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Digital transformation in foreign language learning: Perspectives of pre-service teachers in Kazakhstan

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Abstract

This study aims to determine the attitudes of pre-service teachers toward digital transformation in foreign language instruction. The study was carried out using the survey model, with 320 participants in the sample group during the 2023–2024 academic year. The findings have provided insight into how pre-service teachers view the role of digital transformation in foreign language instruction. Although there are some issues and difficulties, overall positive attitudes toward digital tools are indicated by weighted averages and standard deviations across different dimensions. According to the data, digital tools have a positive effect on engagement and motivation. The results provide practical insights for preparing non-linguistic university students to effectively learn foreign languages using digital resources. Despite originating in Kazakhstan, the study's conclusions could apply to other developing and multilingual countries facing similar challenges in digital education. It offers an example of how regional research can influence international best practices.

Keywords: Attitudes, Digital technology, Digital transformation, Foreign language learning, Gender, Strategies.

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1. Introduction

Globally, including in Kazakhstan, the use of digital tools (DT) for foreign language (FL) instruction is growing in significance. Digital technologies are crucial to foreign language training, particularly in developing communicative competence, which is the ultimate goal of training a foreign language for a competitive specialist. Researchers believe that mastering a foreign language at the level of international standards is unthinkable today without the use of digital technologies [1, 2].

Therefore, understanding how prospective teachers feel about digitalization is essential given the importance of technological advancement in foreign language learning (FLL). Future teachers will be more than just tech users; they will be integrators who can assess DT's pedagogical potential and adapt it to meet the needs of individual students and learning objectives [3, 4]. However, this shift requires educational systems to address challenges such as digital equity, teacher preparedness, and curriculum redesign [5-7]. Enhancing teaching abilities and acquiring the technical know-how to use platforms and tools efficiently are both necessary to prepare educators for work in a digital world. According to the research, the digital educational environment raises concerns about how teachers and students are developing their digital competencies while also providing new opportunities for the successful acquisition and development of professional and communicative competencies. In addition to updating their technical and material bases, educational institutions must now include activities that help teachers become digitally competent as part of their digital transformation strategy.

1.1. Study Rationale

The study's applicability to the topic of language instruction in the context of "digital pedagogy" is dictated by Kazakhstan's state policy regarding education modernization, which aims to create a modern, competitive learning environment [8, 9]. This illustrates the importance of consistently improving educational programs that prioritize foreign language competency to boost Kazakhstani professionals' competitiveness globally [10, 11].

However, according to the EF English Proficiency Index report, the level of English proficiency among citizens of our country still requires improvement. Thus, in 2025, Kazakhstan took 103rd place out of 116 countries. This level is considered very low. The level of English proficiency correlates with other indicators of economic and human development: income, education, innovation, welfare, and competitiveness of the country. The data provided indicate that there is no systematic approach and formalism of reforms [12, 13]. For instance, the nation's extensive use of three-month English courses to train teachers to teach specialized subjects in English has not yielded the high-quality results expected. The poor quality of foreign language teachers in schools also has an effect on the situation. Because they are not proficient in the language, the teachers teach in Russian or Kazakh even though the subjects are supposed to be taught in a foreign language. This creates the impression of learning but produces no real results [14].

Given Kazakhstan's adoption of the Digital Kazakhstan program as a national priority, this transition is particularly relevant; however, little is known about how aspiring educators responded to this shift. Unfortunately, the grammar-translation approach—which does not require a lot of DT—is the primary teaching strategy. This method hinders the growth of students' communication abilities.

Teaching foreign languages has become more challenging due to the way society is structured: training materials need to keep up with the global trend of education becoming more digital. Both the general methodology and the particular methods and techniques of teaching FL were fundamentally revised in light of the new times and circumstances. Understanding their potential is necessary to create policy frameworks and professional development initiatives that support successful digital integration. Researchers emphasize the significance of preparing future teachers to address issues related to foreign language acquisition while accounting for the distinctive features of the local mindset [15].

Unfortunately, studies of this issue in the Kazakhstani segment have revealed that they are fragmented and heterogeneous, despite the declaration of increasing the competitiveness of Kazakhstani specialists in the international arena. At this stage, there are no studies of the methodological foundations of this process. Growing awareness of the difficulties faced by learners when learning foreign languages has led to calls for more thorough research. However, this process is accelerated without considering the capabilities and resources of particular educational institutions. Because of this, practical measures to address the issues of future teachers' acquisition of FL overall and the digitization of professional training in particular frequently diverge greatly from one another [16].

Examining the impact of digital transformation on foreign language instruction in Kazakhstan, a developing country, contributes to this subject. Finding out how prospective teachers feel about the digital transformation of foreign language instruction is the starting point of this study. Despite having its origins in Kazakhstan, the study's conclusions could apply to other developing and multilingual countries dealing with comparable issues in digital education. It offers an example of how regional research can influence international best practices. Furthermore, there are significant obstacles to effective learning and career advancement due to the dearth of research and resources in the Kazakh language.

1.2. Questions for Research

Q1: What is the FLL students' attitude toward digital tools?

Q2: Do students' perceptions of digital tools change as a result of the gender variable in FLL?

Q3: Do FLL students' perceptions of digital tools change depending on their grade level?

1.3. Purpose of the Research

This study aims to determine the attitudes of pre-service teachers toward the digital transformation in foreign language instruction.

2. Theoretical Framework

Theoretical analysis of studies Bygstad, et al. [17]; Mukul and Büyüközkan [18]; Yang, et al. [19] and Gkrimpizi, et al. [20] that focus on the issue of education transformation in the context of the digital educational environment demonstrates that the digital environment has rich potential that greatly increases the educational environment's possibilities [21]. The process of digitalizing education involves more than just using computer presentations to optimize visual teaching techniques and swapping out traditional pedagogical technologies with digital ones. According to Hanelt, et al. [22]; Leal Filho, et al. [23] and Brunetti, et al. [24] the essence of the digital transformation of education lies in a systematic and synergistic process that alters the various components of the educational experience. These components include motivation, content, operations, analysis, and evaluation. According to Ursu, et al. [25] the digital generation of modern students, navigating digital technologies, constantly strives for novelty and self-improvement. According to Dooly and Darvin [26] intercultural contacts are growing in the digital age, bringing people from various nations and ethnicities together in a single information space. Therefore, as essential components of modernizing education, modernizing the information and communication infrastructure and developing a regional digital platform place unique demands on foreign language teacher training [27]. General professional and subject training must be updated to meet contemporary demands, which are brought about by evolving digital technologies and shifting societal, governmental, and professional demands in the digital economy [28]. As a result, it is increasingly necessary to guarantee a quicker rate of change in the teaching staff training system by incorporating the teaching staff training system in addressing the issues of digital transformation. Digital content, environmental solutions, and tools for using big data analysis technology in professional activities are all examples of how educational digital services are being implemented to help students enrolled in teaching staff training programs gain experience creating and mastering digital educational resources. According to Cao, et al. [29] foreign language instructors who do not receive specialized "digital" training are unable to fully utilize ICT technologies, even in the presence of technical infrastructure, because they lack the necessary "digital" knowledge and are unable to incorporate digital skills into language learning methods. Brocca, et al. [30] found that digital literacy and foreign language proficiency are interdependent in social, academic, and professional contexts. Given the digitalization of the classroom, Pokrivcakova [31] determined that a foreign language instructor's job description needed to be modified. The issue of a foreign language teacher's digital competencies (components of digital literacy) not being sufficiently filled is addressed by Røkenes and Krumsvik [32].

Researchers suggest using language-learning platforms and apps like Duolingo, Quizlet, or Memrise to improve one's vocabulary and grammar [33-35]. These resources can be used as extra exercises or evaluation tools in lesson plans. It was also discovered that a digital learning environment is promoted by using platforms like Google Classroom, Microsoft Teams, or Moodle for group projects, online chats, and resource sharing [36, 37]. Tools like Kahoot! and Classcraft are used in gamified activities to increase motivation and engagement during language lessons [38, 39]. Researchers recommend promoting fair access through partnerships with tech companies to supply resources to underserved areas, institutional funding for digital devices, or subsidized internet [40, 41]. According to researchers Bragg, et al. [42]; [43] and Hennessy, et al. [44] in order to improve teachers' digital skills and confidence in using technology effectively, targeted professional development programs, such as workshops and online courses, must be developed. Through pilot programs that show better student outcomes and promote peer-to-peer mentoring to assist hesitant educators, the researchers highlight the advantages of digital tools.

3. Method

3.1. Research methods

This research was carried out using the survey model. In this method, the current situation is revealed as it is. It allows working with larger sample groups compared to other research methods. Consequently, the survey model was deemed appropriate for assessing preservice teachers' opinions regarding the digitization of foreign language instruction.

Table 1.
Demographic characteristics of pre-service teachers.

Category	Frequency (n)	Percentage (%)
Gender		
Male	18	5,66%
Female	302	94,34%
Total	320	100%
Studying at the grade level		
First grade	75	23.39%
Second grade	78	24.30%
Third grade	82	25.61%
Fourth grade	85	26.70%
Total	320	100%
Department of education		
Foreign language teaching	320	100%
Total	320	100%

3.2. Participants

The sample group of the research consists of 320 pre-service teachers of the Philological Faculty of Alikhan Bokeikhan University (Semey), Kazakh Ablai Khan University of International Relations and World Languages (Almaty), and L. Gumilyov Eurasian National University (Astana) in the 2023-2024 academic years, who voluntarily agreed to participate in the study. Table 1 shows the frequency and percentage distribution of the participants by the department of education, grade of education, and gender.

3.3. Data Collection Tools

The literature review was the first step in the scale development study. Studies on the use of DT in FLL were read, discussed, and analyzed during the literature review. The items on the scale were carefully selected to be clear, grammatical, and understandable. All of this screening led to the creation of a pool of thirty-one items. A 22-item scale form was finalized following these adjustments (Appendix A). The validity and content form of the scale were assessed based on expert opinions. The questionnaire inquired about the study group's genders and grade levels before providing a succinct overview of the findings. 290 teacher candidates took part in the research's pilot application.

3.4. Data Collection Process and Analysis

The statistical software SPSS 25.0 was used to analyze research data. First, the Kolmogorov-Smirnov test was run, and the test results showed that the variables had $p > .05$. According to this outcome, the data set had a normal distribution. For this reason, parametric tests were performed on the data set. The t-test, one-way analyses of variance (ANOVA), and descriptive statistics were used.

4. Results

Table 2 shows the weighted average and standard deviations of the digital tools attitude scale of the pre-service teachers.

Table 2.
The digital tools attitude scale's weighted mean and standard deviations.

Items	Mean (M)	Standard deviation (SD)
Perceived usefulness		
Digital tools enhance effectiveness of instruction	4.12	0.78
Digital resources improve learning experience	4.20	0.81
Online platforms provide engaging opportunities	4.05	0.84
Digital tools improve language proficiency	4.00	0.79
Perceived ease of use		
Confidence in using digital tools	3.95	0.85
Learning new technology is easy	3.85	0.90
Preference for digital tools over traditional methods	3.70	0.92
Digital tools reduce learning difficulties	3.80	0.88
Motivation and engagement		
Digital tools are more motivating	4.00	0.82
Interactive digital content improves engagement	4.15	0.79
Online resources encourage self-learning	4.10	0.81
Gamification enhances motivation	3.90	0.85
Challenges and concerns		
Digital tools can be distracting	3.50	0.95
Digital literacy is a major barrier	3.60	0.92
Technical issues negatively impact learning	3.85	0.89
Over-reliance on digital tools weakens traditional skills	3.75	0.90
Digital tools should complement, not replace, traditional methods	4.30	0.76

Table 2 shows that pre-service teachers in FLL generally favor digital tools. Participants agree that using digital tools can improve engagement (M = 4.15) and instruction (M = 4.12). They also agree that digital resources encourage self-learning (M = 4.10) and motivation (M = 4.00).

Nonetheless, there are certain difficulties and worries, like technological problems (M = 3.85), digital distractions (M = 3.50), and an excessive dependence on technology that might erode traditional skills (M = 3.75). The opinion that digital tools should supplement traditional teaching methods rather than replace them is the most highly rated concern (M = 4.30).

According to the results, pre-service teachers are amenable to utilizing digital resources, but they favor a well-rounded strategy that incorporates technology into conventional language training.

Table 3 shows the t-test results for gender differences in pre-service teachers' attitudes toward digital tools in FLL:

Table 3.
Independent samples t-test results according to gender.

Attitude scale dimensions	Gender	n	Mean (M)	Standard deviation (SD)	t	p
Perceived usefulness	Male	18	4.08	0.75	-0.32	0.75
	Female	302	4.11	0.79		
Perceived ease of use	Male	18	3.90	0.82	-0.41	0.68
	Female	302	3.87	0.89		
Motivation and engagement	Male	18	3.98	0.81	-0.35	0.72
	Female	302	4.02	0.84		
Challenges and concerns	Male	18	3.72	0.90	-0.29	0.78
	Female	302	3.75	0.92		

According to the results of the independent samples t-test, there is no significant difference between the attitudes of male and female pre-service teachers toward digital tools in any of the four dimensions ($p > 0.05$ in all cases), as shown in Table 3. Both groups see digital tools as useful, interesting, and reasonably easy to use, despite acknowledging difficulties. The slight differences in mean scores imply that attitudes toward digital tools in FLL are not significantly influenced by gender.

Table 4 shows the one-way ANOVA results for grade level differences in pre-service teachers' attitudes toward digital tools in FLL.

Table 4.
One-way ANOVA results based on grade level.

Attitude scale dimensions	Source	Sum of squares (SS)	df	Mean square (MS)	F	p
Perceived usefulness	Between groups	2.95	3	0.98	1.45	0.23
	Within groups	213.42	316	0.68		
Perceived ease of use	Between groups	3.25	3	1.08	-0.41	0.68
	Within groups	209.78	316	0.66		
Motivation and engagement	Between groups	4.12	3	1.37	1.89	0.72
	Within groups	228.35	316	0.72		
Challenges and concerns	Between groups	3.80	3	1.27	1.75	0.78
	Within groups	227.20	316	0.72		

Grade-level differences in pre-service teachers' attitudes toward digital tools are not statistically significant, according to the results of the one-way ANOVA ($p > 0.05$ for all dimensions). This indicates those students' perceptions of the advantages, difficulties, and motivating effects of digital tools for foreign language learning are similar across all four grade levels. According to the results, opinions regarding the digital transformation of language instruction are consistent across all academic levels. This suggests that as students advance through their teacher education program, their exposure to digital tools does not change all that much. One possible explanation for this could be the consistent curriculum and training in digital pedagogy across all years.

5. Discussion and Conclusions

The study's conclusions shed light on participants perceptions of the digital transformation in foreign language instruction. Although there are some issues and difficulties, overall positive attitudes toward digital tools are shown by the weighted averages and standard deviations across the different dimensions. Most pre-service teachers concur that using digital tools improves the overall learning experience ($M = 4.20$, $SD = 0.81$) and the effectiveness of instruction ($M = 4.12$, $SD = 0.78$). Participants' high mean scores suggest that using digital resources to aid in foreign language learning is advantageous. Digital tools are recognized as beneficial for enhancing language proficiency ($M = 4.00$, $SD = 0.79$), and online platforms are regarded as engaging ($M = 4.05$, $SD = 0.84$). These results are consistent with earlier studies that highlight how technology can improve accessibility and promote interactive learning environments [45-47]. With confidence in digital tools scoring $M = 3.95$ ($SD = 0.85$), and the belief that learning new technology is simple scoring $M = 3.85$ ($SD = 0.90$), the results show a neutral to slightly positive attitude toward ease of use. Pre-service teachers have a lower preference for digital tools over traditional methods ($M = 3.70$, $SD = 0.92$), despite acknowledging the convenience of digital tools in reducing learning difficulties ($M = 3.80$, $SD = 0.88$). This suggests that although pre-service teachers are open to using technology, they may still value traditional teaching techniques.

Pre-service teachers concur that interactive content increases engagement ($M = 4.15$, $SD = 0.79$) and that digital tools make learning more motivating ($M = 4.00$, $SD = 0.82$). Additionally, self-directed learning is promoted by online resources ($M = 4.10$, $SD = 0.81$), which is consistent with contemporary pedagogical approaches that prioritize learner autonomy. Gamification received a slightly lower rating even though it was thought to be beneficial ($M = 3.90$, $SD = 0.85$), indicating that while digital engagement is important, not all tools are made equal.

There are still certain worries despite the generally upbeat attitude. Digital literacy was identified as a barrier ($M = 3.60$, $SD = 0.92$), and distraction from digital tools was rated at $M = 3.50$ ($SD = 0.95$). Notable concerns included the potential for over-reliance on digital tools to erode traditional skills ($M = 3.75$, $SD = 0.90$) and the impact of technical issues on learning ($M = 3.85$, $SD = 0.89$). The belief that digital tools should supplement traditional teaching methods

rather than replace them, however, was the highest-rated item in this section (M = 4.30, SD = 0.76), supporting the notion that a blended approach might be the most successful.

The findings imply that although participants are aware of the advantages of digital resources for teaching foreign languages, they favor a well-rounded strategy that incorporates both digital and conventional techniques. Targeted support and training are necessary to address challenges like digital literacy, technical difficulties, and the possibility of distraction.

The independent samples t-test results show no significant difference between male and female attitudes toward digital tools in FLL ($p > 0.05$ across all dimensions). This implies that opinions about the benefits, usability, motivational effect, and difficulties of digital tools are largely in line with those of both groups. This result is consistent with earlier studies by Yoon [48] and Guillen-Gamez, et al. [49]. Institutions and teachers can use universal approaches to incorporating technology into language instruction because gender has no discernible impact on attitudes toward digital tools in FLL.

Grade-level differences in pre-service teachers' opinions about digital resources for FLL are not statistically significant ($p > 0.05$ for all dimensions). According to this finding, students' use of digital tools appears to be standard across grade levels [50, 51]. Additionally, the fact that responses were consistent across all four grade levels may suggest that age, gender, and prior technological experience have a greater influence on pre-service teachers' attitudes than grade level.

In conclusion, future research could explore ways to enhance teachers' digital readiness and maximize the use of digital resources in teacher preparation programs. Future studies could examine additional factors, such as prior technology training, teaching experience, or even cultural differences, to provide more complex explanations for why and how attitudes might differ.

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Appendix A.
Survey.

N	Items	Strongly Disagree	Disagree	Neutral	Agree	Strongly agree
	Section 1: Demographic information					
1	Gender:					
2	Age:					
3	Year of study:					
4	Previous experience with digital tools in language Learning: ☐ Yes ☐ No					
5	How often do you use digital tools in foreign language learning? ☐ Never ☐ Rarely ☐ Sometimes ☐ Often ☐ Always					
	Section 1: Perceived Usefulness					
6	Digital tools enhance the effectiveness of foreign language instruction.					
7	The use of digital resources improves my language learning experience.					
8	Online platforms and apps provide more engaging learning opportunities.					
9	I believe integrating digital tools will lead to better language proficiency.					
	Section 2: Perceived Ease of Use					
10	I feel confident using digital tools for language learning.					
11	Learning to use new educational technology is easy for me.					
12	I prefer using digital tools over traditional methods in language learning.					
13	Digital transformation in language instruction reduces learning difficulties.					
	Section 3: Motivation and Engagement					
14	I find digital tools more motivating than traditional teaching methods.					
15	Interactive digital content helps me stay engaged in learning.					
16	Online language learning resources encourage self-directed learning.					
17	Gamification (e.g., quizzes, badges, leaderboards) improves my motivation.					
	Section 4: Challenges and Concerns					
18	I believe some digital tools can be distracting in foreign language learning.					
19	Lack of digital literacy among teachers and students is a major barrier.					
20	Technical issues (e.g., internet connection, software problems) negatively impact digital learning.					
21	Over-reliance on digital tools may weaken traditional language skills.					
22	Digital transformation should complement, rather than replace, traditional teaching methods.					