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Gamification as a method supporting the adaptation of first-year students to the university life

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Abstract

The phenomenon of mass student attrition before graduation is a pressing challenge faced by universities globally, including those in Poland. Between 2012 and 2020, over 1.3 million individuals withdrew from Polish universities, failing to resume their studies within a year of deregistration. Notably, the highest dropout rates – up to 70 % – occur within the first two semesters of study. This trend is driven by a confluence of individual factors, such as a lack of interest in the chosen field of study or personal difficulties, and institutional factors, including curriculum design and the pedagogical competencies of academic staff. A key determinant of student retention is the ability to adapt to the distinct norms and expectations of academic life. The successful transition of first-year students to university life is crucial for their subsequent personal and professional development. However, many first-year students struggle with high academic standards, an extensive curriculum, difficult subjects, and monotonous theoretical lectures. Addressing dropout rates necessitates pedagogical reforms, including the adoption of more active teaching methods that promote student engagement, foster critical thinking, and enhance problem-

solving skills. Such reforms empower students to take greater responsibility for their learning, thereby improving their academic experience and retention.

The objective of the project conducted under the *Masters of Didactics – Advanced Program* was to develop a method aimed at increasing student engagement and improving academic performance among first-year students in an engineering program at Lodz University of Technology. The introduction of gamification elements in one of the courses led to a marked improvement in student attendance and heightened willingness to undertake additional challenges. Although the impact of these modifications on students' final academic achievements yielded mixed results, gamification demonstrates significant potential as an effective strategy, particularly for first-year students, to enhance engagement and support their adaptation to the academic environment.

Keywords

university dropout, first-year students, adaptation to study, gamification

Grywalizacja jako metoda wspierająca adaptację studentów pierwszego roku do rzeczywistości akademickiej

Abstrakt

Uczelnie, zarówno w Polsce jak i na całym świecie, mierzą się obecnie ze zjawiskiem masowego ubytku studentów przed uzyskaniem dyplomu. W latach 2012-2020 ponad 1,3 mln osób zrezygnowało ze studiowanego kierunku na polskich uczelniach i w ciągu roku od skreślenia z listy studentów nie podjęło ponownie nauki na nim. Najwięcej przypadków dropoutu przypada na dwa pierwsze semestry studiów (do 70 %). Jest to wynik zarówno różnorodnych czynników indywidualnych (brak zainteresowania kierunkiem studiów, problemy osobiste studenta) jak i szeregu czynników instytucjonalnych, w tym programów studiów oraz kompetencji, także dydaktycznych, nauczycieli

akademickich. Ważnym czynnikiem wpływającym na decyzję o pozostaniu na studiach jest umiejętność adaptacji do odmiennych zasad akademickiego życia. Pomyślna adaptacja studenta pierwszego roku do życia i działalności akademickiej na uczelni jest kluczem do jego dalszego rozwoju osobistego i zawodowego. Szczególnie trudne dla studentów pierwszego roku są wysoki poziom studiów, szeroki zakres materiału, trudne przedmioty, ale także nużące teoretyczne zajęcia i tradycyjnie prowadzone wykłady. Ograniczenie zjawiska dropoutu to między innymi zmiana metod nauczania na bardziej aktywne i pozwalające studentowi przejęcie odpowiedzialności za własna edukację. Nowoczesne metody nauczania angażują studentów bezpośrednio w proces uczenia się poprzez różnego rodzaju aktywności i dyskusje, zachęcając do krytycznego myślenia i doskonaląc umiejętności rozwiązywania problemów.

Celem projektu realizowanego w ramach szkolenia Mistrzowie Dydaktyki – Advanced Program było wypracowanie metody zwiększenia zaangażowania oraz poprawy osiągnięć studentów pierwszego roku jednego z kierunków inżynierskich na Politechnice Łódzkiej. Wprowadzone w ramach jednego z przedmiotów elementy grywalizacji znacząco poprawiły frekwencję studentów na zajęciach oraz ich gotowość do podejmowania dodatkowych wyzwań. Pomimo niejednoznacznych wyników dotyczących końcowych osiągnięć studentów w zmodyfikowanym przedmiocie, grywalizacja zdaje się być (szczególne dla studentów pierwszego roku) bardzo obiecującą metodą poprawiającą zaangażowanie i ułatwiającą adaptację do procesu studiowania.

Słowa kluczowe

rezygnacja ze studiów, studenci pierwszego roku, adaptacja do studiów, grywalizacja

1. Introduction

The transition from high school to university represents a critical milestone in the lives of young individuals, often accompanied by a sense of excitement and anticipation. However, this

transition also poses numerous challenges, which can complicate the adaptation process for many first-year students. One of the most immediate and significant difficulties they encounter is adjusting to the academic demands of university life. The coursework at university level typically differs substantially from that of high school, both in terms of complexity and volume. Students may face challenges such as time management, study skills, social and emotional adjustment, financial pressures, and issues related to mental and physical health. These factors can hinder their ability to adapt to the new academic environment. Unfortunately, such difficulties may contribute to a considerable proportion of first-year students leaving university prematurely (Lorenzo-Quiles et al. 2023).

In the terminology of educational success research, the phenomenon of students discontinuing their chosen field of study before obtaining a diploma, regardless of the reasons or circumstances, is referred to as "dropout" (Quinn 2013; Kehm et al. 2019). This term encompasses both students who have entirely withdrawn from higher education and those who have interrupted their current course of study to pursue a different field or transfer to another institution. The work of American sociologist and anthropologist Vincent Tinto (1975) is considered seminal in dropout research, as he was the first to propose a conceptual framework that has since served as the foundation for subsequent analyses.

The dropout phenomenon is a multifaceted issue with significant consequences for both individuals and institutions. For individuals, leaving university before graduation typically results in reduced lifetime earnings compared to graduates, limiting career opportunities and financial stability (OBW 2023). Moreover, the sense of failure and disappointment associated with dropping out can negatively impact self-esteem and mental health, potentially leading to long-term emotional and psychological challenges. For educational institutions, student dropout translates into financial losses, as universities often rely on state subsidies, which are contingent on student enrolment numbers, as a key source of funding. High dropout rates can

adversely affect an institution's budget, undermining its capacity to provide quality education and resources. Additionally, elevated dropout rates can damage an institution's reputation, reducing its appeal to prospective students and faculty.

At the societal level, less educated workforce can hinder a country's economic growth and innovation potential, as higher levels of education are generally linked to increased economic productivity, technological advancement, and social progress (OPI 2022). Furthermore, high dropout rates and extended time to graduation are recognized in numerous European Union policy documents as inefficiencies in public spending, as well as obstacles to the development of human capital (Stiburek 2017). Consequently, addressing these issues is crucial for fostering sustainable economic and social development.

By understanding the diverse challenges students encounter and implementing targeted support strategies, educational institutions can enhance retention rates and promote both the academic and personal success of their students. In response to the limitations of traditional teaching methods, which are proving increasingly ineffective for contemporary students, universities are adopting modern pedagogical approaches. These innovative strategies not only improve learning outcomes but also facilitate students' transition to higher education. By incorporating methods such as active learning, technology-enhanced learning, personalized instruction, problem-based learning, gamification, and hybrid models, universities can create a more engaging, supportive, and effective learning environment (Yakovleva and Yakovlev 2014). Such approaches not only improve academic performance but also foster social connections, develop practical skills, and cultivate a sense of belonging, all of which are crucial for a successful adaptation to university life.

The aim of the project discussed in this article was to integrate gamification elements into the curriculum of one of the courses within the Environmental Engineering in Construction program at Lodz University of Technology. The primary objective of this initiative was to evaluate whether the modification of the

teaching method would enhance student engagement in the learning process and lead to improved academic outcomes.

2. Literature review

Between 2012 and 2020, over 1.3 million students discontinued their chosen fields of study and did not return within a year of withdrawal. These individuals accounted for as much as 40 % of the student population during the analysed period (OPI Report).

In the past, student dropout was regarded as a normal aspect of academic selection, contributing to the perception of higher education as an elite pursuit (Marciniak et al. 2014). Prospective students, particularly first-year students, were expected to adapt to the established academic norms and assessment criteria in order to remain enrolled in higher education. Moreover, completing a university degree was associated with prestige and typically led to enhanced career prospects. For individuals from smaller towns, attending university often required relocating to larger cities and provided opportunities for social advancement. Despite the relatively low number of applicants – around 10 % of high school graduates in the 1980s – universities consistently experienced higher demand than the number of available spots.

Statistical data unequivocally demonstrate that higher education in Poland has undergone significant expansion. Prior to the political transformation of 1989, the country had 112 higher education institutions, serving a total of 378,400 students (Statistical Yearbook, GUS 1992). However, by the 2010/11 academic year, the number of higher education institutions had increased fourfold to 460, while the student population had expanded more than fivefold (Statistical Yearbook, GUS 2011). The peak in student enrolment was reached during the 2005/06 academic year, when over 1.953 million students were registered. This dramatic growth has led to the conclusion that, in the span of thirty years, higher education in Poland "definitively transformed from an elite institution [...] into a mass institution" (Kupisiewicz 1982). This shift from an elite to a mass system

marks a profound change in the accessibility and reach of higher education, reflecting broader societal changes as well as the effects of Poland's political and economic transformation.

Despite the mass nature of higher education in Poland, evidenced by the fact that over 40 % of high school graduates apply to universities and approximately 1.2 million students are enrolled annually, universities frequently face challenges related to insufficient applicant numbers. In certain programs, the ratio of candidates to available spots is less than 0.5 per position. This issue arises in the context of significant changes in the higher education landscape, including shifts in funding models, the proliferation of universities and their branches – particularly within the private sector—and increased competition between institutions. As a result, universities are now required to compete for every prospective student.

Higher education is increasingly being treated as a commercial product, subject to the dynamics of free-market competition. In this environment, universities that offer superior educational programs, more effectively align with labour market trends, and provide robust support to students throughout the educational process are likely to gain greater popularity and attract more qualified candidates. Research conducted among students has identified key attributes that contribute to the perception of high-quality education. These include the teaching competencies of lecturers, the relevance of educational programs to labour market demands, and the substantive preparation of teaching staff (Ratajczak 2016: 182). The above mentioned factors are considered critical by students in evaluating the overall quality and attractiveness of a university.

Research on university dropout consistently indicates that students who leave higher education prematurely do so for a variety of reasons, including academic failure and voluntary withdrawal (Tinto 1993). Scholars agree that dropping out is rarely the result of a spontaneous, short-term decision or a single factor. Instead, it is understood as a process in which various influencing factors accumulate, leading to a "constellation of

problems that makes leaving the higher education institution seem inevitable" (Heublein 2014: 503).

Five major components are commonly identified as contributing to university dropout: student adaptation, personality traits, socio-economic status, the quality of teacher–student relationships, and the overall quality of university education. These core factors are further accompanied by specific sub-causes, such as demotivation, low self-esteem, frustration, pregnancy, and other personal challenges. Understanding these sub-causes is essential for developing effective strategies to address and eventually reduce dropout rates (Fall and Roberts 2011; Lorenzo-Quiles et al. 2023).

The views of Polish experts corroborate the argument that high dropout rates, particularly in the first year of university, are also shaped by systemic issues in the public education system, which inadequately prepares high school graduates for the demands of higher education (Antonowicz et al. 2014). This underscores the importance of addressing not only individual factors but also broader structural deficiencies in order to mitigate the problem of university dropout.

Support for students at risk of dropping out must be multifaceted and comprehensive. This requires not only a thorough analysis of the problem but also an individualized approach tailored to the specific needs of each student. It is widely recognized that many of the challenges faced by students, particularly those in their first year, can only be effectively addressed at the institutional level. In response to rising student attrition rates, universities have sought to implement a variety of projects and programs designed to support students throughout their academic journey. These initiatives encompass a wide range of measures, from guidance in selecting a field of study to financial assistance, adaptation programs, psychological support, tutoring, mentoring, and community-building activities (Fashola and Slavin 2009; Midford 2023).

Moreover, many universities have established dedicated teams and projects aimed specifically at reducing student dropout rates, such as the START program at the University of Gro-

ningen. In addition to institutional efforts, there are numerous grassroots initiatives led by academic staff who recognize the need for reform within Polish higher education. An example of such an initiative is the foundation established by participants of the Masters of Didactics training series, which seeks to improve the educational experience and support students at risk of leaving university prematurely. These efforts highlight the importance of both top-down institutional strategies and bottom-up initiatives in addressing student attrition.

The vast majority of student dropouts occur relatively early in the academic journey. According to data from the OPI Report (2012–2020), two-thirds of withdrawals from first-cycle studies, 60 % from second-cycle studies, and half from long-cycle master's programs take place within the first two semesters. The first year of university appears to be the most critical period for student adaptation, as it presents a multitude of potential challenges that can hinder successful integration into the academic environment (Clinciu 2013; Birzina et al. 2019). Studies conducted during the first semester reveal that many students struggle to adjust to the demands of university life and the process of studying itself (Ketrish et al. 2017; Cameron and Rideout 2022).

The primary factors affecting student adaptation during this period can be categorized into institutional and personal domains. Institutional factors include the quality of the educational environment and support services, while personal factors encompass students' prior educational experiences and their ability to learn independently. Inadequate adaptation can result in a range of negative psychological outcomes, such as anxiety, depression, increased stress vulnerability, anger, low mood, and mental health disorders (Lorenzo-Quiles 2023).

However, positive psychological adjustment, satisfaction with one’s studies, the development of effective coping strategies, a stronger sense of self-efficacy, and higher self-esteem can mitigate these negative effects. Additionally, the first year is a period in which students develop crucial competencies, including independent functioning, effective time and financial manage-

ment, and intrinsic motivation for learning (Reason et al. 2006; Mattanah et al. 2004). These competencies are essential for students' long-term success and resilience in the face of academic challenges.

In today's rapidly evolving educational landscape, the role of the academic teacher has undergone a significant transformation. No longer limited to the traditional functions of lecturing and grading, academic teachers are now expected to fulfil a multifaceted role that includes mentorship, innovation, and the creation of dynamic learning environments. Contemporary education places a strong emphasis on developing transferable skills and competencies, such as critical thinking, communication, collaboration, and creativity. Academic teachers are crucial in designing curricula and learning activities that foster these skills. By incorporating pedagogical strategies such as problem-based learning, group projects, and real-world applications, they help students acquire the competencies needed to succeed in an increasingly complex and fast-changing world.

Higher education itself is undergoing substantial transformation, driven by technological advancements, evolving student expectations, and a deeper understanding of effective pedagogical practices. Central to this transformation are modern teaching methods, which play a pivotal role in enhancing the quality of education, increasing student engagement, and preparing students for the demands of the 21st century. One of the principal benefits of these methods is their ability to foster greater student engagement. Traditional lecture-based approaches, which often lead to passive learning, can make it difficult for students to maintain interest and absorb information effectively. In contrast, modern techniques such as active learning, flipped classrooms, and gamification directly involve students in the learning process, making education more interactive and dynamic (Andrews et al. 2011; Abeysekera and Dawson 2015; Kumari et al. 2023).

Among these methods, gamification – the integration of game elements into non-game contexts – has emerged as a powerful educational tool (Deterding et al. 2011). Although it began to be

used more widely in education only in the 21st century, gamification has quickly gained its popularity. By incorporating elements such as points, badges, leaderboards, and game-like challenges into learning activities, educators aim to increase student engagement, motivation, and overall learning outcomes (Zichermann and Cunningham 2011). This innovative approach leverages the intrinsic motivation and competitive spirit associated with games to create a more dynamic and interactive educational experience.

One of the primary advantages of gamification is its ability to significantly enhance student engagement (Kapp 2012; Seaborn and Fels 2015; Oliveira 2022). Traditional educational methods often struggle to maintain students' sustained interest, leading to disengagement and suboptimal performance (Lee and Hammer 2011). Gamification addresses this issue by making learning more enjoyable and stimulating (Arslan Namli 2016). When students receive immediate feedback, earn rewards for their achievements, and see tangible progress, they are more likely to remain motivated and actively engaged in their studies.

In addition to fostering engagement, gamification enhances motivation by providing clear goals and rewards. The use of points, badges, and leaderboards introduces a sense of achievement and progress, which can be particularly motivating for students who may not respond as effectively to traditional grading systems (Barata et al. 2013; Gibson et al. 2013). The competitive aspects of gamification, such as leaderboards, also introduce a social element into learning, encouraging students to strive for excellence not only for personal satisfaction but also for recognition among their peers (Berkling and Thomas 2013). This competitive dynamic can drive students to put forth greater effort and take a more active role in their education.

Moreover, gamification supports the development of essential skills, including critical thinking, problem-solving, and teamwork. Many gamified activities are designed to be collaborative, requiring students to work together to meet challenges. This collaborative aspect not only helps students develop social and communication skills but also fosters a sense of community and

belonging within the classroom. Problem-solving tasks within a gamified framework encourage students to approach problems from different perspectives, thereby enhancing their analytical abilities (Kim and Castelli 2021).

Beyond its ability to boost engagement and motivation, gamification also offers valuable data on student performance and learning progress (Oliveira 2023). Through gamified systems, educators can track student performance, identifying which students are excelling and which may need additional support. This data-driven approach allows for more personalized and targeted interventions, ensuring that each student receives appropriate challenges and assistance.

However, despite its many benefits, gamification is not without challenges (Fuchs 2023). Effective implementation requires careful design to ensure that game elements align with educational goals and do not overshadow learning objectives. There is a risk that students may become more focused on earning rewards than on mastering the material. Additionally, the competitive aspects of gamification may lead to increased stress and anxiety for some students (Toda et al. 2017). Thus, educators must strike a balance, using gamification as a tool to enhance learning rather than as an end in itself.

To implement gamification effectively, thoughtful planning and consideration of students' specific needs and preferences are essential (Smiderle et al. 2020; Dicheva et al. 2015). Teachers should strive to create an inclusive and accessible gamified learning environment that provides multiple pathways to success. It is crucial that rewards and challenges are meaningful and relevant to the learning objectives, ensuring that all students benefit from the gamified approach (Dichev and Dicheva 2017).

3. Project

Lodz University of Technology, similar to other technical universities in the country, experiences a notably high dropout rate

among students, particularly during their first year of study. This phenomenon can be attributed to several factors. In addition to the common challenges related to adjusting to a new style of learning compared to high school, integrating into the academic environment, and managing the transition to independent living and personal responsibility, students also face difficulties arising from the demanding nature of the curriculum. These challenges are exacerbated by educational gaps carried over from high school, which hinder students' ability to cope with the increased academic rigor.

The growing difficulty students experience in adapting to the learning methodologies employed at higher education institutions, coupled with deficiencies in their high school education, is becoming increasingly evident. Furthermore, there has been a noticeable shift in the attitudes of young people, particularly in their interactions with academic staff and their approach to education. It is increasingly challenging for students to make a transition from perceiving learning as an obligation to viewing it as an opportunity for personal growth and self-development.

In this context, it is important to note that contemporary students demand new and innovative teaching methods. Traditional pedagogical approaches are proving less effective than they once were. Young people, having grown accustomed to the pervasive use of technology, are constantly exposed to multiple stimuli from digital devices such as computers and smartphones. Consequently, traditional teaching methods, which often lack the dynamic and multisensory engagement of modern multimedia forms of communication, are frequently perceived as monotonous.

One of the most common leisure activities among young people is playing video games, which offer a level of interactivity that traditional forms of entertainment, such as films or books, cannot match. Many video games require players to develop key skills, including quick reflexes, strategic thinking, and logical reasoning. Young people are drawn to the challenges presented by games, which allow for continuous personal development. Moreover, video games often incorporate reward systems that

recognize and reinforce player achievements, such as unlocking new levels or acquiring in-game items. These rewards provide players with a sense of accomplishment and motivation to persist. As a result, gamification has emerged as an increasingly popular approach in education. By integrating game elements into learning, educators can effectively motivate students and foster greater engagement with the educational process.

The objective of this project was to modify the teaching methodology for the course "Sanitary Biology" in the Environmental Engineering in Construction program by incorporating gamification elements, such as scoring systems, levels, badges, and leaderboards. These elements were introduced into the lecture component of the course, while laboratory exercises, being primarily practical in nature, remained unchanged. The primary aims of this modification were to enhance student engagement in the subject through optional point-based tasks, improve lecture attendance, and increase focus on the content presented. Additionally, participation in the gamified learning process was intended to make the subject matter more accessible and enjoyable for students.

Participation in the gamification initiative was entirely voluntary. At the beginning of the semester, students were invited to declare their involvement in the game; however, this declaration did not impose any obligation to complete specific tasks. Importantly, students were neither penalized for inactivity nor for a lack of progress in the game. Furthermore, every activity undertaken by students within the course was awarded points, which ranged from lecture attendance to various tasks, spontaneous test questions, and quizzes based on lecture content. Additionally, students could earn bonus points, for instance, by committing to the game (incentive points) or through consistent attendance, such as attending multiple consecutive lectures without being late. Thus, by accumulating a certain number of points, students were able to advance to the next level within the game.

Initially, all participants began at the "Trainee" level. Upon reaching the designated point threshold, they advanced through

successive levels, namely “Specialist,” “Expert,” and finally “Master”. Notably, the last two levels were associated with tangible rewards, as students reaching these levels received an additional 10 % or 15 % of points, respectively, on their final lecture exam. Moreover, the student who emerged as the overall winner of the competition was awarded the highest grade for the lecture portion of the course.

In addition to the level system, badges were awarded throughout the game to recognize specific achievements. For example, the “Leader's Shirt” was awarded to the student ranked first, “Genius” was given for perfectly completed tasks, “Sharpshooter” was granted to students who answered at least 90 % of quiz questions correctly, and “Philanthropist” was awarded to those who generously donated points to a classmate.

The gamification spanned 11 weeks of the 13-week lecture period. Each week, beginning in the sixth week of the semester, a ranking was published on the WIKAMP platform (an educational platform at Lodz University of Technology based on Moodle), displaying the current scores and badges earned. In order to ensure anonymity, the ranking listed only encrypted player data. At the start of the game, students selected pseudonyms (nicknames for the game), which were known only to the instructor. At the end of the lecture series, the gamification results were summarized, and prizes were awarded. These included promotional items provided by the University’s Promotion Department, which were presented to the three students with the highest scores, and only their names were disclosed.

This project has been implemented three times to date, during the summer semesters of the 2021/22, 2022/23, and 2023/24 academic years. It involved 21, 24, and 17 first-year students, respectively, from the Environmental Engineering in Construction program. Significantly, each year, all students within the cohort opted to participate in the game. In order to assess the effectiveness of the project, several parameters were evaluated, including lecture attendance, the frequency with which students undertook additional tasks, and final grades from the lecture component of the course. These results were

then compared to the performance of students in the same course during the three preceding academic years (2018/19, 2019/20, and 2020/21), in which 26, 44, and 27 students participated, respectively, and where the classes were conducted in a traditional, non-gamified manner. Thus, the comparison provides insights into the impact of gamification on student engagement and academic performance.

3.1. The impact of the project

The influence of the project on student achievements appears to be somewhat ambiguous. Nevertheless, the implementation of gamification clearly influenced student attendance at lectures (72 % in non-gamified cohorts compared to 90 % in gamified ones) as well as the completion of various optional tasks, which, although limited, also existed prior to the project's implementation. In the years preceding the introduction of gamification, only 3-4 students per year (approximately 10 %) completed all additional tasks. In contrast, with the gamified approach, this rate increased significantly, averaging 57 % across all studied cohorts. These data suggest an increase in student engagement and a greater willingness to undertake additional challenges following the introduction of gamification in the course.

However, despite the fact that 100 % of students initially declared participation in the gamification, there were consistently some students (approximately 15 % per cohort) who either did not engage or engaged only minimally in completing the additional tasks. This suggests that while gamification may encourage higher levels of participation, it does not guarantee universal engagement. Student performance on the final test showed a slight improvement following the introduction of gamification, with an average score of 3.38 compared to 3.22 in the non-gamified cohorts. Similarly, the percentage of students passing the test on the first attempt was marginally higher in gamified groups (68 % versus 59 %). These differences could be attri-

buted, at least in part, to the additional points students earned for reaching certain levels in the game.

However, it is important to note that the small size of the student groups (the limited sample size) may have influenced these results, as individual differences in students' abilities and their initial preparation for the course could also play a role. This assumption is supported by the fact that one of the gamified cohorts achieved a slightly lower final test score than the students who completed the course in the traditional format. Despite these mixed results, the project will continue to be implemented in the course in future years, with planned modifications and improvements aimed at further enhancing student performance on the final test.

4. Conclusions

Gamification in education represents a promising strategy for addressing several persistent challenges associated with traditional educational methods. By making learning more engaging, motivating, and interactive, it has the potential to enhance educational outcomes and foster the development of essential skills for the future. Nevertheless, some studies indicate that the use of gamification in an educational context does not always lead to improved student outcomes (Toda et al. 2018; Koivisto and Hamari 2019). Consequently, the effectiveness of gamification may vary depending on the specific design of the gamified system, particularly the selection of game elements, which can lead to different student experiences and learning outcomes.

Therefore, the success of gamification in education is contingent upon its careful implementation and a focus on preserving the integrity of the educational objectives. When employed effectively, gamification has the potential to transform the learning experience, making it both more enjoyable and more conducive to achieving positive educational outcomes for students.

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