9. Baizhumanova G.K. Professionalnaia podgotovka pedagogov v usloviiakh mnogoyazychia. Vestnik KazNPU im. Abaya, (3),2020. p. 112–119.

10. Bugg J. h Rozhdennyi chitat: Kak podruzhit rebenka s knigoi (transl. from English). Moscow: Alpina Non-fiction,2015.

11. Tarkhanova I.Yu. (2019). Sovremennye reguliatory stanovleniia novoi didaktiki vysshego obrazovaniia. Yaroslavskii pedagogicheskii vestnik, (2),2019., p. 23–28.

12. Ponachugin A.V., & Lapygin Yu.N. Tsifrovye obrazovatelnye resursy vuza: proektirovanie, analiz i ekspertiza. Vestnik Mininskogo universiteta, 7(2),2019. 5. https://doi.org/10.26795/2307-1281-2019-7-2-5

13. Stepanova E.V. Iskusstvennyi intellekt v vysshem obrazovanii. In Nauka i obrazovanie: opyt, problemy, perspektivy razvitiia (pp. 153–155). Krasnoyarsk: Krasnoiarskii gosudarstvennyi agrarnyi universitet,2021

14. Mhlanga D. Digital Transformation in Higher Education: A Framework for Research and Practice. Education and Information Technologies,2021. https://doi.org/10.1007/s10639-021-10536-6

15. Ng V., Nicholas H., & Williams A. School experience influences prospective teachers' beliefs about effective teaching. Teaching and Teacher Education,2021. 103, 103345.

16. Salgareyeva G., & Bazarbayeva A. Akparattyk tekhnologiyalar salasynda gylymi-praktikalyk bagyttagy okytu zerteulerine sholu. Vestnik KazNPU imeni Abaya. Seriya Pedagogicheskie nauki, 4(64),2023.

17. Tomczyk Ł., Potyrała K., Wąsiński A., Sánchez-Cruzado C., & Sánchez-Compaña M.T. Digital competence among pre-service teachers: A global study. Teaching and Teacher Education,2024. 138, 104435.

18. Falloon G. From digital literacy to digital competence: the teacher digital competency (TDC) framework. Educational Technology Research and Development,2020. 68, 2449–2472.

19. Basilotta-Gómez-Pablos V., Martín del Pozo M., & García-Valcárcel A. (2022). Teachers' digital competencies in higher education: A systematic literature review. International Journal of Educational Technology in Higher Education, 19(1),2022. p. 9.

20. Niemi H., Multisilta J. Digital storytelling promoting twenty-first century skills and student engagement // Technology, Pedagogy and Education. – 2016. – Vol. 25, № 4. – P. 451–468. – DOI: 10.1080/1475939X.2015.1074610

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THE IMPACT OF DIGITAL EDUCATION ON THE DEVELOPMENT OF PROFESSIONAL SKILLS OF FUTURE PRIMARY SCHOOL TEACHERS

Abstract

Organizing learning processes within a digital context requires not only the development of ICT competencies but also the transformation of educational content and pedagogical methods. In this regard, the purpose of this study is to identify the features of the formation of professional skills of future teachers in the context of digital education.

The research methodology incorporates a combination of system-based, activity-oriented, learner-centered, and competency-based approaches, integrated with principles of digital pedagogy. Empirical data were collected using surveys, observation, content analysis, and self-assessment methods. A total of 175 students from pedagogical institutions in three regions of Kazakhstan participated in the empirical phase. The study explored students' usage of digital tools, their professional orientation, levels of ICT competence, and intrinsic motivation for self-development.

The findings indicate that systematic use of digital educational tools contributes to the acquisition of essential teaching skills, including digital content creation, online communication, effective use of educational platforms, and application of distance learning methods. Moreover, the research revealed increased levels of self-reflection, intrinsic motivation for professional growth, and readiness for continuous learning.

The theoretical significance of the study lies in clarifying the mechanisms of professional skill formation within digitalized teacher education. Its practical value is reflected in the development of concrete recommendations for integrating digital competency modules into teacher education curricula, thereby enhancing the quality of primary teacher preparation and equipping them for the demands of a technology-rich educational environment.

Keywords: digital education, future primary school teachers, primary school educators, professional skills, development of professional skills.

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БОЛАШАҚ БАСТАУЫШ СЫНЫП МҰҒАЛІМДЕРІНІҢ КӘСІБИ ДАҒДЫЛАРЫН ДАМЫТУДА ЦИФРЛЫҚ БІЛІМ БЕРУДІҢ ӘСЕРІ

Аңдатпа

Оқытуды цифрлық ортада ұйымдастыру тек ақпараттық-коммуникациялық технологиялар (АКТ) құзыреттілігін дамытуды ғана емес, сонымен қатар білім беру мазмұны мен педагогикалық әдістерді трансформациялауды талап етеді. Осыған байланысты зерттеудің мақсаты – цифрлық білім беру жағдайында болашақ мұғалімдердің кәсіби дағдыларының қалыптасу ерекшеліктерін анықтау.

Зерттеу әдіснамасы цифрлық педагогика қағидаларымен ұштастырылған жүйелік, іс-әрекеттік, тұлғаға бағытталған және құзыреттілікке негізделген тәсілдердің кешенін қамтиды. Эмпирикалық деректер сауалнама жүргізу, бақылау, мазмұндық талдау және өзін-өзі бағалау әдістері арқылы жиналды. Эмпирикалық зерттеуге Қазақстанның үш өңіріндегі педагогикалық оқу орындарында білім алатын 175 студент қатысты. Зерттеу барысында студенттердің цифрлық құралдарды пайдалану деңгейі, кәсіби бағыттылығы, АКТ құзыреттілігінің деңгейі және өзін-өзі дамытуға деген ішкі уәждемесі қарастырылды.

Зерттеу нәтижелері цифрлық білім беру құралдарын жүйелі қолдану сандық мазмұн әзірлеу, онлайн-коммуникация жүргізу, білім беру платформаларын тиімді пайдалану және қашықтан оқыту әдістерін қолдану сияқты негізгі педагогикалық дағдыларды меңгеруге ықпал ететінін көрсетті. Сонымен қатар, кәсіби дамуға деген ішкі уәждеменің, өзіндік рефлексия деңгейінің және үздіксіз білім алуға дайындықтың артқаны анықталды.

Зерттеудің теориялық маңыздылығы мұғалімдерді даярлаудың цифрландырылған жағдайында кәсіби дағдылардың қалыптасу тетіктерін нақтылаумен айқындалады. Ал практикалық маңыздылығы педагогикалық білім беру бағдарламаларына цифрлық құзыреттілік модульдерін енгізу бойынша нақты ұсыныстар әзірлеуде көрініс табады, бұл бастауыш сынып мұғалімдерін даярлау сапасын арттырып, технологияға бай білім беру ортасының талаптарына сай бейімдеуге мүмкіндік береді.

Түйін сөздер: цифрлық білім беру, болашақ бастауыш сынып мұғалімдері, бастауыш мектеп педагогтары, кәсіби дағдылар, кәсіби дағдыларды дамыту.

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ВЛИЯНИЕ ЦИФРОВОГО ОБРАЗОВАНИЯ НА РАЗВИТИЕ ПРОФЕССИОНАЛЬНЫХ НАВЫКОВ БУДУЩИХ УЧИТЕЛЕЙ НАЧАЛЬНЫХ КЛАССОВ

Аннотация

Организация учебного процесса в условиях цифровой среды требует не только развития информационно-коммуникационных компетенций, но и трансформации содержания образования и педагогических методов. В этой связи целью данного исследования является выявление особенностей формирования профессиональных навыков будущих учителей в условиях цифрового образования.

Методология исследования основана на сочетании системного, деятельностного, личностно-ориентированного и компетентностного подходов, интегрированных с принципами цифровой педагогики. Эмпирические данные были получены с использованием методов анкетирования, наблюдения, контент-анализа и самооценки. В эмпирическом этапе исследования приняли участие 175 студентов педагогических вузов из трёх регионов Казахстана. В ходе исследования анализировались особенности использования цифровых инструментов, профессиональная направленность студентов, уровень их ИКТ-компетентности и внутренняя мотивация к саморазвитию.

Результаты исследования показали, что систематическое использование цифровых образовательных инструментов способствует формированию ключевых педагогических навыков, включая создание цифрового контента, онлайн-коммуникацию, эффективное использование образовательных платформ и применение дистанционных форм обучения. Кроме того, выявлено повышение уровня рефлексии, внутренней мотивации к профессиональному росту и готовности к непрерывному обучению.

Теоретическая значимость исследования заключается в уточнении механизмов формирования профессиональных навыков в условиях цифровизации педагогического образования. Практическая значимость проявляется в разработке конкретных рекомендаций по внедрению модулей цифровых компетенций в образовательные программы подготовки учителей, что способствует повышению качества подготовки учителей начальных классов и их готовности к работе в технологически насыщенной образовательной среде.

Ключевые слова: цифровое образование, будущие учителя начальных классов, педагоги начальной школы, профессиональные навыки, развитие профессиональных навыков.

Introduction. At present, the global transformations occurring in the education system-particularly the active integration of digital technologies—require a reconsideration of how future educators are trained. The digital educational environment involves not only working with information but also aims to foster the professional competence of educators at a new level [1].

The professional skills of primary school teachers are especially important, as they significantly determine the quality of early-stage education for children. Consequently, the formation of digital competence among future teachers is considered one of the key priorities in pedagogical education [2].

At the present stage, the digitalization of the education system has become one of the priority directions in the global educational space. The rapid development of information and communication technologies is fundamentally transforming the content of education, teaching methods, and the forms of organizing the educational process. In the Republic of Kazakhstan, the digital transformation of education is also being implemented at the state level, placing new demands on the professional training of teachers. In this regard, digital education plays a particularly important role in the formation and development of the professional skills of future primary school teachers.

Primary education is a crucial stage that lays the foundation for students' personal, cognitive, and social development. Therefore, a primary school teacher should not only possess strong subject knowledge but also be a professional capable of effectively using modern digital technologies and enhancing students' learning engagement. In a digital educational environment, special importance is attached to teachers' information literacy, their ability to use digital resources, organize online communication, and demonstrate competence in digital pedagogical design.

Kazakhstani scholars such as G.Zh. Ergalieva (2021), A.B. Karayeva (2022) and L.T. Abdrakhmanova (2020) have extensively studied the impact of digital education on the professional competence of future teachers [3], [4], [5]. Their research outlines both the advantages and challenges of digitalization in pedagogical universities and underscores the need to modernize educational content.

Analyzing the works of both domestic and international researchers offers a deeper understanding of the theoretical foundations of this issue. For example, within the European Union, the DigCompEdu framework has introduced a systematic model for developing teachers' digital competence, which focuses on the effective pedagogical use of digital tools [6]. Similarly, UNESCO emphasizes digital literacy as a foundational component of 21st-century skills and highlights its critical role in teacher training [7].

N.A. Azman and his colleagues (2024) conducted a study on developing digital educational skills among future primary school teachers based on modern approaches. Their article presents a systematic literature review on pedagogical strategies used in digital teaching by primary educators. The findings categorize teaching strategies into three major groups and show that effective use of digital resources significantly enhances students' learning outcomes [8].

Among Russian scholars, A.V.Khutorskoy (2020) and I.V.Robert (2021) have examined the characteristics of teaching in a digital environment and its implications for teachers' professional activities. They argue that digital competence goes beyond technical skills to include elements such as pedagogical design, interactive content development, and digital ethics [9], [10].

A.V.Tumalev and A.A.Golovko (2023) explored the role of digital technologies in training students of pedagogical institutions-particularly those in physical education. The authors provide both theoretical and empirical evidence that multimedia, virtual and augmented reality technologies, and telecommunications substantially enhance the professional competence of future educators and contribute to more personalized and effective learning. A survey conducted among students at Herzen University confirmed improvements in training quality and mastery of digital educational resources [11].

This *study aims to* identify the aspects of modernization of professional skills among primary school teachers due to the digitalization of education and empirically assess the effectiveness of using digital educational technologies to develop the professional skills of future primary school teachers.

The development of teachers' digital competence has become one of the most significant areas of educational research in recent years. According to scholars, digital competence is not limited to the mastery of information technologies; it also encompasses the ability to design educational processes, develop digital content, utilize online assessment tools, and effectively interact with learners in digital environments.

International researchers have demonstrated the positive impact of digital technologies on teachers' professional development. Within the DigCompEdu framework, teachers' digital competence is structured around six key areas: professional engagement, digital resources, teaching and learning, assessment, empowering learners, and facilitating learners' digital competence. This framework has been widely adopted in contemporary teacher education and professional development programs.

UNESCO studies identify digital literacy and technological competence as essential components of 21st-century teaching skills. According to UNESCO experts, the effective integration of digital technologies into education contributes to improving educational quality, personalizing learning processes, and enhancing students' motivation and engagement.

Kazakhstani researchers have also examined the impact of digital education on teacher training. Their studies indicate that the use of digital platforms, the development of electronic educational resources, and the implementation of blended learning technologies contribute significantly to improving the professional preparation of future teachers. Furthermore, these studies emphasize the necessity of developing digital infrastructure in pedagogical universities and systematically fostering students' digital competencies.

Russian scholars have investigated the characteristics of digital educational environments, teachers' digital culture, and issues related to information security. Their findings suggest that the integration of digital technologies into the educational process enhances teachers' professional flexibility and enables them to implement innovative pedagogical solutions more effectively.

Materials and methods. In order to achieve the aim of the study, the following theoretical and empirical methods were applied:

1) Theoretical analysis of literature on the topic of the study;
2) Analysis of factors of transformation of professional skills of primary school teachers in the context of digitalization of education;
3) Pedagogical experiment (diagnostic and formative stages with control and experimental groups);
4) Survey (a 15-item author-designed questionnaire covering digital skills, professional competence, and communication skills);
5) Observation of students' learning activities in digital environments;
6) Quantitative and comparative analysis of pre- and post-experimental data.

The study sample consisted of third-year students enrolled in a pedagogical university. A total of 175 students participated in the experimental-empirical research. Two groups were formed: a control group and an experimental group.

The control group included 90 third-year students specializing in primary education pedagogy and methodology at Abai Kazakh National Pedagogical University in Almaty. Among them were 82 female students and 8 male students, aged between 20 and 21.

The experimental group comprised 85 fourth-year students from South Kazakhstan University named after M.Auezov in Shymkent. This group consisted of 84 female students and 1 male student, aged between 21 and 22.

In the experimental group, skill-development activities were conducted using digital technologies. These activities included the use of interactive platforms, online courses, digital simulations, and multimedia resources. To evaluate the outcomes, a questionnaire-based assessment was used. The students' levels of professional skill development were comparatively assessed after the formative phase.

Results and discussion. *Theoretical study.* In general, the digitalization of education has necessitated the modernization of professional skills among primary school teachers. The key aspects of this transformation are outlined below:

1. Technological Transformation of the Educational Environment

Today's schools operate as digital environments equipped with interactive platforms, virtual classrooms, electronic diaries and gradebooks, and LMS systems (such as Moodle and Google Classroom). This setting requires teachers not only to possess technical proficiency but also the ability to integrate digital tools effectively into the learning process.

2. Changing Role of the Teacher

Within the digital learning environment, the teacher's role shifts from that of a traditional knowledge provider to a facilitator, organizer, and mentor. Educators must be adaptable to new pedagogical models such as blended and distance learning, project-based learning, and inquiry-based approaches.

3. Increased Importance of Digital Literacy

Teachers must develop a range of digital competencies, including:

- Creation and adaptation of digital content;
- Use of multimedia resources (videos, animations, infographics);
- Communication with students and parents through digital platforms;
- Adherence to cybersecurity protocols and digital communication ethics.

4. Facilitation of Personalized Learning

Digital technologies enable individualized instruction based on students' readiness levels and interests. Teachers must be capable of using digital analytics to assess learning outcomes and make data-informed instructional adjustments.

5. New Learning Paradigms for Students

Today's learners are digital natives. For them, the integration of modern technologies such as gamification, educational apps, and virtual or augmented reality is essential. Hence, educators must be fluent in the digital language that resonates with students.

These aspects require not only an enhancement of teachers' digital competence but also a comprehensive restructuring of their professional skill set, including emotional intelligence for effective interaction in digital settings.

Empirical study. A custom-designed 15-item questionnaire was used to assess the professional skills of future primary school teachers. It covered three competency domains, with five questions each:

1. Digital Technology Application Skills

This scale evaluated students' ability to navigate the digital learning environment and effectively use digital tools and platforms (e.g., Zoom, Google Classroom, Kahoot, interactive whiteboards). It also assessed their capability to:

- Integrate digital resources into lesson planning;
- Independently conduct online lessons;
- Adhere to digital safety and ethical norms;
- Utilize multimedia materials;

2. Implement digital feedback methods [12].

Professional Competence

This dimension focused on students' methodological, subject-related, and pedagogical knowledge, as well as their ability to:

- Select instructional strategies aligned with learning objectives;
- Make pedagogical decisions in challenging scenarios;
- Apply assessment criteria effectively;
- Demonstrate readiness for inclusive education;
- Understand the psychology of young learners.

3. Communication Skills

This scale assessed future teachers' interpersonal competencies, including:

- Constructive dialogue with students during lessons;

- Professional communication with parents;
- Teamwork adaptability;
- Conflict resolution abilities;
- Effective use of feedback mechanisms.

Table 1 presents the initial assessment results during the diagnostic phase for both control and experimental groups.

Table 1. Levels of professional skills of study participants according to the diagnostic experiment

Scale	*Control Group (n=90)*			*Experimental Group (n=85)*		
	Low (%)	Medium (%)	High (%)	Low (%)	Medium (%)	High (%)
Digital Skills	30.0 (27)	44.4 (40)	25.6 (23)	30.6 (26)	44.7 (38)	24.7 (21)
Professional Competence	32.2 (29)	46.6 (42)	21.1 (19)	36.5 (31)	45.9 (36)	21.2 (18)
Communication Skills	31.1 (28)	45.6 (41)	23.3 (21)	31.8 (27)	45.9 (39)	22.4 (19)

These data are visualized in Figure 1.

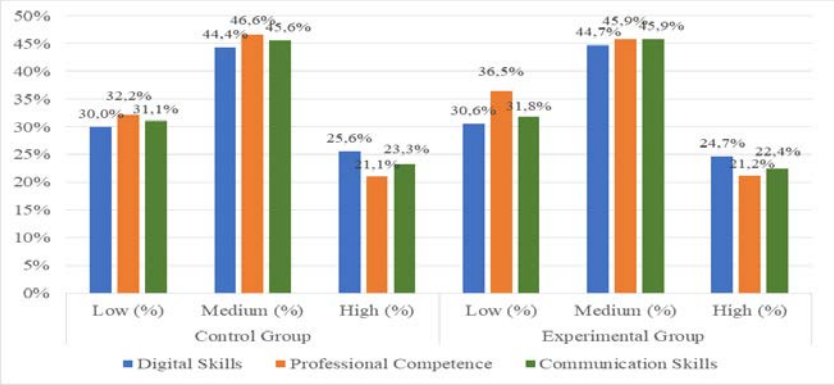

Figure 1 - Graphical Representation of Professional Skill Indicators of Respondents During the Diagnostic Experiment

The results of analysis indicate that prior to the intervention, the levels of digital competency, professional knowledge, and communication skills were similar across both groups. Roughly one-third of students in each group demonstrated readiness for professional activity in digital environments.

After the implementation of formative activities based on digital technologies, positive changes were observed in the professional skills of future primary school teachers. The comparative outcomes of the post-intervention survey for both groups are presented in Table 2.

Table 2. Levels of professional skills of study participants after the formative experiment

Scale	*Control Group (n=90)*			*Experimental Group (n=85)*		
	Low (%)	Medium (%)	High (%)	Low (%)	Medium (%)	High (%)
Digital Skills	28.9 (26)	44.4 (40)	26.7 (24)	24.7 (21)	44.7 (38)	30.6 (26)
Professional Competence	31.1 (28)	47.8 (43)	21.1 (19)	18.9 (16)	55.3 (47)	25.9 (22)
Communication Skills	28.9 (26)	46.7 (42)	24.4 (22)	20.0 (17)	51.8 (44)	28.2 (24)

For better understanding these data are presented in a diagram - *Figure 2*.

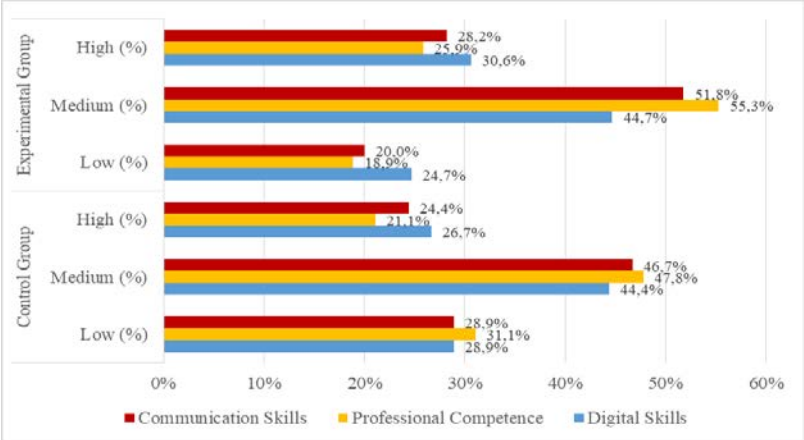

Figure 2. Graphical Representation of Respondents' Results After the Formative Experiment

The given results clearly illustrate the differences between the experimental and control groups after the pedagogical intervention.

Digital Technology Skills: In the control group, the percentage of students at the high level increased slightly to 26.7% (n=24). In contrast, the experimental group showed more notable progress, with 30.6% (n=26) achieving a high level, and a reduction in low-level respondents from 30.6% to 24.7%.

Professional Competence: The experimental group demonstrated a clear positive trend: 25.9% (n=22) of students reached a high level, 55.3% (n=47) were at a medium level, and only 18.9% (n=16) remained at the low level. This suggests that students improved their ability to apply pedagogical knowledge and make instructional decisions. Meanwhile, the control group's results remained unchanged.

Communication Skills: The experimental group also improved significantly in interpersonal communication: 28.2% (n=24) reached a high level, 51.8% (n=44) were at the medium level, and only 20.0% (n=17) remained at the low level. Compared to the control group, this shows that students developed stronger skills in professional interaction, collaboration, and pedagogical dialogue.

The results indicate that pedagogical interventions grounded in digital technologies effectively contributed to the development of key professional skills in the experimental group. Notable improvements were seen in:

1) Digital content creation;
2) Organization of online learning;
3) Effective use of digital tools;
4) Professional communication and reflection.

In contrast, the control group showed little or no improvement in most indicators. Students in the experimental group also demonstrated greater readiness for professional reflection, self-assessment, and decision-making in digital learning scenarios, indicating an overall increase in digital and pedagogical competence.

Conclusion. The conducted study confirmed the effectiveness of systematic and purposeful use of digital technologies in developing professional skills among future primary school teachers. During the formative experiment, positive dynamics were observed in all three core components of professional competence within the experimental group:

- The ability to utilize digital technologies;
- Professional pedagogical competence;
- Communication skills.

Students in the experimental group demonstrated noticeable improvements in the following areas:

- Development of digital content;

- Organization of online learning processes;
- Effective application of digital tools in educational settings;
- Enhanced communication and collaboration skills.

These findings indicate that the students did not merely acquire subject-specific knowledge, but also mastered practical competencies essential for effective professional practice in a digitalized educational environment.

In comparison to the control group, the students in the experimental group exhibited a higher rate of professional growth and competency development. This serves as strong evidence supporting the effectiveness of pedagogical methods based on digital technologies.

Consequently, the integration of digital technologies into the training process of future primary school teachers is a crucial factor in enhancing the quality of education. Moving forward, it is important to continue research in this area and to pay special attention to the comprehensive development of digital competencies as part of teacher education programs.

The analysis of the research findings demonstrated that digital educational technologies play a significant role in the development of the professional skills of future primary school teachers. The use of digital platforms and electronic educational resources not only enhances students' mastery of learning materials but also contributes to the development of their self-directed learning abilities.

Within a digital educational environment, future teachers acquire essential professional skills such as searching for, processing, and analyzing information, creating multimedia educational materials, organizing virtual lessons, and assessing students' academic achievements through digital tools. These competencies enable them to effectively integrate digital technologies into their future pedagogical practice.

At the same time, the study identified several challenges associated with digital education. In particular, differences in students' levels of digital competence, insufficient technical resources, and limited experience in the pedagogical application of digital tools create certain obstacles to effective implementation. Therefore, there is a clear need for the systematic integration of digital educational technologies into teacher education programs and for increasing the proportion of courses related to digital pedagogy in higher education institutions.

The findings of this study are consistent with the conclusions of both international and national research. The purposeful integration of digital technologies into the educational process improves the quality of professional training for future primary school teachers and facilitates their adaptation to the requirements of contemporary education. In this regard, it is important to increase the share of practical activities aimed at developing digital competence within teacher education curricula.

References:

1. Компание А.А. О необходимости формирования цифровой компетентности у современного учителя как субъекта цифровой образовательной среды. Территория новых возможностей, URL: https://cyberleninka.ru/article/n/o-neobhodimosti-formirovaniya-tsifrovoy-kompetentnosti-u-sovremennogo-pedagoga-kak-subekta-tsifrovogo-obrazovatelnogo-prostranstva (2), 2021. Стр.120-129 (дата обращения: 24.05.2025).

2. .Сагалиева Ж.К., Есекешова М.Д., Гумаров Г.С., Жусипова А.А., Кочкорбаева Е.Ш., Нурмуханова К.Ж., Жаканкызы Ш. Цифровая педагогика в образовательном пространстве: Учебное пособие. 2020.

3. Ергалиева Г.Ж. Цифровая образовательная среда и профессиональное развитие учителя. Образовательные технологии, (2), 2021. Стр. 15–20.

4. Караева А.Б. Современные подходы к формированию профессиональной компетентности будущих учителей. Педагогика и психология, 3(52),2022. Стр. 45–51.

5. Абдрахманова Л. Т. Влияние цифровых технологий на процесс обучения. Современное образование, (4), 2020. Стр 37–41.

6. Redecker C. European Framework for the Digital Competence of Educators: DigCompEdu. Luxembourg: Publications Office of the European Union. 2017.

7. UNESCO. Digital Literacy in Education. Policy Brief. URL: https://unesdoc.unesco.org/ark:/48223/pf0000265403 (accessed: 24.05.2025). 2018.

8. Azman N.A., Hamzah M.I., & Razak K.A. Digital Teaching Pedagogy Among Primary School Teachers: A Systematic Literature Review. TOJET: The Turkish Online Journal of Educational Technology, 23(3),2024. page 1–14.

9. Хуторской А.В. Цифровизация образования: откуда дует ветер? Личный сайт – Хроника существования. URL: http://khutorskoy.ru/be/2020/0124/ (дата обращения: 24.05.2025). 2020.

10. Роберт И.В. Цифровая трансформация образования: ценностные ориентиры, перспективы развития. Россия: тенденции и перспективы развития URL: https://cyberleninka.ru/article/n/tsifrovaya-transformatsiya-obrazovaniya-tsennostnye-orientiry-perspektivy-razvitiya (дата обращения: 24.05.2025). (16-1). 2021.

11. Тумалев А.В., и Головко А.А. Влияние цифровых технологий на качество профессиональной подготовки будущих учителей. Вестник университета имени Герцена, URL: https: //cberleninka.ru/article/n/vliyanie-tsifrovyh-tehnologiy-na-kachestvo-professionalnoy-podgotovki-buduschih-uchiteley (дата обращения: 24.05.2025). (207). 2023.

12. Alférez-Pastor M., Collado-Soler R., Lérida-Ayala V., Manzano-León A., Aguilar-Parra J. M., & Trigueros R. Training Digital Competencies in Future Primary School Teachers: A Systematic Review. Education Sciences, DOI: https://doi.org/10.3390/educsci13050461.. 13(5),2023. 461 p.

References:

1. Kompaniets A.A. On the Necessity of Forming Digital Competence in a Modern Teacher as a Subject of the Digital Educational Environment. Territory of New Opportunities. URL: https://cyberleninka.ru/article/n/o-neobhodimosti-formirovaniya-tsifrovoy-kompetentnosti-u-sovremennogo-pedagoga-kak-subekta-tsifrovogo-obrazovatelnogo-prostranstva (accessed: (2), 2021. 120-129 p.

2. Sagalieva Zh.K., Yesekeshova M.D., Gumarov G.S., Zhusipova A.A., Kochkorbaeva E.Sh., Nurmukhanova K.Zh., & Zhakankyzy Sh. Digital Pedagogy in the Educational Space: Educational Manual. Almaty: Bastau,2020. 388 p..

3. Ergalieva G.Zh. Digital Educational Environment and Teacher's Professional Development. Educational Technologies, (2), 2021. 15–20 p.

4. Karayeva A.B. Modern Approaches in the Formation of Professional Competence of Future Teachers. Pedagogy and Psychology, 3(52),2022. 45–51 p.

5. Abdrakhmanova L.T. Impact of Digital Technologies on the Learning Process. Modern Education, (4),2020. 37–41 p.

6. Redecker C. European Framework for the Digital Competence of Educators: DigCompEdu. Luxembourg: Publications Office of the European Union. 2017.

7. UNESCO. Digital Literacy in Education. Policy Brief. URL: https://unesdoc.unesco.org/ark:/48223/pf0000265403 (accessed: 24.05.2025). 2018.

8.Azman N.A., Hamzah M.I., & Razak K.A. Digital Teaching Pedagogy Among Primary School Teachers: A Systematic Literature Review. TOJET: The Turkish Online Journal of Educational Technology, 23(3), 2024. 1–14 p.

9. Khutorskoy A.V. Digitalization of Education: Where Does the Wind Blow From? Personal Website - Chronicle of Existence. URL: http://khutorskoy.ru/be/2020/0124/ (accessed: 24.05.2025). 2020.

10. Robert I.V. Digital Transformation of Education: Value Guidelines, Development Prospects. Russia: Trends and Development Prospects, URL: https://cyberleninka.ru/article/n/tsifrovaya-transformatsiya-obrazovaniya-tsennostnye-orientiry-perspektivy-razvitiya (accessed: 24.05.2025). (16-1). 2021.

11. Tumalev A.V., & Golovko A.A. The Impact of Digital Technologies on the Quality of Professional Training of Future Teachers. Herzen University Bulletin, URL: https://cyberleninka.ru/article/n/vliyanie-tsifrovyh-tehnologiy-na-kachestvo-professionalnoy-podgotovki-buduschih-uchiteley (accessed: 24.05.2025). (207). 2023.

12. Alférez-Pastor M., Collado-Soler R., Lérida-Ayala V., Manzano-León A., Aguilar-Parra J. M., & Trigueros R. Training Digital Competencies in Future Primary School Teachers: A Systematic Review. Education Sciences,. DOI: https://doi.org/10.3390/educsci13050461. 13(5),2023. 461 p.