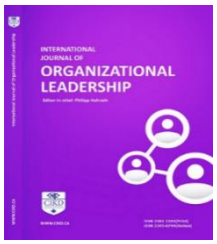
International Journal of Organizational Leadership 14(First Special Issue-2025)582-599



INTERNATIONAL JOURNAL OF ORGANIZATIONAL LEADERSHIP

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journal homepage: https://www.ijol.cikd.ca

Harnessing Gamification for Educational Leadership and Its Impact on Primary and Secondary School Students' Motivation to Learn

Svitlana Dubiaha[1*], Larysa Pushkar[2], Solomiya Illyash[3], Liudmyla Shvydun[4], Tetiana Hlushko[5]

[1]Department of Primary and Special Education, Educational and Scientific Institute of Social-Pedagogical and Artistic Education, Bogdan Khmelnytsky Melitopol State Pedagogical University, Zaporizhzhia, Ukraine

[2]Department of Preschool and Primary Education, Educational and Scientific Institute of Pedagogy and Psychology, Sumy State Pedagogical University named after A. S. Makarenko, Sumy, Ukraine

[3]Department of Pedagogy and Methods of Primary Education, Faculty of Primary Education and Arts, Drohobych Ivan Franko State Pedagogical University, Drohobych, Ukraine

[4]Department of Preschool and Primary Education, Communal Institution of Higher Education "Dnipro Academy of Continuing Education" of Dnipropetrovsk Regional Council, Dnipro, Ukraine

[5]Department of Germanic and Oriental Languages, International Humanitarian University, Odesa, Ukraine

Keywords:
Motivation, Gamification, Platforms, Students, Learning, Teachers

Received
20 February 2025
Received in revised form
20 April 2025
Accepted
01 May 2025

***Correspondence:**
svetlana_107@ukr.net

ABSTRACT

The intensive spread of information and communication technologies in modern society and the growing integration of digital tools into everyday life are radically transforming traditional models of learning and teaching. Representatives of the modern generation, who grew up in the digital age, demonstrate unique cognitive characteristics, diverse learning styles, and specific expectations of the educational environment. In the context of dynamic changes in the educational environment, introducing innovative didactic methods and technologies based on ICTs contributes to both the activation of cognitive activity and the emergence of new pedagogical paradigms. The study aims to determine the effectiveness of gamification on the motivation of primary and secondary school students to learn, in particular, by surveying to assess its ability to change the level of learning activity, increase interest in the learning process and stimulate positive motivational behaviour of students in the context of integrating gamification elements into the educational process. Research methods: comparative analysis, systematisation, generalisation, and survey. Results. The survey found that platforms such as Kahoot and Minecraft: Education Edition have shown high efficiency in increasing motivation and developing key competences. At the same time, less popular tools need further optimisation. The high correlation coefficient (.99) between the popularity of platforms and their ability to motivate students indicates a strong positive relationship between these characteristics, which confirms the effectiveness of using gamification platforms to increase motivation. The study found that using gamification in the educational process significantly improves students' motivation and performance, particularly by increasing the high level of development of key parameters such as motivation to learn, creative thinking and the ability to work independently. Gamification has been shown to impact the learning process positively: 63 per cent of students reported improved attention, 58 per cent reported increased interest in learning, and 70 per cent reported easier memorisation. The study found that 65 per cent of students felt more emotionally satisfied, and 70 per cent became more actively involved in learning. It was determined that gamification is most often implemented in the Ukrainian language and mathematics (35.7% and 31.3%, respectively). It was found that the main methods of gamification used by teachers include virtual awards (85%), interactive games (80%) and mobile applications.

Developing students' motivation to learn remains one of the most pressing challenges in modern educational practice. This problem is especially acute when students find it difficult to understand the purpose of learning activities due to their abstract nature or difficulty in perception. This is especially true for younger students, who are often unable to relate the content of the learning material to practical experience in the real world. This problem becomes even more urgent when teaching scientific concepts, as traditional didactic methods often do not meet the specifics of these concepts or the requirements of modern society due to the development of technology and changed approaches to learning (Mohammed et al., 2024).

The use of game elements in the learning process in primary and secondary schools is becoming increasingly popular. Gamification is an innovative methodological strategy aimed at building sustainable student motivation. This strategy not only helps to increase the level of interest and engagement of students but also provides emotional satisfaction from the learning process, which is often implemented in digital environments. At the same time, gamification can go beyond traditional game formats, creating learning scenarios that mimic the attractive aspects of games and increase the efficiency of knowledge acquisition (Seaborn & Fels, 2015).

Digital gaming platforms integrate fundamental pedagogical principles, providing a high level of interactivity, individualisation of the learning experience, and creating conditions for

authentic assessment and development of competences critical in the modern information society (McClarty, 2012). Among the key skills of the 21st century, which are formed with the help of digital game technologies, are reading, communication, active listening, critical thinking, effective use of technology and complex problem-solving.

One important advantage of gamification is the increased autonomy of learners in the learning process. Thanks to interactive tools, they have the opportunity to independently correct their actions, reducing stress from possible mistakes, and adapt the pace of learning to their own needs and capabilities. Thus, gamification creates conditions for developing a personalised approach to learning that meets the requirements of the modern educational reality and the challenges of the 21st century (Wen, 2023).

Gamification is gaining significant importance in educational systems that face numerous organisational challenges and limited resources, characteristic of developing countries (Aura et al., 2021). In such contexts, gamification is a powerful tool for optimising management processes in the learning process, primarily due to the high student-to-teacher ratio and overcrowded classrooms. Notably, gamification can be easily implemented and adapted to resource-constrained environments, making it a crucial instrument for sustaining students' motivation and engagement (Mohammed et al., 2024).

In this regard, it is necessary to study gamification as an innovative learning approach to assess its impact on students' motivation, engagement, and performance in primary and secondary education.

The study aims to evaluate the effectiveness of gamification in enhancing the motivation of primary and secondary school students through a survey designed to determine gamification's capacity to increase interest in the educational process, alter students' learning activity levels, and foster positive motivational behaviour.

Research objectives of the article:

1. To analyse the distribution of the use of gamification platforms in the educational process among students and teachers.

2. To perform a paired t-test to compare the popularity of gamification platforms and their ability to motivate students.

3. To conduct a comparative analysis of the level of development of the motivation parameters and academic performance of students using the traditional method and the method with gamification.

4. To compare the effectiveness of gamification in the context of different learning parameters.

5. To evaluate the impact of gamification on the learning process based on the student survey results.

6. To survey students and teachers to determine gamification's specific features and effectiveness on students' motivation to learn in primary and secondary schools.

7. To investigate the effectiveness of using gamification in educational disciplines in the opinion of teachers.

Literature Review

An analysis of scientific sources shows that the term "gamification" has gained scientific and practical recognition since 2010, although its conceptual foundations were first proposed by

British programmer Nick Pelling in 2002 (Dreimane, 2021). In contemporary academic discourse, gamification integrates game design elements and principles into non-game contexts, including education, marketing, healthcare, and business (Dichev & Dicheva, 2017). From a pedagogical perspective, gamification is a strategy that uses game elements such as avatars, virtual scores, levels, rewards, challenges, and leaderboards to increase students' motivation to learn (Gibson et al., 2013; Toda et al., 2020).

Educational gamification is focused on engaging learners in the learning process through mechanisms, aesthetics and game thinking that promote learning activity and stimulate positive motivational behaviour (Osatuyi et al., 2018; Pal'ová & Vejačka, 2020). According to theoretical developments, gamification transforms learning tasks into game mechanisms that motivate students through a system of rewards for achievement and promote the desired changes in learning behaviour (Martínez-Hita et al., 2021). The practical implementation of gamification demonstrates its ability to create accessible and cost-effective educational materials that are significantly superior in ease of implementation to specially designed educational games (Rugelj, 2015; Vrcelj et al., 2023).

Gamification, as an innovative pedagogical approach, involves the transfer of elements of game mechanisms into the educational process in order to create a dynamic learning environment that actively promotes student motivation, including the introduction of a system of points, rewards, narrative elements, prompt feedback and mechanisms for recognising achievements, which are the main components of gamification (Deterding et al., 2011; Kapp, 2012). As researchers note, gamification, unlike traditional approaches, does not merely involve the use of games but focuses on creating conditions conducive to stimulating active student participation in learning, which, in turn, fosters emotional engagement in the educational process (Fan et al., 2023; Peláez & Solano, 2023).

Gamification proves effective in situations where the learning process demands high motivation and active interaction between students, learning materials, and peers. For instance, incorporating game elements in mathematics lessons, where students earn points for completing tasks and receive feedback on their current achievements, fosters a sense of success and motivation. In this context, learning motivation is defined as the result of the integration of cognitive interest and behavioural persistence, which is manifested in students' active involvement in the educational process (Rodríguez et al., 2021; Wen, 2023).

Students' motivational aspects largely depend on the structure and content of learning tasks, assessment systems, feedback from teachers, and opportunities for social interaction with peers. Studies by Fadda et al. (2022) highlight that game-based learning tools positively influence student engagement, especially in mathematics, where gamification elements help make complex concepts more accessible and comprehensible. Schukajlow et al. (2021) emphasise that emotional motivation and positive emotional responses from students significantly enhance learning outcomes when the educational environment is appropriately designed and implemented.

Motivation, as a key component of stable and effective behaviour, encompasses numerous determinants that influence individual selective activity and is determined by the interaction of cognitive, affective, and behavioural components that contribute to achieving educational goals (Linnenbrink-Garcia & Patall, 2015; Daniels et al., 2021). It is important to note that modern motivational theories distinguish between two main types of motivation: intrinsic motivation,

which arises from interest in the activity itself, and extrinsic motivation, driven by external rewards or sanctions and oriented toward the outcome rather than the process (Filgona et al., 2020; Legault, 2020).

Issues of low motivation and negative attitudes toward specific disciplines have complex origins, including previous negative experiences and cultural factors. Berger et al. (2020) state that students' motivation depends on their evaluation of the significance of tasks and their expectations regarding performance and teacher assessment. The subjective perception of task importance and students' positive self-perception plays a crucial role in motivation and engagement, which improve academic outcomes (Wang, 2012; Wigfield et al., 2015; Stankov & Lee, 2017).

Implementing gamification in the learning process creates opportunities for fostering positive affective attitudes, stimulating motivation, and creating conditions for student success (Alt, 2023). Gamification offers interactive environments that overcome monotony and engage students by enhancing their cognitive activity, strengthening sustainable motivation and ensuring effective learning (Deterding et al., 2011; Peláez & Solano, 2023).

Studies by Aura et al. (2021) and Botha and Herselman (2015) indicate that insufficient student engagement and low motivation hinder effective and successful learning. A lack of motivation decreases students' academic performance and complicates their achievement of educational goals. Traditional teaching methods often fail to meet modern requirements and exacerbate student demotivation, hindering the assimilation of complex educational concepts (Mohammed et al., 2024).

Recent research highlights the significant potential of gamification to enhance the educational process. Adapting content, optimising tasks, and aligning their complexity with students' abilities contribute to effective and efficient learning. Using games, imaginative elements, and gamification concepts (Aura et al., 2022; Freina & Ott, 2015; Majuri et al., 2018) helps foster motivation. Research on serious games (Ullah et al., 2022) confirms this effect, while studies on the cultural aspects of gamification (Järvelä et al., 2022; Pan et al., 2021) demonstrate that the socio-cultural context influences its effectiveness (Iten & Petko, 2016; Hassan, 2018; Klock et al., 2020).

Research by Nieto-Escamez and Roldán-Tapia (2021) during the COVID-19 pandemic showed that gamification increases student motivation, improving learning outcomes. However, Nieto-Escamez and Roldán-Tapia (2021) emphasise the need for further studies to compare the effectiveness of gamification with traditional methods. Plantak Vukovac et al. (2018) note that a lack of teacher awareness and time constraints complicate the implementation of gamification in schools. Hamari et al. (2014) emphasise the potential of gamification to increase student motivation but point out the need for further empirical research, including quantitative approaches. Generally, the analysis of scientific sources indicates insufficient research on gamification in primary and secondary schools compared to higher education. This creates a research gap and requires comprehensive research to assess the long-term benefits of using gamification in the learning process.

Method

This study aims to achieve the following research methods:

– systematisation was used to collect, classify and structure data obtained from surveys of teachers and students on the use of gamification platforms in the educational process, as well as to analyse different types of gamification in the context of academic disciplines;

– systemic and logical analysis and the method of information synthesis were applied to comprehensively study the relationship between gamification platforms and the level of student motivation, as well as to analyse the impact of gamification on the effectiveness of the educational process in various disciplines;

– the method of generalisation was used to process and integrate the results of teacher surveys, which allowed us to create a comprehensive view of the use of gamification in academic disciplines and assess its impact on student motivation and performance;

– a paired t-test was used to conduct a statistical analysis of the results obtained from student and teacher surveys, which allowed us to determine whether there were statistically significant differences in the use of gamification to increase motivation and learning efficiency in different settings;

– the survey method was used to collect data from teachers and students to determine the level of their attitude towards the use of gamification platforms, the frequency of use of such platforms in the educational process and their impact on learning outcomes;

– the method of processing the survey results included statistical processing of the data obtained, which made it possible to determine the average values and deviations of the relationship between the indicators.

A study was conducted using descriptive statistics to identify specific features and characteristics of the impact of gamification on students' motivation to learn in primary and secondary schools. The data for the analysis were collected by surveying students and teachers through the MS Forms Pro platform, which allowed us to collect accurate and reliable answers. The survey was conducted for students and teachers of primary and secondary schools, which allowed us to obtain various data from different age groups. The survey examined the level of motivation to learn, the impact of different methods on the development of subject knowledge, creative thinking, independent work, the ability to work in a team and adaptability to change. An online survey was conducted from 20 January to 30 November 2024, collecting information from 1525 students and 896 teachers, where respondents answered questions about the level of motivation to learn, the effectiveness of various teaching methods, including gamification, as well as their experience in using innovative approaches in the educational process and assessing their impact on the development of students' key competences. The survey was conducted as an online questionnaire, which included both closed-ended questions (with multiple-choice answers) and open-ended questions, allowing respondents to express their opinions. The survey asked: Which learning gamification platforms are the most effective in increasing (learner) motivation and providing an interactive learning environment? How do you assess the impact of gamification on your learning? What advantages do you see in using gamification in the classroom? Do you think that gamification affects your behaviour in the classroom? What forms and methods of gamification do you use in the learning process? In which subjects do

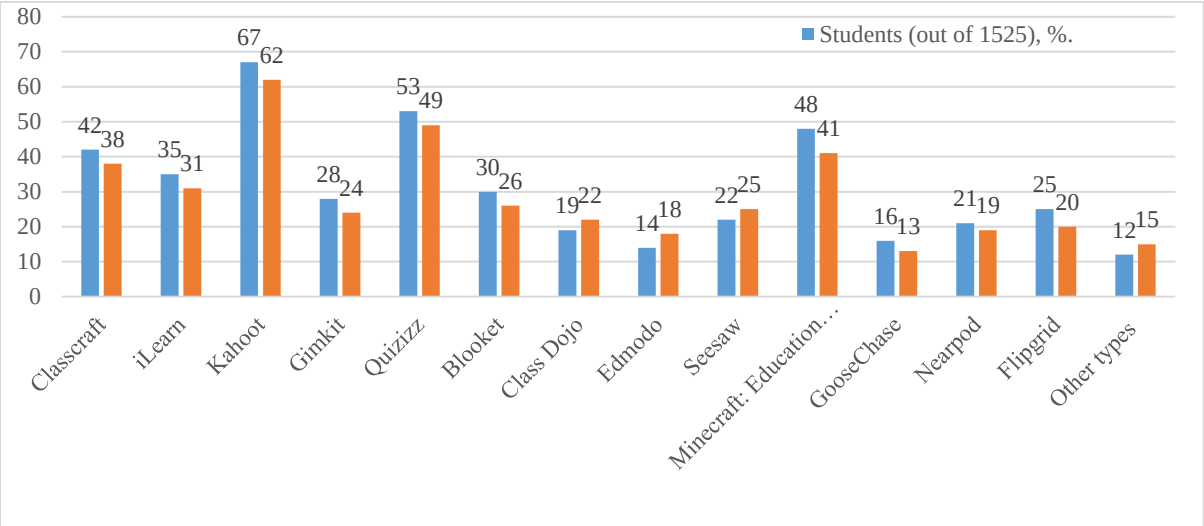
you most often use gamification elements? In which subjects does the use of gamification most effectively increase student motivation?

Results

This study surveyed 1,525 students and 896 teachers to study their preferences and frequency of various gamification platforms. The results presented in Figure 1 show the quantitative distribution of the choice of these platforms, which helps to identify dominant trends and allows us to determine the level of popularity of specific gamification tools among different categories of respondents. A detailed analysis of the data shows significant differences in the preferences of students and teachers due to the specifics of their approaches to integrating gamification tools into learning activities. In order to determine which gamification platforms are used in the latter process, both students and teachers were asked: "Which of the following gamification platforms do you think are the most effective for increasing (students') motivation and providing an interactive learning environment?". As a result, it was found that the most popular platforms among both groups of respondents were Kahoot and Minecraft: Education Edition, which indicates their high adaptability to modern educational needs and functionality. At the same time, the GooseChase and Edmodo platforms are characterised by low popularity, which indicates the need for further optimisation and broader consideration of didactic requirements.

Figure 1

Distribution of the Use of Gamification Platforms in the Educational Process Among Students and Teachers



The results of a paired t-test comparing the popularity of gamification platforms among students and their ability to stimulate learning motivation revealed a statistically significant difference between the mean values of both variables, indicating a close but ambiguous relationship between the level of popularity of platforms and their effectiveness as a motivational tool. In particular, the average value for the popularity of gamification platforms is 470.64, while the average value for their impact on student motivation is 343.57, which indicates a significant difference in the estimates of these characteristics. Despite the high level of popularity of some platforms, their motivational effect does not always meet expectations, indicating that even popular platforms cannot provide a significant impact on increasing

student motivation. The t-statistic value (12.116) exceeds the critical value (2.16) for a two-sided test. The p-value (1.86×10^{-8}) is significantly less than the set significance level of 0.05, which allows rejecting the null hypothesised mean deviation of no difference between the means and confirms that the difference between the popularity of gamification platforms and their ability to motivate students is statistically significant (Table 1).

Table 1

Results of a Paired t-test Comparing the Popularity of Gamification Platforms and Their Ability to Motivate Students

Indicator	The popularity of gamification platforms among students	Motivating students with gamification platforms
Mean	470.64	343.57
Variance	61717.94	48040.11
Number of observations (Observations)	14	14
Pearson Correlation	0.9937	-
Hypothesised Mean Difference	0	-
Number of degrees of freedom (df)	13	-
t-statistics (t Stat)	12.12	-
P(T<=t) one-sided (P(T<=t) one-tail)	9.31×10^{-9}	-
The critical value of t is one-sided (t Critical one-tail)	1.77	-
P(T<=t) two-sided (P(T<=t) two-tail)	1.86×10^{-8}	-
The critical value of t is two-sided (t Critical two-tail)	2.16	-

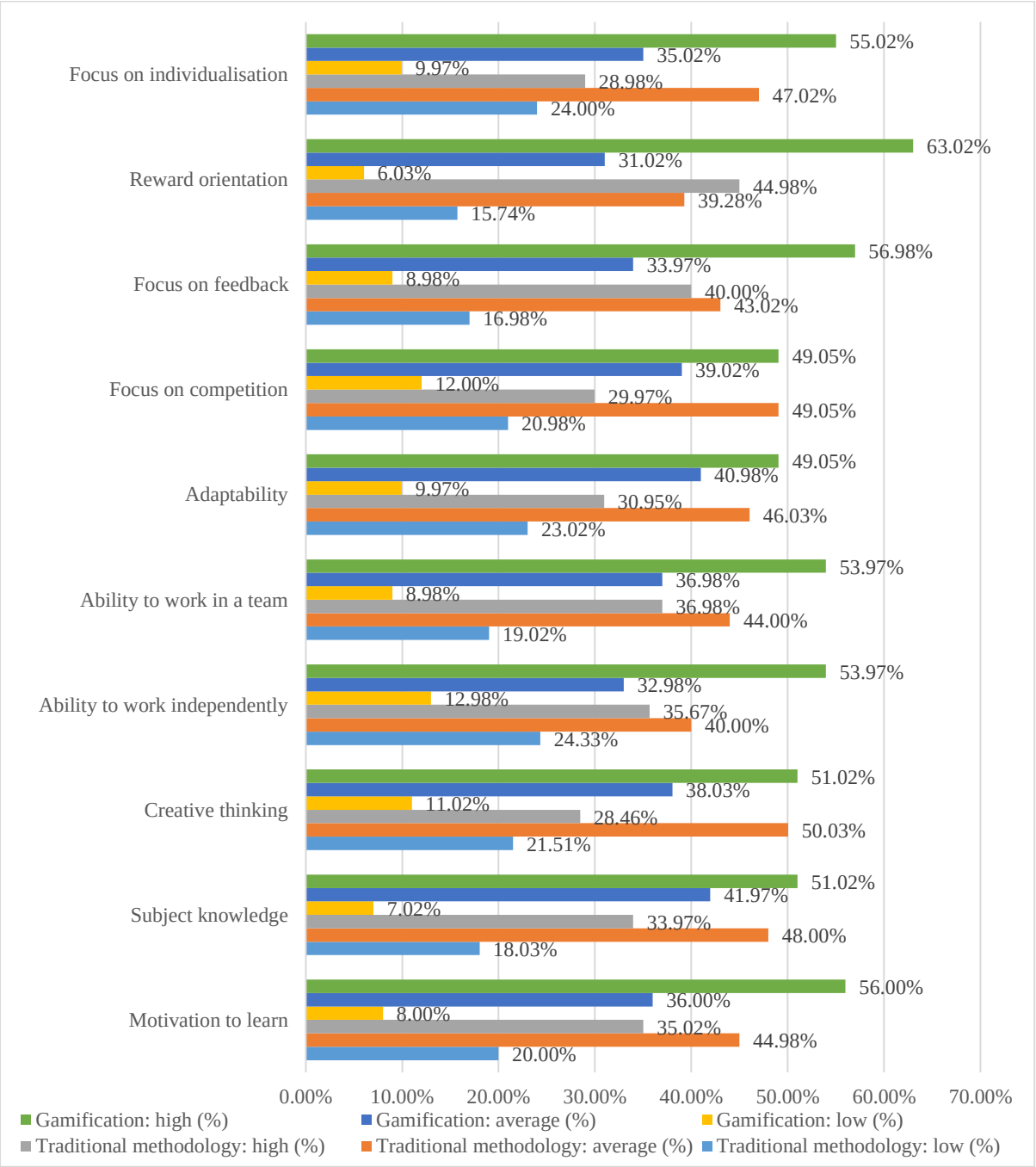
According to the t-test results, the analysis comparing the popularity of gamification platforms among students and their ability to motivate students indicates significant statistically significant differences between these two variables. The high correlation coefficient (.99) between the popularity of platforms and their ability to motivate students indicates a strong positive relationship between these characteristics, which confirms the effectiveness of using gamification platforms to increase motivation. However, the variability in the results indicates that different platforms may have different levels of impact on learners depending on the individual characteristics of the group, which is an important factor to consider when choosing platforms for learning. Thus, the t-test results confirm the existence of significant changes in students' motivation but also highlight the need to consider the variability within the sample to more accurately assess the effectiveness of individual gamification platforms in the learning process.

Figure 2 compares the level of development of ten parameters of students' motivation and performance using traditional teaching methods and methods that include gamification elements. The results reflect the percentage of students who have achieved each parameter's low, medium and high expression levels. An in-depth analysis of the data in the table shows significant differences between the traditional teaching methodology and the methodology that integrates gamification elements in developing key student motivation and performance parameters. The traditional methodology shows a tendency to concentrate students at the average level according to the main criteria, in particular, the parameters of motivation to learn (45%), subject knowledge (48%) and creative thinking (50%). However, in the context of applying the gamification methodology, there is a slight increase in the high level of expression of these parameters, which confirms the significant effectiveness of this approach in the educational process. In particular, in the case of motivation to learn, the high level is 56%, creative thinking – 51%, and the ability to work independently – 54%.

Particularly noteworthy are the positive changes in reducing the proportion of students with low levels of various parameters in gamification. For example, the percentage of those with low motivation to learn decreased from 20% to 8%, which is also observed in subject knowledge (from 18% to 7%) and feedback orientation (from 17% to 9%). These changes indicate the powerful potential of gamification as a tool that helps improve students' motivation and academic results. In particular, the parameters related to reward orientation and individualisation show significant positive changes.

Figure 2

Comparative Analysis of the Level of Development of Student's Motivation and Academic Performance Parameters Using Traditional and Gamification Methods



The study results show the apparent advantages of the gamification methodology compared to the traditional teaching methodology in developing key parameters of students' motivation and performance. In the group of students who studied according to the gamification methodology, there was a significant increase in the expression level of such parameters as motivation to learn, creative thinking, ability to work independently and feedback orientation. The decrease in the proportion of students with low levels in all key parameters is worth noting, which indicates the successful implementation of gamification as an effective tool for improving learning outcomes.

The results of the calculations and analysis of deviations of indicators for different levels of gamification (high, medium and low levels) revealed significant variability in the impact of these methods on the learning process. Gamification of the learning process has demonstrated significant positive results, including improved motivation to learn (59.9%), development of creative thinking (82.2%), increased student adaptability (58.5%) and ability to work independently (54.2%). It also contributed to a focus on individualised learning (89.8%) and increased competition (63.7%). In addition, traditional approaches also demonstrated greater effectiveness for students who have problems with independent work or feedback orientation. Therefore, to achieve optimal results, it is necessary to adapt the gamification methodology to students' individual needs (Table 2).

Table 2

Comparative Analysis of the Effectiveness of Gamification in the Context of Different Learning Parameters

Parameters	Abs. rejections by high level	Relative rejections by high level (%)	Abs. rejections by low level	Relative rejections by low level (%)	Abs. deviations by the average level	Relative deviation by average level (%)
Motivation to learn	320	59.9	-183	-60	-137	-20
Subject knowledge	260	50.2	-168	-61.1	-92	-12.6
Creative thinking	351	82.2	-168	-50	-183	-24
Ability to work independently	289	54.2	-183	-48	-107	-17.5
Ability to work in a team	259	46	-153	-52.8	-107	-15.9
Adaptability	276	58.5	-199	-56.7	-77	-11
Focus on competition	291	63.7	-137	-42.8	-153	-20.4
Focus on feedback	259	42.5	-122	-47.1	-138	-21
Reward orientation	275	40.1	-137	-60	-137	-22.5
Focus on individualisation	397	89.8	-214	-58.5	-183	-25.5

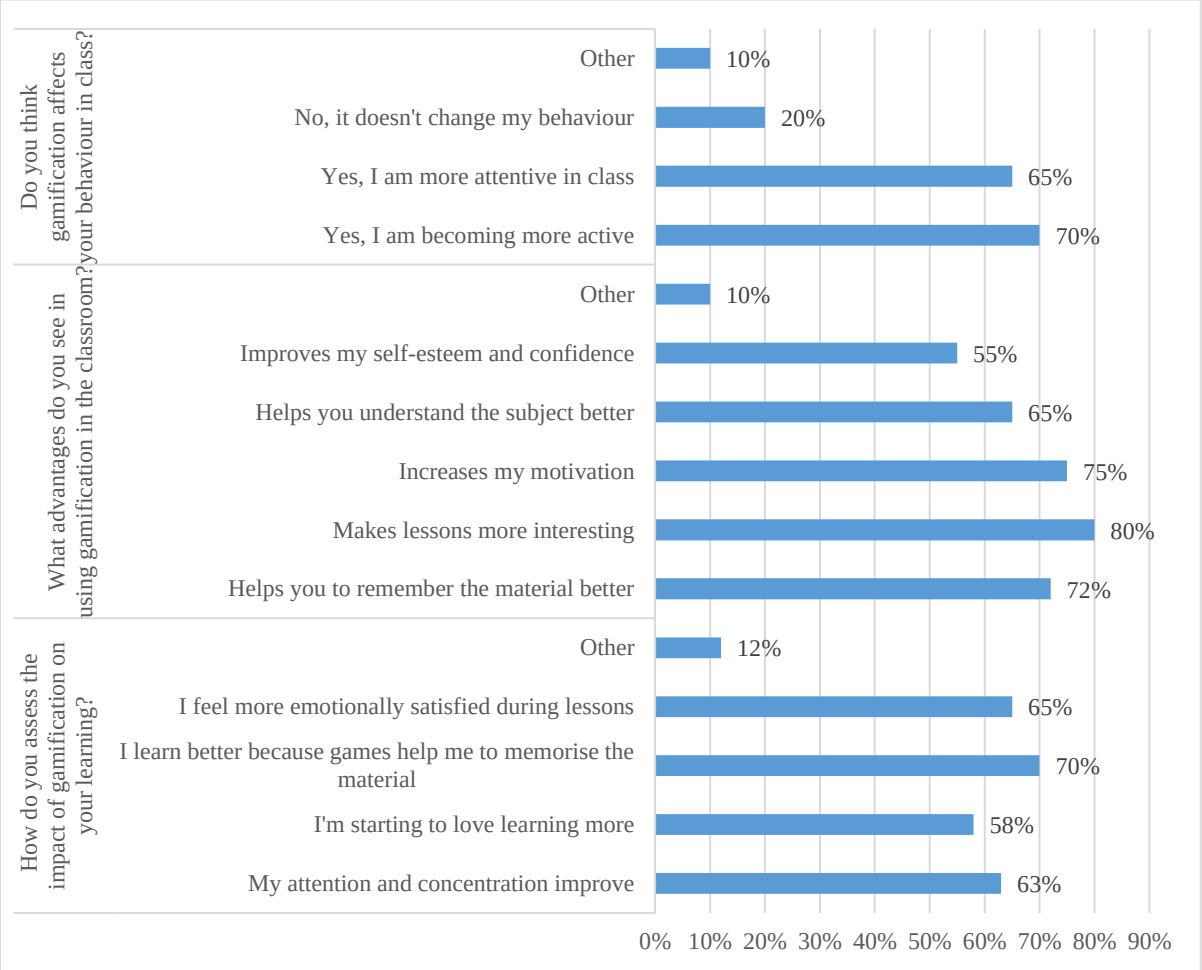
The data analysis found that gamification significantly positively impacts various aspects of learning, including student motivation, creative thinking, adaptability, ability to work independently and focus on individualised learning.

The student survey results show a positive impact of gamification on the learning process. The majority of respondents noted improved attention and concentration (63%), increased interest in learning (58%), and improved memorisation of material through game-based methods (70%). Gamification also contributes to greater emotional satisfaction from lessons (65%) and encourages more active participation in learning (70%). The benefits noted by students include better memorisation of material (72%), more engaging lessons (80%) and increased motivation to learn (75%). At the same time, 20% of students did not feel any changes

in behaviour, which may indicate individual differences in the perception of gamification (Figure 3).

Figure 3

Evaluation of the Impact of Gamification on the Learning Process Based on the Results of a Student Survey

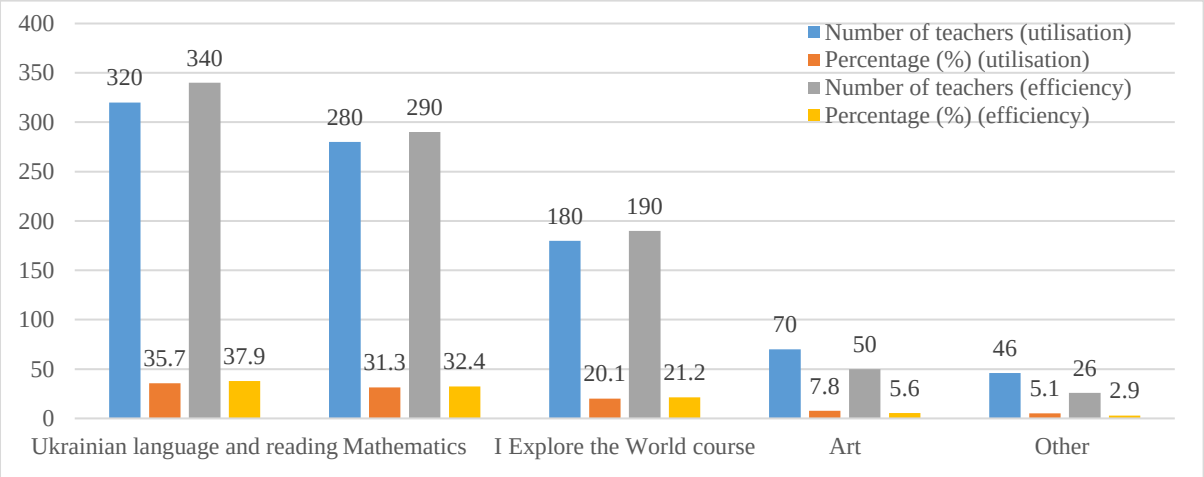


Thus, gamification has a significant positive impact on students' motivation, participation and performance, although its effectiveness varies depending on students' individual characteristics.

The analysis of Figure 4 shows that the most significant number of teachers use gamification elements in teaching Ukrainian language and reading (35.7%) and mathematics (31.3%), which indicates the high popularity of these subjects for integrating gamification methods. The most minor proportion of teachers use gamification in art (7.8%) and other subjects such as computer science and physics (5.1%). As for the effectiveness of gamification, most teachers consider it to be effective in Ukrainian language and reading (37.9%) and mathematics (32.4%), which confirms the high efficiency of gamification in these disciplines. At the same time, the effectiveness of gamification in art (5.6%) and other disciplines (2.9%) is less optimistic.

Figure 4

Evaluation of the Effectiveness of Gamification in Educational Disciplines According to Teachers

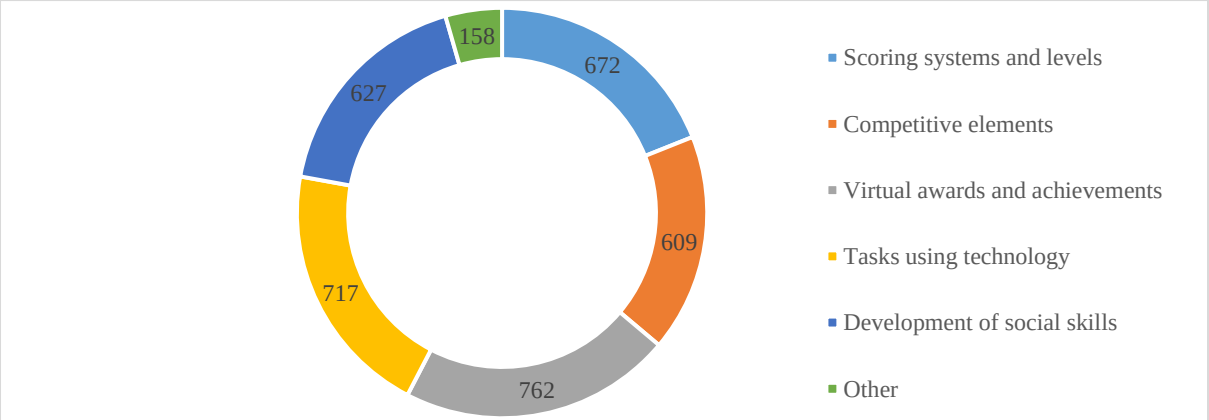


In general, gamification is most widely implemented and assessed as effective in core subjects such as Ukrainian language, reading, and mathematics.

Based on the results of a survey of 896 teachers, it was found that the most popular forms and methods of gamification are the use of virtual rewards and achievements, which are used by 85% of respondents, and tasks using technology, including interactive games and mobile applications (80%). A significant proportion of teachers (75%) also actively use point systems and levels that allow students to be motivated through a system of rewards for achievement and progress, where this method contributes to creating healthy competition among students, which is an important factor in stimulating learning. Using competitive elements, which is actively used by 68% of teachers, is another method of gamification that increases student motivation, encourages cooperation and improves learning outcomes through competitive elements. Equally important is developing social skills through group work or team projects, which 70% of teachers implement. This gamification aspect is important for developing students' communication and collaboration skills, which are essential for effective interaction in modern society (Figure 5).

Figure 5

Distribution of the Use of Gamification Methods Among Teachers in the Educational Process



Thus, the survey results indicate that teachers are actively implementing various methods of gamification, including technological innovations and methods of motivation through

competitions, rewards, and achievements. This confirms the trend towards changes in traditional approaches to teaching to increase students' interest in the learning process and develop their social and intellectual skills.

The survey results reveal that teachers show a high interest in using gamification platforms in the educational process, although the frequency of their use varies. Only 20.1% of teachers use gamification platforms daily. In comparison, the largest share (35.7%) said they use them 2-3 times a week, which may indicate a growing but not yet fully integrated approach to gamification in education. Regarding student motivation, 50.2% of teachers observed a significant increase in motivation with the help of game elements, while another 33.5% noted a slight but positive impact. Regarding students' ability to complete tasks after using gamification platforms, 39.1% of respondents believe that students can complete tasks without difficulty. In comparison, 40.2% say that students need help but manage independently. This indicates that students' independence is increasing, although in 20.7% of cases, teachers still need significant support. The obstacles to integrating gamification into the learning process are multifactorial. The most common are lack of time (34.6%) and insufficient games or materials (22.3%). Limitations in teachers' skills (20.1%) and lack of necessary technologies (17.4%) also have a significant impact, and only 5.6% of respondents mentioned other factors that may indicate particular problems of individual institutions (Table 3).

Table 3

Results of a Survey of Teachers on the Use of Gamification in the Educational Process

Answer option	Number of teachers	Share, %
1. Frequency of using gamification platforms in the educational process		
Daily	180	20,1
2-3 times a week	320	35,7
1 time per week	230	25,7
Rarely	166	18,5
2. Increasing students' motivation to learn through gamification		
Yes, motivation increases significantly	450	50,2
Motivation increases, but only slightly	300	33,5
Motivation does not change	100	11,2
Motivation decreases	46	5,1
3. Students' ability to complete tasks independently after using gamification platforms		
They can perform tasks without difficulty	350	39,1
They need help but perform tasks independently	360	40,2
They often need help with tasks	130	14,5
They are unable to perform tasks without help	56	6,2
4. Factors that hinder the use of gamification in education		
Lack of time	310	34,6
Not enough games or materials	200	22,3
Not all teachers know how to use gamification	180	20,1
Lack of appropriate technology	156	17,4
Other	50	5,6

The analysis confirms that gamification can significantly increase students' motivation and engagement in the learning process.

Discussion

We can draw several significant theoretical and practical conclusions about using gamification in the educational process based on the results obtained. The results indicate the importance of integrating game elements into the learning process to increase students' motivation and active

participation in learning. This is confirmed by the high level of engagement and interest (over 80%) of students who perceive gamification as an effective teaching method.

First, the study showed a significant increase in student engagement in the learning process after the integration of gamification. Compared to traditional methods, the increase was 59.9%, indicating game elements' positive impact on student engagement. It has been established that innovative approaches contribute to creating an interactive and motivational learning environment.

The study demonstrated an increase in students' satisfaction with learning, which enhanced emotional engagement and fostered a positive classroom atmosphere. However, 11.2% of respondents reported no changes, while 5.1% noted a negative impact, highlighting the need for a more detailed analysis of the factors influencing the effectiveness of gamification.

As a result of the survey, we confirm Mohammed et al.'s (2024) conclusions regarding the positive influence of interactive gamification elements on active student engagement in the learning process and their support in helping teachers effectively manage the classroom. According to our data, 70% of respondents indicated that gamification contributes to active participation in learning, increasing interest in education and improving classroom discipline. Moreover, the implementation of gamification helps reduce the workload on teachers, enabling them to focus more on other pedagogical tasks and enhance overall teaching efficiency and effectiveness.

Based on the conclusions of Seaborn and Fels (2015), who emphasise gamification's ability to increase student interest and engagement, we can state that our findings confirm an 80% increase in students' interest in learning and a 65% improvement in emotional satisfaction with the educational process. Thus, gamification is an effective tool for ensuring students' emotional engagement and boosting their motivation to learn, aligning with researchers' findings on forming sustainable motivation through innovative methods.

Our study also confirms Wen's (2023) thesis about increasing learners' autonomy in the learning process through gamification. Our data shows that 39.1% of students complete tasks without difficulty, indicating an increase in learner autonomy and the ability to adapt the pace of learning to their own needs, a key aspect of personalised learning in the modern educational environment.

We agree with the conclusions of Aura et al. (2021), who note that in developing countries, the implementation of gamification may be limited due to insufficient resources for the integration of interactive elements and platforms. This significantly limits its potential in the context of high-technology accessibility requirements. One of the key challenges is the need to adapt gamification to diverse cultural and educational contexts, where technological infrastructure often does not meet the modern requirements of pedagogical innovation.

Based on the analysis of studies conducted by Botha and Herselman (2015), it was established that integrating gamification elements into the learning process faces several significant challenges. As a result, the authors emphasise the critical importance of students' effective self-regulation and the use of ICT in education. In this regard, specific gamification methods can successfully foster collaboration and knowledge acquisition. However, it should be noted that not all of these methods are equally effective at promoting learners' independence and their integration into the digital environment.

Therefore, to enhance the effectiveness of gamification approaches, it is crucial to ensure the thorough preparation of educators, continuous support from educational institutions, and adapting curricula and resources to allow for flexibility and personalisation of the learning process.

Improving teaching methods to meet contemporary demands is critical in the current context. Integrating innovative educational strategies, particularly gamification, stands out among these methods. Consequently, educators must be prepared to adapt to new technologies and consider learners' current needs. These requirements involve developing effective methods to foster key competences in students, ensuring their successful integration into the professional environment.

Conclusion

The results of the conducted research showed a significant positive correlation between the implementation of gamification in the educational process and the increase in student engagement and activity in primary and secondary schools. The analysis of survey results highlighted significant statistical differences in the popularity of different gamification platforms and their ability to motivate students to learn. These aspects emphasise the importance of a careful approach when selecting gamification tools that consider students' characteristics and the specifics of educational tasks. Therefore, gamification is a promising tool for enhancing learning, stimulating students' motivation, and developing their key competences. To achieve maximum effectiveness, it is necessary to adapt methods and platforms that contribute to increasing students' motivation.

The practical significance of the research lies in the fact that its results can serve as a foundation for improving teaching practices in primary and secondary schools by integrating gamification elements into the learning process. In particular, the findings can be applied to develop new methodological guidelines aimed at increasing student motivation in primary and secondary education through gamification tools, focusing on the individual characteristics of each student.

Further research in gamification should focus on a detailed analysis of the impact of modern information and communication technologies on students' motivation and the learning process in primary and secondary schools. Additionally, particular attention should be paid to studying the effectiveness of different types of gamification platforms and their adaptation to various cultural environments. An essential aspect of future research is the exploration of strategies for integrating modern technologies into existing educational programmes.

Declarations

Acknowledgements

Not applicable.

Disclosure Statement

No potential conflict of interest was reported by the authors.

Ethics Approval

Not applicable.

Funding Acknowledgements
Not applicable.

Citation to this article
Dubiaha, S., Pushkar, L., Illyash, S., Shvydun, L., & Hlushko, T. (2025). Harnessing gamification for educational leadership and its impact on primary and secondary school students' motivation to learn. *International Journal of Organizational Leadership, 14*(First Special Issue), 582-599. https://doi.org/10.33844/ijol.2025.60502

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