

B.A. Zhekibayeva¹, A.D. Kalimova^{2*}, B.A. Matayev³

¹Karaganda University of the name of academician E.A. Buketov, Karaganda, Kazakhstan;

^{2,3}Pavlodar Pedagogical University named after A. Margulan

(Corresponding author. E-mail kargu_ase@mail.ru*)

ORCID ID <https://orcid.org/0000-0002-6861-6050>

Methodological support for the preparation of future teachers for the integrated education of younger students

The article presents one of the results of our work on the scientific project “Scientific-theoretical substantiation and methodological support for ensuring the training of future teachers for the integrated education of younger students”, implemented as part of grant funding for research by young scientists under the Republican project “Zhas Galym for 2022-2024”. The purpose of the article is to substantiate the need for methodological support in the preparation of future teachers for the integrated education of primary school students. The research problem is to find and identify ways and means of preparing future teachers for integrated education in primary school in accordance with the requirements of modern society and the education system as its social substructure. The solution to this problem was reflected in the practical significance of the result presented in the article — the development of an automated training program (ALT) “Scientific and theoretical foundations of integration in learning” and the results of its testing with students of the educational program “Pedagogy and methods of primary education”. The methodological basis of the research is revealed on the basis of a theoretical analysis of the psychological and pedagogical literature on the research problem; legal documents of the Republic of Kazakhstan in the field of education; studying the experience of foreign and Kazakhstani researchers on the preparation of future teachers for the integrated education of younger students. The main results of the study showed that the use of an automated training program has a positive effect not only on the expansion and deepening of knowledge, but also on the development of practical skills, as well as their application in the process of integrated learning in the educational process of primary school.

Key words: integrated education in primary school; training of future primary school teachers; integration of scientific knowledge; methodological support; primary school; automated training program; professional training; methodological materials.

Introduction

One of the conditions for improving the quality of professional training, which ensures the competitiveness of primary school teachers, is the deepening of knowledge about the processes of integration in education. The training of future teachers is designed to ensure the complexity and completeness of knowledge, the formation of systemic thinking among students, the comprehension of the upcoming professional activity in elementary school, where the foundation for a holistic perception of the picture of the world is laid for younger students. Nevertheless, the system of training future primary school teachers that has developed in pedagogical universities is aimed primarily at mastering general education, basic and major disciplines, which is not enough for educational and methodological support of the process under study.

The problem of our study is to find and identify the ways and means of preparing future teachers for integrated education in primary school in accordance with the requirements of the modern education system.

The solution of this problem will contribute to the effective formation of a set of scientific and theoretical knowledge, practical skills and abilities of future primary school teachers, as well as the development of their professionally significant qualities for competitiveness in the labor market and solving urgent problems of socio-economic development of the Republic of Kazakhstan.

In this regard, the scientific and theoretical substantiation and provision of methodological support for the training of future teachers for the integrated education of younger students is an important direction in the development of the higher education system.

– Taking into account the results of the dissertation research, the topic of the scientific project was formulated as follows: “Scientific and theoretical substantiation and methodological support for ensuring the training of future teachers for the integrated education of younger students”, within which we planned a phased approbation of scientific and methodological materials that have a practice-oriented character, including:

– Massive Open Online Course (MOOC) “Integrated Education in Primary School”;

- textbook “Theory and practice of integrated education for younger students”;
- electronic textbook “Mechanisms for integrating scientific knowledge in teaching children of primary school age”;
- automated training program (AOP) “Scientific and theoretical foundations of integration in learning”.

In this article, we have presented in detail one of the results of the project and its application in practice. An analysis of the literature on the research problem formed the basis for the development of this automated training program.

The degree of research development. It should be noted that the prerequisites that contribute to the preparation of future teachers for integrated education in primary school are the legal and conceptual documents of the Republic of Kazakhstan, which emphasized the importance of solving this problem:

- Law of the Republic of Kazakhstan “On Education” dated July 27, 2007 No. 319-III (as amended and supplemented as of September 1, 2022) [1];
- National project “Quality Education “Educated Nation” [2];
- The State compulsory standard of primary education, approved by the order of the Minister of Education and Science of October 31, 2018 No. 604 [3];
- Standard training programs in general subjects of primary education, approved by order of the Minister of Education and Science of the Republic of Kazakhstan dated April 3, 2013 No. 115 (as amended and supplemented as of May 10, 2018 No. 199) [4];
- Standard curricula for primary education, approved by the order of the Minister of Education and Science of the Republic of Kazakhstan dated November 8, 2012 No. 500 [5].

In these legal documents, we find a number of justifications for the need for integrated education in primary school. Along with this, the analysis of scientific papers on the research problem shows that the problem of preparing future teachers for integrated education in primary school is currently being actively studied and developed.

In Kazakhstan, the scientific and theoretical basis for the problem of preparing future teachers for integrated education in primary school is made up of the works of A.A. Kuralbaeva, S.A. Feyzuldaeva, Zh.M. Saurykova, Sh.A. Ubniyazova and many others [6-9].

At present, interest in the integration of scientific knowledge in foreign studies has grown significantly in recent years, especially in the field of teacher training. However, scientific works on this topic represent the integration of knowledge in different ways. For example, in the work of T. Lehmann, the integration of scientific knowledge is considered as a special learning process that ensures consistency, including the relationship of theoretical and practical knowledge from different fields of science, which together constitute the professional knowledge base of a primary school teacher [10].

In a study by J. Lee, J.E. Turner it is shown 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 professional activities [11].

The work of N. Harr, A. Eichler, A. Renkl presents an experimental study in which the authors compared various integration methods, where they found that “prompted integration” is more promising for university courses [12].

Analysis of the study by the authors Mallillin, L., Carag, E., Mallillin, J., & Laurel, R. showed that the integration of scientific knowledge during online classes comprehensively affects course teachers and their professional knowledge and beliefs, which are aimed at improving the quality of student learning [13].

– It should be noted that in the study by T. Lehmann, the contribution of the integration of future teachers’ knowledge on topics and areas of integrated learning, providing the interdependence of elements, as well as the emergence of an “integrative property” is studied. The author analyzed and took into account such factors as:

- scientific approaches to education;
- use of cognitive, metacognitive and resource learning strategies;
- epistemological and pedagogical beliefs;
- motivation for choosing a future profession [14].

In the work of Drake S.M. it is noted that integrated learning requires the teacher to carefully prepare, allowing him to adapt to pedagogical innovations. Knowledge of the basics of integration allows students to increase the level of education, which will contribute to a deep understanding of the upcoming professional activity [15].

According to Kneen J. et al., integrated curricula are a good opportunity to systematize the acquired knowledge in teaching 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, the integrity of scientific knowledge [16].

In an empirical study by Worawuth P. et al. it was noted that the professional skills of primary school teachers in organizing integrated learning are productive, which contributes to student achievement [17].

The relationship of ongoing foreign research is characterized by the fact that in science there are theoretical and practical developments on the problem of research, however, in the context of reforming higher education in the Republic of Kazakhstan, the problem of educational and methodological support and the effectiveness of professional training of future teachers for teaching on an integrative basis is of particular relevance. The existing methodological support does not fully ensure the formation of the readiness of future teachers for integrated education in primary school. The solution to this problem was reflected in the development of methodological support for the training of future teachers for the integrated education of younger students, which includes an automated training program "Scientific and theoretical foundations of integration in education".

Object of study: the pedagogical process of the university.

Subject of study: methodological support for the process of preparing future teachers for integrated education of younger students.

The purpose of the study: scientific and theoretical substantiation, practical development and testing of the automated training program "Scientific and theoretical foundations of integration in education" as a methodological support for the formation of future teachers' readiness for integrated education of younger students.

Research objectives:

- reveal the methodological foundations of preparing future teachers for integrated education in elementary school based on the analysis of psychological, pedagogical, methodological literature on the research problem.

- to develop and experimentally test the effectiveness of the automated training program "Scientific-theoretical foundations of integration in teaching" at the first stage of formation of future teachers' readiness for integrated teaching of younger students.

Research structure: includes abstract, keywords, introduction, results and discussion, conclusions, bibliography.

Methods and materials

Theoretical: analysis of legal documents of the Republic of Kazakhstan in the field of education, psychological and pedagogical literature on the research topic; study of foreign and Kazakh experience on the issues of methodological support for the training of future teachers for the integrated education of younger students.

Empirical: in order to study the level of readiness of future teachers for integrated teaching of younger students, empirical methods were applied: questionnaires, testing students using Google forms, as well as a pedagogical experiment.

Experimental and pedagogical work was carried out in the conditions of the educational process of the Karaganda University named after Academician E.A. Buketov and Pavlodar Pedagogical University named after A. Margulan, with students of the educational program: "Pedagogy and methods of primary education", in the amount of 120 people.

Results and discussion

To achieve this goal, we studied the studies of M.G. Chepikov, V.S. Bezrukova, M.V. Lazareva, E.Yu. Sukharevskaya and many others, who present the scientific and theoretical foundations for the integration of scientific knowledge in education.

To effectively ensure the process of preparing future teachers for the integrated education of younger students, we have developed an automated training program (AEP) "Scientific and theoretical foundations of integration in education" [18].

The main goal of the automated training program is to form knowledge about the scientific and theoretical foundations of integration in teaching, as well as methodological support, in order to form the readiness of future primary school teachers to implement integrated learning.

The automated training program includes theoretical knowledge, a system of practical tasks that can be successfully used in the pedagogical process of the university, in the process of forming the professional

readiness of future primary education teachers for integrated learning. A screenshot of the automated tutorial is shown in Figure 1.

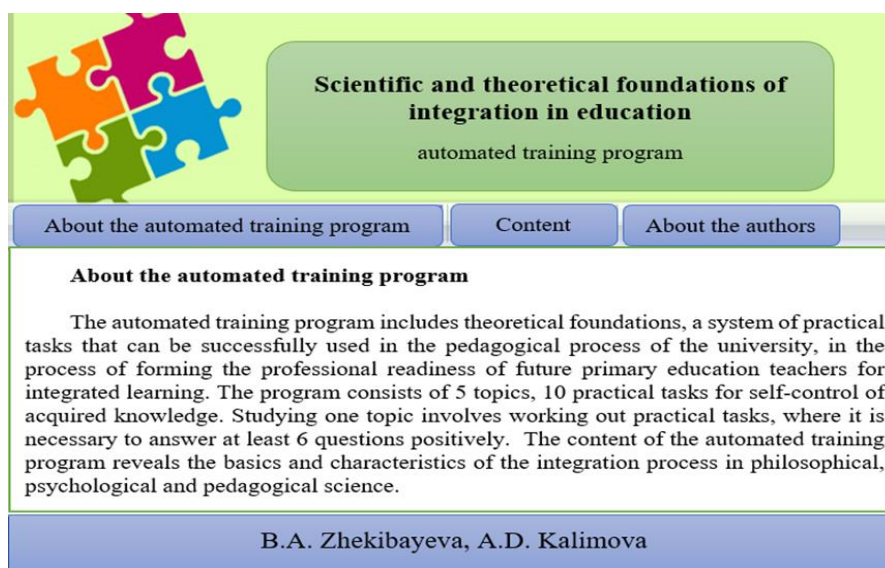


Figure 1. Screenshot of the automated training program “Scientific and theoretical foundations of integration in learning”

The program consists of 5 extensive topics, 10 practical tasks for self-control of acquired knowledge for each topic. The study of each topic involves the development of practical tasks, where it is necessary to answer at least 6 questions positively. The content of the automated training program reveals the features and characteristics of the integration process in the psychological and pedagogical literature (Fig. 2).

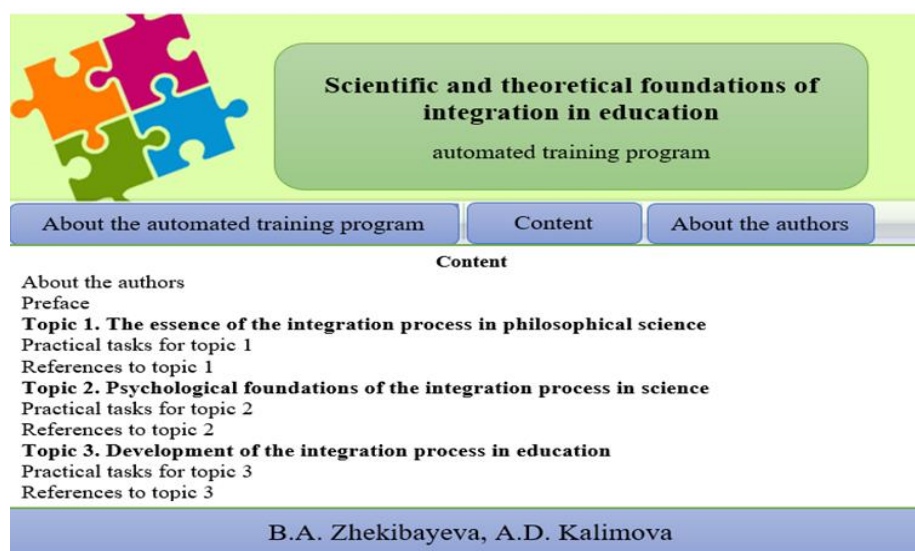


Figure 2. Screenshot of the content of the automated training program “Scientific and theoretical foundations of integration in learning”

The content of the automated training program includes the following topics:

In the first topic, “The Essence of the Integration Process in Philosophical Science”, issues related to the history of the development of integration, stages, classification, types and forms of integration, philosophical concepts, features of the interpretation of the concept of “integration” in the scientific works of philosophers are considered.

The second topic “Psychological foundations of the process of integration in science” presents the psychophysiological substantiation of the process of integration in education. In this topic, we noted that the

process of integration in the education of younger students is reasonably important, as it contributes to the emergence of new mental formations; integration is a significant process in the doctrine of the dynamic stereotype and the second signal system, in the theory of interaction of analyzers, in the theory of the associative-reflex nature of mental activity and the gradual formation of mental actions, in the position on the deep connection of consciousness, communication and generalization.

The content of the next topic “Development of the process of integration in education” presents the results of studies of integration in the scientific works of Kazakhstani and foreign authors, which show integration processes in pedagogical theory and practice, the possibilities of integration in the forms of manifestation and mechanisms for integrating scientific knowledge in teaching children of primary school age.

The topic “The essence of the category “integration” in pedagogical science” reveals the content of this term in the scientific and pedagogical literature, in order to present this complex concept in detail. The basic principles in the theory of integration were the laws of dialectics on the relationship of parts and the whole, such an understanding of integrity, which is not reducible to a simple sum of parts and is understood as the interpenetration of parts of one whole.

The fifth topic “Characteristics of the concept of “Pedagogical integration” presents various features of the concept of integration in pedagogical science: the interdependence of the processes of integration and differentiation; the organic unity of the whole and its parts; the inextricable link between the process and the result, and others.

Experimental verification of the automated training program developed by us was carried out on the basis of two universities: Karaganda University named after Academician E.A. Buketov and Pavlodar Pedagogical University named after A. Margulan, in the amount of 120 students. Two groups were formed by random sampling: control (CG) and experimental (EG). In the course of the study, the purpose of the formative experiment was to test the AOP developed by us “Scientific and theoretical foundations of integration in learning”.

Based on the results of the ascertaining experiment, quantitative and qualitative changes were revealed in the experimental and control groups, which are presented in Table 1.

Table 1.

The results of the initial state of readiness of future teachers for integrated teaching of younger students (in %)

Readiness levels	Experimental group		Control group	
	1 assessment test	2 assessment test	1 assessment test	2 assessment test
low	59,7	89,1	63,1	75,6
average	33,1	7,3	10,6	10,3
high	7,2	3,6	26,3	14,1

According to Table 1, the data of diagnostic test correspond to a low level (75.6 % of students in the control group and 89.1 % of the experimental group).

At the final stage of experimental and pedagogical work, the level of formation of the readiness of future teachers for the integrated teaching of younger students was determined. The dynamics of the levels of formation of the readiness of future teachers for the integrated education of younger students is presented in Table 2.

Table 2.

Dynamics of levels of formation of readiness of future teachers for integrated education of younger students (in %)

Readiness levels	Experimental group		Control group	
	1 assessment test	2 assessment test	1 assessment test	2 assessment test
low	63,1	57,9	6,2	5,1
average	32,5	44,5	35,4	26,7
high	4,4	2,4	58,4	68,2

The analysis of tabular data showed that the levels of formation of readiness for integrated learning of junior schoolchildren before and after the formative experiment in the experimental group amounted to 57.9 % of a high level of readiness, while in the control group this level was reached by 5.1 % of students.

Thus, during the analysis of the results of diagnostics, it was revealed that the activity of students with a high level of readiness is distinguished by the ability to use the received theoretical knowledge in practical activities.

Conclusion

At the present stage of a rapidly developing society, in the context of reforming the higher education system, increasing requirements for the professional training of qualified teaching staff, there is an increasing need to provide methodological support for the quality training of future primary school teachers for the integrated education of younger students. Therefore, the automated training program developed by us is one of the didactic units of educational and methodological content for the effective formation of the readiness of future teachers for the type of activity under study.

The article is funded by the Science Committee of the Ministry of Science and Higher Education of the Republic of Kazakhstan, within the framework of the project AP15473233 "Scientific and theoretical substantiation and methodological support for ensuring the training of future teachers for the integrated education of younger students".

References

- 1 Закон Республики Казахстан «Об образовании» от 27 июля 2007 года № 319–III (с изм. и доп. по состоянию на 01.09.2022 г.) [Электронный ресурс]. — Режим доступа <https://online.zakon.kz>.
- 2 Национальный проект «Качественное образование. «Образованная нация» [Электронный ресурс]. — Режим доступа <https://online.zakon.kz>.
- 3 Государственный общеобязательный стандарт начального образования. Приказ министра образования и науки Республики Казахстан от 31 октября 2018 г. № 604 (с внесенными изм. и доп. № 182 от 5 мая 2020 г.) [Электронный ресурс]. — Режим доступа <https://online.zakon.kz>.
- 4 Типовые учебные программы по общеобразовательным предметам начального образования, утвержденные Приказом министра образования и науки Республики Казахстан от 3 апреля 2013 г. № 115 (с внесенными изм. и доп. на 10 мая 2018 г. № 199) [Электронный ресурс]. — Режим доступа <https://online.zakon.kz>.
- 5 Типовые учебные планы начального образования, утвержденные Приказом министра образования и науки Республики Казахстан от 8 ноября 2012 г. № 500 (с внесенными изм. и доп. на 4 сентября 2018 г. № 441) [Электронный ресурс]. — Режим доступа <https://online.zakon.kz>.
- 6 Куралбаева А.А. Бастауыш білім мазмұнын интеграциялау мәселесі / А.А. Куралбаева // Абай атындағы ҚазҰПУ хабаршысы. — 2013. — № 3(39). — Б. 347-349.
- 7 Фейзулдаева С.А. Межпредметная преемственность как условие профессиональной подготовки учителей начальных классов / С.А. Фейзулдаева // Материалы Междунар. науч.-практ. конф. «Наука и образование в глобальном мире», посвящ. 85-летию Западно-Казахстанского гос. ун-та им. М. Утемисова (19–20 октября 2017 г.). — Уральск, 2017. — С. 261–263.
- 8 Саурыкова Ж.М. Жаңартылған бастауыштың білім мазмұны аясында пәнаралық байланысты жүзеге асырудың педагогикалық шарттары: филос. док. (PhD) ... дис. Мамандығы 6D010200 — Бастауыш оқыту педагогикасы мен әдістемесі / Ж.М. Саурыкова. — Талдықорған, 2019. — 169 б.
- 9 Убниязова Ш.А. Интеграциялық үдерістердің білім берудегі ықпалы / Ш.А. Убниязова // Абай атындағы ҚазҰПУ хабаршысы. Филология сериясы. — 2014. — № 3 (49). — Б. 182-186.
- 10 Lehmann T. (Eds.). (18 May. 2020). International Perspectives on Knowledge Integration. Leiden, The Netherlands: Brill. doi: <https://doi.org/10.1163/9789004429499>.
- 11 Lee Jumi. Extensive knowledge integration strategies in pre-service teachers: the role of perceived instrumentality, motivation, and self-regulation, Educational Studies / Jumi Lee, Jeannine E. Turner, 44:5, 505-520. — 2018. — <https://doi.org/10.1080/03055698.2017.1382327>.
- 12 Harr N. Integrated learning: ways of fostering the applicability of teachers' pedagogical and psychological knowledge / N. Harr, A. Eichler, A. Renkl // Front. Psychol. 6:738. — 2015 — Doi: <https://doi.org/10.3389/fpsyg.2015.00738>.
- 13 Mallillin L. Integration of knowledge through online classes in the learning enhancement of students / L. Mallillin, E. Carag, J. Mallillin, R. Laurel // European Journal of Open Education and E-learning Studies. — 2020. — 5(1). — <http://dx.doi.org/10.46827/ejoe.v5i1.3117>.
- 14 Lehmann T. Student teachers' knowledge integration across conceptual borders: the role of study approaches, learning strategies, beliefs, and motivation / T. Lehmann // Eur J Psychol Educ. — 2022. — <https://doi.org/10.1007/s10212-021-00577-7>.
- 15 Drake S.M. Meeting standards through integrated curriculum. Alexandria, VA: Association for Supervision and Curriculum Development / S.M. Drake, R.C. Burns. — 2004.
- 16 Kneen J. Curriculum integration: the challenges for primary and secondary schools in developing a new curriculum in the expressive arts / J. Kneen, T. Breeze, S. Davies-Barnes, V. John, E. Thayer // The Curriculum Journal. — 2020. — 31. — P. 258-275. <https://doi.org/10.1002/curj.34>.
- 17 Worawuth P. Integrated Learning Teacher Professional Development in Primary Schools / P. Worawuth, C. Prayuth, S. Kanokorn, K. Udomporn, A. Chadchawarn, P. Wilawan // Procedia — Social and Behavioral Sciences. — 2014. — 112. — P. 775–780. <https://doi.org/10.1016/j.sbspro.2014.01.1229>.

18 Жекибаева Б.А. Научно-теоретические основы интеграции в обучении / Б.А. Жекибаева, А.Д. Калимова // Свидетельство о внесении сведений в Государственный реестр прав на объекты, охраняемые авторским правом от 28.10.2022 г. № 29789.

Б.А. Жекибаева, А.Д. Калимова, Б.А. Матаев

Бастауыш мектеп оқушыларын біріктіріп оқытуға болашақ мұғалімдерді дайындауды әдістемелік қолдау

Мақалада «2022-2024 жылдарға арналған Жас ғалым» Республикалық жобасы бойынша жас ғалымдардың зерттеулерінің гранттық қаржыландыру шеңберінде жүзеге асырылатын «Бастауыш мектеп оқушыларын біріктіріп оқытуға болашақ мұғалімдерді дайындауды қамтамасыз етудегі ғылыми-теориялық негіздеме және әдістемелік қолдау көрсету» жобасы бойынша біздің қызметіміздің нәтижелерінің бірі ұсынылған. Мақаланың мақсаты — бастауыш мектеп оқушыларын біріктіріп оқытуға болашақ мұғалімдерді дайындаудың әдістемелік қолдаудың қажеттілігін негіздеу. Зерттеудің мәселесі — заманауи қоғам мен оның әлеуметтік ішкіқұрылымының білім беру жүйесінің талаптарына сәйкес бастауыш мектепте біріктіріп оқытуға болашақ мұғалімдерді дайындаудың жолдары мен әдістерін іздеу және анықтау. Бұл мәселенің шешімі мақалада ұсынылған нәтиженің практикалық маңыздылығында, яғни «Оқытудағы интеграцияның ғылыми-теориялық негіздері» атты автоматтандырылған оқыту бағдарламасын (АОП) әзірлеуде және оны «Бастауыш оқытудың педагогикасы мен әдістемесі» білім беру бағдарламасының студенттерімен сынақтан өткізу нәтижелерінде көрініс тапты. Зерттеудің әдіснамалық негізі зерттеу мәселесі бойынша психологиялық-педагогикалық әдебиеттерді теориялық талдау; білім беру саласындағы Қазақстан Республикасының нормативтік-құқықтық құжаттары негізінде ашылды; болашақ мұғалімдерді бастауыш сынып оқушыларын интеграцияланған оқытуға дайындау мәселелері бойынша шетелдік және қазақстандық зерттеушілердің тәжірибесін зерделеу. Зерттеудің негізгі нәтижелері автоматтандырылған оқыту бағдарламасын қолдану білімнің кеңеюі мен тереңдеуіне ғана емес, сонымен қатар практикалық дағдылар мен дағдылардың дамуына, сондай-ақ оларды бастауыш мектептің оқу-тәрбие процесінде интеграцияланған оқыту процесінде қолдануға оң әсер ететіндігін көрсетті.

Кілт сөздер: бастауыш мектепте біріктіріп оқыту, бастауыш сыныптардың болашақ мұғалімдерін дайындау, ғылыми білім интеграциясы, әдістемелік қолдау, бастауыш мектеп, автоматтандырылған оқыту бағдарламасы, кәсіби дайындық, әдістемелік материалдар.

Б.А. Жекибаева, А.Д. Калимова, Б.А. Матаев

Методическое сопровождение подготовки будущих учителей к интегрированному обучению младших школьников

В статье представлен один из результатов нашей деятельности по научному проекту «Научно-теоретическое обоснование и методическое сопровождение обеспечения подготовки будущих учителей к интегрированному обучению младших школьников», реализуемого в рамках грантового финансирования исследований молодых ученых по Республиканскому проекту «Жас ғалым на 2022–2024 годы». Цель статьи — обоснование необходимости методического сопровождения подготовки будущих учителей к интегрированному обучению младших школьников. Проблема исследования заключается в поиске и выявлении путей и средств подготовки будущих учителей к интегрированному обучению в начальной школе в соответствии с требованиями современного общества и системы образования как его социальной подструктуры. Решение данной проблемы нашло отражение в практической значимости представленного в статье результата — разработке автоматизированной обучающей программы (АОП) «Научно-теоретические основы интеграции в обучении» и результаты ее апробации со студентами образовательной программы «Педагогика и методика начального обучения». Методологическая основа исследования раскрыта на основе теоретического анализа психолого-педагогической литературы по проблеме исследования; нормативно-правовых документов Республики Казахстан в области образования; изучения опыта зарубежных и казахстанских исследователей по вопросам подготовки будущих учителей к интегрированному обучению младших школьников. Основные результаты исследования показали, что использование автоматизированной обучающей программы положительно влияет не только на расширение и углубление знаний, но и на развитие практических умений и навыков, а также на их применение в процессе интегрированного обучения в учебно-воспитательном процессе начальной школы.

Ключевые слова: интегрированное обучение в начальной школе, подготовка будущих учителей начальных классов, интеграция научных знаний, методическое сопровождение, начальная школа, автоматизированная обучающая программа, профессиональная подготовка, методические материалы.

References

- 1 Zakon Respubliki Kazakhstan «Ob obrazovanii» ot 27 iuliia 2007 goda No 319–III (s izmeneniiami i dopolneniiami po sostoiianiiu na 01.09.2022 goda [The Law of the Republic of Kazakhstan “On Education” dated July 27, 2007 No. 319-III (with amendments and additions as of 01.09.2022)]. Retrieved from <https://online.zakon.kz> [in Russian].
- 2 Natsionalnyi proekt «Kachestvennoe obrazovanie «Obrazovannaia natsiia» [National project “Quality Education “Educated Nation”]. Retrieved from <https://online.zakon.kz> [in Russian].
- 3 Gosudarstvennyi obshcheobiazatelnyi standart nachalnogo obrazovaniia. Prikaz ministra obrazovaniia i nauki Respubliki Kazakhstan ot 31 oktiabria 2018 goda No 604 (s vnesennymi izmeneniiami i dopolneniiami № 182 ot 5 maia 2020 goda) [The State compulsory standard of primary education. Order of the Minister of Education and Science of the Republic of Kazakhstan No. 604 dated October 31, 2018 (as amended and supplemented No. 182 dated May 5, 2020)]. Retrieved from <https://online.zakon.kz> [in Russian].
- 4 Tipovye uchebnye programmy po obshcheobrazovatel'nykh predmetam nachalnogo obrazovaniia, utverzhdennye prikazom Ministra obrazovaniia i nauki Respubliki Kazakhstan ot 3 apreliia 2013 goda No 115 (s vnesennymi izmeneniiami i dopolneniiami na 10 maia 2018 g. № 199) [Standard curricula for general education subjects of primary education approved by the Order of the Minister of Education and Science of the Republic of Kazakhstan dated April 3, 2013 No. 115 (with amendments and additions as of May 10, 2018 No. 199)]. Retrieved from <https://online.zakon.kz> [in Russian].
- 5 Tipovye uchebnye plany nachalnogo obrazovaniia, utverzhdennye Prikazom ministra obrazovaniia i nauki Respubliki Kazakhstan ot 8 noiabria 2012 goda № 500 (s vnesennymi izmeneniiami i dopolneniiami na 4 sentiabria 2018 goda № 441) [Standard curricula of primary education approved by the Order of the Minister of Education and Science of the Republic of Kazakhstan dated November 8, 2012 No. 500 (with amendments and additions as of September 4, 2018 No. 441)]. Retrieved from <https://online.zakon.kz> [in Russian].
- 6 Kuralbaeva, A.A. (2013). Bastauysh bilim mazmunyn integratsiialau maselesi [The problem of integrating the content of primary education]. *Abai atyndagy Qazaq ultyq pedagogikalyq universitetinin khabarshysy — Bulletin of the Kazakh National Pedagogical University named after Abay*, 3(39), 347–349 [in Kazakh].
- 7 Feyzuldaeva, S.A. (2017). Mezhpredmetnaia preemstvennost kak uslovie professionalnoi podgotovki uchitelei nachal'nykh klassov [Interdisciplinary continuity as a condition for the professional training of primary school teachers]. *Materialy Mezhdunarodnoi nauchno-prakticheskoi konferentsii «Nauka i obrazovaniia v globalnom mire», posviashchennoi 85-letiiu Zapadno-Kazakhstanskogo gosudarstvennogo universiteta imeni M. Utemisova (19–20 oktiabria) — Materials of the International scientific and practical conference “Science and Education in the global world”, dedicated to the 85th anniversary of the West Kazakhstan State University named after M. Utemisova (October 19–20)*. Uralsk, 261–263 [in Russian].
- 8 Saurykova, Zh.M. (2019). Zhanartylgan bastauiyshytn bilim mazmuny aiasynda panaralyq bailanysty zhuzege asyrydyn pedagogikalyq sharttary [Pedagogical conditions for the implementation of interdisciplinary connections within the framework of the updated content of education]. *Doctor's thesis*. Taldyqorgan [in Kazakh].
- 9 Ubniyazova, Sh.A. (2014). Integratsiialyq uderisterdin bilim berudegi uqpaly [Influence of integration processes in education]. *Abai atyndagy Qazaq ultyq pedagogikalyq universitetinin khabarshysy. Filologia seriiasy — Bulletin of the Kazakh National Pedagogical University named after Abay, Series “Philology”*, 3, 182–186 [in Kazakh].
- 10 Lehmann, T. (Eds.). (2020). *International Perspectives on Knowledge Integration*. Leiden, The Netherlands: Brill. doi: <https://doi.org/10.1163/9789004429499>.
- 11 Lee, Jumi & Turner, Jeannine E. (2018) Extensive knowledge integration strategies in pre-service teachers: the role of perceived instrumentality, motivation, and self-regulation, *Educational Studies*, 44:5, 505–520, DOI: <https://doi.org/10.1080/03055698.2017.1382327>.
- 12 Harr, N., Eichler, A., & Renkl, A. (2015) Integrated learning: ways of fostering the applicability of teachers' pedagogical and psychological knowledge. *Front. Psychol.* 6:738. Doi: <https://doi.org/10.3389/fpsyg.2015.00738>.
- 13 Mallillin, L., Carag, E., Mallillin, J., & Laurel, R. (2020). Integration of knowledge through online classes in the learning enhancement of students. *European Journal of Open Education and E-learning Studies*, 5(1). <https://dx.doi.org/10.46827/ejoe.v5i1.3117>.
- 14 Lehmann, T. (2022). Student teachers' knowledge integration across conceptual borders: the role of study approaches, learning strategies, beliefs, and motivation. *Eur J Psychol Educ.* <https://doi.org/10.1007/s10212-021-00577-7>.
- 15 Drake, S.M., & Burns, R.C. (2004). *Meeting standards through integrated curriculum*. Alexandria, VA: Association for Supervision and Curriculum Development.
- 16 Kneen, J., Breeze, T., Davies-Barnes, S., John, V., & Thayer, E. (2020). Curriculum integration: the challenges for primary and secondary schools in developing a new curriculum in the expressive arts. *The Curriculum Journal*, 31, 258–275. <https://doi.org/10.1002/curj.3>.
- 17 Worawuth, P., Prayuth, C., Kanokorn, S., Udomporn, K., Chadchawarn, A., & Wilawan, P. (2014). Integrated Learning Teacher Professional Development in Primary Schools. *Procedia — Social and Behavioral Sciences*, 112, 775–780. <https://doi.org/10.1016/j.sbspro.2014.01.1229>.
- 18 Zhekibaeva, B.A., & Kalimova, A.D. (2022). Nauchno-teoreticheskie osnovy integratsii v obuchenii [Scientific and theoretical foundations of integration in education]. *Svidetel'stvo o vnesenii svedenii v Gosudarstvennyi reestr prav na obekty, okhraniayemye avtorskim pravom ot 28.10.2022 goda No 29789 — Certificate of entry of information into the State register of rights to objects protected by copyright dated 28.10.2022, No 29789* [in Russian].