DOI:10.59787/2413-5488-2025-52-4-19-28

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DIGITAL APPROACHES FOR IMPLEMENTING GAME-BASED TECHNOLOGIES IN FOREIGN LANGUAGE TEACHING FOR STUDENTS

Abstract. The article examines digital approaches for integrating game-based technologies into foreign language teaching for students in pedagogical specialties. The purpose of the research is to explore both theoretical foundations and practical applications of integrating digital game-based methods, as well as to determine pre-service teachers' readiness for their implementation in the teaching process. The study involved 120 pre-service teachers from Astana International University and assessed three dimensions of preparedness for integrating digital game-based technologies in foreign language teaching: technological literacy, pedagogical awareness, and practical readiness. While participants were familiar with platforms such as Kahoot, Quizizz, Wordwall, and Baamboozle, their practical readiness was limited due to insufficient methodological training and institutional support. To address these challenges, the authors developed a pedagogical manual, The Teacher, providing structured guidance, digital resources, and gamified classroom strategies. A five-month experimental study demonstrated that participants using the manual significantly improved their practical readiness, confidence, and ability to apply game-based tools effectively, whereas the control group showed only modest progress. These findings confirm the hypothesis that insufficient integration of digital and game-based learning limits practical readiness and highlight that targeted methodological support enhances pre-service teachers' competence, creativity, and engagement in modern language instruction.

Keywords: digital gamification, foreign language teaching, pre-service teachers, game-based learning, digital competence, pedagogical technology.

Introduction

Modern education plays a crucial role in preparing specialists capable of adapting to the rapidly evolving conditions of the digital society. The digitalization of education facilities the integration of innovative approaches into foreign language teaching, among which games-based technologies and gamification are gaining increasing prominence. Gamification, viewed as a pedagogical tool, integrates game elements into the learning process, thereby enhancing students' motivation, engagement, and interest. For future foreign language teachers, the ability to apply digital game-based technologies has become an essential component of professional preparation, ensuring the development of communicative, cognitive, and digital competencies required in the 21st-century classroom.

This scientific article is prepared as part of a study addressing the issue of developing professional foreign language competence, a challenge necessitated by several objective contradictions. On the one hand, the modern high-tech society demands that future specialists possess a high level of professional foreign language proficiency and the capacity for lifelong learning in accordance with personal and professional needs. On the other hand, there is a lack of scientifically grounded models for integrating digital game-based technologies into higher education, which could effectively support the formation of these competencies.

It is hypothesized that the relatively low level of professional foreign language competence among students of language-related specializations is linked to the insufficient integration of digital and game-based learning methods. Enhancing this integration within the educational process may significantly improve learners' communicative abilities, digital literacy, and motivation, thereby fostering greater professional readiness.

In this context, the role of pedagogical innovation becomes central. Universities responsible for training future teachers must not only provide theoretical knowledge but also practical tools that prepare students to face real classroom challenges. One of the promising solutions is the development of methodological materials that demonstrate effective ways of using digital game-based tools in foreign language teaching.

The relevance of this study is determined by the growing necessity to implement digital game-based technologies in the process of teaching foreign languages within Kazakhstan's pedagogical universities. The integration of such technologies contributes to improve the quality of education, fostering creativity and critical thinking, and equipping future teachers with the skills required to use digital tools effectively in their professional practice.

Thus, the purpose of this research paper is to explore the pedagogical potential of digital approaches in implementing game-based technologies for foreign language teaching and to identify pre-service teachers' attitudes towards their practical use in the educational process.

To achieve this goal, the following research objectives were defined:

1. To analyze theoretical foundations and recent studies on the integration of digital and game-based technologies in foreign language teaching, with a particular focus on their role in enhancing students' engagement, motivation, and communicative competence;

2. To examine pre-service teachers' readiness and perceptions regarding the integration of digital game-based tools into foreign language teaching, focusing on their competencies and challenges in applying game-based methods effectively.

Theoretical Background

Numerous studies in the field of digital game-based language learning have demonstrated that integrating game mechanics into the educational process enhances learners' engagement, motivation, and cognitive development. According to Y.G. Butler, Y. Someya, and Jabbari and E. Fukuhara (2014), educationally designed games used for pedagogical purposes can serve as effective tools for improving language proficiency when applied with clear pedagogical goals. These researchers emphasize that games provide structured and purposeful language practice, offering learners an opportunity to apply new vocabulary and grammar in contextually rich scenarios.

Ravyse et al. (2017) highlight the collaborative and social aspects of game-based learning, noting that interaction among learners contributes significantly to engagement and knowledge retention [3]. Similarly, Zou et al. (2021) found that serious digital games improve linguistic outcomes by creating meaningful, task-oriented environments that promote active language use rather that passive memorization.

In addition to serious games, many scholars draw attention to the potential of commercial off-the-shelf games, such as online role-playing games, for language learning. Studies conducted by Hung et al. (2018) show that such games provide authentic language input and real-time communication with other platers, allowing learners to acquire vocabulary and communicative competence through immersion and social interaction. However, as Chen et al. (2021) notes, these open gaming environments also present challenges, such as distraction or exposure to non-educational content, which underscores the importance of teacher guidance and structured learning design.

Additionally, Vygotsky highlights the cognitive and social dimensions of game-based learning. The concept of "flow" explains how learners become fully absorbed in challenging

yet achievable tasks, leading to deeper learning and sustained engagement. Meanwhile, Vygotsky's theory of scaffolding supports the idea that digital games provide an adoptive environment where learners receive appropriate support based on current level of proficiency.

Thus, previous research confirms that digital game-based learning contributes to improve communication skills, vocabulary retention, problem-solving, and collaboration. It also supports the formation of digital literacy and learner autonomy which are essential skills for future teachers in the context of Kazakhstan's educational modernization. The findings of these studies provide a theoretical foundation for this research, which explores how digital game-based technologies can be effectively integrated into foreign language teaching to enhance pre-service teachers' professional competence, motivation, and engagement.

Materials and research methods

This research employed a quantitative survey method to examine the readiness and perception of pre-service teachers toward the integration of digital game-based technologies in foreign language teaching. The aim was to determine how well future educators understand the pedagogical potential of digital gamification tools and to identify possible barriers to their implementation in professional practice. The obtained data were intended to serve as a foundation for enhancing the methodological preparation of future English teachers in the digital learning environment.

The study was conducted at Astana International University (AIU) and involved 120 pre-service teachers enrolled in language education programs. Participants represented different academic years, which allowed for a more comprehensive understanding of how experience and exposure to technology influence their attitudes.

The instrument used in this research was a structured questionnaire consisting of 30 items divided into three analytical dimensions: technological literacy, measuring participants' familiarity and confidence in using digital tools such as Kahoot, Quizizz, Wordwall, and Baamboozle; pedagogical awareness, exploring their understanding of how game-based digital technologies can enhance motivation, participation, and learning outcomes in foreign language classrooms; practical readiness, assessing their willingness and perceived ability to implement these tools in their own teaching practice.

Responses were collected using a four-point Likert scale ranging from "strongly disagree" to "strongly agree". Each section had a maximum attainable score of 40 points, reflecting the degree of readiness for integrating digital game-based learning methods. Based on the total scores, participants were classified into three readiness categories:

Low readiness (10-19 points)

Moderate readiness (20-29 points)

High readiness (30-40 points)

The questionnaire was created and distributed via Google Forms to ensure ease of participation and reliability of data collection. Responses were automatically coded and analyzed using descriptive statistics to determine overall trends, mean values, and response distributions. Additionally, qualitative comments provided by participants were examined to identify recurring ideas, challenges, and insight related to the application of gamified tools in English language teaching.

This methodological design enabled the identification of pre-service teachers' levels of digital competence and their attitudes toward using game-based technologies as an innovative pedagogical approach within foreign language education.

Results and discussion

The results of the conducted survey among 120 pre-service teachers at Astana International University provide valuable insights into their awareness, readiness, and

experience regarding the use of digital game-based technologies in foreign language teaching. The results of the survey on pre-service teachers' awareness of digital game-based tools are represented in Table 1. The majority of participants demonstrated a high level of familiarity with widely used educational platforms such as Quizlet (83%) and Kahoot (78%), which are primarily employed for vocabulary practice and formative assessment. Tools such as Quizizz and Wordwall were also relatively well-known among respondents, while Baamboozle appeared less familiar, with only 49% of students reporting awareness. These findings suggest that while digital gamification tools are becoming increasingly popular in Kazakhstani higher education, their usage remains uneven across platforms. This aligns with Zou et al. (2021) noted that vocabulary-oriented applications often dominate the early stages of digital game-based language learning implementation due to their simplicity and accessibility.

Table 1
Awareness of digital games-based tools

Digital tool	Fully aware (%)	Partly aware (%)	Not aware (%)
Kahoot	78	18	4
Quizizz	72	22	6
Wordwall	65	27	8
Baamboozle	49	38	13
Quizlet	83	14	3

The frequency of tool usage, presented in Table 2, reveals that only 31% of respondents regularly (weekly) use these tools in their teaching or learning practice, while 44% do so occasionally. Meanwhile, 18% reported rare use, and 7% had never used any of the listed platforms. Although awareness levels are generally high, these findings highlight a notable gap between knowledge and active implementation. This observation echoes Arnab et al. argued that despite growing recognition of digital games' pedagogical potential, many educators struggle to translate theoretical understanding into sustained classroom application.

Table 2
Frequency of using digital game-based tools in classroom activities

Frequency of use	Percentage of respondents (%)
Regularly (weekly)	31
Occasionally (monthly)	44
Rarely (once per semester)	18
Never used	7

As shown in Table 3, most participants recognized the pedagogical benefits of integrating game-based digital tools. A significant 89% of respondents agreed that gamified learning increases students' motivation, while 82% highlighted its positive effect on engagement and participation. Additionally, 76% observed that such technologies support the development of speaking and vocabulary skills. These results are consistent with Li L et al. emphasized the link between intrinsic motivation and learner autonomy in gamified environments. The perceived role of gamification in promoting collaboration 70% and formative assessment 61% further reinforces its potential to create interactive and student-centered learning environments.

Table 3

Perceived benefits of using game-based technologies in foreign language teaching

Perceived benefit	Percentage of agreement (%)
Increased student motivation	89
Improved engagement and participation	82
Development of speaking and vocabulary skills	76
Promotion of collaboration and communication	70
Support for formative assessment	61

The barriers to implementing digital game-based tools, summarized in Table 4, reflect the most significant challenges faced by pre-service teachers. The most frequency reported issue was lack of methodological training 57%, followed by insufficient digital literacy 43% and limited access to technology 36%. Additional factors included time constraints 28% and unclear assessment methods19%. These findings indicate that while motivation toward innovation is high, institutional and pedagogical support remains limited.

Table 4

Barriers to integrate digital game-based tools in teaching practice

Barrier	Percentage of respondents (%)
Lack of methodological training	57
Insufficient digital literacy	43
Limited access to technology	36
Lack of time for lesson planning	28
Unclear assessment methods	19

To address these challenges in practice, the next stage of the research focused on developing and testing a pedagogical manual designed to enhance teachers' readiness to integrate game-based approaches into English language instruction. Based on the results of the survey, it became evident that pre-service teachers required more practical guidance and methodological support for implementing digital game-based tools. Therefore, the researchers decided to design a comprehensive manual that could serve as a methodological aid for future educators.

Practical implementation

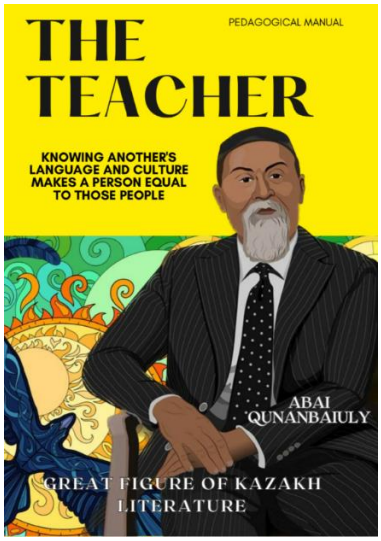
As a practical continuation of this research, the authors developed a pedagogical manual titled "The Teacher: A practical Pedagogical Manual for New Teachers and Aspiring Educators". This manual, officially patented and protected by copyright, was created as part of the authors' innovative approach to supporting pre-service and novice teachers in applying game-based digital tools in language education. It compiles methodological strategies, classroom scenarios, and gamified activities aimed at enhancing language skills, motivation, and engagement in English language learning.

Figure 1 presents the cover of the manual. Figure 2 illustrates a sample page from the manual titled "Digital Platforms for engaging language learning". This section provides an overview of educational platforms such as Kahoot, Quizizz, Nearpod, along with QR codes that enable teachers to directly access and apply these tools in their lessons. These materials demonstrate how theoretical insights from the research have been transformed into practical teaching resources that foster innovation in language education. The development of this manual reflects the study's findings: while pre-service teachers displayed well-developed

technological and pedagogical awareness, their practical readiness for integrating digital game-based tools requires further methodological training and guided practice.

Figures 1,2

Cover of "The Teacher" and a sample page from the manual



As a practical continuation of this research, the authors developed and implemented a pedagogical manual titled "The Teacher: A Practical Pedagogical Manual for New Teachers and Aspiring Educators". This manual, officially patented and protected by copyright, was created to enhance pre-service teachers' methodological readiness to integrate game-based digital tools into English language teaching. It compiles methodological strategies, lesson plans, and gamified classroom scenarios that translate theoretical principles into real pedagogical practice.

Following the identification of gaps in participants' methodological preparedness during the survey phase, the research team conducted a five-month experimental study to evaluate the effectiveness of The Teacher manual. The same 120 pre-service teachers from Astana International University participated and were divided into two groups:

Experimental group (n= 60): received systematic training with The Teacher manual through a series of three workshops, guided micro-teaching sessions, and reflective discussions.

Control group (n=60): continued their regular methodological courses without exposure to the manual.

Both group completed pre-assessment and post-assessment questionnaires identical in structure to the initial survey, measuring three key dimensions: technological literacy, pedagogical awareness, and practical readiness. Each dimension had a maximum of 40 points.

The pre-assessment results (Figure 3) indicated no significant difference between the two groups confirming their comparable initial levels of readiness:

Control group – mean score: 23.6

Experimental group – mean score: 24.1

After the five-month implementation, the post-assessment results (Figure 4) demonstrated a noticeable improvement among participants who had used The Teacher manual:

Control group – mean score: 27.3

Experimental group – mean score: 33.8

Three findings illustrate a substantial increase in the experimental group's overall readiness and confidence in applying digital game-based tools in their teaching practice.

Qualitative reflections collected from the experimental group further reinforced the quantitative findings. Participants noted that The Teacher manual offered clear guidance, accessible digital resources, and step-by-step methodological support for classroom implementation. They emphasized that the manual reduced anxiety associated with technology use and fostered creativity, confidence, and engagement in lesson planning.

Figure 3

Pre-assessment results

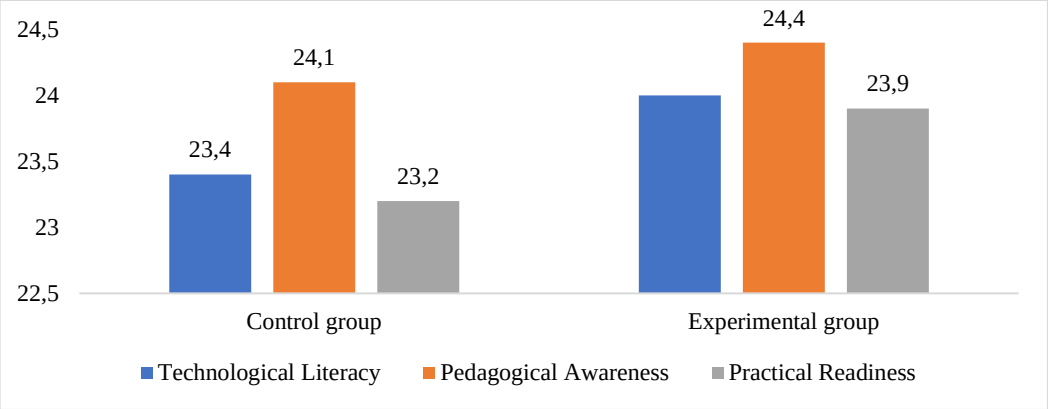
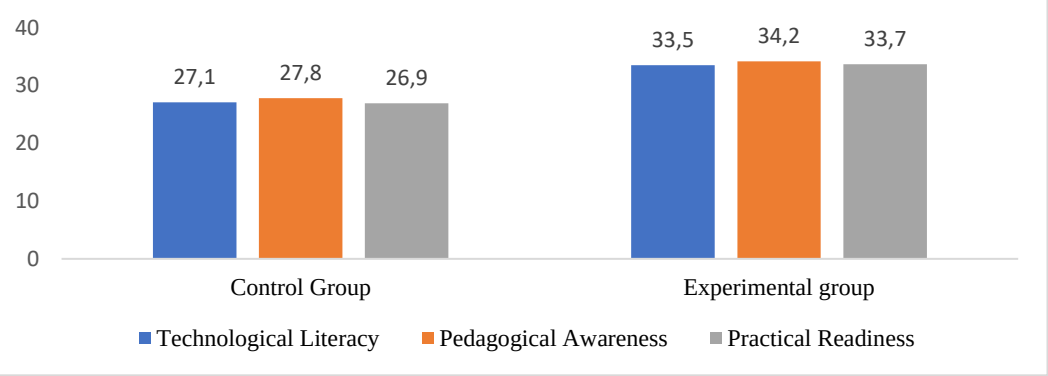


Figure 4

Post-assessment results



To statistically verify the relationship between the use of The Teacher manual and the improvement in pre-service teachers' methodological readiness, a Pearson linear correlation coefficient was applied. This coefficient allowed the research team to determine the degree of association between the variables: the performance indicators of the control group (CG) and the experimental group (EG) after the intervention. The correlation was calculated using the following formula (1):

$$r_{xy}=\frac{\Sigma(x_i-\overline{x})\cdot(y_i-\overline{y})}{\sqrt{\Sigma(x_i-\overline{x})^2}\cdot\sqrt{\Sigma(y_i-\overline{y})^2}} \qquad (1)$$

where: r_{xy} – Pearson's linear correlation coefficient;

x_i – indicator of the control group;

y_i – indicator of the experimental group;

$\overline{x}$ – mean value of the control group;

$\overline{y}$ – mean value of the experimental group.

The calculations were conducted using Microsoft Excel tools. As input data, the mean scores of the CG and EG were used to examine the statistical dependence between the implementation of The Teacher manual and the observed improvement in methodological preparedness. Pearson's coefficient was computed for three main dimensions: technological literacy, pedagogical awareness, and practical readiness.

The results revealed the following correlation coefficients:

Technological literacy – r_{xy} = 0.92

Pedagogical awareness – $r_{xy} = 0.93$

Practical readiness – $r_{xy} = 0.91$

According to Charles Gilbert Chaddock's scale, these values indicate a very high level of positive correlation, confirming a strong statistical relationship between the integration of The Teacher manual and the participants' enhanced performance indicators.

Correlation coefficient	0.1-0.3	0.3-0.5	0.5-0.7	0.7-0.9	0.9-1.0
Strength of correlation	Low	Moderate	Above average	High	Very high

Therefore, the obtained results statistically confirm that The Teacher manual had a significant positive impact on pre-service teachers' ability to effectively integrate digital game-based tools into their teaching practice. The correlation analysis corroborated the quantitative and qualitative findings, providing empirical evidence that The Teacher manual serves as an effective pedagogical instrument that enhances pre-service teachers' methodological competence, fosters digital confidence, and promotes innovation in contemporary language education.

Conclusion

This study conducted an in-depth investigation into pre-service teachers' readiness to implement digital game-based learning (DGBL) in foreign language education, focusing on three core dimensions: technological literacy, pedagogical awareness, and practical classroom readiness. The research was carried out among 120 pre-service teachers enrolled in various foreign language education programs at Astana International University, representing a diverse sample in terms of academic background, digital experience, and teaching aspirations.

The findings revealed a complex, multidimensional readiness landscape. On the one hand, participants demonstrated a solid level of technological familiarity, reporting frequent use of widely recognized educational platforms, gamified applications, and digital tools commonly used in language instruction. Additionally, the majority exhibited strong theoretical and conceptual understanding of the principles of game-based learning, acknowledging its motivational value, its relevance for communicative competence development, and its alignment with contemporary pedagogical trends.

However, the study also uncovered a clear discrepancy between theoretical knowledge and practical competence. The assessment showed that pre-service teachers' practical readiness remained notably limited, primarily due to insufficient methodological preparation, a lack of structured opportunities for hands-on practice, and minimal institutional support for experimenting with innovative digital teaching approaches. Many participants reported

challenges in designing gamified lessons, selecting appropriate digital resources for specific learning outcomes, and managing classroom processes within a game-based environment. These constraints pointed to systemic gaps in teacher education programs, particularly in the integration of digital pedagogy and applied instructional design.

To address these issues, the researchers developed a comprehensive pedagogical manual titled "The Teacher", specifically designed to strengthen pre-service teachers' methodological foundations and practical skills. The manual includes step-by-step guidelines for lesson planning, a curated set of digital tools, game-based activity templates, assessment frameworks, and detailed case studies illustrating successful DGBL implementation in language classrooms. Its structured design enables novice teachers to gradually develop confidence, autonomy, and creativity in applying gamified instructional strategies.

To evaluate the effectiveness of the manual, a five-month experimental study was conducted, involving an experimental group that actively used the manual in coursework and practicum activities, and a control group that continued with the standard teacher education curriculum. Quantitative and qualitative analyses demonstrated that the experimental group achieved significant improvements in practical readiness, instructional confidence, and ability to integrate digital game-based tools effectively into foreign language teaching. They also displayed higher levels of creativity, reflective practice, and innovation in designing communicative tasks. In contrast, the control group exhibited only modest, incremental progress, mostly limited to theoretical understanding rather than practical skill development.

These results empirically confirm the study's hypothesis that insufficient integration of digital pedagogy and game-based learning methods within teacher education programs directly limits pre-service teachers' practical readiness for modern language instruction. Furthermore, the outcomes validate the effectiveness of targeted methodological interventions such as the implementation of specialized pedagogical manuals in enhancing the quality of teacher preparation.

Overall, the findings underscore the urgent need for systematic, institutionally supported methodological frameworks within teacher education. They highlight that well-designed pedagogical resources not only expand pre-service teachers' professional competence but also cultivate creativity, innovation, autonomy, and engagement, which are essential qualities for teaching in contemporary digitally enriched learning environments. The study thus makes a meaningful contribution to the field of digital foreign language pedagogy by demonstrating a practical, scalable approach to strengthening the readiness of future educators to meet the demands of 21st-century language teaching.

Conflict of Interest Statement

The authors declare no potential conflicts of interest regarding the research, authorship, or publication of this article.

Author contributions

Gulim Karimova: Conceptualization, Methodology, Data curation, Writing-Original draft preparation. Saltanat Abylaikhan: Reviewing and Editing. Kenesbekova Saltanat, Alshynbayeva Zhuldyz: Data curation. Galym Aiganym: Writing-Original draft, Writing-Reviewing, and Editing.

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