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A study of pre-service teachers' readiness for integrated learning in primary school

Assemgul Kalimova [1*], Academician E.A. Buketov Karaganda University, 100026, 28 Universitetskaya Str., Karaganda, Republic of Kazakhstan https://orcid.org/0000-0002-6861-6050

Botakoz A. Zhekibayeva [2], Academician E.A. Buketov Karaganda University, 100026, 28 Universitetskaya Str., Karaganda, Republic of Kazakhstan https://orcid.org/0000-0003-0671-8550

Raushan Karimova [3], Pavlodar Pedagogical University, 140000, 60 Mira Str., Pavlodar, Republic of Kazakhstan, https://orcid.org/0000-0003-2811-9751

Sholpan Khamzina [4], Pavlodar Pedagogical University, 140000, 60 Mira Str., Pavlodar, Republic of Kazakhstan https://orcid.org/0000-0002-2931-026X

Tatiana Fomina [5], Pavlodar Pedagogical University, 140000, 60 Mira Str., Pavlodar, Republic of Kazakhstan https://orcid.org/0000-0002-8100-9896

Uteshkaliyeva Aigul [6], Kh. Dosmukhamedov Atyrau University, Studenchesky Ave.,1, 060009, Atyrau, Kazakhstan https://orcid.org/0000-0002-7571-6279

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Abstract

In this article, the authors explore the problem of pre-service teachers' readiness for integrated learning in primary school. The purpose of the article is to determine the state of readiness of pre-service teachers for integrated education in primary school at the stage of university training. The study was conducted in the logic of a summative psychological and pedagogical assessment, the material obtained from the empirical data was analyzed and summarized. The sample consisted of 120 students enrolled in an educational program at Karaganda Buketov University and Pavlodar Pedagogical University. The obtained data are interpreted and subjected to statistical analysis using the student's t-test. The components of the pre-service teachers' readiness for the type of activity under study are determined: motivational, substantive, procedural, and their indicators, levels. In conclusion, the reasons that influenced the learning outcomes of the studied students are described, and the tasks of eliminating the identified causes are determined.

Keywords: Integrated learning; knowledge; pre-service; primary school; scientific.

* ADDRESS FOR CORRESPONDENCE: Assemgul Kalimova, Academician E.A. Buketov Karaganda University, 100026, 28 Universitetskaya Str., Karaganda, Republic of Kazakhstan.
E-mail address: kargu_asem@mail.ru

1. Introduction

The updated education system in the Republic of Kazakhstan in the conditions of integration into the world educational space, the building of an innovative market economy, needs human capital as the main factor of the country's competitiveness, the development of science, innovation, and technology (The Law, 2020). This need is explained by the fact that the new educational paradigm contains strategic tasks of flexible response to the problem of improving the quality of higher professional education following the requirements of international standards, as well as in the preparation of highly qualified, competitive graduates for the labor market. Accordingly, the need for a professionally active teacher's personality, ready for innovative transformations, increases.

In connection with the transition to the updated content of education in the Republic of Kazakhstan, it is relevant to prepare teaching staff for the implementation of integrated learning in the educational process of primary schools, recognized as one of the most productive ones, in the perspective of developing the intellectual potential of primary school children (The Law of the Republic of Kazakhstan «On Education», 2020). Therefore, new approaches are needed in the preparation of pre-service teachers for integrated primary school education, which we associate with the targeted training of pre-service teachers at pedagogical universities and the development of their professional competence in this matter.

Researchers, Julia et al., (2020) note that a good educational process makes it possible to prepare teachers with professional competencies in various aspects. Therefore, it is very important to focus on the training of pre-service teachers in the context of undergraduate courses (Dofková, 2019). Interest in the integration of scientific knowledge has grown significantly in recent years, especially in the field of teacher training. However, research on this topic presents the integration of knowledge in different ways. For example, in the work of Lehmann (2020), the integration of scientific knowledge is considered a special learning process that ensures consistency, including the interconnection of theoretical and practical knowledge from different fields of sciences, which together make up the professional knowledge base of primary school teachers.

1.1. Related research

The study (Lee & Turner, 2018) shows that the use of extensive knowledge integration strategies by teachers at the beginning of work is significantly associated with the main motivational and cognitive variables since knowledge integration is a key cognitive activity necessary for the development of expert knowledge in teachers in their professional activities. Some scientists believe that the integration of scientific knowledge is characterized as «a dynamic process of linking, connecting, organizing and structuring parts of a single whole, patterns, views, ideas, theories and visualizations» (Linn, 2000).

According to the study by Jennings-Wray, (1984), the integration of scientific knowledge consists of of the process of ordering previously disparate parts into certain integrity, system, and totality, which has the potential for further development within academic disciplines. In the work of Harr, Eichler, & Renkl, (2015), an experimental study is presented in which the authors compared different integration methods, and they found that "prompted integration" is more promising for university courses.

An analysis of the authors' study, Leovigildo Lito et al., (2020) showed that the integration of scientific knowledge during online classes affects course teachers and their professional knowledge and beliefs, which are aimed at improving the quality of student learning. In a study by Lehmann, (2021), the contribution of integrating the knowledge of pre-service teachers on topics and areas of integrated learning, ensuring the interdependence of elements, as well as the emergence of an «integrative property», was studied. The author took into account such factors as approaches to learning; use of cognitive, metacognitive, and resource learning strategies; epistemological and pedagogical beliefs; as well as the motivation for choosing a pre-service profession.

Thus, Usmeldi and Amini, (2020) believe that all knowledge has integrated relationships, therefore, should be studied in interconnection. Based on the work of the researchers presented above, we believe that thanks to the integration of scientific knowledge, students see the subject in a new way, and realize the relationship of ideas about the world, society, science, and art. One of the most effective tools for integrating scientific knowledge in education is integrated learning. Modern pedagogical science considers integration as one of the main didactic principles. The use of integrated methods and tasks in teaching primary school students allows for expanding pedagogical techniques and using integrated knowledge in high school (Zhekibayeva et al., 2020).

Integrated learning requires a thorough preparation from the teacher, allowing him to adapt to pedagogical innovations. Knowledge of the basics of integration allows students to increase their level of education, which will contribute to a deep understanding of their pre-service professional activities (Drake & Burns 2004). An empirical study by Worawuth et al., (2014) noted that the professional skills of primary school teachers in organizing integrated learning are productive, which contributes to student achievement.

According to Kneen et al., (2020), integrated curricula are a good opportunity to systematize the acquired knowledge in education and a non-standard approach to solving educational problems. The author noted that integration is the most necessary condition for revealing the essence of synthesis, and the integrity of scientific knowledge. As the review of literary sources on the research topic shows, the concept of integration is characterized from the standpoint of integrity, consistency, interconnectedness, complexity; principle, process, and result; unification into a whole of disparate parts, complexation, and summation; synthesized courses. Therefore, we consider it important to note that integrated education in primary school is a multifunctional concept that carries a different semantic load depending on the type of phenomenon being characterized.

Taking into account the significance and effectiveness of the studies carried out, it should be clarified that pedagogical science has not sufficiently studied issues related to the preparation of a pre-service teacher for integrated education in primary school. An analysis of the literature allows us to conclude that, on the one hand, the development of problems on the research topic has a very long history and is one of the relevant areas, on the other hand, there is obviously an insufficient number of scientific papers that reveal professional readiness for integrated learning in the educational process of primary school.

1.2. Purpose of study

Thus, the real practical tasks of integrating scientific knowledge in the education of primary school children should be reflected in the content of university students' training. There is a need to form a research hypothesis. If the author's complex diagnostic methods and tests developed by us are introduced into the pedagogical process of the university, this will provide an opportunity to find out the state of readiness of pre-service teachers for pre-service professional activities, since students will be involved in activities aimed at mastering the totality of knowledge, skills, and abilities of integrated learning in primary school. The purpose of the article is to determine the state of readiness of pre-service teachers for integrated education in primary school at the stage of university training.

2. Materials and methods

2.1. Data collection instrument

To diagnose the level of readiness of pre-service teachers for integrated education in primary school, we organized a starting experiment based on two Kazakhstani universities: Karaganda University named after Academician E.A. Buketov, and Pavlodar Pedagogical University, with students of the educational program «Pedagogy and methods of primary education». The experimental work included a stating, forming, and control experiment.

2.2. Participants

The experiment included 120 people. Two groups were formed by random sampling: control (CG) and experimental (EG). The average age of the participants in the experiment is 21 years.

2.3. Procedure

The experiment was carried out from October 2021 to January 2022. Diagnostics of pre-service teachers' readiness for integrated education in primary school were carried out by identifying the levels of development of the motivational, content, and procedural components of the studied readiness. To identify the level of the motivational component building, pre-service primary school teachers were offered some original methods that diagnose the motives for choosing a profession «The motive for preparing for integrated education in primary school»; «My ideas about the pre-service profession», as well as the test-questionnaire «Motives for choosing a profession» the author (Grunshpun, 1994).

To determine the level of development of the content component of readiness, we used the author's training tests and diagnostic tasks («Fundamentals of Integrated Learning in Primary School»; «Integrated Learning in the Work of a Primary School Teacher»).To determine the level of development of the procedural component of readiness, we used the author's diagnostic tasks to determine the skills and abilities to integrate scientific knowledge in teaching primary school children.

3. Results

In our study, the motivational component of the readiness of pre-service teachers for integrated learning in primary school is represented by a combination of the following motives:

1. Motivational interest in integrated learning in primary school.

2. Awareness of the importance of the future profession and the need to integrate knowledge in the process of teaching primary school children.

3. Motivational connection of interests to the pre-service profession of a primary school teacher.

To diagnose the indicators of the motivational component of the studied readiness, students were offered some author methods that diagnose the motives for choosing a profession: The motive for preparing for integrated education in primary school; My ideas about the pre-service profession, as well as a test - questionnaire "Motives for choosing a profession" by the author (Grunshpun, 1994). An analysis of the results of diagnostic methods made it possible to summarize the data and results showing the level of the motivational component of the studied readiness, presented in Table 1.

Table 1

The level of development of the motivational component of the readiness of pre-service teachers for integrated education in primary school (n=120)

Level	Pre-service Teacher Readiness Indicators					
	Development of motivational interest in integrated learning in primary school		Awareness of the importance of the pre-service profession and the need to integrate knowledge in the process of teaching primary schoolchildren		Motivational connection of interests to the pre-service profession of a primary school teacher	
	n	%	n	%	n	%
High	23	19,17	27	22,50	25	20,83
Average	44	36,66	42	35,00	41	34,17
Low	53	44,17	51	42,50	54	45,00

Thus, summarizing the results of the study, the motivational component of pre-service teachers' readiness for integrated education in primary school showed that 22.50% of the students surveyed show a high level of development of the motivational component of pre-service teachers' readiness for integrated education in primary school.

The average level of development of the motivational component of readiness of pre-service teachers for integrated education in primary school was revealed in 36.66% of students, which manifests itself in partial satisfaction with the chosen profession, the presence of a weakly expressed interest in integrated learning in the pedagogical process of primary school, due to the lack of incomplete theoretical knowledge. We found a low level of development of the motivational component of the readiness of pre-service teachers for integrated education in primary school in 45.0% of pre-service teachers, which indicates dissatisfaction with their pre-service profession, a slight need to acquire knowledge in the field of integrated education, and a passive attitude towards obtaining theoretical and practical knowledge.

The content component of the state of readiness of pre-service teachers for integrated learning in primary school is represented by a set of knowledge:

1. Knowledge of the nature and content of integrated education in primary school.

2. Knowledge of the features of integrated education for primary school children.

3. Knowledge of ways of optimal correlation of knowledge in the process of integrating subjects in primary school.

To check the indicators of the content component of the studied readiness, we have developed original training tests and diagnostic tasks. To compile test and diagnostic tasks, the scientific works of such scientists as Chapaev, (2017), Sukharevskaya, (2003), and Levchenko, (2007) were used. The results of the content component of the studied readiness are presented in Table 2.

Table 2

The level of development of the content component of the studied readiness (n=120)

Level	Pre-service Teacher Readiness Indicators					
	Knowledge of the nature and content of integrated education in primary school.		Knowledge of the features of integrated education for primary school children		Knowledge of ways to optimally balance the integration of educational subjects in primary school	
	n	%	n	%	n	%
High	29	21,87	28	20,70	24	19,83
Average	46	37,64	41	34,00	42	36,17
Low	45	40,49	51	45,30	54	44,00

The analysis of the answers showed that 21.87% of students are quite fluent in the knowledge of the content of integrated teaching of primary school students. Having an interest in integrated learning, 44% of students do not know how to optimally balance knowledge in the process of integrating academic subjects in the pedagogical process of primary school. Thus, the diagnosis of the content component shows that a significant part of the surveyed students shows a low level. These diagnostic results are manifested in the fact that with the development of initial knowledge and skills, pre-service teachers do not have a complete idea of how to use knowledge in the upcoming pedagogical activity, since they do not know the ways of pedagogical integration of scientific knowledge in the educational process of primary school.

In general, the level of development of the content component of the readiness of pre-service teachers for integrated learning in primary school showed that the majority of 89% of students have low and average levels that do not correspond to awareness, completeness, and consistency of the totality of knowledge about integrated learning of younger schoolchildren.

Students do not have sufficient theoretical knowledge that would allow them to be optimally used in practical activities and would correspond to a high level of development of the content component.

The procedural component of the readiness of pre-service teachers for integrated learning in primary school is characterized by the presence of skills, among which we have identified:

1. Skills and abilities to use the opportunities and advantages of integrated learning in primary school.

2. The ability and skills of independent selection of types of integration and their appropriate combination in the teaching of primary schoolchildren.

3. Skills and abilities of control and analysis of integrated learning in primary school.

To determine the indicators of the procedural component of the readiness of pre-service teachers for integrated learning in primary school, students were offered diagnostic tasks. During the experimental check of the indicators of the studied readiness, we were convinced that the main attention in the educational process of primary school is on the study of a new lesson topic, and the process of integrating scientific knowledge occurs at an intuitive level, by simply "superimposing" scientific knowledge.

Analysis of the results of diagnostic tasks indicates that 3.4% of students have the skills and abilities to use the opportunities and advantages of integrated learning in primary school; 23.8% of respondents have some skills and abilities; 72.8% do not have the necessary skills and abilities. Thus, insufficient possession of theoretical knowledge and practical skills on the subject under study negatively affects the pedagogical activity of pre-service teachers. The results of the analysis of the procedural component of the readiness of pre-service teachers for integrated learning in primary school are shown in Table 3.

Table 3

The level of development of the studied readiness procedural component (n=120)

Level	Indicators of readiness of pre-service teachers					
	Skills and abilities to use the opportunities and benefits of integrated learning in primary school		The ability and skills of independent selection of types of integration and their appropriate combination in teaching primary schoolchildren		Skills and abilities of control and analysis of integrated learning in primary school	
	n	%	n	%	n	%
High	20	18,21	25	24,63	26	23,83
Average	48	39,61	43	37,00	43	37,00
Low	52	42,18	52	38,37	51	39,17

It should be noted that all components of the readiness of pre-service teachers for integrated learning in primary school are closely interrelated and mutually dependent on each other. Their implementation ensures the successful organization of an integrated lesson; therefore, the results directly depend on the development of knowledge, skills, and abilities. Summary data of the results of the state of readiness of pre-service teachers for integrated learning in primary school are presented in Table 4.

Table 4

Results of the state of readiness of pre-service teachers for integrated learning in primary school (in %)

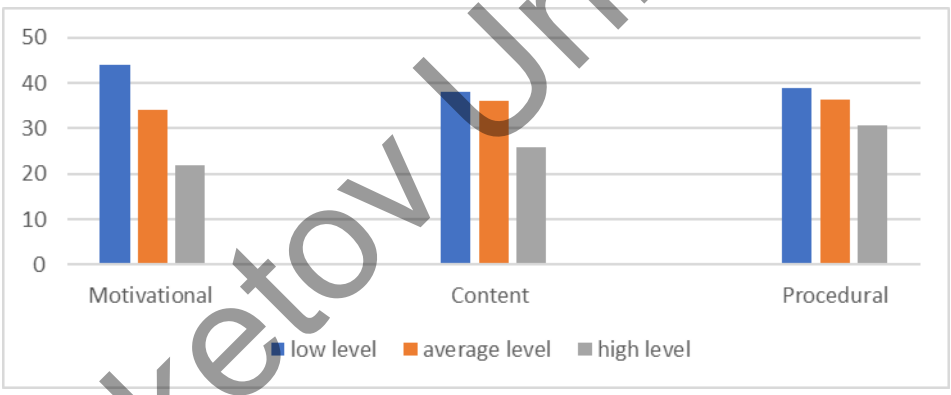
Students	Low level	Average level	High level
Motivational component			

Experimental group (71 students)	38,1	36	26,1
Control group (49 students)	40,2	33,3	26,5
	Content component		
Experimental group (71 students)	42,8	33,8	23,4
Control group (49 students)	40,3	36,1	23,6
	Procedural component		
Experimental group (71 students)	38,4	36,4	25,2
Control group (49 students)	39,0	30,2	30,8
The final result of diagnostics of the state of readiness of pre-service teachers for integrated learning in primary school (in %)			
Experimental group (71 students)	44	34	22
Control group (49 students)	38	36	26

The analysis of the state of readiness of pre-service teachers for integrated learning in primary school allowed us to conclude that the motivational, substantive, and procedural components of readiness are at a low level - 44.0%, and the average level of the desired readiness is 36.0% of pre-service teachers; the high level of the studied readiness is 26.0% of the surveyed students (Fig.1).

Figure 1

Diagnostics of the state of readiness of pre-service teachers for integrated learning in primary school



4. Discussion

Diagnostics of the state of readiness of pre-service teachers for integrated learning in primary school showed a low level. Students have low indicators of the importance of their pre-service profession. Consequently, pre-service primary school teachers do not have sufficient knowledge about the invariant characteristics (nature, content, features, methods) of integrated learning in primary school. A small part of the students demonstrated a high level of skills and abilities to use the opportunities and advantages of integrated learning in primary school.

In recent years, considerable attention has been paid to the relationship between different fields of knowledge in professional education, based on the assumption that achieving consistency between fields of knowledge is important for student learning and the quality of education in general (Hermansen, 2020). For the qualitative organization of the process of preparing pre-service teachers for integrated education in primary school, it is necessary to systematize methodological facts and phenomena, and a deep and comprehensive study of this issue. As well as thorough analysis and selection of the most rational and effective ways to help the pre-service primary school teacher realize the possibilities of integrated learning aimed at improving the quality of education in general.

Researchers (Matayev et al., 2021) note that the purposeful development of the main professionally important qualities leads to an increase in the subjective assessment of personal readiness for pre-service professional activity. Success in achieving this aspect depends on the level of training of pre-service teachers and the correct definition of the content of the training.

5. Conclusion.

Diagnostics of the state of readiness of pre-service teachers for integrated learning in primary school showed several reasons that influenced the results of students' education:

- the content and results of training in the disciplines of basic and professional competencies of students of the educational program "Pedagogy and methods of primary education" do not fully reflect the content of integrated education in primary school;

- low level of motivational interest in integrated learning in primary school;

- in the educational process of experimental universities, there is not enough educational and methodological support for the development of knowledge and practical skills and skills for the implementation of integrated learning in primary school.

Thus, there is a contradiction between the objective need of society for teaching staff with a high level of professional training, capable of using integrated learning in their professional activities, and the insufficient level of readiness of most students to carry out this type of activity. The exclusion of these reasons is possible in the process of purposeful activity of the university, through the introduction of technology for preparing pre-service teachers for integrated learning in primary school, which was a prospect for our further research.

Conflict of interest statement

The authors state that the study was conducted with no commercial or financial relationships that could be interpreted as a potential conflict of interest.

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