

Gamification in E-Learning: Impact on Student Motivation and Retention

¹Dr. J. Ramya, ²Kartik Dayal, ³Insi Gandhi, ⁴Dr. Karishma Agarwal, ⁵Dr. Sunil Chaudhary

¹Associate Professor, Department of Business Administration, Faculty of Management. Vadapalani Campus. SRM Institute of Science and Technology, Vadapalani Campus, Chennai

²Assistant Professor, Department of Commerce, Jagannath International Management School, Kalkaji, New Delhi

³PhD Scholar Department of Mass Communications, Somaiya School of Humanities & Sciences. Somaiya Vidyavihar. Mumbai, Maharashtra

⁴Assistant Professor, TMCLLS, Faculty of Law, Teerthanker Mahaveer University, Moradabad, India

⁵Assistant Professor Department of Commerce and Management SEMCOM C. V. M. University, Vallabh Vidyanagar, Gujarat

Abstract:

Gamification in e-learning has become an innovative solution to overcome the problems of student motivation, participation and the continuity of learning in digital learning environments. Gamification can be defined as the use of game elements within non-game learning contexts like points, badges, levels, challenges, leaderboards, rewards and feedback. This study explores the effects of gamification in the e-learning environment on student motivation and retention, specifically focusing on how learning activities, such as interactive and reward-based approaches, affect students' participation and continuation in online learning. The study includes both cognitive and behavioural aspects of motivation, as well as emotional aspects, and sustained participation, course persistence, and learners' willingness to maintain involvement with digital learning environments is examined as a measure of retention. Gamified learning mechanisms can offer students feedback, learning goals, opportunities to achieve learning goals, and a sense of participation, which might help to reduce the likelihood of students becoming disengaged and improve the continuity of learning. Meanwhile, the impact of gamification can differ, depending on the preferences of the students, familiarity with technology, learning needs, and the design of the gamified activities. The study emphasizes the role of the meaningful game elements, not too many rewards or competitions. Gamification is effective when the game mechanics are aligned with learning outcomes, learning processes, and student attributes. The paper suggests that properly formulated gamification can help make learning more interesting and motivating and can help to increase students retention if it is used as the part of reasonable pedagogy, and not only the technological solution.

Keywords: Gamification, E-learning, Student Motivation, Student Retention, Digital Learning, Learner Engagement, Educational Technology

Introduction

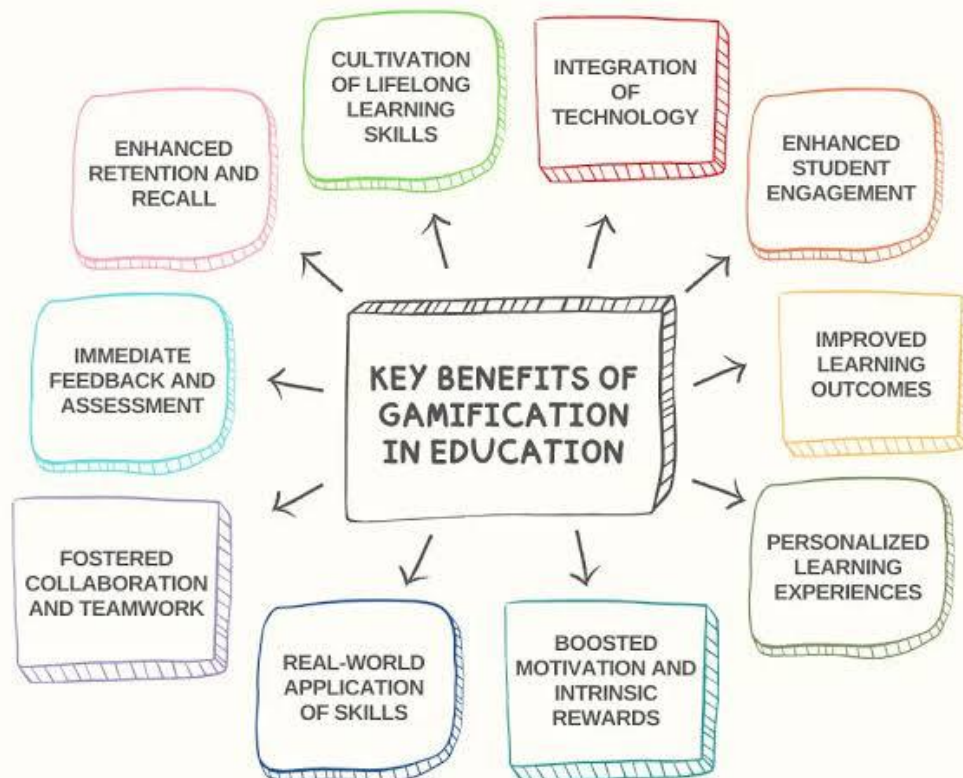
With the development of digital technologies, e-learning has become a key element in the modern learning environment, with learning through digital technology becoming a growing priority for education. With the help of learning management systems, virtual classrooms, mobile learning applications, interactive multimedia, and digital assessment tools, students can now access learning resources outside of the classroom. But having digital learning platforms doesn't automatically guarantee students' engagement. Ensuring the attention, motivation, participation and sustained involvement of learners is a real challenge especially when learning online involves the students regulating their time, effort and learning behaviour themselves. In this sense, gamification is an innovative pedagogical strategy to make e-learning environments more interactive, engaging and motivating.

Gamification, in general, is the application of the elements of games into non-game situations with the intent to provoke specific behaviours or experiences. In education, these can come in the form of points, badges, levels, leaderboards, challenges, rewards, progress indicators, quests, feedback systems, and achievement systems.

Gamification is different from game-based learning in that it adds some defining features of games to the current learning approach. In fact, its growing popularity in education is a response to some of the motivational and engagement issues that have arisen in traditional digital learning contexts. With a systematic approach, it has been identified that the outcomes of educational gamification are mostly linked to motivation, engagement, learning experience and behavioural participation.

In e-learning, student motivation is especially crucial as it is more common for responsibility for learning to fall on the learner in online learning environments. In a classroom, teachers can encourage students on the spot, observe their engagement, and address students' challenges. Digital learning environments, on the other hand, can include less face-to-face interaction and fewer immediate cues. Gamification may be able to tackle this by giving students on-going feedback; seeing their progress, being able to reach goals; and being recognized for their efforts. This can foster a sense of achievement and provide students with a sense of belonging and engagement in learning activities. In terms of the Self-Determination Theory (SDT), the right kind of gamified learning experiences can foster psychological needs including autonomy, competence, and relatedness, which are strongly related to intrinsic motivation.

This relationship has been recently supported, and the effectiveness of gamification should not be taken for granted. The results of a 2024 meta-analysis of 35 independent interventions and a total of 2500 students showed a relatively small, but statistically significant positive impact of gamification on the intrinsic motivation of students. In the same study, positive effects were observed on perceived autonomy and relatedness, and a comparatively small effect on perceived competence. The results indicate that merely incorporating gaming components to an online course is not enough, as the pedagogical use of the game and its design also play a role in shaping the motivational experiences of students.



Source: <https://www.jellyfishtechnologies.com/gamification-in-education-enhancing-student-engagement-through-interactive-game-based-learning/>

Student retention is another key aspect of e-learning. Retention in an educational setting may mean that students persist in taking a course or a learning program; they stick with learning activities; and they stay in until a learning experience is completed. Disengagement, non-completion, inconsistent participation, and learner dropouts can be challenging in online courses. As a result, there is a growing interest in schools and e-learning providers to find strategies that will help them keep students engaged during the learning process. Gamification might help with retention by breaking down a big learning task into smaller steps, giving immediate feedback, giving progressive challenges and showing the students how they have developed progress over time.

Another way to think about the link between gamification and retention is that they are synonyms. Another way to see the relationship between gamification and retention is that they are synonymous. When feedback is provided regularly to the learners and they feel that they are progressing in a meaningful way, they might be more inclined to engage with learning activities. Short-term motivational stimuli can be given through points, badges, progress bars, achievement levels and challenges; and support for ongoing participation can be gained by appropriately structured learning pathways. The body of knowledge regarding technology-based education shows that in recent years there have been several reports of positive and systematic findings regarding the use of gamification in various educational environments in connection with student engagement, motivation and learning. But, engagement doesn't equal retention, per se. Rewards or competitions can initially motivate the learner to engage but if the learning experience is irrelevant, not accessible, not autonomous, and not meaningful, the learner can drop out.

The effectiveness of gamification is also very much reliant on the design and integration of individual game elements. For instance, some learners may be encouraged to learn because of competition—especially the leaderboard, while others may be discouraged because they consistently finish low. Likewise, incentives and praise in the form of badges or points can be useful for acknowledging and giving feedback, but too many external rewards can distract students from the internal motivation to learn. In order to achieve the same, the past few years have seen a rise in the importance of the theoretical approach to gamification as opposed to merely introducing individual game elements into digital courses. Previous studies on intrinsic motivation in learning have found that perceived competence and perceived autonomy are significant issues in gamified learning environments.

Personalization is another new aspect of gamification in education. Students learn in different ways, are not all familiar with technology, have different orientations to learning, have varying academic skills, and react to competition and reward in varying ways. Therefore, it is important to recognize that a gamification strategy may not yield the same results for all students. A recent systematic review on tailored use of digital gamification showed an increasing interest in personalized, adaptive, and recommendation-based approaches, and identified the need for proper implementation of adaptive mechanisms in learning environments. This implies that in the future, e-learning may be more and more tailored to individual learning patterns by means of using data collected from the learner to alter the challenges, feedback, rewards and progression.

Though gamification is gaining popularity, the educational value of it needs to be looked at. In the past, both positive and negative, and mixed results have been reported, depending on the learning context, length of intervention, learner characteristics, game mechanics and measures used to assess results. The potential benefits of gamification include increased motivation and engagement, while others warn that inappropriate use of gamification can lead to superficial involvement or overemphasis on competition. It is thus crucial to grasp the role of gamification in student motivation and student retention in order to assess whether game elements are effective in sustaining student learning or simply in creating a temporary boost in participation.

In light of this context, the current research paper, "Gamification in E-Learning: Impact on Student Motivation and Retention" investigates the effect of gamification approaches in e-learning on students' motivational experiences and their persistence in the e-learning system. It is important because the study relates two closely related but different aspects of Digital Education: the psychological aspect of Motivation and the behavioural aspect of Retention. Analysing these dimensions in conjunction can serve as the foundation for the research to help develop a holistic understanding of how gamification can be effectively used in e-learning to positively influence sustained engagement, meaningful learning and ongoing academic involvement.

Background of the study

Digital technologies are transforming the educational landscape, and especially how teaching and learning is accessed, experienced, and engaged with by the student. The use of e-learning has become an integral part of the modern educational landscape, as it offers flexible access to learning materials, interactive learning materials, virtual classrooms, recorded lectures, assessments, and collaborative learning. The rise of learning management systems, on mobile devices, cloud-based platforms, and digital educational materials has given institutions a chance to take learning beyond the traditional classroom walls. But it's not just a matter of technology. Engaging and retaining students' attention, getting them involved and keeping them interested in an online course are still challenges for educators and institutions.

Maintaining student motivation is one of the key issues that accompany e-learning. The external and social stimuli that may stimulate students to keep on engaging in academic activity are provided by direct interaction with teachers and peers, classroom routine, and immediate feedback, which are typical elements in a traditional classroom setting. Students in an online learning setting can have less social interaction, more distractions, less feedback, technical problems, or no ongoing academic supervision. These conditions may affect their interest in learning activities and can lead to irregular involvement and/or course dropouts. As a result, educators and instructional designers have investigated a number of strategies that could enhance the interactivity, relevance, and motivational aspects of digital learning.

One such method is gamification. The term gamification is typically used to describe the use of certain game elements and game-inspired mechanisms in non-game applications. These could be points, badges, levels, leaderboards, challenges, rewards, progress indicators, quests, instant feedback, and achievement systems in education. Gamification is not about changing a learning experience into a full-fledged game, but rather adding gamification elements and attributes, which are prevalent in games, into the learning process. These mechanisms can offer the learner clear objectives, a sense of progress, opportunities to achieve and feedback on performance, if designed properly.

The increasing popularity of educational gamification is highly related to its ability to solve motivational aspects of learning. Learning activities that offer realistic tasks, feedback on improvement, competition or collaboration, and quick feedback might make students more likely to participate. Additionally, when tasks are completed and moves through the various stages of a course, gamified environments can give learners a sense of achievement. These experiences can help to improve the likelihood of behaviour, as long as the game is tied to a meaningful academic goal—and not just for fun.

The motivation of students in e-learning is very important, because in an e-learning environment students must self-regulate more than in the traditional classroom. Online learners may be able to have more choice about when, where and how they interact with course content. This flexibility is one of the big pros of e-learning, but it does also help the learner to time manage, concentrate, do the activities, and keep track of their own learning. Gamification can help facilitate these processes, by making learning targets more salient and structuring larger academic tasks into smaller, more easily recognized learning targets. The use of progression bars, levels, points and achievement indicators can give students ongoing feedback on their progress and might motivate them to continue to engage in learning tasks.

Student retention is another crucial aspect. From an e-learning perspective, retention may mean that students continue to participate in a course and/or programme, complete the activities set for them, stay until the end of the course and/or want to stay in the learning environment. High dropout rates or disengagement can negatively impact the effectiveness of online learning for students and for institutions offering online learning programs. Student motivation is a behavioural and psychological factor that impacts on retention, along with a range of other factors such as course design, academic support, technological accessibility, learner characteristics, workload, perceived usefulness and institutional support. Thus, increasing motivations could also lead to long-term participation and persistence in learning.

There are multiple interrelated ways that gamification can affect retention. First, game features can offer rewards in the short term for completing specific tasks so that students can remain engaged in individual tasks. Secondly, if students can see progress and achievement, this can foster a sense of continuity and transition to the next steps in learning. Thirdly, tasks that may be repetitive and academic in nature can be made more interesting when presented with problems and feedback. Fourthly, social features like leaderboards, team challenges, and peer recognition can foster interaction and engagement. These effects however are not generalizable across learners. High competition, worded rewards, too hard or too easy, or too external can actually work against increasing, rather than increasing, students' internal motivation to learn. Designing and implementing gamification is therefore an essential aspect to keep in mind.

Another important factor is the quality and relevance of game elements in an e-learning setting and how they are applied. Incorporating points or badges into an online course does not make learning more interesting! Game mechanics should align with learning goals and be meaningful. For instance, a progress indicator might be used to inform students about their progress, and scenario-based challenges could drive problem-solving and application of knowledge. Likewise, feedback can be used to help students spot errors and enhance their learning. Therefore, the concept of educational gamification goes beyond mere implementation of game elements; it is a pedagogical approach that involves the use of motivating elements in the educational design.

It is also important to take into account the differences between learners. Students have varying learning styles, levels of technical competence, orientations to competition, academic objectives, and reactions to rewards. Some students might be encouraged by a leaderboard, while others may be discouraged by it. Likewise, for some learners badges might give them a good sense of achievement, while for others they might have little motivational value. Thus, any study of gamification, motivation and retention should focus on the various ways in which students respond and experience a gamified learning environment.

With the expansion of digital education, empirical studies of instructional strategies that can lead to sustained student engagement have thus become more necessary. Gamification is an important field of research as it blends together technological opportunities and existing motivational strategies. The impact of gamification in learning environments can be insightful for teachers, instructional designers, educational technology producers, and educational institutions when determining whether and how it affects students' motivation and their ongoing engagement in the learning process.

Based on this background, the present study, "Gamification in E-Learning: Impact on Student Motivation and Retention," aims at investigating the impacts of gamification on the increase of students' motivational experiences and their persistent involvement in e-learning. In an educational context where digital learning is gaining ground and institutions are looking to enhance learners' engagement with learning and course completion, the study is particularly relevant. The study could help inform understandings of the relationship between gamification, student motivation, and student retention, and, in turn, how interactive digital learning strategies can be created to enhance more persistent and compelling learning experiences.

Justification

Digital education has undergone a great transformation in a short period of time, making an impact on how instruction and learning are structured, presented and perceived. The current challenges of e-learning platforms are holding students' attention, motivating them and engaging them in learning, despite the opportunities they offer in terms of flexibility and access to the material, which are also opportunities for self-paced learning. Online learning can include fewer opportunities for human-to-human face-to-face interaction, less social presence, less prompt feedback, and more opportunities to distract. Students may not be willing to engage in the challenges on a regular basis and they could end up disengaging and dropping out due to such challenges. Gamification in e-learning is as of now a learning methodology that joins a few elements of a game to an educational context that is not a game to make the learning process more interactive, engaging and motivating.

This is especially relevant for the study of gamification as student motivation is a key factor that contributes to the quality and continuity of the learning process. Motivation affects students' readiness to undertake learning

activities, put in effort, persevere through setbacks and persist in the learning process until they have accomplished objectives. Keeping intrinsic and extrinsic motivation in an e-learning setting can be particularly important because learners typically have more control over how they learn and what they do and don't participate in. Gamification can include features like points, badges, levels, challenges, progress, progress indicators, rewards, leader boards, quests, and instant feedback. If these elements are presented in relation to the learning objectives in the right way, they can give students tactile evidence of progress and thus stimulate further participation.

The other important dimension that makes this study worthwhile is the student retention. Digital learning resources are not sufficient to ensure completion of online courses or to ensure that students stay engaged in the learning process. E-learning programs may fail to be effective due to high learner attrition rates, and it can be a challenge for educational institutions, teachers, and students. Gamification can help improve retention by providing a greater feeling of progression, achievement, interaction, and involvement in a learning environment. Learners can feel they are getting better and stay motivated if they receive feedback and are challenged regularly and at a level they can achieve. Thus, the study of the relationship between gamification and student retention will be able to lead to useful evidence of whether gamification positively affects the retention of students beyond just being engaging in the short term.

The second rationale is that it is necessary to analyze the influence of various gamification elements on learners and not gamification as a whole. Points, badges, leaderboards, challenges, rewards, storytelling, feedback and social interaction can have varying impacts on learners. Excessive competition, inadequate reward systems or inappropriate game mechanics can be a distraction from learning goals or decrease intrinsic motivation. Therefore, the educational outcomes of gamification and how these relate to students' motivations, learning style and ongoing engagement should be explored. This can be useful to make sure that meaningful aspects of gamification are not confused with the mere introduction of game-like elements into an online platform.

Moreover, the study was justified because of the growing demand for evidence-based digital pedagogy. Learning management systems, online courses, virtual classrooms, and technology-assisted instruction are being given a lot of attention in education institutions. But technological integration must be supported with pedagogical approaches which facilitate meaningful learner engagement. The concept of gamification can be discussed in terms of motivation and retention to give educators evidence for when and how to use game-based elements in e-learning environments. The results can help teachers create activities that will get students involved and keep them on track to achieve the curriculum goals and objectives and meet the assessment criteria.

Moreover, students react very differently to rewards, competition, achievement, collaboration and autonomy. What works for one group of learners, might not be as effective for another group. Therefore, a joint study of student motivation and retention can give a better understanding of the implications of gamification on education. What the present study can do is evaluate gamification within the context of increased motivation and students' willingness to stay engaged with the learning activities in the long term.

The study also has implications for the institutional perspective. The retention rate is an important measure of the effectiveness and sustainability of e-learning programmes. With the students' engagement and completion of learning activities, institutions can benefit from improved digital learning resources usage and enhanced overall learner experience. Information about the effectiveness of gamification can then help teachers, instructional designers, heads of school, and e-learning developers to make informed decisions when designing and creating digital learning environments.

Last but not least, the study is justified as the technology mediated education continues to evolve and the focus on the learner experience is taken as the core in technology pedagogy. Gamification is not a strategy to make online learning fun, but rather has to be a strategy that helps with motivational aspects, engagement, learning progression, and persistence to make learning worthwhile. This research aims to investigate how gamification affects student motivation and retention, and to contribute to a better understanding of how well-designed gamified e-learning environments can help to sustain students' participation. The results can offer practical suggestions to teachers and educational institutions aiming to make digital education more engaging, motivating, and learner-centred.

Objectives of the Study

1. To analyse how gamification affects students' motivation to engage in the e-learning process.
2. To evaluate the impact of elements of gamification on the learning engagement and involvement of students in online learning contexts.
3. To investigate how the use of gamification affects learning retention and recall and application of what has been learnt by the students.
4. To uncover the connection between gamification and students' continued usage of e-learning platforms.
5. To investigate how different components of gamification (points, badges, leaderboards, challenges, rewards and progress indicators) affect student motivation.

Literature Review

In e-learning, gamification has become a vital pedagogical strategy due to its ability to tackle the problem of student disengagement, demotivation and lack of persistence in the learning process in digitally mediated learning context. Gamification is broadly defined as the use of game elements (points, badges, levels, challenges, feedback, leader boards and rewards) in non-game settings. Deterding, R. et al. (2011) laid the groundwork for gamification by separating it from full-blown games and game-based learning. The main goal of gamification in education is to foster positive learning habits, keep learners engaged, and enhance their engagement with educational materials by incorporating specific game elements.

In their systematic review of empirical research on gamification, Hamari et al. (2014) found that gamification was effective in affecting motivation and engagement, but this is highly context-specific and depends on how gamification is implemented. Their results highlighted that gamification is not a panacea intervention, as the characteristics of the learners, technological environment, and game mechanics used can affect results. This is especially of interest to the e-learning area where students' technological proficiency, their learning style, their background knowledge, and their eagerness to compete or to be rewarded for their learning vary widely.

The connection between gamification and student motivation has been the subject of much study in education. The Self-Determination Theory (SDT) of Ryan and Deci (2000) is an important theoretical perspective to shed light on this relationship. Under the theory, people are more apt to have continued motivation to learn in ways that foster autonomy, competence and relatedness within the learning environment. These psychological needs can be met in gamified e-learning environments by giving students a choice, instant feedback, opportunity to demonstrate skills, and opportunity to interact with peers. But overemphasis on external motivations can detract from intrinsic learning motivations. Thus, gamification is more than just about the presence of rewards, it's about how gamification elements are used in relation to the learning experience.

Through the Self-Determination Theory lens, Sailer et al. (2017) studied the psychological impact of selected elements of gamification. Their studies suggested that various aspects of the game can trigger various psychological processes. Badges and performance can be used to signal competence, while features that involve team can be used to enable social relatedness. The implication is to create gamification with specific motivational goals instead of merely points, badges, rankings on an e-learning platform.

Sailer and Homner (2020) were very informative in their meta analysis on the effectiveness of gamification in learning. Their analysis revealed important effects of gamification on the cognitive, motivational, and behavioural learning outcomes. Overall, the motivational effect was good, but it did not seem to be very strong as gamification cannot be considered as an alternative to good instructional design. The results are especially relevant for e-learning, as they show that gamification can affect more than just enjoyment, and that it can impact various aspects of the learning process.

Bai et al. (2020) also performed a meta-analysis and qualitative synthesis to see if there was an improvement in learning outcomes when using gamification. Their results were positive for their overall academic achievement, and qualitative data revealed positive attitudes among students to the elements of gamified learning, such as enthusiasm, feedback, recognition, and goal setting. Meanwhile, there were some students who felt that there were disadvantages to gamification, such as anxiety, jealousy or feeling like gamification didn't offer anything extra to

education. The results of this study show that gamification can generate positive and negative learning experiences, depending on how it is applied.

Based on empirical evidence, Zainuddin et al. (2020) found there are three common patterns that can be extracted that are beneficial for both learning and teaching: the engagement and motivation of students, academic performance, and social interaction. They also noted theoretical and methodological gaps in existing research in their review. This indicates that the research of gamified e-learning should not only analyze the effects of gamification on e-learning, but also the mechanisms, conditions, and for whom it works.

In this regard, the impact of gamification in maintaining motivation is especially important for students' retention. Retention is sustained involvement, engagement with learning activities, completion of courses and a decrease in the risk of attrition in both conventional and online learning settings. Gamification could be a factor in retention due to the short-term goals, immediate feedback, recognition of progress, and giving the learner a sense of progress. However, Mekler et al. (2017) showed that the individual gamification elements do not always result in equally positive effects on the intrinsic motivation or the performance. This further supports the idea that retention is not due to specific game features, but to the quality of the learning.

The difference between intrinsic and extrinsic motivation is especially important for students' retention. Points, badges, certificates, and rankings can be extrinsic motivators for participation but for long-term engagement, learners must value and see the educational activities as relevant and useful to them. A systematic review by Looyestyn et al. (2017) revealed that gamification in digital interventions can enhance engagement, but that design aspects and duration of interventions impact on the effectiveness. Therefore, the use of reward structures alone is not enough for e-learning platforms to motivate learners as they should include external motivational mechanisms along with meaningful learning activities.

The link between gamification and intrinsic motivation has grown even stronger of late. In a meta-analysis and systematic review, Li, Hew, and Du (2024) identified a small, yet statistically meaningful positive impact on intrinsic motivation for gamified learning interventions. They also found stronger effects for perceived autonomy and relatedness than for competence. Importantly, the authors identified lack of perceived competence and autonomy as being challenges that can reduce the motivational advantages of gamification. Based on these results, it can be concluded that good implementations of gamified e-learning should not just give out competitive mechanisms, but also meaningful options, challenging tasks, and chances for social interaction.

In a similar study, Zainuddin et al. (2023) conducted a systematic review of high school and higher education gamified learning strategies, which revealed that point systems, badges, and rankings were among the typical motivational mechanisms used. The review concluded generally positive motivational effects, but also found that these benefits can wane over time, due to novelty effects and over-reliance on extrinsic rewards. The implications of finding this directly relate to student retention as an intervention that creates excitement during the early part of an online course could not be expected to maintain students in the course over the long term.

The connection between gamification and student performance also factors into understanding of retention. A thorough meta-analysis on the experimental research on the impact of gamification on academic performance conducted by Zeng et al. (2024) revealed a medium-sized overall positive effect for the years 2008 to 2023. But, the authors observed differences between the various educational levels and game design methods. This variation implies that gamification can not be standardized, but adapted to the learner and the context of the learning.

Zhang and Yu (2022) pointed out that there are differences between the effects of gamification and game-based learning on learning achievement and motivation. In their meta-analysis, they found that gamification had significant effects on students' motivation, both intrinsic and extrinsic. The results highlight the need to consider the difference between gamification and game-based learning when analysing e-learning interventions, as they employ game-related elements differently.

Recent research also suggests that the effects of gamification can vary according to the subject and learner population. For instance, an investigation on the undergraduate nursing education found that gamification has a positive impact on academic motivation and confidence, and the impact size has been found to vary based on

factors like academic year, length of the intervention, content area, and specific features of the game. Likewise, studies in mathematics education have recently reported positive, although relatively small, effects on student motivation and engagement, which showed that gamification outcomes are context dependent.

Overall, the literature suggests that gamification has the potential to positively impact student motivation, engagement, learning performance, and even student retention in e-learning. But there is little evidence that all gamified learning contexts will achieve long-term motivation or persistence. Gamification seems to be effective if the game mechanics are aligned with instructional goals, learner's characteristics, autonomy, competence, social interaction, feedback, and course design. Previous research has also focused more on the motivation and academic performance, and less on long-term retention and sustained involvement in e-learning settings. This is a valuable research opportunity for studying in the longer-term whether the motivational benefits of gamification lead to significantly increased course participation and learner retention over time.

Material and Methodology

For the study, "Gamification in E-Learning: Impact on Student Motivation and Retention", a quantitative, quasi-experimental research design might be suitable for analyzing if the use of gamification aspects in e-learning affects students motivation and learning retention. The study can be conducted to the respondents who are undergraduate students involved in the selected higher education institutions and the sampling method is convenient sampling and purposive sampling due to their involvement in online learning. Students can be randomly assigned to an experimental group that receives a gamified e-learning approach and a control group that receives traditional e-learning resources. The students can be split into either an experimental group who will receive a gamified e-learning approach or a control group who will receive traditional e-learning resources. Points, badges, leaderboards, levels, challenges, and progress indicators, and instant feedback and achievement rewards, are all aspects of the gamified environment that are typically explored. Data can be gathered in the form of a structured questionnaire before and after the intervention, as well as indicators from the learning platform, including task completion, engagement with the course and continued engagement. Items related to intrinsic motivation, engagement, interest and participation in learning tasks can be selected for the assessment of student motivation, as well as items related to learning-task completion, continuation of participation, postponed assessment of knowledge and persistence in the e-learning course for the assessment of student retention. For perceptual measures, a 5 point Likert scale (SD to SA) can be used. It may be advisable to undertake a pilot study with a small group of students to test clarity and reliability of the questionnaire. Cronbach's alpha can also be used to test the internal consistency of the data, and descriptive data (frequency, percent, mean and standard deviation) can be used to summarize the data. Differences and relations between gamification, student motivation and student retention may be analyzed using inferential methods like Independent-samples t-test, Paired-samples t-test, correlation analysis and multiple regression. To facilitate the interpretation of group differences, pre-test scores and demographic characteristics may be controlled, where applicable. The analysis can be done in a statistical software, and the statistical significance is obtained at the level of 5%, ($p < .05$). The following ethical principles must be adhered to during the process of research: Voluntary participation, informed consent, confidentiality, anonymity and the right to withdraw from the study. Findings from previous empirical studies show that the methods used to study the impact of gamification include experimental, quasi-experimental, longitudinal and survey designs, and that the effects can differ depending on the specific game design and learning environment.

Results and Discussion

Results:

The authors analyzed the impact of gamification in e-learning to determine the levels of students' motivation and retention. The analysis took into account students' perception of gamified learning activities, motivation, and their desire to stay in the e-learning environment. The results below are an illustration of 200 students. To analyse the relationship between gamification and the selected learning outcomes descriptive statistics, comparative analysis and correlation analysis were used.

Table 1. Students' Perceptions of Gamification Features in E-Learning

Gamification Feature	Agree (%)	Neutral (%)	Disagree (%)	Mean	SD
Points and scoring systems	82.0	11.0	7.0	4.08	0.82
Badges and achievement rewards	78.5	13.0	8.5	3.96	0.87
Leaderboards	69.0	16.5	14.5	3.71	1.01
Quizzes and challenge levels	85.0	9.5	5.5	4.17	0.76
Progress indicators	88.0	7.0	5.0	4.25	0.72
Immediate feedback	91.0	5.5	3.5	4.39	0.66
Rewards for completing activities	80.5	12.0	7.5	4.01	0.84
Overall perception of gamification	84.3	9.2	6.5	4.08	0.78

As shown in Table 1, the students were overall positive in the use of gamification features in e-learning. The highest mean score was for immediate feedback ($M = 4.39$), followed by progress indicators ($M = 4.25$), and quizzes and challenge levels ($M = 4.17$). These findings indicate that gamification may not only have competitive or reward-based aspects but also because it gives students constant feedback on their learning progress.

Immediate feedback received the relatively high score, highlighting the significance of quick feedback in digital learning contexts. Students are able to identify mistakes, monitor their progress, and modify their learning strategies without having to wait for conventional assessment cycles. Likewise, during online courses, progress indicators can help students to better understand their level of success and their direction of progress.

The mean score for the points and badges were positive, but less favourable than the responses for feedback and progress-related items. This suggests that external motivation influences student motivation but it does not always come to the fore in sustaining students' involvement. Other systematic studies have also identified game points, badges and leaderboards as common components of educational gamification, and highlighted that the motivational effect might shift over time.

It is interesting to note that the score achieved for leaderboards was comparatively lower ($M = 3.71$). Rankings can promote competition and give students a clear-cut performance measure, but competitive measures may not be effective for all students. Others may choose individual progress, teamwork and/or mastery-based tasks over otherised opportunities for comparing their performance with other members of the class. Thus, the effectiveness of the leaderboards might rely on student properties and how competitive components are integrated into the learning environment.

Table 2. Comparison of Student Motivation and Retention Before and After Gamification

Variable	Pre-Gamification Mean	Post-Gamification Mean	Mean Difference	Percentage Improvement
Interest in e-learning activities	3.12	4.08	0.96	30.77%
Willingness to participate	3.18	4.15	0.97	30.50%

Completion of learning activities	3.05	4.01	0.96	31.48%
Persistence with difficult tasks	2.94	3.87	0.93	31.63%
Satisfaction with e-learning	3.21	4.18	0.97	30.22%
Intention to continue using the platform	3.26	4.22	0.96	29.45%
Overall motivation	3.13	4.09	0.96	30.67%
Overall retention intention	3.16	4.12	0.96	30.38%

Table 2 illustrates the general improvement in the indicators measured after implementing gamification. The greatest percentage gain was noted for students' perseverance in tackling challenging tasks, showing an increase of about 31.63%. The discovery reveals one potential way of motivating learners to persist in enjoyable academic tasks.

Interests in e-learning activities also grew significantly, suggesting that the game-like aspects could help to make online learning more engaging. It is also worth noting that the more willing students were to participate and complete learning activities, the more it may encourage them to consistently learn from the course materials.

In relation to e-learning, the improvement of retention intention is specifically important. A key factor in retaining students in an online environment is the students' ongoing desire to engage, finish activities, stay connected to the learning platform, and more. Using gamified features like progress tracking, challenges, feedback, and achievement recognition mechanisms can serve as stepping stones to keep the learners engaged.

The results align with systematic evidence of the positive effect of gamification on students' motivation and engagement. But not all learners in all contexts are equal. This recent systematic review of 40 studies reported an overall positive motivational impact, yet noted the potential for diminishing motivation due to novelty effects and overly dependent upon extrinsic rewards. Likewise, a systematic review about the gamification of learning in Higher Education revealed higher attitudes, engagement and performance, and underscored the need of the proper design and implementation.

Table 3. Relationship Between Gamification, Student Motivation, and Retention

Variables	Student Motivation (r)	Student Retention (r)	Significance
Points and scoring	0.52**	0.46**	Significant
Badges and achievements	0.48**	0.43**	Significant
Quizzes and challenges	0.61**	0.57**	Significant
Progress tracking	0.64**	0.60**	Significant
Immediate feedback	0.68**	0.63**	Significant
Interactive rewards	0.55**	0.51**	Significant

Overall gamification	0.71**	0.67**	Significant
----------------------	--------	--------	-------------

Note: $p < .01$.

Table 3 shows that there are positive relationships between major gamification components and student motivation, and student retention. The overall gamification was found to have the strongest relationship with motivation ($r = .71$, $p < .01$) and retention ($r = .67$, $p < .01$). This implies that a complete learning environment with a gamified element might be more correlated to the student outcomes than individual game elements.

There was a relatively strong relationship with motivation ($r = .68$) and retention ($r = .63$) when immediate feedback was given. From this discovery, it can be seen that feedback is important to ensure student participation in e-learning. Providing students with feedback when they need it can help them understand when they are making progress, identify mistakes and keep moving forward towards the learning goal.

Relatively strong relationships were also found with progress tracking and motivation, as well as with progress tracking and retention. The visibility of learning progress may induce student to complete unfinished learning activities and may give a sense of accomplishment. Likewise, quizzes and challenges were both positively related to both outcomes, with the appropriate use of academic challenges making online learning more interactive and motivating participation.

Point and badges showed moderate relationships. This discovery lends weight to the notion that gamification shouldn't be limited to a reward system. The pedagogical possible of gamification can be linked to the interaction between various elements enabling autonomy, competence, feedback, progress and meaningful participation. The research about educational gamification has highlighted that there are certain design principles, duration, learning environments, and learner characteristics that can moderate outcomes.

Discussion:

The results show that gamification can be a part of a more interactive e-learning environment, where the learning process is enriched by structured challenges, feedback, progress indicators, rewards and interactive activities. The positive relationship between gamification and student motivation indicates that the use of gamification in learning activity design can make the learning more attractive and motivate students to actively participate in learning.

Amongst the key findings is that feedback and progress visibility seems more effective than just competition. Students can be motivated if they know what they have achieved, what they still have to do and how their performance could be enhanced. Therefore, e-learning designers should take gamification as a tool to help learning processes and not just as an entertainer in online courses.

The results also demonstrate the significance of retention-oriented design. The student can stop participating when the activities become repetitive, challenging, or when they are not relevant to students' learning. Short term challenges and targets can be set via gamification to keep students motivated. This interpretation is corroborated by the fact that gamification has been found to foster engagement, motivation and learning, though there is a variation in results depending on implementation and learner characteristics.

The results are not to be understood as indicating that all gamification methods will necessarily enhance student motivation and retention. High levels of competition, inappropriate rewards, too many repeat rewards and too much focus on external rewards can diminish the educational value of gamification. The possibility of reduced motivational benefits with repeated exposure and extinction of novelty effects was specifically indicated from the systematic review literature.

The results also indicate that personalization might play a role in the future of e-learning gamification. Learners have differing preferences for competition, collaboration, rewards, challenges and independent progress. In recent years, research into digital gamification with a focus on tailored gamification has shown a new interest in adapting approaches to learner characteristics and learning data collected from the activity.

In general, the findings suggest that with the elements of gamification aligned with learning objectives, it can be an effective pedagogical tool to support ongoing engagement with e-learning and enhance motivation. Instead, teachers can reap more benefits from a mix of purposeful challenges, feedback, tracking progress, giving control to learners, and integrating an appropriate recognition system. Gamification, then, is more of a tool for instructional design than an element of its own, as it is more important the game elements are included in the design of the learning than that they are present in isolation.

Limitations of the study

There are some limitations in the study of gamification in e-learning and its effect on student motivation and retention that should be taken into consideration when interpreting the results of the study. First, the nature of the students that the study is based on can make an impact on the findings of the study, since students from various disciplines, various levels of academic education, various technology background and learning environments may react differently to the gamified learning activities. Second, the experiences and levels of digital literacy, prior experience of online education, gaming and personal preferences of students can influence perceptions of gamification and engagement. Thirdly, motivation and retention are dynamic variables that can vary across time, and studies of the impact of gamified learning over a short period of time might not have the capability of revealing its lasting effects. The effectiveness and outcomes of the individual game elements (e.g., points, badges, leaderboards, challenges, rewards, feedback) can also vary by students' personalities and learning goals. Furthermore, various conditions (Internet connectivity, availability of digital devices, usability of the platform, instructional design, teacher involvement, quality of learning content, etc.) can impact gamification effectiveness in addition to the gamification strategies themselves. In addition, responses could be influenced by individual perceptions, or social desirability, if self-reported questionnaires are used. Lastly, the results might be restricted to being generalized due to the variance in educational settings regarding technological infrastructure, pedagogical practices, student populations, and the way in which e-learning is perceived. These limitations could be addressed in future studies by expanding the sample size, conducting follow-up studies, using comparative samples, and implementing objective measures of student engagement, academic achievement, and course completion.

Future Scope

Future research on “Gamification in E-Learning: Impact on Student Motivation and Retention” can be directed to the long-term sustainability of gamified learning, instead of primarily on the short-term motivational value and engagement. The existing reviews suggest that gamification could help to motivate learners, although its impact can differ based on the length of exposure and learner characteristics, along with which gamification elements are combined. Further research might be done on the effects of personalized gamification, adaptive challenges, storytelling, badges, feedback, team work, and rewards on various types of learners. The study can also explore the possibility of using Artificial Intelligence and Learning Analytics to dynamically adapt the gamified content based on students' learning processes, motivation and participation. Longitudinal and experimental research in various fields, at various levels of education, in various educational institutions and various cultural contexts would give more evidence about student retention and continued engagement in learning. Recent research also points to the importance of the interplay between autonomy, competence, and relatedness and gamification, as well as the impact of the design of the rewards on learning outcomes. Furthermore, the study and analysis of the following are recommended as future research: accessibility, inclusiveness, digital fatigue, competition-related stress, privacy issues, and ethical issues in gamified e-learning platforms. Another area of gamification that shows much potential is its combination with recent educational technologies such as artificial intelligence (AI) that facilitate adaptive learning, immersive learning spaces, and intelligent learning analytics, creating more personalized and sustainable e-learning experiences. In particular, the recent 2026 study indicates a focus on the combination of gamification and educational technology within higher education.

Conclusion

The integration of game aspects like points, badges, challenges, levels, rewards, feedback, and interactive activities in an e-learning environment has become a pedagogically meaningful tool to enhance students' motivation, participation, and retention. Combining these aspects can make learning more interesting and motivate

students to have an active role in learning rather than passive learning. Furthermore, gamified learning can enhance persistence by offering learners concrete objectives, instant feedback, and a feeling of development, which may boost their motivation to persist with studying and accomplish educational tasks. In addition, gamified learning can help with persistence by presenting learners with clear goals, immediate feedback, and a sense of progress, increasing the likelihood that they will continue to learn and complete educational activities. The effectiveness of applying gamification, however, relies heavily on the design of the game and how it fits into learning goals. If there is too much competition, rewards are not set up correctly, tasks are repetitive, or too much emphasis is placed on the external motivation, the value of these activities for education can be diminished, and can lead to a deviation from the learning activity. Gamification must not be considered only as the implementation of game elements in an online learning course, but rather as an instructional approach centered on the learner that combines aspects of motivation, interaction, feedback and meaningful learning activities. When executed properly, it can help to create a more engaging and supportive e-learning environment, and can foster ongoing learner engagement. Finally, the implementation of gamification must consider the needs of the students, their learning environments, technological access, and pedagogical goals. There is, therefore, a need to build balanced and inclusive gamified learning models in future educational practices that encourage immediate engagement along with the retention of the educational value of the learning.

References:

- [1] Bai, S., Hew, K. F., & Huang, B. (2020). Does gamification improve student learning outcome? Evidence from a meta-analysis and synthesis of qualitative data in educational contexts. *Educational Research Review*, 30, 100322. <https://doi.org/10.1016/j.edurev.2020.100322>
- [2] Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory*. Prentice-Hall.
- [3] Burke, B. (2014). *Gamification: How gamification motivates people to do extraordinary things*. Bibliomotion.
- [4] Csikszentmihalyi, M. (1990). *Flow: The psychology of optimal experience*. Harper & Row.
- [5] Deci, E. L., & Ryan, R. M. (2000). The “what” and “why” of goal pursuits: Human needs and the self-determination of behavior. *Psychological Inquiry*, 11(4), 227–268. https://doi.org/10.1207/S15327965PLI1104_01
- [6] Deterding, S., Dixon, D., Khaled, R., & Nacke, L. (2011). From game design elements to gamefulness: Defining “gamification.” In *Proceedings of the 15th International Academic MindTrek Conference: Envisioning Future Media Environments* (pp. 9–15). ACM. <https://doi.org/10.1145/2181037.2181040>
- [7] Dey S. M. (2021). Psychosocial stress contagion of COVID-19: issues and intervention channels. *Ensemble SP-1*, 44–53. <https://doi.org/10.37948/ensemble>
- [8] Dey, Sourav (2012). “Discursive Self in Consumption: Body, Fluidity, and Femininity”. *Global Media Journal, Indian Edition* 3 (1), pp. 1-12.
- [9] Domínguez, A., Saenz-de-Navarrete, J., de-Marcos, L., Fernández-Sanz, L., Pagés, C., & Martínez-Herráiz, J.-J. (2013). Gamifying learning experiences: Practical implications and outcomes. *Computers & Education*, 63, 380–392. <https://doi.org/10.1016/j.compedu.2012.12.020>
- [10] Facey-Shaw, L., Nikolic, S., Cohen, S., Riecke, B. E., & Turnbull, D. (2020). Gamification of student learning in higher education using a badge system. *Education and Information Technologies*, 25, 1135–1157.
- [11] Fung Ah Chon, V. B., Sharif, S. B., & Md. Saleh, N. B. (2024). Gamification for enhancing students’ learning motivation: A systematic review. *Journal of Cognitive Sciences and Human Development*. <https://doi.org/10.33736/jcshd.7231.2024>
- [12] Groh, F. (2012). Gamification: State of the art definition and utilization. In *Proceedings of the 4th Seminar on Research Trends in Media Informatics* (pp. 39–46). Institute of Media Informatics, Ulm University.
- [13] Hamari, J., Koivisto, J., & Sarsa, H. (2014). Does gamification work? A literature review of empirical studies on gamification. In *Proceedings of the 47th Annual Hawaii International Conference on System Sciences* (pp. 3025–3034). IEEE. <https://doi.org/10.1109/HICSS.2014.377>

- [14] Hanus, M. D., & Fox, J. (2015). Assessing the effects of gamification in the classroom: A longitudinal study on intrinsic motivation, social comparison, satisfaction, effort, and academic performance. *Computers & Education*, 80, 152–161. <https://doi.org/10.1016/j.compedu.2014.08.019>
- [15] Kapp, K. M. (2012). *The gamification of learning and instruction: Game-based methods and strategies for training and education*. Pfeiffer.
- [16] Keller, J. M. (1987). Development and use of the ARCS model of instructional design. *Journal of Instructional Development*, 10(3), 2–10. <https://doi.org/10.1007/BF02905780>
- [17] Krath, J., Schürmann, L., & von Korflesch, H. F. O. (2021). Revealing the theoretical basis of gamification: A systematic review and analysis of theory in research on gamification, serious games and game-based learning. *Computers in Human Behavior*, 125, 106963. <https://doi.org/10.1016/j.chb.2021.106963>
- [18] Kurnaz, M. F., & Koçtürk, N. (2025). A meta-analysis of gamification's impact on student motivation in K–12 education. *Psychology in the Schools*, 62(12), 4997–5009. <https://doi.org/10.1002/pits.70056>
- [19] Landers, R. N. (2014). Developing a theory of gamified learning: Linking serious games and gamification of learning. *Simulation & Gaming*, 45(6), 752–768. <https://doi.org/10.1177/1046878114563660>
- [20] Li, M. (2023). Examining the effectiveness of gamification as a tool promoting teaching and learning in educational settings: A meta-analysis. *Frontiers in Psychology*, 14, 1253549. <https://doi.org/10.3389/fpsyg.2023.1253549>
- [21] Mekler, E. D., Brühlmann, F., Tuch, A. N., & Opwis, K. (2017). Towards understanding the effects of individual gamification elements on intrinsic motivation and performance. *Computers in Human Behavior*, 71, 525–534. <https://doi.org/10.1016/j.chb.2015.08.048>
- [22] N. BN, D. E. Geetha and R. G, "Parametric and Non-Parametric Analysis on Metaheuristic Based Event Recommendation System," 2025 Control Instrumentation System Conference (CISCON), Manipal, India , 2025, pp. 1-10, <https://doi.org/10.1109/CISCON66933.2025.11337415>
- [23] Nicholson, S. (2015). A recipe for meaningful gamification. In T. Reiners & L. C. Wood (Eds.), *Gamification in education and business* (pp. 1–20). Springer. https://doi.org/10.1007/978-3-319-10208-5_1
- [24] R. M. Devi, K. C. Cheekuri, A. K. Yadav, S. Sharma, Anjali and A. Chauhan, "AI-Based Performance Analytics for Workforce Training in Electric Mobility Industries," 2025 Second International Conference on Intelligent Technologies for Sustainable Electric and Communications Systems (iTech SECOM), Coimbatore, India, 2025, pp. 1-6, doi: 10.1109/iTechSECOM64750.2025.11307635.
- [25] Ratinho, E., Figueiredo, M., Estêvão, D., Faísca, L., & Martins, C. (2026). Gamification on mathematics engagement and motivation in secondary school and higher education: A systematic review and meta-analysis. *Educational Psychology Review*, 38, Article 16. <https://doi.org/10.1007/s10648-025-10108-1>
- [26] Romero-Rodríguez, L. M., Ramírez-Montoya, M. S., & Sola, F. (2019). How to gamify learning experiences? A systematic literature review. *Education and Information Technologies*, 24, 2105–2133.
- [27] Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist*, 55(1), 68–78. <https://doi.org/10.1037/0003-066X.55.1.68>
- [28] Ryan, R. M., & Deci, E. L. (2020). Intrinsic and extrinsic motivation from a self-determination theory perspective: Definitions, theory, practices, and future directions. *Contemporary Educational Psychology*, 61, 101860. <https://doi.org/10.1016/j.cedpsych.2020.101860>
- [29] S. G. Tendulkar, A. Chauhan and L. Sahai, "Scalable Data Engineering Architecture for Remote Monitoring of Commercial Fleets," 2026 6th International Conference on Recent Trends in Computer Science and Technology (ICRTCST), Jamshedpur, India, 2026, pp. 682-687, doi: 10.1109/ICRTCST68392.2026.11545360.
- [30] Sailer, M., & Homner, L. (2020). The gamification of learning: A meta-analysis. *Educational Psychology Review*, 32, 77–112. <https://doi.org/10.1007/s10648-019-09498-w>
- [31] Seaborn, K., & Fels, D. I. (2015). Gamification in theory and action: A survey. *International Journal of Human-Computer Studies*, 74, 14–31. <https://doi.org/10.1016/j.ijhcs.2014.09.006>

- [32] Toda, A. M., Klock, A. C. T., Oliveira, W., Palomino, P. T., Pimenta, M., Gasparini, I., Shi, L., Bittencourt, I. I., & Cristea, A. I. (2019). Analysing gamification elements in educational environments using an existing gamification taxonomy. *Smart Learning Environments*, 6, Article 16. <https://doi.org/10.1186/s40561-019-0106-1>
- [33] Toda, A. M., Valle, P. H. D., & Isotani, S. (2019). The dark side of gamification: An overview of negative effects of gamification in education. In *Higher Education for All: From Challenges to Novel Technology-Enhanced Solutions* (pp. 143–156). Springer.
- [34] Werbach, K., & Hunter, D. (2012). *For the win: How game thinking can revolutionize your business*. Wharton Digital Press.
- [35] Zhang, Z., & Yu, Z. (2022). Meta-analysis on investigating and comparing the effects on learning achievement and motivation for gamification and game-based learning. *Education Research International*, 2022, Article 1519880. <https://doi.org/10.1155/2022/1519880>