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GAMIFICATION AND INTERACTIVE LEARNING IN SECONDARY AND HIGHER EDUCATION IN KAZAKHSTAN

Abstract. This article examines the implementation of gamification and active learning methods in secondary schools and higher education institutions in Kazakhstan. The purpose of the paper is to analyzes the role of gamification in education, its effects across different educational settings, and the primary obstacles to its effective implementation. The first section reviews the educational aspects of gamification, highlighting its role in enhancing student engagement, motivation, and the shift from traditional teaching methods toward active pedagogy. It also discusses institutional barriers, such as rigid educational frameworks that hinder gamification adoption. The second section explores the differences in gamification application between secondary and higher education. Findings indicate that secondary students respond more actively to competitive game elements, such as points and leaderboards, whereas higher education students prefer simulations and project-based learning. The study also highlights challenges, including the lack of adequate resources, underprepared educators, and the absence of effective policies supporting gamification. Finally, the paper proposes key solutions, including strengthening institutional support, developing specialized teacher training programs, increasing access to digital educational materials, and introducing curriculum flexibility to integrate innovative teaching techniques.

Keywords: gamification; interactive learning; student engagement; digital education; Kazakhstan.

Introduction

Increasingly, educators are utilising gamification as a strategy for motivation, enjoyment of learning, and increasing effectiveness. Gamification incorporates elements of games like points, leaderboards, challenges, and even simulations to achieve heightened engagement and participation from learners. Research suggests that gamification influences, for the better, engagement, motivation to learn, and academic success (Miodoński, 2023). Gamification elements, while widely adopted in educational settings, do not yield uniform effects across all learner profiles and educational levels. The effectiveness of such strategies varies depending on factors such as the student's personality, preferred learning style, and cognitive development stage. Competitive features like leaderboards, point systems, and rewards may effectively motivate some students but can trigger disengagement or stress in others, particularly those who are more collaborative or intrinsically motivated. Younger students may be more responsive to immediate, tangible feedback, while older learners often seek deeper, more context-rich learning experiences through simulations or project-based tasks. These observations suggest that the use of a one-size-fits-all model in gamification is inherently flawed and may risk excluding or demotivating certain student groups if applied without adaptation to individual and contextual needs (Qodr et al., 2021).

To ensure that gamification genuinely supports diverse learners, its design must be flexible and responsive to classroom realities. Gamification should not be applied rigidly, but

rather designed to reflect the age-appropriateness and learning preferences of each group. This includes allowing educators to adjust levels of challenge, types of feedback, and forms of interaction according to the learners' characteristics and learning goals. The goal is not only to increase participation but to support long-term cognitive engagement and meaningful learning. Therefore, the design of automated or digital gamified environments should incorporate customizable frameworks that can evolve with learners' developmental stages and classroom dynamics (Kamil Budiarto et al., 2021). Although much of the existing research has centered on gamification in higher education, its use in school settings is becoming increasingly valued for its ability to build sustained learning habits and encourage positive student behaviors over time (Vrcelj et al., 2023).

The implementation of gamification in Kazakhstan's educational system remains fragmented and unsystematic, primarily due to persistent structural and institutional challenges that limit its scalability and sustainability. One of the most significant obstacles is the pronounced digital divide between urban and rural regions, where schools in less developed areas often lack access to basic technological infrastructure such as stable internet connectivity, up-to-date computers, and digital learning platforms. This disparity not only hinders the equitable adoption of gamification tools but also exacerbates existing educational inequalities. Compounding this issue is the limited readiness and capacity of educators to implement gamified strategies effectively. Many teachers and lecturers have not received formal training in instructional design principles related to gamification, leading to inconsistent or overly simplistic applications that fail to exploit its full pedagogical potential. Moreover, there is a conspicuous absence of national or institutional policies that support digital innovation in education, particularly those that integrate gamification into the broader curricular framework. Without such policies to guide and incentivize implementation through funding, training programs, and curricular flexibility gamification remains a localized and often experimental effort rather than a structured component of Kazakhstan's educational reform. This lack of coherence across technological, pedagogical, and regulatory dimensions poses a critical barrier to institutionalizing gamification as a mainstream educational practice. This, therefore approaches, be more comprehensive, integrating pedagogical and technological approaches to optimise the effectiveness of gamification in teaching and learning (Santos-Villalba et al., 2020). Additional research is required to investigate the ideal implementation of gamification across different educational levels in Kazakhstan, considering flexible design elements, educator preparedness, and sufficient regulatory backing.

This research contributes meaningfully to the academic discourse by holistically exploring gamification within the educational system of Kazakhstan. It captures the perspectives of diverse stakeholders like teachers, lecturers, secondary school students, and university students, thereby offering a multidimensional understanding of how gamification is both implemented and experienced across different educational levels. The study does not limit its focus to isolated technological tools or predefined frameworks; rather, it investigates the real-world practices, perceptions, and outcomes of gamification as they occur in classrooms and lecture halls throughout the country. By examining the application of gamified strategies in both secondary and tertiary education, the research provides valuable insights into how contextual variables such as age, institutional infrastructure, and pedagogical readiness influence the effectiveness and acceptance of gamification techniques. Moreover, it identifies and analyzes the distinct challenges encountered in each setting, including technological limitations, insufficient teacher training, and the absence of supportive policy frameworks. Unlike earlier investigations, which have tended to focus narrowly on gamification in higher education or examined only its mechanistic components such as point systems or digital rewards (Vrcelj et al., 2023), this study adopts a more integrative and critical approach. It seeks to address a more fundamental set of questions: how do key actors within the education sector

in Kazakhstan teachers, students, and academic staff, understand and engage with gamification as a pedagogical innovation. What are the structural and pedagogical conditions that constrain or facilitate its use, and how do these intersect with broader institutional and policy frameworks. By situating these questions within the national educational context, the study not only contributes empirical data but also provides practical implications for policymakers and educational leaders. The findings call attention to the need for more adaptive and inclusive strategies to embed gamification meaningfully into curricula, thereby encouraging stakeholders to pursue reforms that enhance its pedagogical impact and long-term viability in Kazakhstan's evolving education landscape.

This study holds practical significance for educators, educational institutions, and policymakers in Kazakhstan by offering evidence-based insights into the effective implementation of gamification in diverse learning environments. For educators, the findings provide concrete guidance on how to tailor gamification strategies to suit the developmental needs, learning preferences, and motivational profiles of students, thereby enhancing both engagement and learning outcomes. The research highlights specific components such as reward systems, simulations, and collaborative tasks that can be selectively applied based on classroom context and educational level. Furthermore, the study equips educational institutions and administrators with a clearer understanding of the institutional support required to sustain gamification initiatives, including teacher training, technological infrastructure, and curricular flexibility. For policymakers, the findings present an opportunity to design and promote more adaptive educational policies that facilitate the systematic integration of gamification into national curricula. By doing so, they can support pedagogical innovation that aligns with contemporary educational goals and prepares students for active participation in an increasingly digital learning landscape.

This study enhances the scientific literature by providing a more comprehensive examination of gamification implementation in Kazakhstan, surpassing previous research that primarily focuses on higher education or the technical facets of gamification. This study aims to: 1) investigate the experiences of educators in implementing gamification, particularly in selecting suitable strategies; 2) assess students' perceptions of the effectiveness of gamification and its influence on motivation and learning outcomes; 3) examine the primary challenges in gamification implementation from technical, pedagogical, and institutional perspectives; 4) elucidate the advantages of gamification for both students and educators, particularly in enhancing engagement and interaction in the learning process; and 5) identify the success factors of gamification within the Kazakh education system, which can inform the development of optimal strategies for educators and policymakers in advancing gamification-based learning innovations more effectively.

Methods and materials

This study adopts a qualitative research design with a case study approach to examine the use of gamification within secondary and higher education contexts in Kazakhstan. The selection of this methodology is based on its ability to provide a deep and contextualized understanding of how various stakeholders including teachers, lecturers, and students experience, interpret, and respond to gamification within their actual educational environments. Unlike quantitative methods that often seek generalizability, the qualitative case study allows for an intensive exploration of complex social and pedagogical processes, capturing the richness of interactions and institutional dynamics that shape the implementation of gamified learning. This approach also facilitates the identification of subtle challenges and success factors that may not be readily observable through standardized measurement tools, making it particularly effective in revealing how educational innovation unfolds in practice. The design is thus well-suited to explore nuanced phenomena within naturalistic settings, where variables such as infrastructure, teacher readiness, and classroom culture interact in

multifaceted ways (Bhangu et al., 2023). At this stage, case study design was chosen because it offers rich, contextual, and dynamic analysis on the phenomenon under study. Education stakeholders involved in this study included teachers, lecturers, and university and secondary school students in Kazakhstan who had used or been exposed to gamification in educational settings. Purposive sampling is recommended because it is believed that participants selected in this manner possess a unique perspective on learning gamification (Miles et al., 2016). The study involved a total of 40 participants, comprising 3 university lecturers or professors, 2 secondary school teachers, 17 school students, and 18 university students, thereby ensuring representation from all key stakeholder groups within the educational system. This balanced sampling approach was deliberately chosen to capture a wide range of perspectives and experiences related to the implementation of gamification across both secondary and tertiary education levels. By including voices from both educators and learners, the study was able to explore not only how gamification is perceived and applied in each context, but also to identify the distinct challenges and advantages inherent to each educational tier. This diversity in participant backgrounds enabled a comparative qualitative analysis that revealed meaningful contrasts such as the greater appeal of competitive game elements at the school level versus the preference for simulation and project-based gamification in higher education. Consequently, the sample structure enhanced the study's capacity to generate nuanced, context-sensitive insights into how gamification functions within different institutional and pedagogical environments.

Table 1.

Demographic Profile of Research Subjects

Category	Number of Participants	Selection Criteria
Lecturer	3	Teaching at universities that apply gamification in lectures
Teacher	2	Teaching in secondary schools that apply gamification in learning
School Student	17	Follow gamification-based learning at secondary level
College Student	18	Experiencing gamification methods in college lectures
Total	40	Participants were selected based on active involvement in gamification-based learning

The overall data for this study was accrued through the use of separate interviews, observations, and documents, which encompasses the implementation of gamification in the educational context of Kazakhstan (Miles et al., 2018). In order for the respondents to describe their perception or experience concerning the application of gamification in education, along with the benefits and challenges posed by the degree, in-depth interviews were done with teachers, lecturers, school children, and college students. These additionally included classroom observations to assess the actual processes of gamification, the teacher/student relationship, and the various conditions critical for the success or failure of the gamification strategies. Also, in the analysis that supported the findings from the interviews and the observations, the documents that were scrutinized included educational materials, structured modules for gamified learning, and institutional policies. The three methods were used concurrently in order to improve the quality of the data as well as comprehensively understand the context of gamification in secondary and higher education in Kazakhstan.

This study employed a combination of interview guides and observation instruments as its primary data collection tools, allowing for a comprehensive exploration of gamification practices within educational settings. The interviews were designed to elicit detailed insights into participants' experiences, perceptions, perceived benefits, and challenges related to the

implementation of gamification, involving a range of stakeholders, including educators, lecturers, secondary school pupils, and university students. Semi-structured interview formats were selected to provide both consistency across participants and the flexibility to explore emerging themes, thereby enriching the depth of the data collected. Complementing the interviews, systematic classroom observations were conducted using structured observation sheets that documented how gamification was applied as a teaching method, the nature of student-teacher interactions, and the extent to which these interactions influenced student engagement and participation. Additionally, document analysis was conducted to examine institutional materials and relevant policy documents, providing supplementary evidence that triangulated and contextualized the findings obtained through interviews and observations. This multi-method approach ensured a robust and nuanced understanding of the dynamics surrounding gamification in the Kazakhstani educational context. The next grid explains the research instruments, which can be identified in Tables 2 and 3.

Table 2.
Interview Guidelines

Indicators	Example Questions
Teacher/lecturer experience	What is your experience in implementing gamification in the classroom?
Student perception	What do you think about gamification in learning?
Challenges	What are the main difficulties in adopting gamification?
Benefits	What benefits do you experience from using gamification?
Success factors	What do you think makes gamification successful in the classroom?

Table 3.
Observation Sheet

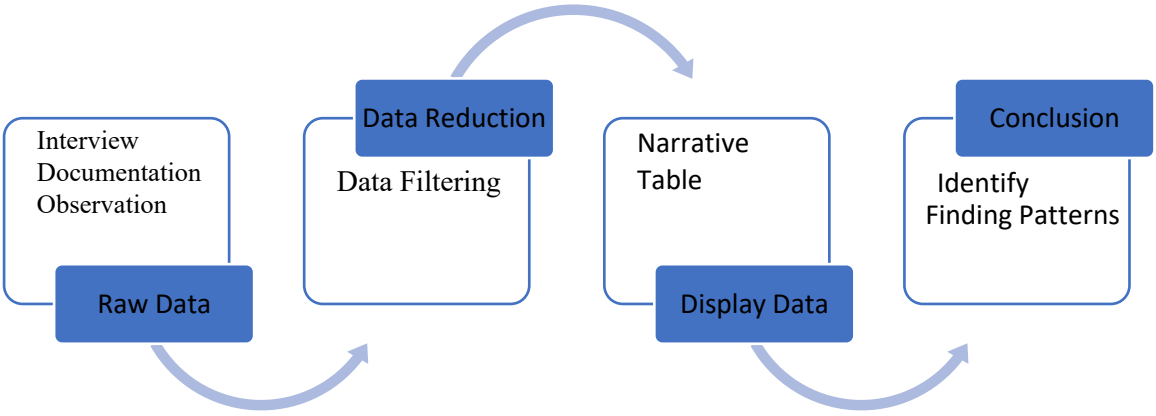
Observation Aspect	Description
Student Engagement	How active are students in participating in gamification activities?
Teacher Response	How do teachers integrate gamification into learning?
Gamification Type	What gamification strategies are used? (e.g., leaderboard, rewards, badges, etc.)

In verifying the credibility of the data, source triangulation, method triangulation, and member checking are used (Miles et al., 2018). Information from different sources that including teachers, lecturers, school children, and university students, is classified as source triangulation. Photography, interviews, and document analysis are combined into one single data collection method to achieve method triangulation. To test the credibility and validity of the research findings, the interview results of the respondents are, in some cases, compared with the respondents' actual accounts and experiences to enhance the interpretations made from the data (Chenail, 2012).

In line with Miles et al. (2018), the analysis of data for this study was conducted through data reduction, data display, and conclusion drawing. In this case, data reduction was achieved through sorting, filtering, and grouping the information obtained through interviews, observations, and documentation, which is needed to meet the objectives of the research. In the data analysis phase, the information gathered from interviews, observations, and document reviews was systematically organized and presented through various forms of visual and narrative representation to facilitate interpretation. Data visualization techniques, including narrative descriptions, tables, and thematic diagrams, were utilized to enhance clarity and coherence, enabling the identification of key patterns and relationships within the dataset. These tools played a crucial role in synthesizing complex qualitative information into accessible and meaningful formats for analysis. The final stage of the analysis process involved

drawing conclusions based on these identified patterns, which provided valuable insights into the effectiveness, challenges, and contextual dynamics of gamification practices within Kazakhstan's educational system. This stage not only addressed the core research questions but also uncovered broader implications related to pedagogical strategies, institutional readiness, and student engagement in gamified learning environments. The overall analytical process, including its stages and methodologies, is illustrated in Figure 1, offering a comprehensive overview of how the data was systematically examined to derive meaningful conclusions.

Figure 1.
Data Analysis Techniques



Results

Experiences and Perceptions of Gamification in Learning. Educators at both secondary and tertiary levels in Kazakhstan have increasingly adopted gamification as a pedagogical approach to enhance student participation and motivation. Common methods include the use of interactive quizzes, leaderboards, digital badges, and simulation-based activities. At the secondary level, teachers frequently rely on user-friendly platforms such as Kahoot! and Quizizz, which allow them to incorporate competitive elements into classroom instruction with relative ease. In contrast, lecturers at the tertiary level tend to employ more complex forms of gamification, including case-based scenarios and adaptive learning tools that are designed to align more closely with advanced academic content. These tools are particularly effective in promoting active learning and engagement, especially in contexts that require critical thinking and application of theoretical concepts. Despite their growing popularity, these strategies are not without limitations, and their success often hinges on how appropriately they are integrated into the curriculum.

One of the most pressing challenges faced by educators is the lack of adequate technological infrastructure. Many schools, particularly in rural areas, struggle with unstable internet connectivity and limited access to devices, which significantly hampers the seamless implementation of gamified instruction. Beyond these technical constraints, pedagogical issues also emerge. Several teachers express concern that gamification, while engaging, may detract from the core objectives of learning if not properly aligned with curriculum standards. Balancing the entertaining aspects of games with rigorous academic goals presents a significant dilemma, especially when educators must simultaneously convey foundational knowledge and adapt the difficulty level to suit diverse student abilities. Some educators also report that while gamification successfully stimulates enthusiasm in the classroom, it does not always translate into improved comprehension or mastery of subject matter. As such, although gamification has the potential to enrich educational experiences, its application must be carefully designed to ensure it supports learning outcomes.

Research conducted involving both secondary school and tertiary students discovered that a vast majority perceive gamification as a more enthusiastic and motivational learning technique in comparison to traditional methods. Nevertheless, the effectiveness of gamification is dependent on the design used. Secondary school learners are more likely to prefer competition-oriented gamification components like contests and leaderboards because these features foster a higher level of motivation among them by providing a sense of competition. In contrast, college students prefer simulation-based gamification and project-based learning, which allow them to apply theoretical knowledge in real-world scenarios.

Despite the overall positive reception of gamification, several concerns emerged from student interviews that underscore the importance of thoughtful and balanced implementation. Some high school students voiced apprehensions regarding the overly competitive nature of certain gamified activities, noting that the emphasis on rankings, points, and rewards can create pressure and reduce opportunities for meaningful collaboration. For these students, gamification that prioritizes individual achievement may inadvertently undermine cooperative learning dynamics and inclusivity. Similarly, university students expressed that while gamification initially sparked interest, it risked becoming monotonous and less effective when limited to repetitive formats or lacking in instructional diversity. These observations highlight a critical need for educators to design gamification strategies that are not only engaging but also varied, inclusive, and aligned with pedagogical objectives. By ensuring that gamified learning includes both competitive and collaborative elements, and by offering diverse formats that sustain learner interest, educators can mitigate potential drawbacks and enhance the overall educational value of gamification. The detailed findings from these interviews are presented in Tables 4 and 5, which categorize students' and educators' insights across different dimensions of gamification use.

Table 4.

Interview Coding Analysis Results: Students and Teachers

Findings Category	Students (School)	Teachers
Form of Gamification Implemented	Most experienced gamification based on points, leaderboards, and badges.	Using gamification in the form of interactive quizzes, reward systems, and game-based simulations.
Technical Challenges	Unstable internet connection and limited devices were the main obstacles.	Difficulty in selecting and adapting digital platforms for gamification.
Pedagogical Challenges	Some students felt gamification was more competitive than collaborative.	Developing gamification that is in line with the curriculum is quite challenging.
Alignment with Learning Objectives	Gamification made learning more interesting, but was not always related to understanding the material.	Gamification is effective in increasing student engagement, but requires strategies to remain relevant to learning.
Impact on Student Motivation	Increased motivation to learn because of the elements of rewards and challenges.	Seeing increased student engagement, but not all students respond positively.
Preferences for Gamification Elements	Preferred interactive leaderboards and challenges over badges or point systems.	Preferring game-based quizzes and reward systems to increase student engagement.

Table 5.

Interview Coding Analysis Results: Students and Lecturers

Findings Category	Students	Lecturer
Form of Gamification Implemented	Experienced gamification based on project-based learning, simulations, and badges.	Using gamification in the form of game-based case studies and adaptive learning.
Technical Challenges	Some gamification platforms are not user-friendly and require adaptation.	Time constraints in designing effective gamification elements.
Pedagogical Challenges	More interested in gamification that contains aspects of competition and collaboration.	Difficulty adjusting the level of difficulty of gamification to student abilities.
Alignment with Learning Objectives	Helps understand concepts but can feel repetitive if not varied.	Gamification is effective if designed according to student academic competencies.
Impact on Student Motivation	Gamification increases motivation but only if there is an element of challenge.	Increasing student participation, but less effective if there is no clear evaluation.
Preferences for Gamification Elements	Prefer simulations and project-based learning.	Preferring game-based case study methods to support understanding of the material.

Challenges and Obstacles in Implementing Gamification. At both the secondary and tertiary levels of education, technical challenges pose yet another serious limitation to the implementation of gamification. While observing secondary school classrooms, it became obvious that many of them do not have the necessary supporting equipment, such as projectors, computers, or even functional internet connections, which make the application of gamification principles difficult. Rural students to whom I spoke in interviews expressed difficulty in obtaining digital devices on their own for participation in gamified activities.

At the higher education level in Kazakhstan, access to computers, smartphones, and internet connectivity is generally more stable compared to secondary schools, thereby reducing basic infrastructural barriers to gamification. However, this relatively favorable digital environment does not necessarily guarantee the effective use of gamified learning tools. Many students report encountering challenges related to the usability and compatibility of gamification platforms with their personal devices. Specific tools or software introduced by lecturers are sometimes designed without sufficient consideration for user experience, leading to confusion or disengagement. Moreover, while students often have the technical ability to navigate basic educational technologies, they may struggle with applications that are poorly localized, lack clear instructions, or have complex interfaces. These usability issues ultimately diminish the intended motivational and pedagogical benefits of gamification.

From the faculty's perspective, there are significant challenges in adapting existing curricula to accommodate gamified elements in a meaningful way. University lecturers have expressed concern that while gamification has pedagogical potential, its effective integration requires a specific set of digital competencies that many educators have not yet fully developed. In interviews, faculty members noted that the training offered by their institutions is often insufficient, outdated, or narrowly focused on general digital literacy rather than on the pedagogical design of gamified content. As a result, lecturers are left to navigate unfamiliar platforms with little institutional guidance, which can lead to inconsistent or suboptimal implementation. These gaps highlight the pressing need for structured professional development programs that equip university educators with the skills necessary to leverage gamification effectively, aligning digital tools with instructional objectives and diverse student learning needs.

The implementation of gamification encounters both pedagogical and institutional challenges across educational levels. From a pedagogical perspective, secondary school teachers often struggle to design effective gamification strategies, frequently becoming

ensnared in competitive elements such as leaderboards, which may not be suitable for all students and can even generate pressure that detracts from material comprehension. In the context of higher education, while students are more open to simulation and project-based learning, instructors are struggling to balance the academic rigor with the level of integration of these methods. Some students regard these processes as too monotonous (i.e., too much sameness) unless some variation is incorporated. Striking a balance between competitive and collaborative elements presents a unique challenge that demands greater creativity.

Findings from interviews with educators reveal that one of the most persistent barriers to implementing gamification in Kazakhstan's education system is the lack of institutional support, particularly in terms of training and technological resources. Many teachers and lecturers feel inadequately prepared to design and apply gamified learning strategies due to limited access to targeted professional development opportunities. Although some institutions offer general digital training, these programs often do not address the specific pedagogical principles or technical nuances required for effective gamification. As a result, educators frequently rely on self-initiated learning or trial-and-error approaches, which leads to inconsistent implementation and missed opportunities for maximizing the educational potential of gamification. Compounding this issue is the absence of institutional clarity—most educational organizations lack standardized policies or guidelines on how gamification should be integrated within formal instructional frameworks, leaving educators without a clear mandate or structured support.

This institutional ambiguity is particularly evident in higher education, where rigid academic rules and traditional assessment systems often act as deterrents to pedagogical innovation. Despite the growing recognition of gamification as a tool for enhancing engagement and learning outcomes, its operationalization remains limited and fragmented. Document analysis conducted as part of this study confirms that the majority of universities and secondary schools in Kazakhstan have not yet formalized any policies that explicitly recognize or regulate the use of gamification within teaching and learning processes. The absence of such frameworks results in sporadic, isolated initiatives that struggle to gain traction or institutional legitimacy. To overcome these multifaceted challenges greater collaboration is needed among educators, institutional leaders, and policymakers. This collaboration should focus on improving digital infrastructure, expanding access to specialized training for educators, and crafting more flexible and forward-looking educational policies that support the systematic and sustainable integration of gamification across all levels of education.

Table 6.

Thematic Observation and Interview Findings

Challenge Categories	Main Findings	Sources
Technical and Infrastructure Challenges		
- Barriers to technology use	Unstable internet connection, inadequate devices, difficult to access platforms.	Observation in schools and universities, Interview with Teachers/Lecturers
- Barriers to device access	Students in rural areas have less access to digital devices.	Interview with School Students
- Adaptation of technology in higher education	Students have difficulty accessing gamification platforms that are not user-friendly.	Interview with University Students
Pedagogical Challenges		
- Difficulty in designing strategies	Teachers and lecturers struggle to design effective and balanced gamification.	Interview with Teacher/Lecturer

- Mismatch of learning styles	Some school students are more comfortable with conventional methods.	Interview with School Students
- Competitive-collaborative balance	It is challenging to balance competitive and collaborative elements in gamification.	Classroom observations in schools and universities.
Institutional and Policy Challenges		
- Lack of institutional support	Schools and universities do not provide adequate training or budgets.	Interview with Teacher/Lecturer
- Regulation and policy	Rigid curricula in higher education hinder innovation in learning.	Document Analysis, Interview with Lecturer

Benefits and Success Factors of Gamification in Learning. The integration of gamification into the learning process has demonstrated a range of pedagogical benefits for both students and teachers across educational levels. Interviews with secondary school students revealed a notable increase in learning motivation when gamified elements such as leaderboards, rewards, and interactive tasks—were introduced. Students who were previously disengaged or hesitant to participate in classroom activities became more active, responsive, and confident. In particular, the competitive elements of gamification appeared to stimulate a sense of achievement and urgency among younger learners, which translated into higher classroom energy and involvement. Similarly, students in higher education responded positively to gamification, particularly in forms such as simulations and project-based tasks that allowed them to engage with academic content in more applied and contextualized ways. These methods were seen to enhance comprehension of abstract theoretical concepts by placing them within scenarios that mirrored real-world challenges.

From the perspective of educators, gamification not only improved classroom dynamics but also encouraged greater participation and discipline. Teachers observed that students were more willing to interact, ask questions, and engage in peer discussions, leading to a more dynamic and student-centered learning environment. Instructors in university settings reported similar trends, particularly in terms of heightened collaboration during game-based assignments and discussions—practices that are often difficult to cultivate in conventional lecture formats. However, while the benefits of gamification are evident, several educators expressed concern regarding its equitable impact. There is a risk that gamification may disproportionately benefit students who are naturally competitive or extroverted, while potentially alienating those who are less inclined toward competition or more anxious in group settings. Moreover, without thoughtful instructional design, gamified activities may prioritize entertainment over depth of learning, leading to superficial engagement rather than sustained academic growth. These insights highlight the importance of implementing gamification in a balanced and inclusive manner, ensuring that it complements pedagogical goals and addresses the diverse motivational profiles of all learners.

Furthermore, while students and teachers alike acknowledged the motivational potential of gamification, its sustainability over time remains a matter of concern. Some students reported that repetitive or overly simplistic gamified activities gradually lost their appeal, leading to a decline in engagement and diminishing returns in learning outcomes. In higher education, the use of simulations and project-based tasks was perceived as more intellectually stimulating, yet these approaches are also more resource-intensive and time-consuming to design and assess. Educators emphasized that without sufficient institutional support, there is a risk that gamification efforts may stagnate or fail to scale effectively. As a result, what begins as an innovative instructional strategy may revert to surface-level adoption if not continuously adapted to align with evolving learning objectives and student expectations.

Equally important is the issue of assessment and academic rigor. Interviews and observations indicated that while gamification can foster greater student interaction and

enthusiasm, it does not inherently guarantee deeper understanding or improved academic performance. Teachers noted that certain gamified tasks lacked clear alignment with learning outcomes or failed to assess higher-order thinking skills. In some cases, students were more focused on earning points or badges than on engaging meaningfully with the subject matter. This finding underscores the necessity for careful instructional design in which gamification is integrated not merely as a motivational tool but as a method that reinforces critical content and learning competencies. Therefore, for gamification to move beyond novelty and become a meaningful pedagogical innovation, educators must adopt a strategic, evidence-based approach that includes differentiated task design, ongoing evaluation of effectiveness, and intentional links to curriculum standards and assessment practices.

The success of gamification implementation in education is determined by institutional support, freedom in their teaching style, and evidence from other institutions that clearly define their technology integration policies that make them more successful. In summary, interviews with students indicate that there is a need for variety in the forms of gamification because there is a tendency to fail to achieve desired outcomes due to the overuse of certain methods when trying to implement gamification (e.g., game-based assessments, storytelling, or role-playing). The effectiveness of gamification in educational settings is closely tied to both the technological infrastructure available and, more critically, the digital competencies and pedagogical skills of teachers. When educators possess a solid understanding of gamification principles and the technical proficiency to apply them, they are more likely to implement these methods in ways that are pedagogically meaningful and aligned with curriculum goals. The findings of this study align with and reinforce existing literature, which consistently shows that teachers who have received formal training in gamification demonstrate higher levels of confidence and creativity in integrating game-based elements into their instruction. This preparedness not only enhances the quality and consistency of gamification implementation but also leads to greater student engagement, deeper interaction with the learning content, and improved conceptual understanding. In contrast, educators lacking such training may either misuse gamification or abandon it altogether due to uncertainty or perceived ineffectiveness. Therefore, targeted professional development remains a critical enabling factor for the successful integration of gamified strategies into mainstream education.

In general, the findings regarding the benefits and success factors of implementing gamification in schools and universities are summarized in the following analysis results Table 7.

Table 7.

Results of Analysis of Benefits and Success Factors of Gamification

Category	Middle School	Higher Education	Sources
Increased learning motivation	Students are more engaged and motivated in gamification-based learning.	-	Interview with School Students, Classroom Observation
More dynamic interactions	Teachers see increased student participation in class discussions.	-	Observation at School
Better understanding of concepts	Scenario-based gamification helps students understand difficult concepts.	-	Documentation Analysis
Increased student engagement	-	Students are more active in gamification-based discussions and projects.	Interview with Students, Classroom Observation
More collaborative interactions	-	Simulation-based gamification increases collaboration among students.	Observation at College

Strengthening critical thinking skills	-	Gamification-based case studies help students solve problems.	Analysis of Academic Documentation
Institutional support	Schools with supportive policies for gamification are more successful in implementing it.	Universities with flexible curricula are more likely to implement gamification.	Interview with Teachers/Lecturers
Challenge-based gamification strategies	Students are more engaged when gamification is combined with storytelling or group-based challenges.	Students are more engaged in game-based learning that includes real-world scenarios.	Interview with Students, Classroom Observation
Technology readiness and educator competency	Classrooms with good access to technology are more effective in implementing gamification.	Lecturers who are more skilled in technology tend to be more successful in implementing gamification.	Interview with Lecturers, Classroom Observation

Discussion

The findings suggest that educators in Kazakhstan adopt differentiated gamification strategies depending on the educational level and the learning profiles of their students, reflecting a growing awareness of pedagogical diversity. In secondary schools, the prevalent use of leaderboards, reward systems, and quiz-based tools caters well to students who are motivated by competition and instant feedback; however, these same techniques may inadvertently marginalize learners who are less responsive to extrinsic motivators or who experience anxiety in competitive settings. In higher education, the shift toward more sophisticated approaches demonstrates a conscious effort to promote deeper cognitive engagement and real-world application of knowledge. Yet, these methods demand significant preparation, including the design of contextually relevant scenarios and continuous facilitation by educators, which can be resource-intensive and difficult to sustain without institutional backing. Moreover, the lack of integration between game elements and specific learning outcomes in both settings points to a broader issue: many gamification practices remain more focused on engagement mechanics than on fostering authentic, transferable learning. Thus, while the diversity of gamification strategies is encouraging, their long-term pedagogical value depends on the development of more inclusive, context-sensitive, and outcome-aligned game-based designs that are supported by adequate training and policy frameworks. These results conform with research findings that show that gamification increases motivation or gamified learning experience; however, the effectiveness is based on consideration of learner characteristics (Park & Kim, 2021). Another study notes that in secondary education, competition elements work much better (Alsadoon et al., 2022), while at the higher level, simulations and project-based learning are better at improving understanding of the units of study (Ferriz-Valero et al., 2020). However, their success will depend on institutional backing, technical readiness, and curricular flexibility. As a result, gamification needs to be designed in a flexible way, that incorporates competition and collaboration and it needs to be supported by more adaptable educational policies to help with implementation at various educational stages.

The findings reveal a nuanced awareness among both high school and college students regarding the differentiated impact of gamification strategies at their respective educational levels, underscoring the importance of age-appropriate and context-sensitive design. High school students generally respond positively to competitive gamified features such as points, badges, and leaderboards which introduce an element of challenge and excitement that can increase engagement and short-term motivation. However, these same features may inadvertently contribute to academic stress or burnout, particularly for students who do not thrive in high-pressure, performance-oriented environments. This highlights the risk of over-reliance on extrinsic motivators without sufficient attention to individual emotional and

cognitive needs. In contrast, college students exhibit a clear preference for collaborative and applied forms of gamification, such as project-based learning, simulations, and group challenges. These methods are valued not only for their relevance to real-world contexts but also for their potential to foster teamwork, critical thinking, and the transfer of theoretical knowledge into practice. The divergence in preferences between these two groups suggests that a one-size-fits-all approach to gamification is inherently flawed. Instead, effective implementation requires a differentiated strategy that aligns with learners' developmental stages, cognitive maturity, and motivational orientations, ensuring that gamification enhances rather than hinders the educational experience. These findings support other studies that have shown how the effectiveness of gamification is influenced by learner profile, initial motivation, and the gamification elements used (Reyssier et al., 2022). While competitive elements are more effective for school students, challenge-based approaches, especially those set in real-world contexts, are more useful for college students, and also other studies have shown that systematizing gamification based on intrinsic motivation and learner type is effective in increasing their persistence and sense of achievement in educational activities (Kian et al., 2022). Consequently, educators must integrate competitive and collaborative components in gamification to ensure that learning is both engaging and yields a more effective and enduring experience.

Research findings indicate that the implementation of gamification in Kazakhstan is hindered by a range of interrelated technical, pedagogical, and institutional challenges that limit its effectiveness and scalability. In schools with underdeveloped infrastructure, persistent issues such as unstable internet connections, limited access to digital devices, and outdated hardware significantly constrain the ability of educators to integrate gamified tools into classroom instruction. Beyond these logistical barriers, teachers often lack formal training in the pedagogical and technical aspects of gamification, leaving them to navigate complex digital platforms without sufficient support or guidance. This gap in professional development results in uneven application of gamification practices and, in some cases, the abandonment of potentially beneficial tools due to implementation difficulties. On the pedagogical front, a major concern arises from the tension between designing competitive and collaborative learning environments. While game elements such as leaderboards and reward systems can serve as powerful motivators, they may also generate stress or disengagement among students who do not thrive in competitive settings, potentially undermining inclusivity and emotional well-being in the classroom (Kian et al., 2022). These challenges point to the need for a more systemic approach that addresses not only the technological prerequisites but also the pedagogical strategies and institutional frameworks necessary to support sustainable gamification in education. Although university teachers tend to use simulation- and project-based teaching, they often fail to ensure that students' academic needs are met when designing gamification elements. Teachers are also constrained by rigid curricula, as well as a failure to recognize gamification as a teaching technique, which hinders the use of this approach (Montenegro-Rueda et al., 2023). Other studies have shown that there is a lack of teacher training in other countries; together with the lack of digital infrastructure, they serve as barriers to the implementation of gamification. Although gamification has been shown to enhance student motivation and engagement, its effectiveness remains contingent upon designs that align with learner profiles and initial motivational factors (Gasanov, 2024). Several countries, such as Finland and South Korea, have addressed these challenges by increasing access to technology and adjusting educational policies to better support gamification-based learning innovations (Prokopenko & Sapinski, 2024). Therefore, to improve the effectiveness of gamification in Kazakhstan, strengthening the technology infrastructure, training for teachers and lecturers, and more flexible policies to support learning innovations are needed.

The findings of this study provide compelling evidence that gamification serves as a powerful catalyst for improving student motivation, engagement, and classroom interaction across both secondary and tertiary education contexts. At the secondary level, gamified elements such as leaderboards, point systems, and rewards appear to stimulate active participation by introducing a sense of constructive competition among learners, thereby transforming traditionally passive learning environments into more dynamic and participatory spaces. These mechanisms are particularly effective in capturing the attention of younger students, encouraging them to engage with content through challenge-based tasks that align with their developmental needs. In contrast, at the tertiary level, the implementation of gamification is more conceptually grounded, with a stronger emphasis on enhancing students' understanding of academic material and fostering higher-order thinking skills. Strategies such as simulations, role-playing, and project-based activities not only allow university students to apply theoretical knowledge in practical scenarios but also promote collaborative learning and problem-solving competencies essential for real-world application. Nevertheless, while these outcomes are promising, they underscore the need for continued refinement in the alignment of gamified practices with curricular goals, ensuring that the motivational appeal of gamification does not overshadow the pursuit of deep and sustained learning. These findings align with the meta-analyses conducted by (Zhang & Yu, 2022), which demonstrated that gamification exerts a moderate to substantial positive impact on academic attainment, exceeding traditional techniques. Additional research indicates that gamification can alleviate anxiety while enhancing students' autonomy and motivation (Parra-González et al., 2020). The impact, however, differs notably between pupils acquainted with game-based learning and those lacking gaming expertise.

Other components such as institutional support, technological readiness, and teacher competence that correspond with the design aspect must also be analyzed while appreciating the effectiveness of gamification in education. Supportive infrastructure and policies enhance the probability of efficient gamification integration (Zainuddin et al., 2020). Furthermore, effective gamification design must achieve a balance between learning goals and the active participation of students (Zhang & Yu, 2022). Consequently, gamification elements should be designed to be adaptive and flexible, integrated with other teaching methods, and data-driven to align with student preferences, learning objectives, and to balance intrinsic and extrinsic motivation, thereby enhancing its effectiveness.

The findings of this study underscore the critical importance of a coordinated and multi-stakeholder approach to effectively implement gamification within Kazakhstan's education system. Teachers, as the primary agents of classroom innovation, require sustained and targeted professional development that equips them not only with technical proficiency in using gamified platforms but also with pedagogical strategies to integrate competition and collaboration in a balanced and inclusive manner. Given the diversity of student learning styles and motivational profiles, educators must be trained to design adaptive gamification approaches that foster engagement without alienating less competitive learners. Simultaneously, educational institutions must take an active role in facilitating this transformation by providing the necessary technological infrastructure such as access to reliable devices, internet connectivity, and gamified learning management systems, as well as crafting flexible curriculum policies that encourage experimentation and innovation. Without these structural supports, gamification risks remaining a fragmented and superficial intervention rather than a sustained pedagogical advancement.

Equally essential is the role of government in shaping a policy environment that legitimizes and enables gamification-based innovation. This includes developing national education strategies that incorporate digital pedagogy, allocating funding for technological upgrades in underserved schools, and instituting evaluation mechanisms that measure the long-

term impact of gamification on student outcomes. However, the scope of this study is inherently limited by its geographic and methodological focus. By concentrating exclusively on Kazakhstan and employing a qualitative design, the findings provide rich, context-specific insights but lack the generalizability required to make broad claims applicable to other educational systems or to establish causal relationships between gamification and academic achievement. Despite these limitations, the research highlights gamification's transformative potential in reconfiguring how students learn and engage with content. When supported by coherent institutional frameworks and inclusive policies, gamification can become a cornerstone of pedagogical renewal in both secondary and higher education, promoting not only motivation and participation but also deeper cognitive and social learning outcomes.

Conclusion

The findings of this research indicate that gamification in education within Kazakhstan holds significant potential for enhancing motivation, engagement, and learning effectiveness at both the secondary and higher education levels. Educators predominantly implement competitive elements, such as leaderboards and reward systems, while university instructors tend to favor simulations and project-based learning to deepen students' academic understanding. Despite the demonstrated benefits of gamification, its implementation still encounters challenges, particularly regarding institutional support, technological readiness, and the flexibility of educational policies. Consequently, future research is recommended to adopt quantitative or mixed-method approaches to more objectively assess the impact of gamification and to explore optimal strategies that can be applied across various disciplines. For policymakers, there is a need for more adaptive regulatory support and digital infrastructure, including the development of training programs for educators and policies that facilitate the systematic integration of gamification into the national education curriculum.

Conflict of Interest Statement

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

Author Contributions

Sardarova E.: Data curation, Writing - Original draft preparation, Software, Supervision, Writing - Reviewing and Editing, Investigation, Project administration. Baigunakova A.: Conceptualization, Methodology, Resources. Shubayeva G.: Validation, Formal analysis, Visualization.

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