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THE ROLE OF THE GAMIFICATION METHOD IN IMPROVING LESSON EFFECTIVENESS AND PRACTICAL EXAMPLES

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Abstract
This article scientifically analyzes the role and practical aspects of the gamification (game-based learning) method in improving lesson effectiveness in the modern educational system. It is based on recent research showing how the application of game elements in the learning process affects students' cognitive, emotional, and motivational aspects. The article presents a classification of gamification elements, their impact on learning outcomes, as well as examples of practical implementation. Special attention is also given to the contradictory results of various studies, which indicates the need for caution when applying the method.

Keywords: Gamification, game-based learning, lesson effectiveness, learning motivation, educational innovations, gamification elements.

Introduction

One of the greatest challenges facing teachers in the modern educational system is maintaining students' interest in lessons and encouraging them to participate actively. As one of the effective solutions to this problem, the gamification (game-based learning) method has been increasingly applied around the world in recent years. The modern educational system is in the process of transitioning from traditional lecture-based lessons to active, interactive teaching methods, and this transition is affecting all stages of the learning process. In this context, gamification — as a means of fostering a sense of playfulness (gamefulness) in students by incorporating game design elements into the teaching process — has gained great importance. According to the classic definition proposed by Deterding and colleagues (2011), gamification is the process of applying game design elements to non-game contexts such as teaching, meaning not the creation of a full game, but the transfer of individual game-specific elements to another environment.

In recent years, the number of scientific studies in the field of gamification has increased sharply. While the first scientific work on this topic was published in 2002, the number of studies increased sharply from 2013 and reached its highest levels in subsequent years. In bibliometric analyses, thousands of scientific works have been reviewed, and several key research clusters have been identified in this field: gamified learning experience, student learning, K-12 education, science education, gamification effectiveness, and game elements.

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The existence of these clusters shows that gamification is no longer a one-sided "trend," but has become a scientific direction being deeply studied in various directions. At the same time, there is no consensus among scholars regarding the effectiveness of gamification — while some studies show its strong positive impact, others emphasize the need for a cautious approach. This very contradiction constitutes the scientifically interesting aspect of the article. Below, research in both directions is analyzed in detail. The purpose of the article is to theoretically and practically analyze the role of the gamification method in improving lesson effectiveness and to develop evidence-based recommendations. In doing so, not only the advantages of the method, but also its limitations and risks are examined, since applying any pedagogical tool without critical evaluation can lead to erroneous results.

Gamification is the process of introducing elements characteristic of games (point collection, leveling up, rewards, competition, missions and tasks) into non-game areas, including the educational process. This is not simply "playing in class," but rather the art of constructing the learning process to be psychologically attractive and rich in motivation.

Humans are naturally in need of competition, achievement, and recognition. Gamification relies precisely on these needs:

Intrinsic motivation - the student enjoys completing the task because the process itself is interesting.

Extrinsic motivation - motivating action through non-material rewards such as points, badges, or certificates.

Immediate feedback - the student sees their result immediately, which accelerates working on mistakes.

Opportunity to make mistakes in a safe environment - in a game format, losing becomes part of the "fun," and fear decreases.

The theory of gamification is based on several pedagogical and psychological concepts. According to psychologists, gamification aligns with the "flow" theory developed by Mihaly Csikszentmihalyi (2000) — the task should not be too easy, but also not impossible; this precise balance fully immerses the student in the process. According to this theory, when a person performs a task at a level of difficulty appropriate to their skill, they lose track of time and become fully absorbed in the task — this state is observed precisely in well-designed games. Within the framework of Self-Determination Theory, researchers have shown the importance of gamification in enhancing intrinsic learning motivation, since according to this theory, humans have three basic psychological needs: autonomy (making independent choices), competence (feeling one's own ability), and relatedness (connection with others). A well-structured gamification system serves precisely to meet these three needs — for example, the opportunity to choose a level provides autonomy, collecting points provides competence, and team games provide relatedness.

A comprehensive literature review conducted by Hamari, Koivisto, and Sarsa (2014) synthesized empirical studies on gamification and showed that, while the positive effect of gamification was noted in most studies, the results were found to be strongly dependent on the context — that is, in which domain, with what user group, and with what elements it is applied. This conclusion is very important, as it implies that gamification should not be viewed as a

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"magic tool that always works," but rather as a pedagogical tool that must be applied in a context-appropriate manner. In other words, the same game element may yield excellent results in one classroom but fail to produce the expected effect in another, and this difference will depend on the age of the students, the nature of the subject, and how the game element was implemented.

The most reliable method for evaluating the impact of gamification on academic outcomes is meta-analyses that combine multiple studies. A comprehensive meta-analysis conducted by Zeng, Sun, Looi, and Fan (2024) analyzed 22 experimental studies carried out between 2008 and 2023, comparing the outcomes of gamified and traditional lessons. According to the research results, gamification showed a significant and positive impact on student achievement across various geographic regions, educational levels, learning environments, subjects, and game elements. More specifically, using a random effects model, the results showed that gamification has a moderately positive effect on students' academic outcomes. This figure is considered a "medium-to-large" effect by the standards of educational research, indicating that gamification has a real and noticeable impact. At the same time, the researchers found that the level of heterogeneity was very high (93.98%), confirming that the results are not uniform across all contexts, but are strongly dependent on specific application conditions.

An experimental study conducted by Legaki, Xi, Hamari, Karpouzis, and Assimakopoulos (2020) on teaching statistics is particularly noteworthy, as it was carried out with scientific rigor using control groups. The researchers created a gamified program called "Horses for Courses" consisting of elements of points, levels, tasks, and a leaderboard. The study results showed that challenge-based gamification had a positive impact on student learning compared to the traditional teaching method. Furthermore, this effect was found to be greater for female students and engineering students compared to business school students. The statistical analysis results were also reliable: the null hypothesis regarding mean equalities was rejected ($W=23821$, $p<0.001$), indicating that the use of the "Horses for Courses" program has a moderate-level effect. This study shows that gamification does not affect all student groups equally — taking demographic and subject-related differences into account is of important practical significance for teachers. Laksana and colleagues (2024) studied the effect of digital gamification and metacognitive skills on students' problem-solving ability in mathematics education. The research results showed that the combined use of gamification and metacognitive skills leads to the highest level of effectiveness. The points and levels system is particularly effective in mathematical subjects, with points awarded for each correct answer, homework submission, or activity. Based on accumulated points, the student progresses "from level to level." The leaderboard is posted on the classroom wall or an online platform in the form of a weekly ranking, and to avoid negative competition, the board can also be organized as a "group achievement" rather than an "individual achievement." Quest-based learning divides the topic into several "stages," encouraging students to master each stage. Badges and certificates: a digital or paper badge is given to a student who has mastered a certain skill (for example, "Grammar Master," "Fast Calculator"). In linguistics or literature classes, students play the role of a specific character, compose dialogues, or solve problems from the perspective of a "hero." These role-playing activities develop students' creative thinking and help them understand the

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topic more deeply. The mission and tasks method in history classes encourages students to play the role of a "Great Silk Road traveler" and consolidate knowledge by completing tasks about each city and filling in the "map." In escape room-style lessons, students work in groups to solve several puzzles and tasks with the aim of "escaping the room." Each task tests knowledge of the subject (for example, finding a "key" by solving a chemistry formula). In the virtual currency and "shop" system, students can exchange their accumulated points in the classroom's virtual "shop" — for example, for extra time, a small prize, or privileges (such as the right to choose a seating place).

From a scientific integrity standpoint, studies showing that gamification does not always produce positive results cannot be overlooked. Hanus and Fox (2015) conducted a long-term study over a 16-week semester between two courses (one gamified — with a leaderboard and badges, the other traditional) and obtained unexpected results. According to the study results, students in the gamified course showed less motivation, satisfaction, and intrinsic empowerment over time compared to students in the traditional course. More importantly, the effect of the course type on final exam scores was mediated through students' intrinsic motivation levels, meaning that students in the gamified course had less motivation and lower final score indicators. From this result, the researchers concluded that caution is necessary when applying certain gamification mechanisms in education. This result, in particular, warns about the negative impact of systems that place heavy emphasis on rewards (rankings and badges) — because excessive reliance on external rewards can "crowd out" intrinsic interest, which in psychology is called the "overjustification effect."

How can the two contrasting results above — on one hand a strong positive effect, and on the other a negative effect — be explained? As emphasized in Zeng and colleagues' (2024) analysis, while the positive effect of gamification has been noted in various studies, cases where no improvement in student outcomes was observed have also been identified in some studies. The main reason for this difference is the type of game elements used, the degree to which they have been tailored to the purpose, and the characteristics of the student group. For example, as studied by Legaki and colleagues (2020), gamification results vary depending on the subject and area of application, which is why researchers emphasize the need for stronger empirical evidence. Thus, when introducing gamification, a teacher should avoid the "one size fits all" principle and instead select elements appropriate to the age, subject, and psychological needs of their classroom. Furthermore, recent meta-analyses on K-12 education have noted that the effectiveness of gamification varies depending on the duration of the intervention and the type of motivation, with small but statistically significant effects observed in some cases. This shows that short-term, "one-time" gamification activities may have less impact compared to a long-term, systematic approach. For gamification to be effective, the following points must be considered, and these recommendations are based on the results of scientific research. Staying focused on the goal — the game element must not obscure the learning objective; the game should always remain a means, not an end, because if the game itself is interesting but fails to fulfill the function of imparting knowledge, its educational value is lost. Avoiding excessive competition — as shown by Hanus and Fox's (2015) study, for students who remain in a perpetual "loser" position, motivation may actually decrease and even their sense of inner

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empowerment may diminish. Considering age characteristics — visual and physical games are more appropriate for younger students, while intellectual and digital formats are more suitable for older ones, since each age group differs in terms of attention and perception. Maintaining balance — it is not necessary to turn every lesson into a game; on the contrary, gamification should remain a supplementary tool, not a replacement for the core methodology. Individual approach — the needs and abilities of each student must be taken into account, as the same game elements may not have the same effect on all students. Technological infrastructure — when implementing gamification through digital platforms, sufficient technical capabilities must be available. Teacher competence — the correct selection and application of gamification elements depends on the teacher's pedagogical skills. Assessment criteria — there must be a clear link between game elements and the assessment system. Long-term monitoring — long-term studies must be conducted to fully evaluate the impact of gamification.

Beyond the scientific results presented above, the impact of gamification on cognitive processes also deserves separate study. The decline of student attention after a certain time in traditional lessons is widely documented in pedagogical literature, and game elements (timers, competition, animation) help maintain attention for longer. The desire to collect points or rise to a higher position on the leaderboard transforms students from passive listeners in class to active participants — however, the Hanus and Fox study discussed above reminds us that this activity can sometimes arise not from intrinsic motivation, but from external pressure. There are assumptions suggesting that knowledge acquired through an emotionally pleasant experience is retained longer in memory — knowledge acquired through play is remembered as an "event," not merely as information, but this effect only arises when the game element is linked to a meaningful learning objective. Most digital gamification platforms adapt to each student's pace, which helps implement the principle of differentiated instruction and allows for an individual approach to students of varying levels simultaneously. Finally, games played in teams cultivate the spirit of collaboration, communication, and healthy competition, which serves not only academic but also social-emotional skill development.

According to the research results, the most commonly used gamification elements in education are the following:

Element	Description	Role in Education
Points	Points awarded for each correct answer or task	Motivating student actions
Leaderboards	Comparing results among students	Creating a competitive environment (requires caution)
Badges	Symbols awarded for achieving specific accomplishments	Ensuring long-term motivation
Levels	Level increased by completing tasks	Visually showing progress
Time limits	Completing tasks within a given time	Increasing speed and attention
Team play	Completing tasks in groups	Developing collaboration skills

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Below are specific methods that can be applied in the classroom for various subjects and age groups. Each example is recommended based on the scientific conclusions presented above — that is, in a manner that does not undermine but rather enhances intrinsic motivation.

Points are awarded for each correct answer, homework submission, or activity. Based on accumulated points, the student progresses "from level to level" (for example, "Beginner" → "Experienced" → "Master"). This is particularly effective in mathematical subjects, because it clearly and visually shows the student's personal development. An important aspect is that points should be compared not with other students, but with the student's own previous results, which helps maintain intrinsic motivation.

A weekly ranking is posted on the classroom wall or an online platform. However, an important point here is that — as the Hanus and Fox (2015) study showed — leaderboards can reduce motivation in some students, so to avoid negative competition, the board can also be organized as a "group achievement" rather than an "individual achievement." Additionally, introducing a separate "progress ranking" (most improved) for students who are consistently falling behind would be beneficial.

The topic is divided into several "stages," with each stage being a separate "mission." For example, in a history class, students play the role of a "Great Silk Road traveler," completing tasks about each city and filling in the "map." This approach aligns with the challenge-based gamification approach of Legaki and colleagues (2020), as it encourages students to develop through progressively more challenging tasks. A student who has mastered a certain skill is given a digital or paper badge (for example, "Grammar Master," "Fast Calculator"). This makes the student's personal achievements visible. As shown in studies, badges generate less negative competition than leaderboards, because they reward each student's individual achievement without comparing them to others. Quick, competition-style quizzes are conducted at the end of the lesson using digital tools such as Kahoot!, Quizizz, and Blooket. This is particularly effective in review lessons, as immediate feedback allows students to immediately reinforce their knowledge. Since the competition on such platforms is short-term, the risk of long-term negative effects is also lower. In linguistics or literature classes, students play the role of a specific character, compose dialogues, or solve problems from the perspective of a "hero." This method satisfies the need for autonomy in Self-Determination Theory, as the student chooses their own role and solution path. Students work in groups to solve several puzzles and tasks with the aim of "escaping the room." Each task tests knowledge of the subject (for example, a "key" is found by solving a chemistry formula). This format encourages teamwork and collaboration, which is consistent with the positive effects noted in Legaki and colleagues' (2020) study. Students can exchange their accumulated points in the classroom's virtual "shop" — for example, for extra time, a small prize, or privileges (such as the right to choose a seating place). Caution is required when applying this method — if rewards become too material, external expectation may replace intrinsic interest, so it is advisable to choose rewards in the form of meaningful privileges related to the learning process itself.

For gamification to be effective, attention must be paid to the following points. First, staying focused on the goal is important — the game element must not obscure the learning objective; the game must always remain a means, not become an end, because if the game itself is

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interesting but does not fulfill the function of imparting knowledge, its educational value is lost. Second, as shown by Hanus and Fox's (2015) study, avoiding excessive competition is necessary — for students who remain perpetual "losers," motivation may actually decrease and their sense of inner empowerment may even diminish. Third, age characteristics must be taken into account — visual and physical games are more appropriate for younger students, while intellectual and digital formats are more suitable for older ones, since each age group differs in attention and perception. Fourth, maintaining balance is necessary — it is not necessary to turn every lesson into a game; on the contrary, gamification should remain a supplementary tool and not replace the core methodology. Fifth, as shown by Legaki and colleagues' (2020) study, taking into account the demographic characteristics of the student group (gender, direction, interests) when selecting gamification elements yields beneficial results, since the same element may affect different groups differently. Sixth, when designing the reward system, attention must be paid to the delicate balance between intrinsic and extrinsic motivation — an excessive number of external rewards can, paradoxically, reduce students' natural interest in the subject. Seventh, before introducing gamification, it is recommended that the teacher define a clear pedagogical goal and verify that each game element serves that goal. Eighth, the duration of the intervention is also an important factor — short-term, one-time activities may not produce lasting results, so a systematic and continuous approach is preferred. Ninth, the teacher must regularly monitor students' reactions and be ready to modify or cancel a gamification element in a timely manner if it does not produce the expected results. Tenth, particular caution is needed when directly linking gamification to the grading system, as there are specific warnings that this may have a negative impact on students' attitudes toward the subject.

The analysis of scientific research presented above shows that gamification is one of the powerful yet inconsistently functioning tools of modern pedagogy. On one hand, the comprehensive meta-analysis of Zeng and colleagues (2024) statistically confirmed a medium-to-large positive effect of gamification on academic outcomes, and the experimental study of Legaki and colleagues (2020) showed the effectiveness of challenge-based gamification in specific subjects. On the other hand, the long-term study of Hanus and Fox (2015) showed that gamification — especially in its ranking- and reward-based form — can in some conditions have a negative impact on intrinsic motivation and even on academic outcomes. The coexistence of these two different results means that the effectiveness of gamification is not based on the principle "if applied, it works," but rather on a complex set of factors depending on "how, for whom, and for how long it is applied."

First, gamification has a complex effect on students' cognitive, emotional, and motivational aspects. This effect is not limited to the fun of playing, but is realized through deep psychological mechanisms such as Self-Determination Theory and flow theory. Second, the effectiveness of gamification depends on how it is applied — gamifying the assessment system may negatively affect students' perceptions of the subject, so gamification elements must be carefully selected. Third, the long-term impact of gamification has not yet been sufficiently studied — many studies have measured short-term outcomes, and there is a need to conduct deeper, longer-term research in this area. Practical recommendations are as follows. For teachers: always keep the pedagogical goal as the top priority when gamifying lessons, apply

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game elements to the extent that they serve the purpose of imparting knowledge, and take into account the individual characteristics of each student. For educational institutions: organize professional development courses for teachers on gamification methods, create access to digital platforms, and develop guidelines for using gamification elements in lesson planning. For researchers: study the long-term impact of gamification, the separate effect of individual game elements, and adaptability to context, and conduct additional research across different age groups and subject areas. For policymakers and educational organizations: develop government programs for the widespread introduction of gamification technologies into educational institutions, study international experience, and adapt it to national educational standards.

The final conclusion is that if a teacher applies gamification based on a clear pedagogical goal, equally taking into account the risks and opportunities shown by scientific research, and considering the characteristics of each student, lesson effectiveness will increase significantly and the educational process will become an unforgettable and useful experience for the student. Conversely, one must always keep in mind that introducing gamification mechanically, without critical thinking, may produce the opposite of the expected result.

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