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## **FROM READINESS TO PRACTICE: ARE PRE-SERVICE TEACHERS PREPARED FOR DIGITAL INSTRUCTIONAL PRACTICE?**

Digital transformations in the academic domain demand a high level of readiness for digital instructional practice among pre-service teachers. Future educators' advanced digital skills have a positive impact on the quality of the teaching process and learners' academic outcomes. However, despite the high level of digital competence and positive attitude towards technology implementation, future teachers undergo constraints in the authentic setting to apply digital tools and platforms. The purpose of the paper is to identify pre-service teachers' current preparation for digital instructional practice and make comparisons between self-reported and observed data. Quantitative research design was employed to answer the research questions; data collection tools included the survey and structured observation checklists. The research involved 97 third- and fourth-year students from the Kazakh National Women's Teacher Training University. The differences between self-assessed and observational outcomes were measured through Spearman's correlation. The findings reveal a moderate level of digital preparation and a considerable theory-practice gap. The theoretical value lies in creating a holistic comprehension of digital readiness. Practically, the results can empower university authorities to update the training curriculum focusing on the teaching components which were presented in the paper. Moreover, taking into consideration the significant gaps of the digital elements may be the basis of the innovative comprehensive framework.

**Keywords:** digital competence, digital readiness, pre-service teachers, digital instructional practice, pedagogical practice.

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## **Дайындықтан бастап тәжірибеге дейін: болашақ мұғалімдер цифрлық оқыту тәжірибесіне дайын ба?**

Академиялық саланың цифрлық түрлендірулері болашақ мұғалімдердің цифрлық оқыту практикасына дайындығының жоғары деңгейін талап етеді. Болашақ мұғалімдердің озық цифрлық дағдылары оқу процесінің сапасына және оқушылардың оқу нәтижелеріне оң әсерін тигізеді. Алайда цифрлық құзыреттіліктің жоғары деңгейіне және технологияны енгізуге деген оң көзқарасқа қарамастан, болашақ мұғалімдер цифрлық құралдар мен платформаларды қолдану үшін шынайы жағдайда шектеулерге ұшырайды. Жұмыстың мақсаты-болашақ мұғалімдердің цифрлық оқыту деңгейін анықтау және өзін-өзі есеп беру мен бақыланатын деректерді салыстыру. Зерттеу сұрақтарына жауап беру үшін сандық зерттеу дизайны қолданылды, деректерді жинау құралдары сауалнама мен құрылымдық бақылау парақтарын қамтыды. Зерттеуге Қазақ ұлттық қыздар педагогикалық университетінің 3-4 курсында оқитын 97 студент қатысты. Өзін-өзі бағалау мен бақылау нәтижелерінің арасындағы айырмашылықтар Спирманның корреляциясы арқылы өлшенді. Нәтижелер цифрлық дайындықтың қалыпты деңгейін және теориялық және практикалық тәжірибеде айтарлықтай алшақтықты көрсетеді. Теориялық құндылық цифрлық дайындық туралы тұтас түсінік қалыптастыруда жатыр. Іс жүзінде нәтижелер университет басшылығына мақалада ұсынылған оқыту компоненттеріне назар аудара отырып, оқу бағдарламасын жаңартуға мүмкіндік береді. Сонымен қатар цифрлық элементтердің елеулі олқылықтарын ескере отырып, инновациялық кешенді құрылымның негізі болуы мүмкін.

**Түйін сөздер:** цифрлық құзыреттілік, цифрлық дайындық, болашақ мұғалімдер, цифрлық оқыту практикасы, педагогикалық практика.

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### От готовности к практике: готовы ли будущие учителя к цифровой учебной деятельности?

Цифровые преобразования в академической сфере требуют от будущих преподавателей высокого уровня готовности к практике цифрового обучения. Продвинутое цифровые навыки будущих педагогов оказывают положительное влияние на качество учебного процесса и академические результаты учащихся. Однако, несмотря на высокий уровень цифровой компетентности и позитивное отношение к внедрению технологий, будущие учителя сталкиваются с трудностями в применении цифровых инструментов и платформ в реальной обстановке. Цель статьи – определить текущую подготовку учителей к практикам цифрового обучения и провести сравнение между данными, полученными от самих учителей, и данными наблюдений исследования. Для ответа на вопросы исследования был использован количественный подход к исследованию, инструменты сбора данных включали опрос и структурированные контрольные списки наблюдений. В исследовании приняли участие 97 студентов 3–4 курсов Казахского национального женского университета. Различия между результатами самооценки и наблюдений были измерены с помощью корреляции Спирмена. Полученные результаты свидетельствуют о среднем уровне цифровой подготовки и значительном разрыве между теорией и практикой. Теоретическая ценность заключается в создании целостного представления о цифровой готовности. На практике результаты могут помочь руководству университетов обновить учебные программы, уделив особое внимание учебным компонентам, которые были представлены в статье. Более того, учет значительных пробелов в цифровых элементах может стать основой инновационной всеобъемлющей структуры.

**Ключевые слова:** цифровая грамотность, цифровая готовность, будущие учителя, цифровая учебная практика, педагогическая практика.

#### Introduction

The educational sector is exposed to transformations due to the rapid development of digitalization. Digital components, which are implemented in the instructional practice enable positive academic outcomes (Aduwa-Ogiegbaen, 2009; Pandita & Kiran, 2023) and provide improvements in educational benchmarks (Hanell, 2018). Foreign language education requires innovative teaching approaches with digital elements to encourage the development of receptive and productive language skills (Ghanizadeh et al., 2015). Moreover, it has a positive impact on boosting students' motivation and provoking their interests in learning a foreign language (Golonka et al., 2012). Teacher is a key figure of digital pedagogical implementation; it is essential to prepare future educators to use not only technical skills but also to be able to integrate effective pedagogical strategies in digital education. In other words, future teachers should have the capabilities to combine pedagogical and technological elements effectively in the teaching process. Traditional instructional practice might be improved through the implementation of technology using digital tools and resources which encourage an engaging learning environment. The accessibility to digital platforms and educational ap-

plications allow us to adapt lesson delivery to meet the learning objectives. Hence, technological advancements require meaningful implementation of digital elements into instructional practice in foreign language classes.

Many studies related to pre-service teachers' preparation for technology integration focused on the factors influenced the level of digital competence (Dolezal et al., 2025; Yang et al., 2022). Otherwise, some studies are dedicated to evaluating future teachers' digital competence, especially measuring the level of it (Çebi & Reisoğlu, 2020; Haşlıman et al., 2024). Thus, most research is based on assessing the level of digital preparation and factors which affect it. In the Kazakhstani context, some researchers evaluate pre-service teachers' attitudes and readiness for digital education (Kurebayeva et al., 2025). Along with that, some studies focused on exploring future teachers' experiences, challenges, and perspectives in terms of digitalisation of instructional practice (Nurbekova & Nurbekov, 2023; Nogaibayeva, A., 2023). In other words, Kazakhstani researchers have examined pillars that affect the development of digital competence without exploration of authentic teaching practices. Little has been explored about comparative analysis of self-assessed preparation and observational out-

comes of digital instruction for pre-service teachers to facilitate the process of teaching with technology-integrated components.

The aims of the research are to explore the current preparation of pre-service teachers for digital instructional practice and compare pre-service teachers' self-reported data and observed adoption. It leads to the following research questions:

1. To what extent are pre-service teachers ready for digital education?

2. How do pre-service teachers integrate the elements of digitalization into their foreign language teaching practices?

The contribution of the research lies in the preparation and implementation digital elements in the teacher education curriculum and creating conditions for digitally enhanced teaching:

- The incorporation of digital components into the curriculum enables the development of digital pedagogy and reflective digital practice involving alignment with innovative teaching approaches.

- The outcomes encourage pre-service teachers to utilize knowledge in real educational settings, which has a positive impact on practical pathways.

- Digital transformation fosters pre-service teachers to move beyond the traditional classroom, focusing on the usage of diverse digital tools.

### Literature review

The level of digital competence indicates the pre-service teachers' preparedness for a tech-driven classroom, embracing knowledge, skills, and attitudes which foster the process of technology integration (Redecker & Punie, 2017). Nowadays, digital competence holds special attention in teacher education as technology is evolving rapidly. Consequently, it requires efficient technology integration, which is impossible without technological readiness. It is a vital tool that allows to enhance technological knowledge and implement it in hands-on practice (Masoumi, 2021). Dolezal et al.'s study (2025) revealed that the majority of pre-service teachers are not sufficiently prepared for teaching in a technology-driven classroom. They connected it with different factors, one of the main determinants was related to specialization and practical experience, namely, STEM students tend to have a higher level of digital competence compared to non-STEM students. Another indicator is the limited digital training at university, so pre-service teachers are likely to boost the level of digital competence outside the teaching institutions to meet the demands of a model digital society. As a result, researchers insisted on

the systematic implementation of the components to promote digital competence into the university curriculum. Socio-demographic factors have been explored in the Yang et al.'s study (2022), it revealed that older pre-service teachers demonstrated a high level of digital competence in comparison to the younger generation. In this case, it is possible to organize adequate preparation for a digitally enhanced learning environment, taking into account the features of different levels of digital preparation. In addition, it was supposed that different factors might remarkably affect the ratings of digital competence embracing future educators' attitudes and the significance of role models. Thus, the formation of digital competence is exposed to various factors that might be divided into personal and contextual.

Various studies are dedicated to exploring pre-service teachers' perceptions, experiences, and opinions towards the digitalisation of teaching practices. The study conducted by Jimarkon et al. (2021) revealed that future teachers are positive about their digital pedagogical experience; nevertheless, it was found that they have minimal practice in digital implementation. Furthermore, they commonly tend to apply a considerable number of digital tools with the purpose of visualisation to grab learners' attention and bring them into the process. Hence, the outcomes of the research indicate the need for boosting pre-service teachers' digital literacy to promote innovative digital instructional practices. Meantime, future educators utilise popular, ready-made materials suggested by digital platforms. Although some pre-service teachers are likely to adapt or modify teaching materials, a significant number of student teachers primarily use existing resources (Area-Moreira et al., 2023). The researchers noted that regular application of ready-to-use resources lead to the pre-service teachers' limited ability to meet individual students' needs and abilities. Otherwise, it is a powerful tool to support future educators in their early career paths while adaptation and developing professional autonomy. Technology has revolutionized the educational process, suggesting new avenues to make teaching and learning interactive and promote contemporary skills necessary in today's world. Implementing digital tools fosters the development of digitally advanced forms of formative assessment and effective differentiated strategies. Pre-service teachers highlighted the benefits of digital tools to meet students' uniqueness and learning styles and to transit from teacher-led instruction to student-centered (Sabourianzadeh & Ahmadi, 2023). Additionally, it was underscored that student progress might be tracked immediately, and it

created more opportunities for bridging knowledge gaps and enabling personalized instruction. Hence, integration of technologies contributes to an effective learning environment through instant results and personalization.

The majority of pre-service teachers evaluated their level of digital competence highly; however, they perceived their preparation program as moderately effective (Alnasaib, 2023). Zhang et al. (2023) stated that proficiency in digital competence should extend beyond the superficial application of technologies, underscoring the significance of pedagogical elements. It highlights the equal importance of pedagogical and technological elements in technology integration. Thus, the level of pre-service teachers' readiness for digitalized instructional practice is contingent not only on the quality of university curriculum but also on self-related dispositions matter. Possessing knowledge of technology implementation does not guarantee effective integration into teaching practice. Liu (2012) stated that although pre-service teachers' perception of digital skills is positive, they faced difficulties in technology integration in the authentic setting. Similarly, future educators expressed positive attitudes towards digital tools, yet they experienced obstacles in realizing the significance of pedagogical-technical components (Andreasen et al., 2022). Therefore, it emphasizes the discrepancy of the actual level of digital competence and real classroom practices.

In the Kazakhstani context, Kurebayeva et al. (2025) explored pre-service teachers' attitudes towards digital tools in language teaching, it was revealed that student teachers were positive in terms of digitalization of the lessons and highlighted beneficial effects on learners' incentive and engagement. Furthermore, the study confirmed a positive correlation between age and digital readiness of future teachers. In order to minimize the profound effect of age on shaping the level of digital preparation, it is crucial to implement digital training and stimulate pre-service teachers for real-classroom application. In addition, Nogaibayeva (2023) asserted that limited practice experience may lead to poor authentic teaching performance, highlighting the barriers influencing pre-service teachers' digital readiness. She also stated the significance of additional support for future teachers in the form of practical training and experiential sessions to avoid potential future collapses in technology-driven classrooms. Thus, in the Kazakhstani educational context, pre-service teachers have positive perceptions towards digitalization, including high, medium, and low levels of digital readiness; how-

ever, they need ongoing digital professional development at the university stage.

## Materials and methods

Quantitative research design was used in the research, namely, a quantitative survey was made to identify pre-service teachers' readiness for digital instructional practice, and then, observational data were collected through the checklist scoring system to make comparisons between self-assessed and actual performance. Table 1 illustrates the overall number of participants which comprise 97 third-year and fourth-year students from Kazakh National Women's Teacher Training University; including different specializations related to languages, they were chosen through purposive sampling. Pre-service foreign language teachers make up the highest proportion, whereas future teachers of Russian Language and Literature account for the lowest. The study was conducted only among female pre-service language teachers. Selected participants have already been exposed to a pedagogical internship, and they may rate their own level of digital competence and share experiences in a technology-driven classroom.

**Table 1**  
*Demographic Information of the Participants*

Demographic variable	Categories	Number	Percentage
Year	3rd	48	49%
	4th	49	51%
Specialization	Kazakh Language and Literature	33	34%
	Russian Language and Literature	29	30%
	Foreign Languages	35	36%

*Source / Note: This table was compiled by the authors based on the analysis of materials.*

The research instruments included the survey which was developed according to the digital teaching professional framework (Jisc, 2018). However, only components related to the instructional practice were taken into consideration. The survey was divided into four categories including 20 questions, namely the process of lesson planning, digital resources and materials, assessment and feedback, and differentiated instruction. Respondents mea-

sured their readiness for digital instructional practice by the Likert scale (from 1-strongly disagree to 5-strongly agree). Pre-service teachers chose the best option for themselves in the online survey. The results were analyzed through statistical software called Jamovi (version 2.3.28). Overall, the chosen research instruments assisted in identifying the differences between pre-service teachers' self-assessed level of digital readiness and actual teaching performance. It was carried out through a survey and an observation checklist. In other words, observation provided a systematic examination of the technology integration in the authentic environment. It was done through structured observation by the researcher; the observation checklist encompassed the elements and statements from the survey.

### Results and discussion

The findings reveal a considerable discrepancy between self-assessed data and observational out-

comes regarding pre-service teachers' preparation for digital instructional practice. Survey responses demonstrate higher readiness for technology integration compared to a lower level of practical implementation. In other words, future educators' digital preparation does not correspond to the authentic teaching context.

Table 2 presents pre-service teachers' self-reported data on readiness for digital instructional practice. Moreover, other statistical measurements were taken into account, namely focusing on the central value, which illustrates the average dataset, and the standard deviation allows for determining variability. This combination provides a full analysis of the research outcomes for accurate and meaningful variation of the dataset. All components of the survey, apart from the "differentiated instruction" demonstrate moderate variability that points out the small differences among all participants' responses. Otherwise, the elements of differentiation indicate limited competence in this area.

**Table 2**  
*Pre-service Teachers' Readiness for Digital Instructional Practice*

Dimension	Category	Percentage of cohort (%)	Mean	Standard deviation (SD)
Lesson planning	Low	15%	4.1	0.976
	Medium	40%		
	High	45%		
Digital resources and materials	Low	27%	3.0	0.886
	Medium	38%		
	High	35%		
Assessment and feedback	Low	20%	3.2	0.987
	Medium	42%		
	High	38%		
Differentiated instruction	Low	46%	2.2	0.889
	Medium	33%		
	High	21%		

*Source / Note: This table was compiled by the authors based on the analysis of materials.*

According to the results of the survey, pre-service teachers are quite prepared for digital instructional practice. "Lesson planning" component is the highest, which points out to the pre-service teachers' willingness to use technology in the process of session planning and choosing teaching approaches suitable for the utilization of digital tools.

However, student teachers have trouble organizing differentiated instruction through technologies. This indicates a lack of knowledge in meeting students' individual needs and preferences, especially in selecting appropriate digital tools and adapting instruction for personalized pathways. Meantime, "digital resources and materials" and "assessment

and feedback” domains reflect a medium readiness level, approximately 40% of the participants are aware of choosing, evaluating, and integrating digital resources efficiently. Similarly, a reasonable proportion of future educators highlighted effective technology-enhanced assessment practices. It means that pre-service teachers comprehend the significance of digital assessment using online quizzes, dashboards, and automated feedback systems. Overall, even though the findings present a considerable competence in lesson planning, there is a gap in their ability to select suitable digital resources, integrate digital assessment strategies, and utilize dif-

ferentiated strategies. It highlights the importance of a balanced approach to digital pedagogy combining technological and pedagogical elements.

Table 3 shows the comparisons between pre-service teachers’ self-reported scores and authentic teaching experiences, which vary across four dimensions of digital instructional practice. Four dimensions demonstrate a consistent gap between survey scores and observed practice, namely, pre-service teachers reported quite high readiness for digital instructional practice; however, the observed results show it in the lower position, producing a significant gap.

**Table 3**  
*Comparisons of Pre-service Teachers’ Self-reported and Observational Means*

Dimension	Survey mean	Observation mean	Mean differences	Spearman’s $\rho$	p-value
Lesson planning	4.1	3.5	0.6	0.42	0.0001
Digital resources and materials	3.0	2.6	0.4	0.39	0.0003
Assessment and feedback	3.2	2.7	0.5	0.36	0.0007
Differentiated instruction	2.20	1.8	0.4	0.28	0.0041

*Source / Note: This table was compiled by the authors based on the analysis of materials.*

As an illustration, the most significant disparity is highlighted in the “Lesson planning” category with more than 0.5. It points out to the lack of rich technology-driven strategies; however, the correlational outcomes ( $p=0.42$ ) indicate the slight positive relationship between self-reported and observed preparation. It means that those future educators who assessed themselves high competent in lesson preparation are eager to display better performance in the authentic setting. Even though future educators present a moderate level of preparation for using digital resources and materials, it reveals a practical gap in the utilization of digital tools, platforms and resources. The indicator of p-value shows the weak point of the self-perception and the classroom environment. Furthermore, pre-service teachers overestimate their ability to assess students using digital assessment; the discrepancy denotes limited application of digital tools and automated feedback. Regarding the category that reveals the lowest level of preparation, pre-service teachers face the challenge of meeting diverse students’ needs in the classroom.

Findings demonstrate that future educators assess themselves as well-prepared for digital instructional practice, especially in terms of lesson planning; however, they are not ready enough for

organizing differentiated instruction digitally. However, p-values indicate the differences that are statistically significant, whereas Spearman’s correlational values confirm moderate positive relationships between self-reported and observed data.

The findings are consistent with previous research presenting pre-service teachers’ high level of digital competence, which indicates the confidence in their personal skills; however, it does not provide effective technology utilization. Conversely, the results of Alnasaib’s study (2023) illustrate the moderate effectiveness of university curriculum, which has had a positive impact on boosting the level of digital competence. It aligns with limited institutional training of digital instructional practice which affect the real-life application in the classroom setting. Furthermore, the findings of the research support the earlier study by Liu (2012), who asserted that pre-service teachers had an optimistic outlook towards the technology-driven classroom and expressed full readiness for technology utilization. Otherwise, there are some barriers in technology utilization in the authentic environment. Meantime, the previous study underscored the interplay between pedagogy and technology which highlighted that it is insufficient to rely solely on pedagogical

or digital knowledge (Andreasen et al., 2022). Kazakhstani researchers found that despite the positive attitude towards digitalization of the traditional classroom, there is inadequate digital training which has a negative impact on the technology utilization in the authentic setting. Providing opportunities for effective technology implementation empowers pre-service teachers to convert their optimistic perceptions into high practical performance.

However, the study has several limitations; first of all, the study is context-specific, the results are based on the single university. Moreover, the research site is female-only university which also may have an impact on the generalizability of the findings. Another limitation is methodology which employed only a quantitative design, creating constraints in the deep understanding of possible reasons and causes of pre-service teachers' readiness for digital instructional practice. Despite the valuable outcomes of the research, the study might be developed and resulted in future research perspectives which can cover the limitations of the study. Particularly, further studies may use mixed methods to examine deeper insights and experiences of shaping readiness for digital education. Additionally, future research should be based on exploring factors forming of discrepancy between self-reported and observed data.

### **Conclusion**

Modern demands of the educational context require effective technology integration and digital readiness for comprehensive teaching. It is significant to perform meaningfully applying appropriate digital tools for future educators in teaching internships which guarantees a successful teaching career and ongoing professional development in digital instructional practice. Moreover, one of the crucial aspects of technology in a digitally enhanced classroom is the ability to combine technological and pedagogical components in the process of teaching. Even though pre-service teachers express positive attitudes towards technology integration and active application of digital tools, they experience difficul-

ties in demonstrating digital knowledge and skills in the classroom. The findings reveal that pre-service teachers demonstrate a medium level of readiness for digital instructional practice, especially in lesson planning, yet future instructors experienced challenges in organizing digital differentiated instruction. In addition, it was found the theory-practice gap which indicates a moderate level of digital competence, but technology implementation in the authentic setting remains notably low. In other words, a significant discrepancy between future educators' self-assessment and performance in real classroom contexts points out pre-service teachers' confidence in using digital tools but illustrates a lack of practice-oriented digital training. The outcomes of the research emphasize the significance of implementing technology in a real educational context. It indicates the necessity of updated university curriculum which empowers future educators to apply the elements of digital pedagogy in practical pathways. The results of the study contribute to the possibilities of upgrading the training program focusing on innovative teaching approaches. Moreover, taking into the consideration the research analysis, suitable digitally enriched environment can be organized that fosters effective technology integration. Based on the findings, it is recommended to incorporate the practice-oriented elements into an academic authentic setting. It is essential to develop a comprehensive framework to identify precisely appropriate knowledge and skills in order to minimize perceived and actual preparedness for digital instructional practice.

### **Funding**

None

### **Acknowledgements**

None

### **Conflict of Interest**

The author declares no conflict of interest

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*Received 27.08.2025*

*Accepted 01.03.2026*