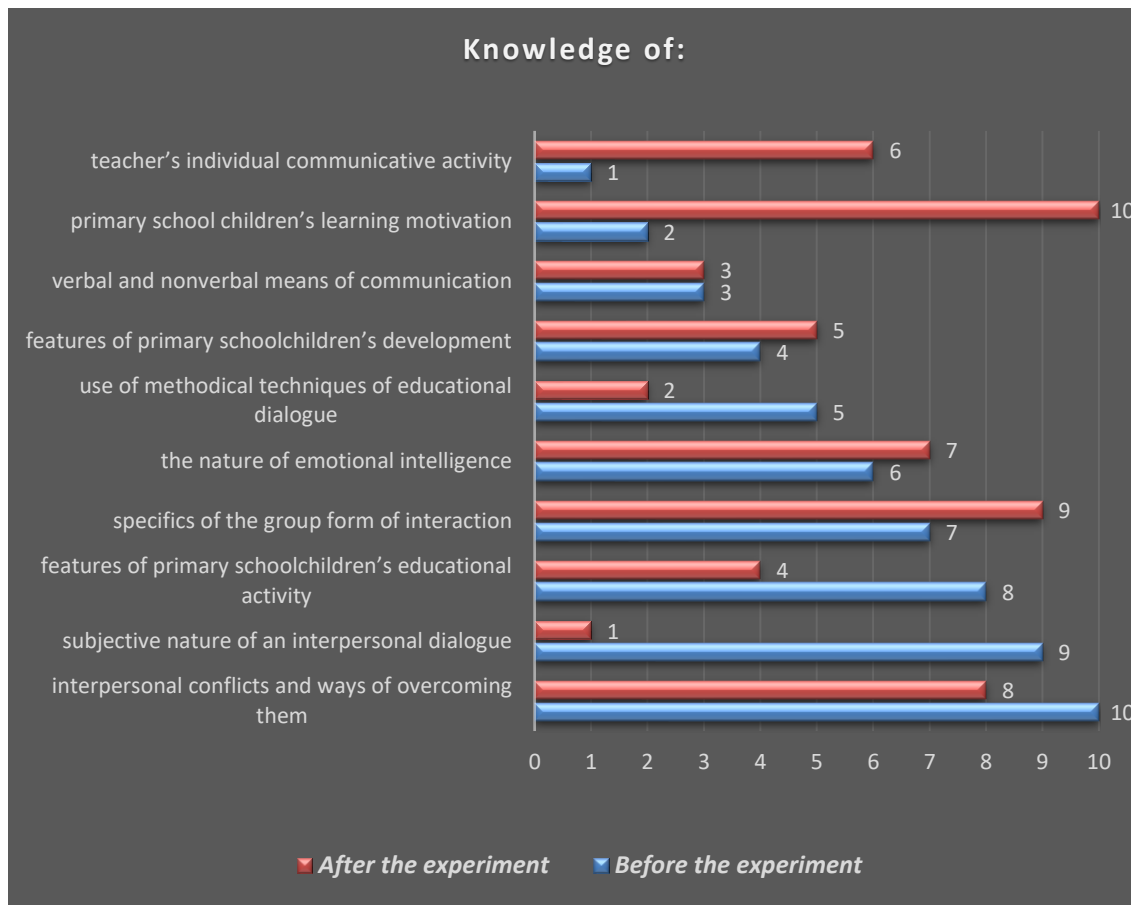
Figure 2
The results of EG ranking of knowledge necessary for the teacher
for organizing dialogic learning

After the formative experiment the CG students' assessment haven't changed significantly. The EG students expressed a little bit different responds: subjective nature of an interpersonal dialogue became considered to be the most important (rank 1) (before the formative experiment – rank 9), use of methodical techniques of educational dialogue (rank 2), verbal and non-verbal means of communication (rank 3). So, students became aware of the fact that these types of knowledge are the most necessary for the organization of dialogic learning.

At the same time, we noticed that students of the experimental group both before and after the formative experiment underestimate the importance of such types of knowledge as: knowledge of the nature of emotional intelligence, specifics of group form of interaction, features of primary schoolchildren's educational motivation (ranks 7, 9, 10). As we can see it is necessary to make some adjustments to the developed model to increase students' knowledge of specific aspects and mechanisms of implementation of dialogic learning.

The generalization of the data obtained as a result of ascertaining and formative experiments in the form of a level structure made it possible to form future primary school teachers' distributions according to the levels of formation of the cognitive component of readiness for dialogic learning, which are presented in Fig. 3. As you can see, before the

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experiment, students of CG and EG did not differ significantly as for levels of readiness for the organization of dialogic learning. After the implementation of the developed model, in EG we observed an increase in the number of students with a high level (39.7%, dynamics + 17.7%) of professional readiness for the organization of dialogic learning.
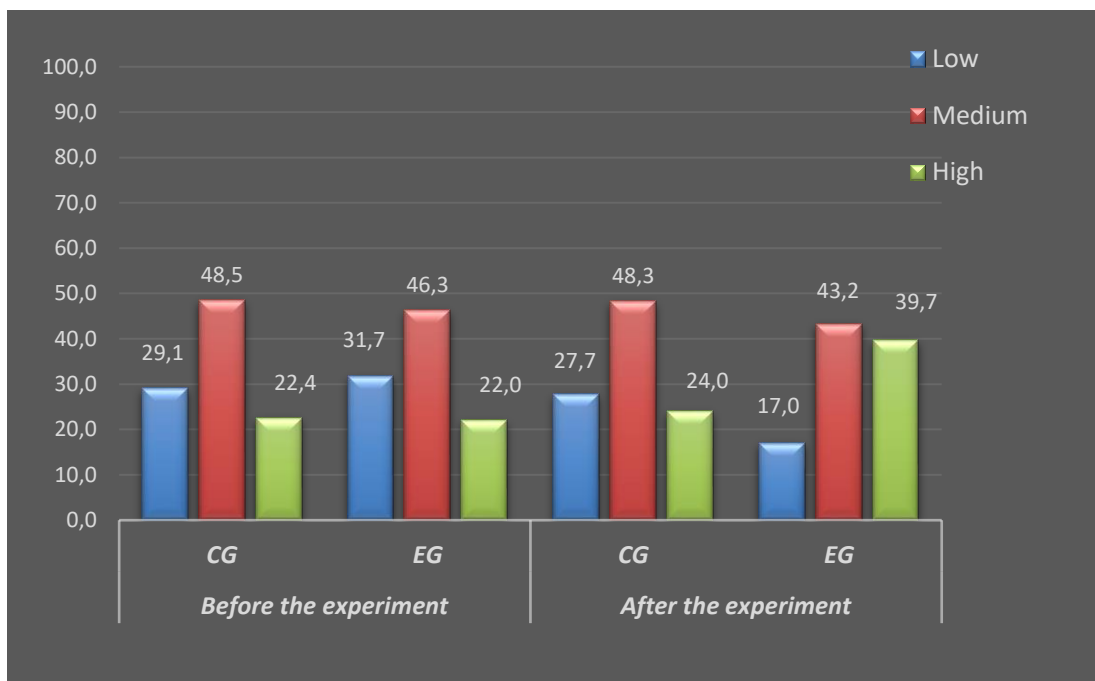

Figure 3
Distributions of future primary teachers according to the levels of formation of the cognitive component of readiness for the organization of dialogic learning (%)

It should be noted that these changes occurred mainly due to a decrease in the number of respondents with a low level (31.7%, dynamics - 14.7%) before the experiment. The CG students didn't express significant changes.

Conclusions

Summarizing the results of the formation of cognitive component of the readiness of future primary education professionals to organize dialogic learning according to cognitive criteria, we came to the following conclusions:

1.   A significant part of future teachers (according to the results of the observational stage of the experiment) is focused on the use of such forms of learning that involve teacher-student interaction within the subject-object model, directive-cognitive learning and subject division of education. This means that the existing teacher training system does not train a specialist capable of implementing societal challenges for interactive and problem-based learning.

2.   One of the effective ways of implementing a personality-oriented paradigm, activity, reflective, competence approaches is the organization of dialogic learning. However, evidently, as the results of the observational experiment, future primary school teachers do not have enough knowledge about the nature and specifics of this training, can not clearly determine what knowledge is necessary for its practical implementation in school practice.

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3. Statistically reliable changes of students' priorities regarding choice of interactive and dialogic forms of learning, their better understanding of the essence and specifics of the concept "dialogic learning", awareness of the need for a set of specific knowledge that allows using dialogic learning, prove the effectiveness of the model developed and implemented in the work of higher education institutions of teacher training for the organization of dialogic learning.

We hope that the presented material will be useful for researchers and practitioners in the organization and pedagogical support of educational dialogue and interaction in the classroom, as well as improving the professional competence of teachers in this context.

Conflict of interest

The authors declare that there is no conflict of interest.

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