Enhancing Student Motivation, Engagement, and Achievement through Gamification Techniques

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Abstract

This study investigates the impact of gamified learning in higher education, focusing on STEM disciplines, including Information Technology, Physics, and Microbiology. Conducted within a college-based higher education setting, I employed a qualitative methodology, incorporating in-depth interviews with a diverse cohort of students, lecturers, a special education manager, and a technologist. My primary aim was to examine the transformative potential of gamification in education by assessing its effects on student motivation, engagement, and academic achievement. Additionally, I explored how gamification, as an instructional strategy, can cater to diverse student needs, thereby enriching the overall learning experience. My research is theoretically underpinned by Activity Theory, which provides a structured framework for analysing the dynamic interactions between individuals, tools, and educational objectives within a social context. Engeström (1987) posits that Activity Theory serves as a robust analytical tool for understanding these interactions, particularly in educational environments where learning is mediated by cultural and institutional factors.

My findings indicate that gamification holds considerable promise in enhancing student engagement and motivation. The results suggest that features such as points, badges, and narrative elements can significantly improve the educational experience, making learning more engaging and contextually relevant. Methodologically, I adopted a rigorous qualitative framework, employing thematic analysis of interview data with the support of NVivo software. While I acknowledge limitations, including the relatively small sample size and the potential biases associated with purposive sampling, this study contributes valuable insights to the field of Technology-Enhanced Learning (TEL). It demonstrates how gamification, when effectively integrated into curricula, can significantly enrich learning experiences, particularly in an era where sustaining student engagement remains a challenge. Moreover, my study highlights the need for further large-scale studies to refine the design and implementation of gamified learning strategies.

Introduction and Research Questions

The concept of incentivising individuals through structured mechanisms has been present across various domains for decades. However, the formal term "gamification" was first coined by British programmer Nick Pelling in 2002 to describe the integration of game mechanics into non-gaming contexts to enhance user engagement and motivation (Pelling, 2011). While developing game-like interfaces for ATMs and vending machines, Pelling introduced this term to define the application of game elements in non-traditional gaming environments. Despite its early introduction, gamification did not gain widespread recognition until around 2010, when major corporations, including Microsoft, SAP, and Deloitte, began implementing game-based elements in their systems to increase participation and motivation (Silverman, 2011).

Gamification has since evolved into a significant pedagogical approach, particularly in higher education, where it is employed to foster student motivation, enhance engagement, and improve academic performance. By integrating game mechanics such as rewards, leaderboards, and interactive challenges, educators aim to transform traditional learning experiences into dynamic and immersive environments (Kapp, 2012). While its efficacy continues to be explored, gamification is increasingly recognised as a powerful strategy to accommodate diverse learner needs and facilitate meaningful educational outcomes. I critically examine the role of gamification in higher education, evaluating its impact on student motivation, engagement, and achievement. By analysing existing literature and emerging trends, I aim to assess whether gamified approaches contribute meaningfully to academic success and sustained learning engagement.

This empirical case study investigates the impact of gamification on higher education students in the fields of Information Technology, Physics, and Microbiology. The study is situated within a college environment that offers a range of STEM subjects and higher education courses, supported by a strategic commitment to creating an outstanding and innovative student experience through exceptional teaching and learning. In the context of a fast-paced, technology-driven society where modern devices, social media, and varied personal interests are prevalent, students often encounter challenges in maintaining focus on their studies. Educators across higher education institutions in the United Kingdom face significant challenges in ensuring sustained student engagement (Hassel & Ridout, 2018).

As I embark on this study, my background in educational technology and commitment to innovative teaching methods informed my approach. To maintain objectivity, I consistently reflected upon potential biases and ensured that transparency guided the research process. Adherence to ethical standards, including obtaining informed consent and safeguarding participant confidentiality, was paramount. Additionally, collaboration with colleagues from various academic disciplines enriched the study by incorporating diverse perspectives and mitigating individual biases. Overall, I approached the study with rigour, ensuring that it remained reputable, transparent, and objective while exploring gamified learning in higher education.

In response to the challenges faced by lecturers in maintaining student engagement, gamification has emerged as a promising strategy to reinvigorate student motivation and active participation in the learning process. As articulated by Kapp (2012), gamification transcends the simple integration of games into education; it represents a sophisticated fusion of aesthetics, pedagogical principles, and the compelling aspects of gameplay designed to empower learners and facilitate knowledge acquisition. Its incorporation into various teaching models underscores both its versatility and its potential to yield valuable insights (Gironella, 2023).

Given this context, my central research inquiry focuses on the impact of gamified learning strategies on student motivation, engagement, and academic performance. I anchored the research in a qualitative paradigm, employing semi-structured interviews to gather insights from a diverse cohort within the college environment, including higher education learners, lecturers, special education managers, and a technologist. Through this methodology, I aim

to obtain a comprehensive understanding of the lived experiences and perspectives of those directly involved in gamified learning at the institution (Hashim & Jones, 2007).

> *RQ1:* How do subtle elements of gamified learning ignite and sustain student motivation over time in higher education settings?
>
> *RQ2:* In what ways do gamified learning strategies influence student engagement and subsequently affect academic performance within diverse educational contexts?
>
> *RQ 3:* How can research on game-based learning be enhanced to better serve the needs of individuals with disabilities, and why is inclusive gamified learning crucial in addressing the diverse social landscape of higher education?

This study aspires to make a significant contribution to the discourse on gamified learning in higher education. By thoroughly examining the impact of gamification on the academic journey, I seek to provide a nuanced understanding of its role and potential to inform future teaching strategies and educational policies.

Theoretical Framework

I align my perspective closely with the principles of Activity Theory, a framework, as elaborated by Engström (1987), that views human activity as a complex, dynamic system wherein actions are mediated by cultural tools, language, and social norms. In this approach, I see individual behaviours and cognitive processes not as isolated events, but as deeply embedded within a broader socio-cultural context. This framework highlights that while an objective reality exists, a rich tapestry of human activities, it is continually interpreted and reshaped through dynamic social interactions and individual perspectives. My approach to knowledge resonates with social constructivism, emphasising the active construction of understanding through these interactions. Consequently, my philosophical and epistemological orientations synergise harmoniously with Activity Theory, thereby facilitating an in-depth exploration of how individuals engage in activities within their social contexts.

Activity Theory (illustrated in Figure 1) offers me an invaluable analytical framework for understanding the dynamics of motivation within gamified learning, highlighting how these strategies impact engagement and academic performance in diverse higher education settings. It directly addresses my key research questions concerning the influence of gamified learning on motivation and achievement, while also supporting my research on inclusivity for students with disabilities. This theoretical perspective guides both my research context and methodological choices, providing a comprehensive lens to explore the complex social dynamics inherent in gamified learning environments. Rooted in Engström's development of Vygotsky's ideas, Activity Theory identifies three core components: the subject (the individual), the tools (e.g., mobile applications), and the objectives (such as engaging with course content), which lead to specific outcomes like course grades. Scholars have expanded upon this by adding three social contextual factors: community (shared meanings and interdependence), rules (guiding behaviour), and the division of labour (task allocation).

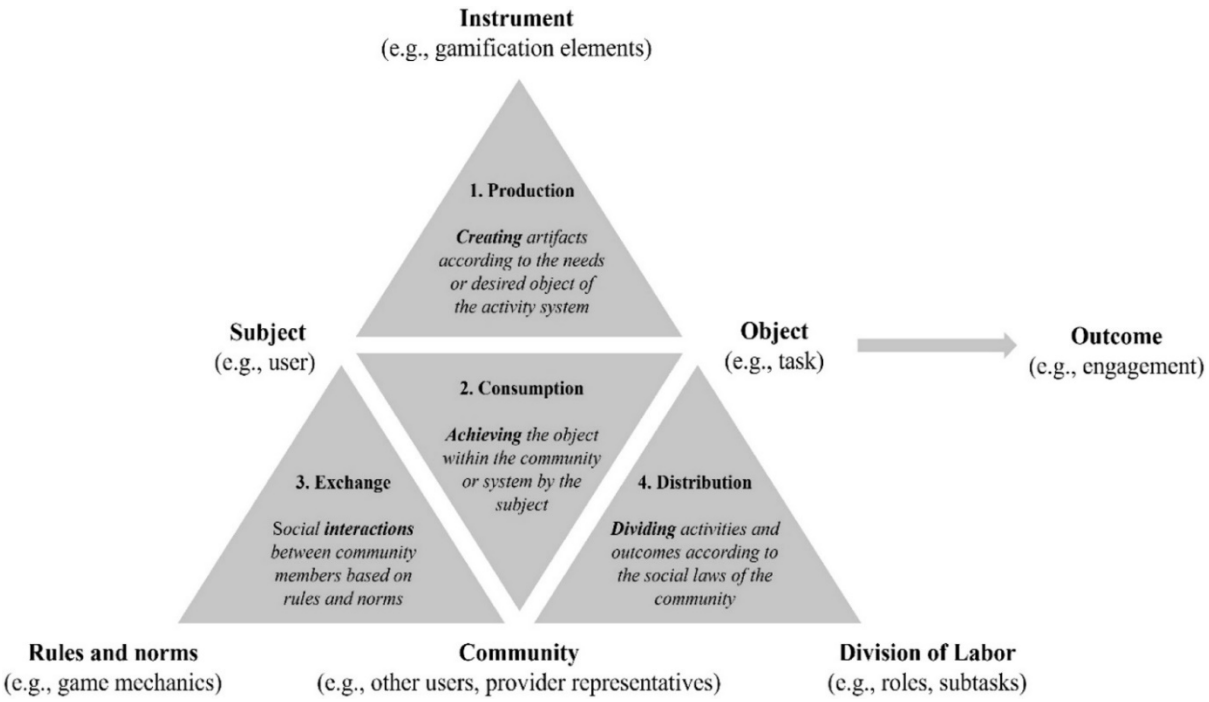

Figure 1: Activity Theory adapted from Cowan and Butler (2013), Engeström (1987), and Holt and Morris (1993).

In essence, Activity Theory presents a holistic view of how I perceive the interactions between individuals, tools, and objectives within social contexts. It identifies four main functions: production, consumption, exchange, and distribution emerging from interactions within activity systems (e.g., Cowan and Butler, 2013; Engström, 1987; Holt and Morris, 1993). Each function comprises diverse nodes; the details are summarised in Table 1.

Gamification Function	Gamification Focus
Production	Effectiveness of gamification elements
Consumption	Fun experience
Exchange	Social Interaction
Distribution	Allocation of Benefits

Table 1: Gamification Functions through the Lens of Activity Theory (Adapted from Vermeulen, Gain, Marais, & O'Donovan, 2016).

I focus on enhancing student motivation, engagement, and academic achievement in higher education through gamification, guided by theoretical frameworks notably Engeström's (1987) gamification functions within activity theory. Engström's framework identifies four key functions within activity systems: production, consumption, exchange, and distribution. In my research, I considered production as the creation of gamified content and activities, which is fundamental to developing engaging learning materials. I observe consumption as students interact with these elements, thereby deepening their involvement with course content and tasks. Exchange, a core aspect of activity theory, refers to interactions within the learning community, which I recognise are shaped by both competition and cooperation. Empirical

studies by Dindar et al. (2021), Hammedi et al. (2021), Leclercq, Hammedi, and Poncin (2018), Suh et al. (2017), Suh and Wagner (2017), and van Roy and Zaman (2018) illustrate the dual nature of competition: it may be beneficial in winning scenarios, yet detrimental in cases of loss. Within the context of distribution in gamified classrooms, I implement strategies such as reward systems, collaborative groups, progress tracking, and tailored challenges. These approaches aim to foster an engaging environment that recognises achievements and promotes continuous improvement. By integrating Engeström's functions into activity theory, I offer a comprehensive view of how these elements collectively impact student outcomes in higher education.

The Application of Gamification in Higher Education

Gamification can be defined as:

> *"The use of game design elements (for example, points, leader boards and badges) in non-game contexts … to promote user engagement" (Mekler et al. 2013).*
>
> *"The use of game-based elements such as mechanics, aesthetics, and game thinking in non-game contexts aimed at engaging people, motivating action, enhancing learning, and solving problems" (de Sousa Borges et al., 2014)*

Gamification has emerged as a transformative strategy in higher education, integrating game-based mechanics to enhance student motivation, engagement, and achievement (Deterding et al., 2011). This approach employs elements such as points, leaderboards, badges, and challenges to create dynamic learning experiences. The increasing digitisation of education, particularly in the wake of the COVID-19 pandemic, has necessitated pedagogical strategies that sustain student interest in virtual and hybrid learning environments (Raju et al., 2021). This literature review critically evaluates gamification's role in higher education, exploring key definitions, theoretical underpinnings, empirical findings, and existing research gaps. The synthesis of studies reveals both its benefits and limitations, highlighting areas for further exploration.

Key Definitions

Motivation

Motivation is a crucial factor in educational success, referring to the internal and external forces that drive students to learn. Self-Determination Theory (SDT) postulates that motivation is enhanced when learners experience autonomy, competence, and relatedness (Ryan & Deci, 2000; Hellín et al., 2023). Extrinsic motivators such as points and rewards can be effective, but sustained engagement often requires intrinsic motivation, which gamification must cultivate (Chapman & Rich, 2018).

Engagement

Engagement encompasses cognitive, behavioural, and emotional involvement in learning activities (Mahfuzah et al., 2018). It is linked to improved academic outcomes and retention rates. Gamification facilitates engagement through interactive elements that sustain learners'

attention and encourage active participation (Alomari et al., 2019). However, some studies suggest that engagement may decline once extrinsic rewards are removed, questioning the long-term efficacy of gamification (Rivera & Garden, 2021).

Achievement

Achievement in gamified learning is typically measured through assessment scores, skill development, and conceptual understanding (Mohamad et al., 2018). Some research suggests a direct correlation between gamification and academic performance (Hellín et al., 2023), while others argue that improvements stem from increased effort rather than inherent pedagogical value (Chans & Castro, 2021).

Theoretical Perspectives on Gamification in Higher Education

Gamification in higher education is underpinned by several well-established theoretical frameworks that explain its impact on student motivation, engagement, and learning outcomes. Self-Determination Theory (SDT) posits that students' intrinsic motivation is fostered when their psychological needs for autonomy, competence, and relatedness are satisfied through gamified elements (Ryan & Deci, 2000; Hellín et al., 2023).

Flow Theory, introduced by Csikszentmihalyi (1990), suggests that immersive learning experiences occur when students are deeply engaged in tasks that balance challenge and skill level, a state that well-designed gamified environments can facilitate (Alomari, Al-Samarraie, & Yousef, 2019). Keller's ARCS Model (Attention, Relevance, Confidence, and Satisfaction) provides another critical perspective, asserting that gamified learning experiences enhance student motivation by capturing attention, establishing relevance, building confidence, and ensuring satisfaction (Keller, 1987; Raju et al., 2021).

Landers' Theory of Gamified Learning extends these perspectives by proposing that gamification can influence learning by modifying students' behaviours and attitudes through structured game-based mechanics (Landers, 2014; Rivera & Garden, 2021). Despite these theoretical foundations, the effectiveness of gamification in education remains contingent on its alignment with pedagogical goals and students' cognitive and emotional needs (Chans & Castro, 2021). Recent studies highlight the necessity of adaptive gamification strategies that cater to diverse learner profiles to optimise its benefits (Mahfuzah et al., 2018). These frameworks collectively support the integration of gamification as a pedagogical tool while acknowledging its limitations and the need for empirical validation in varied educational settings.

Empirical Findings on Gamification's Effectiveness

Positive Outcomes

Numerous studies report that gamification enhances student motivation and engagement. For instance, a study on chemistry students found that gamified assessments improved attendance, participation, and comprehension (Chans & Castro, 2021). Similarly, research on programming students indicated that gamified platforms led to higher retention rates and more positive learning attitudes (Hellín et al., 2023). In addition, Rivera and Garden (2021)

demonstrated that incorporating game elements in business education significantly increased student collaboration and problem-solving skills, leading to improved performance outcomes.

Challenges and Limitations

Despite its benefits, gamification has limitations. Some studies highlight that extrinsic rewards may lead to short-term engagement but diminish intrinsic motivation over time (Chapman & Rich, 2018). Additionally, not all students respond positively to competitive elements like leaderboards, which can create stress rather than motivation (Rivera & Garden, 2021). Furthermore, implementation challenges, such as the need for faculty training and technological infrastructure, can hinder adoption (Mohamad et al., 2018). A study by Alomari et al. (2019) found that while gamification boosted engagement, it did not necessarily lead to better knowledge retention in some disciplines, suggesting that its effectiveness varies by subject area.

Diverging Perspectives

The literature presents mixed findings on gamification's impact on academic performance. While some studies demonstrate significant gains, others find minimal differences compared to traditional teaching methods (Alomari et al., 2019). Contextual factors, such as subject discipline and student demographics, influence these outcomes, suggesting that gamification should be tailored rather than universally applied (Raju et al., 2021). A meta-analysis by Mahfuzah et al. (2018) revealed that while gamification improved engagement levels, the long-term impact on knowledge retention and transferability of skills remains unclear, necessitating further investigation.

Research Gaps and Future Directions

Despite the growing body of research on gamification in higher education, significant gaps remain that necessitate further investigation. One major concern is the lack of longitudinal studies assessing the long-term impact of gamification on student learning outcomes and retention (Alomari et al., 2019). Current research predominantly focuses on short-term engagement benefits, often overlooking whether gamification leads to sustained academic success and deep learning (Hellín et al., 2023). Additionally, most gamification studies have been conducted within STEM disciplines, particularly in computing and engineering fields, with limited research exploring its effectiveness in the humanities and social sciences (Chans & Castro, 2021). This raises concerns regarding the generalisation of gamification strategies across diverse educational contexts (Mahfuzah et al., 2018).

Another critical gap is the lack of personalised and adaptive gamification models. Many existing implementations adopt a one-size-fits-all approach, which fails to account for individual differences in learning styles, intrinsic motivation, and digital literacy (Rivera & Garden, 2021). Research suggests that customised gamification strategies, which dynamically adjust based on students' engagement levels and preferences, could enhance learning outcomes (Chapman & Rich, 2018). However, empirical evidence supporting adaptive gamification mechanisms is still scarce, highlighting the need for further experimental and comparative studies.

Theoretical Basis and Its Influence on Motivation

Gamification in education draws upon theories of motivation, both intrinsic and extrinsic, to enhance student engagement and learning experiences. Self-determination theory, for instance, underscores the importance of intrinsic motivation; it posits that when students are motivated by personal interest and satisfaction, they tend to demonstrate greater persistence, creativity, and overall achievement in their academic endeavours (Ryan & Deci, 2020). To initiate motivation, extrinsic rewards may be strategically employed. Research has consistently demonstrated the capacity of gamification to motivate students, while also highlighting the necessity of fostering sustained, autonomous engagement that aligns with educational objectives (Dicheva, Dichev, Agre, & Angelova, 2015). Moreover, scholars have emphasised that psychological needs such as autonomy, mastery, and a sense of belonging serve as critical drivers of motivation (Han, 2015).
The subsequent subsections present key findings, examine overarching themes, and portray both commonalities and divergences within the literature.

Intrinsic and Extrinsic motivation

Intrinsic and extrinsic motivation represent critical dimensions in understanding how students engage with gamified learning environments in Higher Education. Within the domain of motivation theory, intrinsic motivation, an internal drive fuelled by personal interest and the gratification derived from learning, has been widely acknowledged as essential for sustained engagement and profound learning outcomes (Ryan and Deci, 2020). While extrinsic motivators, such as external rewards and recognition, can catalyse initial engagement, there remains ongoing debate regarding their capacity to maintain engagement over time (Hanus and Fox, 2015).

A central theme emerging from the literature is the necessity of achieving a judicious balance between these two forms of motivation. Gamification elements, including points, badges, and leaderboards, have demonstrated efficacy in initiating engagement by providing immediate feedback and recognition, particularly in structured educational settings (Alomari, Al-Samarraie, and Yousef, 2019). However, as Self-Determination Theory (SDT) suggests, intrinsic motivation driven by autonomy, competence, and relatedness remains fundamental to enduring engagement in learning contexts (Deci and Ryan, 2004). Empirical evidence supports this assertion, indicating that learners engaged through intrinsic motivation exhibit deeper cognitive processing and more sustained persistence than those motivated by external reinforcements alone (Hellín et al., 2023).

Nevertheless, the limitations of extrinsic motivators warrant careful scrutiny. Over-reliance on reward-based gamification has been found to undermine intrinsic motivation, potentially shifting the focus from authentic learning to the pursuit of external validation (Nicholson, 2012). Some studies have suggested that gamification frameworks are most effective when extrinsic motivators are aligned with and support intrinsic motivators, rather than functioning as their replacement (Rivera and Garden, 2021). Furthermore, the efficacy of extrinsic rewards appears highly contingent upon contextual factors. For instance, while leaderboards may enhance competitive spirit and foster behavioural engagement in some students, they may simultaneously deter those who consistently struggle to attain high rankings, leading to feelings of exclusion or disengagement (Chapman and Rich, 2018). These findings underscore

the imperative for a nuanced and pedagogically grounded approach to gamification in Higher Education. Rather than treating extrinsic motivators as standalone tools, they should be strategically integrated within learning environments that also cultivate autonomy-supportive practices and provide meaningful, formative feedback (Sailer et al., 2017). Such integration is critical to fostering both short-term behavioural engagement and deeper, long-lasting cognitive and affective engagement (Chans and Portuguez Castro, 2021). Accordingly, the literature advocates for the careful calibration of gamification elements to sustain intrinsic motivation, thereby supporting both immediate engagement and durable learning gains in Higher Education settings.

Psychological Needs and Student Engagement

The cultivation of motivation and engagement in gamified learning environments is closely linked to the fulfilment of students' psychological needs, a relationship that has been widely acknowledged within the scholarly literature (Han, 2015). Central to this discourse is the recognition that the effective integration of gamification must prioritise the psychological needs of autonomy, competence, and relatedness to foster genuine student engagement. However, while there is general consensus regarding the pivotal role of these psychological needs in shaping engagement, divergence persists concerning the practical implementation and efficacy of such approaches. For instance, Han (2015) contends that addressing psychological needs through gamification can enhance motivation and promote deeper forms of engagement. Yet, this assertion invites further scrutiny, as the translation of these principles into pedagogically sound designs remains contested. The theoretical underpinnings of self-determination theory (SDT), as articulated by Deci and Ryan (2000), underscore the importance of these needs; nonetheless, their application within gamified learning environments has demonstrated varying degrees of success. Empirical studies have highlighted challenges in seamlessly integrating autonomy-supportive and competence-enhancing features within gamified platforms, particularly when balancing these elements against curricular demands and institutional constraints (Dichev & Dicheva, 2017; Landers et al., 2019).

Consequently, while the foundational role of psychological needs is broadly accepted, there is an evident heterogeneity in how this principle is operationalised within gamified learning contexts. This underscores the necessity for further empirical inquiry to refine design practices that truly support these needs in a manner that is both contextually sensitive and pedagogically robust. A prudent and methodical approach is therefore essential to ensure that gamified learning environments meaningfully address these psychological drivers, thereby advancing both theoretical understanding and practical application in the higher education landscape.

Gamification and Academic Performance

Recent scholarship suggests that gamification can positively influence learning outcomes by promoting knowledge acquisition, problem-solving abilities, and critical thinking (Sailer et al., 2017). Nonetheless, the extent of this impact is heavily contingent upon the alignment between gamified activities and specific learning objectives, as well as the thoroughness of their design (Landers, 2015). Such considerations invite a more nuanced analysis of whether improvements observed in academic performance are attributable directly to gamification or rather to the pedagogical robustness of its implementation. Although there is general

agreement on the prospective benefits of gamification, notable divergence persists regarding the contexts and conditions under which these benefits manifest most effectively. This highlights the importance of examining the interplay between gamification and diverse pedagogical approaches within higher education. Moreover, the dimension of personalisation and adaptability, underscored by Ibanez, Di Serio, and Delgado Kloos (2014), warrants critical evaluation. While technological affordances of gamified systems can provide immediate feedback and adaptive learning pathways, further analysis is required to ascertain the extent to which these features address individual learner needs and preferences. Despite an expanding body of literature on gamification in higher education, discernible gaps remain. One such gap concerns the limited availability of validated design methodologies for gamified interventions. This calls for future research that identifies and evaluates design strategies tailored to distinct learning contexts. Additionally, while extant studies often report increased motivation and engagement resulting from gamification, there is a relative dearth of critical examinations concerning its sustained impact on intrinsic motivation over time. Recent meta-analyses tend to highlight short-term improvements without addressing how these interventions fare once their initial novelty diminishes (Zainuddin et al., 2020). Such gaps highlight the necessity for longitudinal studies to better understand the enduring effects of gamification in higher education.

Research Design

Operating within the field of educational technology and higher education, I have been profoundly influenced by my own experiences in developing a nuanced understanding of gamification's role in education. I approached this study from a constructivist perspective, viewing reality as subjective and shaped by individual, cultural, and educational backgrounds. This perspective guides my interpretation of data, with each participant's experience of gamified learning regarded as a unique and personal narrative rather than an objective truth. Epistemologically, I have embraced an interpretivist stance, prioritising the meanings individuals attribute to their experiences. This approach is vital for comprehending how participants perceive and engage with gamification in their educational contexts. Rather than seeking objective truths, I focus on empathetically understanding and interpreting the diverse experiences associated with gamified learning, thereby informing the research methodology and analysis to provide a holistic view of gamification in education.

I employed stringent inclusion and exclusion criteria to ensure a comprehensive and reliable analysis of the available research. My primary criterion for inclusion was the relevance to the topic, focusing on studies that explicitly addressed the impact of gamification on student motivation, engagement, and academic performance. I included peer-reviewed journal articles, conference papers, and reputable academic publications, emphasising recent studies (post-2015) to capture the most current insights into the evolving field of gamified learning. To maintain the integrity and relevance of the review, I applied stringent exclusion criteria. Studies that did not directly pertain to higher education settings, those lacking empirical evidence, and publications dated before 2015 were excluded. I also deliberately excluded literature that conflated gamification with other educational technologies or methodologies. This careful curation ensured that the review retained a clear emphasis on the distinct aspects of gamification in education.

The process of identifying relevant literature involved comprehensive searches across academic databases such as JSTOR, Google Scholar, and specific educational technology

journals. I used a carefully considered set of keywords, including “gamification,” “higher education,” “student engagement,” and “academic performance,” in various combinations. This systematic approach allowed me to accumulate a diverse range of studies, providing valuable insights into different facets of gamification within educational contexts. By adhering to these specific inclusion and exclusion criteria, I have aimed to uphold transparency and replicability in the source selection process. I engaged with a wide spectrum of literature, encompassing empirical studies, meta-analyses, and theoretical papers. This comprehensive approach ensures a multi-dimensional understanding of the role of gamification in enhancing the educational experiences of higher education students.

Targeted Group

In this small-scale study, I engaged with participants from a medium-sized college in the United Kingdom, accommodating approximately 3,500 students. The college offers a diverse range of higher education programmes, including undergraduate and postgraduate degrees across various disciplines such as business, health sciences, and creative industries. The participant group comprised students from these distinct academic pathways, enabling a rich exploration of their personal experiences with gamification within their learning environments. In addition to students, I involved lecturers who have integrated gamification into their pedagogical practices, providing nuanced perspectives on the impact of such strategies on teaching and learning dynamics. Furthermore, a technologist responsible for the design, implementation, and maintenance of gamified learning platforms offered specialist insights into the technical underpinnings of these educational environments. The manager of the college’s special education programme also participated, contributing valuable perspectives on how gamification is being adapted to support inclusive educational practices and its effectiveness in addressing the learning needs of students with additional support requirements.

Sampling Approach

I employed purposive sampling to select participants who were directly involved in or had experience with gamification in higher education. My goal was to ensure a diverse and comprehensive representation of viewpoints related to gamification in educational contexts. I selected nine participants, encompassing a variety of roles, to facilitate a holistic understanding of the subject matter. These roles included undergraduate students, postgraduate students, lecturers, a technologist responsible for implementing and supporting gamification tools, and the manager of the college’s special education programme. The criteria for participant selection were that they should have direct experience with or exposure to gamification in educational settings. All participants provided informed consent and engaged in semi-structured interviews, thereby ensuring adherence to ethical research guidelines.

Method of Data Collection and Ethical Considerations

I conducted semi-structured interviews, which I designed to provide flexibility in participant responses while ensuring that discussions remained aligned with the study’s key themes. Each interview was scheduled to last between 30 and 45 minutes, allowing ample time for an in-depth exploration of the topics. Ethically, I adhered to Lancaster University’s Code of Ethics, upholding the highest standards of academic integrity and ethical conduct. Furthermore, I rigorously preserved the confidentiality and anonymity of all participant data, safeguarding

the privacy of those involved and ensuring that the information was used solely for research purposes in a manner consistent with ethical research practices.

Data Analysis

Following individual semi-structured interviews, in which participants shared their thoughts and experiences regarding gamification, I employed qualitative methods to analyse the data and recordings. My primary objective was to identify significant patterns and relationships aligned with the study's focus. To achieve this, I personally transcribed the interview recordings and utilised NVivo software to facilitate a thematic analysis. This process involved categorising and correlating segments of the interview responses with key variables of interest, specifically investigating how gamification influenced student motivation, engagement, and academic achievement. I found that the chosen framework was particularly well-suited for uncovering overarching themes within the data, whilst also preserving the unique perspectives of the participants. This approach enabled me to capture nuanced and subjective insights that are often overlooked in quantitative research, as highlighted by Braun and Clarke (2016).

Limitations

Small Scale and Sample Size*:* Conducted on a limited scale with only nine participants, my sample may not adequately represent the broader population, which could affect the generalisability of the findings.

Participant Diversity: Although I included a diverse range of roles, such as undergraduate and postgraduate students, lecturers, a technologist, and a manager of the special education programme, the study nonetheless had limitations in terms of demographic diversity, particularly with respect to age, gender, ethnicity, and socio-economic status. This restricted demographic diversity may constrain the generalisability of the findings to wider population groups and could introduce biases that reflect the particular characteristics of the sampled cohort rather than broader societal dynamics.

Purposive Sampling and Bias*:* I employed purposive sampling by selecting participants based on specific criteria. This approach carries the potential for bias in participant selection, as individuals were chosen on the basis of predefined characteristics and experiences. While these limitations are important to acknowledge, I do not believe they diminish the value of the insights gathered. Rather, they highlight the need for future research to explore gamification in education further, encompassing larger and more diverse samples to enhance the robustness and applicability of the findings.

Findings

RQ1: How do subtle elements of gamified learning ignite and sustain student motivation over time in higher education settings?

Based on the responses collected (see Table 2) from semi-structured interviews conducted with nine participants, categorised into three distinct roles (five students, two technologists, and two special education managers),(see Appendix A for participant details), the table below presents their agreement scores regarding the assertion that gamification enhances

motivation. The ratings range from 1 (strongly disagree) to 5 (strongly agree), short-term engagement and long-term learning retention (Chans & Portuguez Castro, 2021)

Role	Agreement Score: 3	Agreement Score: 4	Agreement Score: 5
Special Education Manager	0	1	1
Students	1	2	2
Lecturers	0	0	2
Technologist	0	1	1

Table 2: Agreement scores

In this distribution, it is evident that the majority of participants across all roles agree (scores of 4 or 5) that gamification elements help with motivation. The distribution is as follows: Special education manager, Lecturer and Technologist gave scores indicating agreement (4 or 5). Among students, four out of five agreed (scores of 4 or 5), with only one giving a neutral score (3). This finding is corroborated by the literature, for instance, Hamari, Koivisto, and Sarsa (2014) in their study "Does Gamification Work? A Literature Review of Empirical Studies on Gamification" found consistent evidence supporting the motivational benefits of gamification in different settings, including education and technology. These studies provide a solid academic foundation for the observed agreement among different groups regarding the motivational benefits of gamification.

> *"As a microbiology student, I'll be honest the content in some of my courses can be dry at times. But gamification elements like points, levels, achievements, and even storylines have really increased my engagement and motivation to learn. I am more intrinsically driven to participate in discussions, complete difficult assignments, and even do extra reading for gamified classes."* Alicja (Microbiology Student)

RQ2 - Why and in what ways do gamified learning strategies influence student engagement and subsequently impact their academic performance within diverse educational contexts?

The findings derived from the qualitative interviews (see Appendix B) are summarised in Table 3, illustrating the perceived impact of gamification across multiple educational roles. The table provides insights into how different stakeholders—lecturers, special education managers, students, and technologists—evaluate gamification in terms of engagement, learning experience, cognitive development, emotional and behavioural changes, academic performance, and applicability across diverse educational contexts.

Role	Enhanced Engagement	Improved Learning Experience	Cognitive Development	Emotional & Behavioural Changes	Impact on Academic Performance	Diverse Educational Contexts
Lecturer	5.0	5.0	5.0	4.0	5.0	4.0
Special Education Manager	4.0	4.0	4.0	5.0	4.0	4.0
Student	5.0	5.0	4.0	4.0	5.0	4.0
Technologist	4.0	4.0	5.0	4.0	4.0	4.0

Table 3: Educational Roles

Lecturers evaluated various dimensions of gamification positively, with Enhanced Engagement, Improved Learning Experience, Cognitive Development, and Impact on Academic Performance each receiving the highest rating of 5.0. Similarly, students expressed a favourable perspective on gamification, particularly emphasising its value in Enhanced Engagement, Improved Learning Experience, and Impact on Academic Performance, all of which were rated 5.0. In contrast, the Special Education Manager assigned the highest score to 'Emotional and Behavioural Changes', rating it at 5.0. The Technologist exhibited a consistent scoring pattern, awarding 4.0 to 'Enhanced Engagement' and 'Improved Learning Experience', while attributing a higher rating of 5.0 to 'Cognitive Development'. These findings align with the overall high ratings observed in 'Enhanced Engagement' and 'Cognitive Development'. Moreover, the impact of gamification on emotional and behavioural changes is substantiated by prior research, such as Dicheva et al. (2015) in their study "Gamification in Education: A Systematic Mapping Study".

RQ 3: How can research on game-based learning be enhanced to better serve the needs of individuals with disabilities, and why is inclusive gamified learning crucial in addressing the diverse social landscape of higher education?

Drawing upon the findings presented in Table 4, which are derived from semi-structured interviews with nine participants, this section evaluates critical dimensions associated with the enhancement of game-based learning for individuals with disabilities. The scores reflect participants' perceptions of the effectiveness of tailored design, accessibility features, understanding diverse learning needs, engagement and motivation, as well as diversity and equity in education.

Participant Role	Tailored Design	Accessibility Features	Understanding Diverse Learning Needs	Enhancing Engagement & Motivation	Diversity and Equity in Education
Lecturer	4.5	4.5	4.5	4.5	4.5
Special Education Manager	5.0	5.0	5.0	5.0	5.0
Student	5.0	5.0	5.0	5.0	5.0
Technologist	5.0	5.0	5.0	4.0	5.0

Table 4: Inclusive Game-Based Learning for Disabled Learners in HE

The data revealed a strong consensus on several key aspects of game-based learning, particularly highlighting the importance of tailored design, accessibility, understanding diverse learning needs, enhancing engagement and motivation, and a commitment to diversity and equity in education. Notably, all participant roles rated 'Tailored Design' and 'Accessibility Features' very highly, with scores of 4.5 or above, underscoring the critical need for game-based learning tools to be specifically crafted to meet the varied needs and abilities of individuals with disabilities. This unanimity reflects a growing recognition of the importance of creating inclusive educational tools. In addition, there was a strong consensus on the importance of 'Understanding Diverse Learning Needs,' in line with educational research emphasising a comprehensive approach to accommodating students with disabilities (Rose & Meyer, 2002).

Most participants, except the Technologist, highly rated 'Enhancing Engagement and Motivation,' indicating general agreement on the effectiveness of gamified learning, especially for learners with disabilities, supported by research on interactive learning environments (Freeman et al., 2014). These findings highlight the critical importance of designing inclusive and accessible gamified learning experiences, aligning with the broader educational trend of catering to diverse learners, particularly those with disabilities. The slightly lower score for 'Social Inclusion and Interaction' by the Special Education Manager suggests areas for potential development and research, aiming to ensure that gamification in education promotes not only learning but also a more inclusive and socially interactive environment.

> *"In physics, I find that incorporating real-time data visualisation tools as a gamification element is highly effective. This interactive approach enhances engagement and achievement by making abstract concepts tangible. Gamification is particularly beneficial for students with disabilities due to its interactive and customisable nature, enabling accommodations and modifications that improve the learning experience. Game-like simulations simplify complex concepts, making them more accessible for students with cognitive disabilities." (Physics Lecturer)*

Discussion

In discussing the impact of gamification in higher education, this study aligns its findings with the initial inquiry, exploring how gamification strategies address the challenges of student engagement, motivation, and achievement. The discussion effectively mirrors the

introduction, addressing the context, problematisation, setting, background, participants, and research questions.

Emerging theme: Relationship Between Gamification Level and Motivation

This study examines how gamification elements within higher education can sustain student motivation. Analysis of feedback from nine diverse participants indicates that the incorporation of gamification significantly enhances motivation. For instance, Alicja, a microbiology student, along with other participants, observed that the allocation of points and the integration of narrative elements augmented their engagement. Such findings lend support to the study's hypothesis that gamification renders learning more engaging and pertinent. Students reported increased motivation and engagement through interactive simulations, immediate feedback, and competitive elements, which contributed to a more enjoyable learning experience. Furthermore, gamification positively influenced their class participation and the timely completion of assignments, as the accumulation of points and badges served as an impetus for more active involvement. Saleem and colleagues' (2022) research further confirms that gamification exerts a substantial positive impact on student motivation in educational settings. The study identifies five key motivational elements-Goal, Access, Feedback, Challenge, and Collaboration, which are frequently embodied through artefacts such as badges and leaderboards.

Figure 2: Motivation Elements in Gamified Learning (Source: GAFCC gamification design model, Motivational requirements, elements that drive motivation, and factors that facilitate motivation)

Emerging theme: Correlation between Gamification Level and Engagement

A comparative analysis (see Appendix C) of traditional and gamified lectures demonstrated a marked enhancement in student engagement and academic performance within gamified environments. Feedback from participants across various disciplines overwhelmingly indicates that gamified learning is perceived as more engaging and effective than conventional teaching methods. For example, one Information Technology student reported that the gamification of coding instruction was considerably more enjoyable than prior experiences with lectures delivered via PowerPoint. Students noted that gamified elements, including points, badges, and leaderboards, rendered learning more stimulating and motivating, thereby increasing the likelihood of assignment completion and active participation in class discussions. Similarly, a meta-analysis by Hamari and Koivisto (2017), which encompassed 67 studies on gamification in education, found that the implementation of gamification consistently resulted in enhanced student engagement, motivation, and learning outcomes.

Emerging Theme: Fostering Inclusivity in Gamified Learning

Participants consistently emphasised the importance of tailored design and accessibility features in gamified learning, thereby underscoring the imperative for inclusivity in the development of educational tools. This collective perspective is in alignment with the broader trend of embracing inclusive learning practices in education, particularly through two interconnected dimensions: 'Understanding Diverse Learning Needs' and 'Enhancing Engagement and Motivation.' Both lecturers and technology experts commended the adaptability of gamified learning environments in simplifying complex concepts and providing interactive, customisable content. Such adaptability is pivotal in catering to a broad spectrum of learning needs, including those of students with disabilities.

Participants acknowledged several key advantages, including accessible design features that integrate assistive technologies, subtitles, and compatibility with various devices, all of which contribute to enhancing the accessibility of educational content. Furthermore, they recognised the value of diverse game types in accommodating different learning styles and addressing various disabilities. For instance, visual puzzles were deemed beneficial for individuals with auditory impairments, whereas text-based games were considered advantageous for those with visual impairments. This flexibility in game design is regarded as a powerful instrument in ensuring that gamified learning is accessible to all. In addition to these technical considerations, experts emphasised the importance of inclusive storytelling and scenario development. These elements were perceived as enhancing the overall learning experience by ensuring that content and narratives resonate with a diverse audience. Inclusivity in storytelling encompasses not only representation but also the creation of scenarios that engage and connect with learners from a variety of backgrounds and abilities. In sum, the emerging theme of inclusivity in gamified learning highlights a collective recognition of the need to establish educational environments that are not only engaging but also accessible and tailored to the diverse learning requirements of all students. This theme aligns with the broader educational movement towards inclusivity, representing a significant step towards ensuring that gamification benefits all learners in the educational landscape.

Summation of Findings and Implications

The positive responses from all participants collectively construct a compelling case for the incorporation of gamification into higher education curricula. This approach effectively addresses the challenge of sustaining student engagement in an era dominated by technology, aligning seamlessly with the institution's overarching objective of fostering a cutting-edge and engaging learning environment. To harness the potential benefits of gamification effectively, educational institutions should allocate resources for technology, lecturer training, and research in the domain of gamified learning (Dicheva, 2015). Professional development programmes for lecturers assume a pivotal role in ensuring the inclusive and pedagogically robust implementation of gamification (Hamari & Koivisto, 2017). These findings possess the capacity to broaden the horizons of educational theories and promote interdisciplinary collaboration. Within the domain of educational technology, there exists a pressing need for the prioritisation of user-centred design, involving lecturers in the development of tools that align seamlessly with curriculum standards (Garris et al., 2002).In essence, the study furnishes compelling evidence advocating for the incorporation of gamified learning strategies into higher education, with ramifications extending across policy, practice, theory, and technology. It lays the foundation for a more interactive, inclusive, and effective learning environment within higher education.

Conclusion

The findings of this study provide compelling evidence that, when carefully integrated into higher education programmes, gamification can significantly enhance student engagement and learning experiences. This is particularly relevant in contemporary digital learning environments, where sustaining student engagement remains a persistent challenge (Hellín et al., 2023). Prior research suggests that gamification fosters motivation and participation by incorporating game mechanics into educational contexts, thereby promoting interactive and immersive learning experiences (Alomari, Al-Samarraie, & Yousef, 2019). Empirical studies further substantiate these claims, demonstrating that gamified learning platforms contribute to improved retention, increased motivation, and enhanced academic performance (Raju et al., 2021). The positive reception from diverse educational stakeholders, including students and academic staff, reinforces the argument for incorporating gamification within higher education (Rivera & Garden, 2021).

Moreover, this study aligns with institutional priorities aimed at fostering innovative and engaging student experiences, particularly in addressing the needs of a technologically adept student population (Chapman & Rich, 2018). Nevertheless, it is necessary to acknowledge the study's limitations. The most significant constraint is the relatively small sample size, which, while yielding meaningful qualitative insights, may restrict the generalisability of the findings (Chans & Portuguez Castro, 2021). Furthermore, the initial application of activity theory posed methodological challenges, particularly in translating its theoretical constructs into practical implementation. Despite these limitations, the data collected exhibited strong validity and reliability, contributing meaningfully to the discourse on technology-enhanced learning (TEL) and offering valuable insights into the effective implementation of gamification in educational settings. Future research should build upon these findings by conducting studies with larger and more diverse sample populations to improve the generalisability of outcomes (Hellín et al., 2023). Additionally, there is an opportunity to explore the design and application of

gamification strategies in greater depth to ensure their suitability for a diverse range of learners, including students with disabilities (Alomari et al., 2019). Longitudinal studies are also needed to examine the sustained impact of gamification on academic performance and student engagement over time (Rivera & Garden, 2021).

In conclusion, this study makes a meaningful contribution to the ongoing discourse on gamification in higher education. It highlights how gamification can be leveraged to foster more engaging and motivating learning environments, ultimately enhancing students' academic experiences and outcomes (Chapman & Rich, 2018). The implications of this research extend beyond the immediate institutional context, offering valuable insights for the development of future pedagogical strategies and educational policies (Mahfuzah Mohamad et al., 2018). Ultimately, the study emphasises the transformative potential of gamification, not only for institutions seeking to modernise their approaches to learning but also for the broader educational community invested in improving student engagement and success (Chans & Portuguez Castro, 2021).

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Appendices

Appendix A

Interview participant number	*Code name*	*Gender*	*Role*	*Interview duration (mins)*
001	*Alicja*	*F*	*HE student*	*35*
002	*Kellie*	*F*	*HE student*	*30*
003	*Lucy*	*F*	*HE student*	*35*
004	*Ashutosh*	*M*	*HE student*	*35*
005	*Gary*	*M*	*HE student*	*35*
006	*Steven*	*M*	*IT Sr. Lecturer (HE)*	*30*
007	*Adam*	*M*	*Sr. Lecturer (HE)*	*35*
008	*Caton*	*M*	*Special education Manager*	*40*
009	*Ryan*	*M*	*Technologist*	*40*

Table A1: Participant Information Dataset

Participants: A mix of higher education (HE) students, senior lecturers, a special education manager, and a technologist.

Roles and Experience: This diversity in roles and experiences offers a comprehensive view of the impact of gamification across various educational stakeholders.

Interview Duration: Interviews lasted between 35 to 40 minutes, providing ample time for in-depth discussions.

Appendix B

Gender	
Male	6
Female	3
Age	
19-24	5
30-55	4
Game play experience	
0-2 (Years)	4
3-5	3
>5	2

Table B1: Participant Demographics Data Set

Gender Distribution: Of the 9 participants, 6 are male and 3 are female.

Age Range: Participants are spread across two age groups: 5 participants aged 19-24 and 4 participants aged 30-55.

Gaming Experience: Varied gaming experience with 4 participants having 0-2 years, 3 participants with 3-5 years, and 2 participants with more than 5 years of experience.

Appendix C

Variables	Traditional lecture without gamification	Gamified lecture	Based on:	Analysis
Interest	Mild interest	High	Analysis/ Questions posed during interviews to all participants.	Gamification significantly increases students' interest in the subject matter.
Motivation	Low	High	Analysis/ Questions posed during interviews to all participants	Gamification strategies enhance students' motivation towards learning.
Engagement	Low	High	Analysis/ Questions posed during interviews to all participants	The interactive nature of gamification fosters greater student engagement.
Performance	Average	High	Analysis/ Questions posed during interviews to all participants	Improved performance is noted in gamified environments, suggesting enhanced learning outcomes.

Table C1: Comparison of Traditional Lectures and Gamified Lectures