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DIGITAL COMPETENCE OF FUTURE PRIMARY SCHOOL TEACHERS WITHIN THE FRAMEWORK OF A MULTILINGUAL APPROACH TO EDUCATION

Abstract

This article addresses the development of digital competence among future primary school teachers within the framework of a multilingual approach to education. The aim of the study is to assess the level of digital competence among pedagogical students and their readiness to implement multilingual strategies in a digital educational environment.

The scientific and practical significance of the work lies in the need to modernize teacher training programs amid the digitalization and globalization of education. The methodological basis of the research includes theoretical analysis, questionnaires, testing, and correlation analysis.

The results demonstrated a positive correlation between the students' level of digital competence and their readiness to apply multilingual technologies in teaching practice. The conclusions confirm the necessity of integrating digital and multilingual modules into teacher training curricula.

The value of the study is in justifying approaches to the development of digital literacy among future educators within the multilingual education context. The practical significance lies in the possibility of applying the research results in designing educational programs and professional development courses for teachers.

Keywords: digital competence, multilingual approach, teacher training.

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БОЛАШАҚ БАСТАУЫШ СЫНЫП МҰҒАЛІМДЕРІНІҢ КӨП ТІЛДІ ОҚЫТУ ТӘСІЛІНДЕГІ ЦИФРЛЫҚ ҚҰЗЫРЕТТІЛІГІ

Аңдатпа

Мақалада болашақ бастауыш сынып мұғалімдерінің цифрлық құзыреттілігін полилингвалды оқыту тәсілі шеңберінде қалыптастыру мәселесі қарастырылады. Зерттеудің мақсаты – педагогикалық бағыттағы студенттердің цифрлық құзыреттілік деңгейін және олардың цифрлық білім беру ортасында полилингвалды стратегияларды қолдануға дайындығын анықтау.

Жұмыстың ғылыми және практикалық маңыздылығы педагогтарды даярлау жүйесін цифрландыру және білім беруді жаһандандыру жағдайында жаңғыртудың қажеттілігімен анықталады. Зерттеудің әдіснамалық негізі ретінде теориялық талдау, сауалнама жүргізу, тестілеу және корреляциялық талдау әдістері пайдаланылды.

Зерттеу нәтижелері студенттердің цифрлық құзыреттілік деңгейі мен полилингвалды технологияларды тиімді қолдану дайындығы арасында оң байланыс бар екенін көрсетті. Қорытындылар болашақ мұғалімдерді даярлау бағдарламаларына цифрлық және полилингвалды модульдерді интеграциялау қажеттілігін дәлелдейді.

Зерттеудің құндылығы педагогикалық білім беру саласында цифрлық сауаттылықты дамыту тәсілдерін негіздеуде жатыр. Практикалық мәні – алынған нәтижелерді оқу бағдарламаларын және мұғалімдердің біліктілігін арттыру курстарын әзірлеуде қолдану мүмкіндігі.

Түйінді сөздер: цифрлық құзыреттілік, полилингвалды тәсіл, мұғалімдерді даярлау.

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ЦИФРОВАЯ КОМПЕТЕНТНОСТЬ БУДУЩИХ УЧИТЕЛЕЙ НАЧАЛЬНЫХ КЛАССОВ В ПОЛИЛИНГВАЛЬНОМ ПОДХОДЕ К ОБУЧЕНИЮ

Аннотация

В статье рассматривается проблема формирования цифровой компетентности будущих учителей начальных классов в рамках полилингвального подхода к обучению. Цель исследования заключается в выявлении уровня цифровой компетентности студентов педагогических направлений и оценке их готовности использовать полилингвальные стратегии в условиях цифровой образовательной среды.

Научная и практическая значимость работы определяется необходимостью модернизации профессиональной подготовки педагогов в условиях цифровизации и глобализации образования. Методологической основой исследования послужили теоретический анализ, анкетирование, тестирование и методы корреляционного анализа.

Результаты исследования показали наличие положительной связи между уровнем цифровых компетенций студентов и их готовностью к применению полилингвальных технологий в образовательной практике. Выводы исследования подтверждают необходимость интеграции цифровых и полилингвальных модулей в программы подготовки будущих учителей.

Ценность исследования заключается в обосновании подходов к формированию цифровой грамотности будущих педагогов в контексте полилингвального образования. Практическое значение работы состоит в возможности применения полученных результатов при разработке учебных программ и курсов повышения квалификации педагогических кадров.

Ключевые слова: цифровая компетентность, полилингвальный подход, подготовка учителей.

Introduction. The modern world is undergoing rapid transformations driven by digitalization, globalization, and the development of new communication technologies, all of which have a profound impact on the field of education. As digital and physical realities become increasingly intertwined, there is a growing need to fundamentally reconsider the models used to prepare teaching professionals. Future primary school teachers, as the first guides to knowledge, socialization, and intercultural communication for children, must possess well-developed digital competence and be prepared to work effectively in a multilingual educational environment.

A number of studies have examined the development of teachers' digital literacy, the integration of digital technologies into the educational process, as well as the use of Web 2.0 tools and multimodal resources for language learning [1; 2]. At the same time, comprehensive research that combines the development of digital competence among future primary school teachers with multilingual education remains limited. This creates a problematic situation in which teacher training does not sufficiently address the demands of a modern digital and multilingual society.

The need to modernize teacher education is supported by the work of international scholars. The theory of transformational leadership developed by B.M.Bass and B.J.Avolio [3] highlights the importance of educational leadership in times of rapid social change. J. Spillane's concept of distributed leadership [4] and the research of A.Harris [5] reveal the significance of shared professional responsibility among teachers in the context of the digital school, which is directly linked to the development of new teacher competencies.

Multilingual education is traditionally explored within the frameworks of J. Cummins [6], O. García [7] who emphasize the cognitive, cultural, and social advantages of multilingual learning. However, these studies are rarely examined in connection with the digital preparation of future educators.

Kazakhstani researchers also actively study digitalization and multilingual education. The works of A.B.Aitpaeva [8], G.K.Baizhumanova [9] underline the necessity of preparing teachers capable of working in multilingual and digital educational settings. State programs such as Digital Kazakhstan and Trilingual Education further reinforce the importance of developing digital and multilingual competences among future teachers. Nevertheless, scholarly research dedicated to a comprehensive model for preparing primary school teachers to work in a digital, multilingual environment is still lacking.

An analysis of the literature shows that, despite the significant contributions of international, Russian, and Kazakhstani scholars to the development of the theory of digital competence and multilingual education, integrative studies aimed at preparing future primary school teachers have not yet been sufficiently developed. This underscores the relevance of the present research and the need to design a scientifically grounded model for developing digital competence in future teachers within a multilingual educational environment.

Basic provisions. Given the specifics of the digital transformation of education, the development of digital competence in future primary school teachers should be grounded in a multilingual approach and the active use of multimodal educational resources. The integration of digital technologies into professional training requires the creation of flexible educational pathways focused on developing skills for working in multilingual and intercultural contexts.

In the context of rapid globalization and digitalization of the educational space, future primary school teachers must be capable of designing a digital learning environment that supports the development of students' multilingual literacy.

The results of the correlation analysis confirmed a positive relationship between students' level of digital competence and their readiness to implement multilingual educational strategies. Theoretical reflection and practical testing of the proposed approaches make it possible to formulate recommendations for modernizing teacher training programs in the digital era.

Materials and Methods. The main research methods included:

- theoretical analysis of scientific literature on digital literacy, multimodality, multilingual education, and teacher training;
- content analysis of curricula and programs for training primary school teachers, aimed at identifying the integration of digital and multilingual components;
- student surveys to assess their digital competence and readiness for multilingual teaching. A specially designed author questionnaire was used, featuring sections on ICT proficiency, multilingual task design, and digital communication organization;
- competency testing focused on practically evaluating students' ability to apply digital technologies in educational activities, including the creation of multimedia and multilingual educational products;
- correlation analysis of quantitative data, conducted using the SPSS Statistics software, which revealed the relationship between the level of digital competence and readiness to implement multilingual strategies in educational practice.

The novelty of the research lies in the comprehensive application of theoretical and empirical analysis to identify the conditions for effective preparation of future teachers for work in a digital and multilingual educational environment.

The theoretical foundation of the study is based on the concept of the Digital Educational Environment (DEE), interpreted not as a mere collection of technical and software tools, but as a complex, open educational system that fosters new principles of interaction between participants in the educational process. The author emphasizes that the digital environment should not replicate traditional forms (e.g., lectures, lessons), but should be designed as an open system that allows students to choose individualized learning paths, engage with multimedia content, and participate in project- and research-based activities. This is especially relevant for training future teachers who will work in digital and multilingual school environments.

Key characteristics of the DEE include:

- accessibility and openness;
- multimodality and non-linearity of content;
- adaptability to personal educational goals;
- active feedback and networked interaction [3].

American author Jason Boog, in his book *Born Reading: Bringing Up Bookworms in a Digital Age* [10], points out that modern children learn both classic reading skills—like reading printed books—and

digital literacy from an early age. He highlights that children now grow up developing two types of literacy simultaneously – print and digital – which calls for a new approach to teaching and educational environment design. This is particularly significant in the context of multilingual education, as children are capable of perceiving and combining information in multiple languages and formats – text, video, interactive media. Therefore, preparing future teachers must include training in designing multimodal environments where children can engage seamlessly with both books and digital tools, in one or more languages simultaneously [10].

In the context of educational digitalization, it is important to consider not only technical and methodological transformations but also changes in educational culture and communication. I.Yu. Tarkhanova, in her article “Modern Regulators in the Formation of a New Didactics of Higher Education,” emphasizes that the emergence of new didactics is impossible without accounting for shifts in the cognitive strategies and behavioral attitudes of the digital generation [11, p. 25]. The author draws attention to how the digital environment creates new communicative spaces, interaction norms, and values – including digital ethics, self-presentation culture, network cooperation, and multilingual communication. This is directly linked to the goals of multilingual education: in a digital context, language becomes not only a means of learning but also a regulator of social activity. This requires educators to manage multilingual communication, work with hypertexts, and utilize multimodal educational formats.

Today’s digital educational space demands more than just the presence of electronic platforms – it requires their pedagogically sound design. A.V.Ponachugin and Yu.N.Lapygin emphasize that a university’s digital resources should be developed with educational goals in mind, including the structure of learning content, interactivity, and adaptability to students’ needs [12]. The authors note that digital course development often takes a formal, linear approach rooted in traditional education models, reducing the effectiveness of learning in digital environments. This is especially critical in multilingual education, where the goal is not simply content delivery, but the creation of an environment for multilingual interaction. Such an environment should include modules with multilingual interfaces, multimedia resources, and interactive tasks focused on intercultural communication.

Modern approaches to the digitalization of higher education are increasingly tied to the implementation of artificial intelligence technologies. E.V. Stepanova asserts that AI can not only automate routine educational processes but also support the personalization of learning paths, individualized material delivery, and enhanced learning diagnostics [13, p.154]. In preparing future teachers – especially in multilingual learning environments – AI can be particularly valuable: from automatic assessment of tasks in multiple languages to suggesting difficulty levels and linguistic learning paths for students. The author also stresses the importance of developing digital and methodological literacy in educators – those capable of not just using digital tools, but thoughtfully integrating them into the educational process. These insights further confirm the relevance of rethinking teacher education at the university level, emphasizing mastery of not only standard digital platforms but also advanced intelligent technologies that broaden the potential for intercultural and multilingual communication.

In the work of David Mhlanga, the opportunities and limitations of transitioning from traditional face-to-face learning to asynchronous online education – enabled by Fourth Industrial Revolution technologies – are examined. The author identifies several major barriers to the widespread implementation of asynchronous online learning: high levels of poverty and social inequality, power supply disruptions, insufficient digital literacy, limited internet access in rural areas, and the absence of clear governmental policy on educational digitalization. Nevertheless, he emphasizes that with sufficient investment in digital infrastructure and the development of educators’ professional competencies, educational institutions can become centers of excellence, helping to ensure access to quality education through digital technologies [14].

Thus, the conclusions presented in Mhlanga’s work are significant for rethinking approaches to training future primary school teachers. Transitioning to asynchronous digital education requires

teachers not only to acquire basic digital skills but also to develop the ability to design educational pathways tailored to diverse cognitive, linguistic, and cultural characteristics of learners.

In the context of multilingual education, this means future educators must develop the ability to work with multilingual content, organize interaction in different languages via digital platforms, and use technology to overcome linguistic and cultural barriers. Special attention should be paid to the development of digital ethics, skills in critically evaluating information sources, and the ability to create an inclusive learning environment accessible to all students, including those facing technological or language-based challenges.

Consequently, teacher training should be grounded in the principles of multilingual digital didactics and include not only the development of ICT competencies but also the formation of multilingual and intercultural competence – responding to the challenges of the Fourth Industrial Revolution in education.

In the work of Van Ng, Howard Nicholas, and Alan Williams, the impact of school experience on the beliefs of future teachers regarding effective teaching methods is explored [15]. The authors stress that personal experiences gained during school years play a crucial role in shaping prospective teachers' professional ideas about what effective teaching and student interaction should look like.

The study found that even during university training, many students base their pedagogical beliefs on their own school experiences, often replicating outdated models of educational organization. This highlights the need for universities to purposefully work on revising and broadening the pedagogical beliefs of future teachers – especially in the context of digital transformation in education.

In the context of training primary school teachers for multilingual education, it is essential to recognize that the integration of digital technologies and multilingual practices requires a rethinking of traditional teaching approaches. Therefore, teacher training programs must not only develop digital and multilingual competencies but also foster new professional values in future educators – values centered on flexibility, intercultural communication, and the effective use of modern educational technologies.

G.Salgareeva and A.Bazarbayeva emphasize that the application of digital technologies in education should aim to create a practice-oriented learning environment. Digital tools are considered means for actively engaging students in project- and research-based learning, rather than just auxiliary technical aids [16, p. 109]. They stress the development of learner autonomy and the formation of individualized educational trajectories.

Research findings indicated that a high level of technological competence increases job satisfaction, reduces professional burnout, and boosts teachers' motivation for continuous development. Conversely, insufficient training in information technologies becomes a source of stress and negatively affects the quality of the educational process.

In the context of preparing future primary school teachers for digital multilingual education, the findings of this study highlight the need for the targeted development of technological skills. In a multilingual educational environment supported by digital platforms, teachers must be proficient in working with multilingual resources, managing online communication, and navigating interactive educational environments. This requires a high level of digital competence and an openness to lifelong learning.

The experimental part of the study was conducted at Korkyt Ata Kyzylorda University and aimed to assess the level of digital and multilingual competencies among students enrolled in the educational program 01303 – Pedagogy and Methodology of Primary Education. The relevance of the experiment stemmed from the need to prepare future primary school teachers for professional activity in a digital educational environment incorporating elements of multilingual instruction.

The purpose of the research was to identify the relationship between students' proficiency in digital technologies and their readiness to apply multilingual methods in teaching practice. The experiment involved 112 senior students, including 90 male and 22 female students. The sample was purposefully selected among those intending to pursue careers in primary education.

Results and Discussion. In the first stage, the study assessed students' levels of digital competence and readiness for multilingual education using a custom-designed questionnaire and testing instruments. Students self-assessed their proficiency with platforms such as Moodle, Google Classroom, Kahoot, and Zoom, as well as their ability to utilize multilingual resources in educational activities. Responses were rated on a 5-point Likert scale.

In the second stage, methods of correlation and variance analysis were applied using SPSS Statistics 26.0 to process and interpret the results.

Table 1. Level of digital competence of students

Digital Competence Level	Number of Students	Number of Students
High (4.1–5 points)	28	25%
Medium (3.1–4 points)	62	55%
Low (1–3 points)	22	20%
Total	112	100%

As shown in Table 1, the majority of students (55%) demonstrate a medium level of digital competence, indicating the presence of basic skills in working with digital educational resources. A high level of digital literacy was demonstrated by 25% of the students, while 20% of participants showed a low level of skills. This highlights the need for further development of digital literacy within the system of training future primary school teachers.

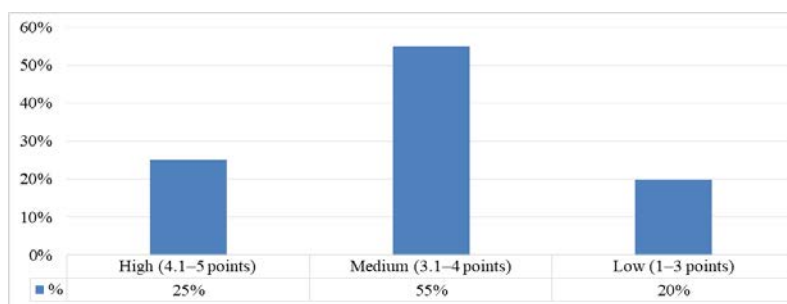


Figure- 1. Students' Level of Digital Competence

Figure 1 graphically illustrates the distribution of digital competencies among the study participants. The largest proportion of students demonstrates a medium level of technological proficiency, which confirms the findings presented in the table. The fact that many students still show low levels of competence suggests a clear need to revise teacher training programs. This could be done by including more content on digital pedagogy and modern information technologies.

Table 2. Readiness of Students for Multilingual Education

Level of Readiness for Multilingual Education	Number of Students	Percentage (%)
High (4.1–5 points)	18	16%
Medium (3.1–4 points)	50	45%
Low (1–3 points)	44	39%
Total	112	100%

According to the table, just 16% of students showed strong readiness to apply multilingual technologies in their teaching. Around 45% reported a moderate level of preparation, while 39% were not sufficiently ready to use such tools in educational settings. These results indicate the need for targeted development of multilingual competence during the professional training of educators.

To identify the relationship between digital and multilingual competencies, a correlation analysis was conducted (see Table 3).

Table 3. Results of the correlation analysis

Variables:	Correlation Coefficient(r)	Significance Level (p)
Digital Competence ↔ Readiness for Multilingual Education	0,24	< 0,05

Table 3 presents the results of a correlation analysis examining the relationship between students' level of digital competence and their readiness to implement multilingual education within a digital learning environment. As the data show, there is a moderate positive correlation between the two variables ($r = 0.24$), which is statistically significant at the $p < 0.05$ level.

This indicates that students with a higher level of digital literacy also demonstrate a greater readiness to use multilingual methods in their educational practice. Thus, the development of digital competencies among future primary school teachers can be considered one of the key factors in successful preparation for implementing multilingual education in a digital environment.

Table 4 presents the distribution of students by levels of digital competence and their average level of readiness for multilingual education.

Table 4. Distribution of Students by Levels of Digital Competence and Average Readiness for Multilingual Education

Level of Digital Competence	Average Score of Readiness for Multilingual Education	Number of Students	Percentage of Total Sample (%)
Low (1.0–2.0 points) –5.0 points Total	2,2	10	9%
Below Average (2.1–3.0 points)	2,6	32	29%
Average (3.1–4.0 points)	3,4	56	50%
High (4.1–5.0 points)	4,1	14	12%
Total	–	112	100%

An analysis of the data presented in Table 4 reveals a general trend: students' readiness for multilingual education increases as their digital competence grows. Students with a high level of digital literacy (4.1–5.0 points) demonstrated the highest average readiness score (4.1 points) for applying multilingual approaches in educational activities.

The majority of the sample (50%) possess an average level of digital competence, with an average readiness score for multilingual education of 3.4. This indicates the presence of basic skills but also highlights the need for further development of both multilingual and digital competencies. Particular attention should be given to the group of students with low digital literacy levels (1.0–3.0 points), who make up 38% of the sample: their readiness for multilingual education was significantly lower, which may hinder the successful integration of digital technologies and multilingual practices into their future professional activities.

Thus, the distribution results confirm that digital competence is an important predictor of the effectiveness of teacher preparation for a multilingual digital educational environment.

The experimental part of this research was aimed at identifying the level of digital competence among students enrolled in pedagogical degree programs, as well as assessing their readiness to

implement a multilingual approach within the context of a digital educational environment. It is important to emphasize that the integration of multilingual pedagogy with digital tools represents a key challenge in contemporary teacher education. During the process of administering surveys and diagnostic testing, it was established that while the majority of students possess fundamental skills in utilizing digital educational resources (such as Moodle, Google Classroom, Kahoot, and Zoom), their readiness to effectively integrate multilingual technologies remains significantly underdeveloped.

A correlation analysis conducted using SPSS Statistics 26.0 revealed a statistically significant positive relationship between students' level of digital competence and their readiness to apply multilingual instructional strategies (correlation coefficient $r = 0.24$, $p < 0.05$). This finding supports the central research hypothesis, which posits a mutually reinforcing relationship between the development of digital and multilingual competences in future educators. Furthermore, it underscores the importance of addressing these two domains as interconnected and complementary components within the framework of professional teacher preparation.

However, the collected data also indicate a notable disparity: despite demonstrating basic digital proficiency, many future teachers do not appear to have fully developed the capacity to utilize these tools within linguistically and culturally diverse learning environments. This disjunction between technical readiness and the pedagogical application of digital technologies for multilingual education highlights the pressing need for a more comprehensive and systematic approach to teacher training.

In light of these observations, a comparative analysis with findings from other empirical studies is warranted to better contextualize our results within both national and international academic discourse. Specifically, this analysis will allow us to benchmark our findings against broader research on the integration of digital and multilingual competences in education and draw informed conclusions regarding the necessary directions for curricular improvement.

The gap identified between digital literacy and the ability to apply it meaningfully in multilingual instructional contexts points to the necessity of rethinking teacher education programs. Such programs must be designed to not only develop students' technical fluency with digital tools but also cultivate their methodological preparedness to design and facilitate learning activities that reflect the linguistic and cultural diversity of contemporary classrooms. This includes the ability to create pedagogical content tailored to multilingual learners, using multimodal resources, multilingual assignments, and digital platforms that support communication across multiple languages.

In this regard, the results of the present study are largely consistent with the conclusions drawn by Ł. Tomczyk [17], who noted that the level of digital competence among pre-service teachers tends to vary globally, although it is most commonly observed at an intermediate level. According to this research, the absence of clearly articulated digital and methodological components within teacher education curricula results in fragmented digital competence and limits the pedagogical effectiveness of ICT integration. These insights are corroborated by our data, which indicate that basic digital skills are insufficient in the absence of intentional and structured opportunities for students to apply such tools in multilingual pedagogical settings.

Consequently, a shift from a purely technical understanding of digital literacy toward a more holistic vision of pedagogical digital readiness—specifically one that encompasses multilingual education—is an essential condition for preparing the next generation of educators. The remainder of this section provides a comparative overview of relevant studies that further illuminate the nature of this challenge and offer direction for potential reforms in teacher education.

A significant contribution to the theoretical framing of digital competence is offered by G. Falloon [18], whose model encompasses not only technical abilities but also ethical, methodological, and professional aspects of teaching with technology. The findings of our study echo this multidimensional understanding: students who exhibit a higher level of digital proficiency also tend to demonstrate a greater willingness and capacity to implement multilingual approaches, particularly in tasks involving multimodal content design and online educational interaction. This relationship serves as compelling

evidence that digital competence becomes pedagogically effective only when embedded within a comprehensive instructional strategy.

Similar conclusions are drawn in the systematic literature review conducted by V. Basilotta-Gómez-Pablos, M. Martín del Pozo, and A. García-Valcárcel [19], which emphasizes that the most successful examples of digital teacher preparation are those that integrate ICT training with disciplinary content, methodological expertise, and cultural sensitivity. Our results affirm this position: digital skills developed in isolation from linguistic and cultural frameworks do not lead to the formation of well-rounded professional competencies capable of addressing real-world classroom diversity.

The importance of multimodal literacy is likewise emphasized in the research by H. Niemi and J. Multisilta [20], who argue for the need to equip future educators with the ability to work across various formats of digital content—text, video, hypermedia, and visual data. Our findings support the notion that such abilities are closely linked with enhanced readiness to incorporate multilingual strategies into teaching practice, particularly in technology-enhanced learning environments.

In conclusion, the combined weight of empirical evidence and comparative analysis with existing scholarly literature clearly demonstrates that the formation of integrated digital and multilingual competencies must become a strategic priority in teacher education. This need is particularly acute in the context of ongoing digital transformation, which places increasing demands on educators to be flexible, interculturally competent, and technologically adept in their professional practice.

Conclusion. The conducted study identified a correlation between the level of digital competence and the readiness of future primary school teachers to implement multilingual education in a digital learning environment. While most students demonstrated basic skills in using digital resources, their preparedness for multilingual education was significantly lower. This imbalance highlights the need to strengthen the focus on developing multilingual strategies during teacher training.

Data analysis confirmed a positive relationship between digital and multilingual competencies: an increase in digital literacy was accompanied by greater readiness to use multilingual educational technologies. Students with high levels of digital competence showed significantly greater readiness to apply multilingual methods, underscoring the role of digital literacy as a key factor in successfully integrating multilingual practices into the educational process.

The scientific novelty of the study lies in its comprehensive examination of the relationship between digital and multilingual competencies within the framework of training future primary school teachers. The data obtained expand current scientific understanding of digital pedagogy and contribute to the development of teacher training models for a multilingual digital educational environment.

The practical significance of this work lies in the development of recommendations for modernizing educational programs in teacher training institutions. It is recommended to integrate modules into curricula that focus on:

- creating multilingual digital resources;
- designing lessons using multimedia technologies;
- developing skills for critically evaluating digital tools in a multilingual context;
- cultivating students' abilities to design a multilingual digital learning environment.

Future research may focus on identifying effective pedagogical technologies for developing integrated digital and multilingual literacy, as well as on designing and testing specialized courses and training programs that support the professional readiness of future teachers to work in a globalized educational setting.

Developing integrated digital and multilingual competencies in future educators is a strategic direction for preparing modern professionals capable of thriving in a rapidly changing educational environment.

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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.