The Research Context of Artificial Intelligence and Gamification to Improve Student Engagement and Attendance in Higher Education

O Contexto da Investigação em Inteligência Artificial e Gamificação para Melhorar o Envolvimento e a Assiduidade dos Estudantes no Ensino Superior

Viktoriya Limonova
Universidade Aberta
2202373@estudante.uab.pt
Arnaldo Manuel Pinto dos Santos
Universidade Aberta
arnaldo.santos@uab.pt
José Henrique Pereira São Mamede
Universidade Aberta
jose.mamede@uab.pt
Vítor Manuel de Jesus Filipe
Universidade de Trás-os-Montes e Alto Douro
vfilipe@utad.pt

Abstract: A significant concern that is widely discussed in the field of Higher Education is declining student participation. In several institutions, attendance is optional, allowing students to attend lectures at their convenience. This study proposes the integration of Artificial Intelligence and Gamification to improve student engagement and attendance rates. The initiative combines advanced technological strategies with conventional educational methodologies to enhance the lecture experience. The initiative is significant as formal lectures often witness dwindling student interest and frequent absenteeism, undermining the educational process and student's future career prospects. This combination has the potential to revolutionise Higher Education by providing a more interactive and engaging learning experience. While gamification has positively impacted learning in various contexts, integration with Artificial Intelligence is a game-changer, paving the way for a modernised educational experience. This innovative exploration of the AI-gamification blend sets the stage for future research and the implementation of updated academic strategies, ultimately addressing student engagement and attendance. This position paper presents the bases and foundations for understanding the problem of student attendance and engagement and the role of AI and gamification in Higher Education in alleviating it.

Keywords: Higher Education, Artificial Intelligence, Gamification, Student Engagement

Resumo: Uma inquietação relevante e extensamente discutida no domínio do Ensino Superior é a diminuição da participação dos estudantes. Em diversas instituições, a assiduidade é facultativa, permitindo aos estudantes a frequência às aulas segundo a sua disponibilidade. Este estudo propõe a integração da Inteligência Artificial e da *Gamification* como meios para melhorar o envolvimento e as taxas de assiduidade dos estudantes. A iniciativa em causa articula estratégias tecnologicamente avançadas com metodologias educativas convencionais no intuito de enriquecer a experiência de ensino. Tal iniciativa assume importância dada à constante diminuição do interesse dos estudantes e a assiduidade irregular nas aulas formais, fatores que afetam negativamente o processo de ensino e as perspetivas de carreira dos estudantes. Esta combinação ostenta o potencial de revolucionar o Ensino Superior, proporcionando uma experiência de aprendizagem mais interativa e envolvente. Embora a *Gamification* já tenha impactado positivamente o processo de aprendizagem em diversos contextos, a sua integração com a Inteligência Artificial surge como um elemento transformador, abrindo caminho para uma experiência educacional modernizada. Esta investigação inovadora que combina a IA e *Gamification* prepara as bases para investigações futuras e a implementação de estratégias académicas aprimoradas, concentrando-se principalmente no envolvimento e na assiduidade dos estudantes. Este artigo de posicionamento apresenta as bases e os fundamentos necessários para a compreensão do problema da frequência e envolvimento dos estudantes no Ensino Superior, assim como o papel da IA e da *Gamification* na sua mitigação.

Palavras-chave: Ensino Superior, Inteligência Artificial, *Gamification*, Envolvimento dos Estudantes

1. Introduction

The exploration of research is seamlessly incorporated into the academic curriculum of the Doctoral Program in Web Science and Technology at Universidade Aberta in Lisbon. Although the doctoral program is part of an asynchronous system, this position paper aims to conduct research within face-to-face Education. This focus was determined following a preliminary systematic literature review, which revealed a lack of papers addressing this theme in the context of traditional, in-person teaching. The position paper presents a cutting-edge and technologically advanced approach to tackling a critical concern in present-day academia, specifically emphasising Higher Education (HE). This research aims to broaden literary resources and foster more excellent knowledge in the HE field. It encompasses all levels of Education, from bachelor's to doctoral students. Higher Education's challenge resides in keeping students engaged and interested. It is not uncommon for student absenteeism and decreased motivation to pose significant challenges to the educational process (Gershenson, 2016; Sithole et al., 2017; Pinter et al., 2020;). The concept of attendance refers to the action of being present at an event or regularly attending an institution. Additionally, the act of being present at a specific place or event is an indication of attendance (Patel & Swaminarayan, 2014).

The significance of student engagement is widely acknowledged. Engagement in the context of learning refers to the enthusiastic and deliberate participation of students in every aspect of their Education, whether through structured academic activities or informal, spontaneous ones (Boulton et al., 2019). However, it is a multifaceted concept that can be challenging to define accurately. Depending on the situation, engagement can manifest in various ways (Kahu & Nelson, 2018). It is not a term that can be universally applied but rather an evolving notion encompassing many facets.

Additionally, the emotional component of engagement is apparent when students experience a profound sense of connection and attachment to their educational setting, aligning with their institution (Truta et al., 2018). Technology integration in educational settings has been shown to significantly improve student involvement and participation, according to research conducted by Bond et al. (2020). By incorporating game-like aspects into non-gaming situations, participants have been found to exhibit more significant curiosity and interest (Mora et al., 2017; Kalogiannakis et al., 2021). Academic institutions are increasingly adopting gamification techniques (Abramovich et al., 2013; Fodor, 2018) to bolster student motivation and encourage greater engagement throughout their academic pursuits. The primary challenges of HE institutions are rooted in the lack of student engagement and attention (Ghasemi et al., 2018) and their frequent non-attendance in academic sessions (Joseph et al., 2021). One significant impact of this problem is the suboptimal academic results, particularly in theoretically challenging courses. Among various strategies, gamification is a promising solution (Loos & Crosby, 2017; Welbers et al., 2019).

In the evolving landscape of Education, the role of AI has expanded, transcending traditional data-centric tasks. Its synergy with gamification offers a potent avenue that holds promise in reinvigorating student motivation and engagement (Vrabie, 2023). The fusion of AI and gamification within HE can enhance student involvement greatly. Despite being a relatively new concept, its potential for further academic investigation is promising. Consequently, delving into the combination of AI and gamification is not only forward-thinking but also can stimulate more research and the implementation of contemporary methods within academia.

2. Background

Regular attendance is vital to academic success and fosters a strong sense of community in the university environment. Students can actively participate in discussions, ask questions, and receive constructive teacher feedback by attending classes consistently. Furthermore, maintaining a consistent presence in class allows students to stay organised with their coursework, develop a deeper understanding of the material, and form meaningful relationships with their peers (Truta et al., 2018; Amerstorfer & Freiin von Münster-Kistner, 2021). However, mere physical presence is insufficient to demonstrate genuine engagement. Authentic involvement necessitates active cognitive and emotional participation (Abun et al., 2019; Tan et al., 2021).

Extensive research has shed light on the significant negative impact of disengagement on various aspects of life. Sanders et al. (2016) delved into the retention patterns of foundation-year students, unveiling a direct correlation between disengagement and dwindling academic performance, culminating in reduced graduation rates. However, the Education landscape is in flux. With the rapid technological advancements and the continuous evolution of teaching methodologies, the conventional classroom setting has been redefined (Subhash & Cudney, 2018; Haleem et al., 2022). Advanced pedagogical methods are recognised as innovative techniques that play a vital role in amplifying the effectiveness of teaching and learning processes. These methods are instrumental in enhancing the quality of Education by providing students with a comprehensive understanding of the subject matter (Nancy et al., 2020).

Contemporary pedagogical shifts lean towards constructivist approaches. The nexus between academic success and engagement is unmistakable in HE, with attendance and active participation being critical determinants of favourable outcomes (Abun et al., 2019). Improving student engagement is crucial in maximising the effectiveness of educational systems. By incorporating game mechanics and elements into learning activities, students are motivated and actively participate in the learning process, leading to better academic outcomes (Loos & Crosby, 2017), promising a personalised curriculum and innovative methods to encourage active student participation in their Education (Pinter et al., 2020). What makes gamification particularly compelling is its foundation on digital technologies. Educators must acknowledge that modern classrooms are mainly composed of the latest generations. Born amidst technological revolutions, their learning styles and knowledge acquisition patterns differ from their predecessors. This demographic shift underpins the urgency to employ innovative educational tools, and gamification is a potent solution (Barna & Fodor, 2018). The allure of gamification lies in its capacity to ignite curiosity. Incorporating game elements into academic settings has significantly enhanced motivation levels across various theoretical domains (Ribeiro et al., 2018; Subhash & Cudney, 2018; Welbers et al., 2019).

Gamification has proven to be a highly effective tool in enhancing the learning experience (Kalogiannakis et al., 2021), and as a result, educational institutions across different tiers are increasingly incorporating it into their learning programs (Dias, 2017; Khaitova, 2021). Empirical evidence lends further credence to the impact of gamification. Studies have consistently shown that implementing gamification in educational settings has a significant positive impact on students' motivation levels (Barna & Fodor, 2018; Subhash & Cudney, 2018). Incorporating gamification techniques into attendance tracking can increase student engagement and promote a healthy sense of competition. For instance, using leaderboards can allow students to showcase their progress (Hanus & Fox, 2015). Notably, the influence of gamification transcends classroom boundaries, fostering an academic rigour that correlates with overall scholastic achievement (Ibanez et al., 2014; Barna & Fodor, 2018). As Loos and Crosby's (2017) research indicated, implementing a point-based grading mechanism was the prevalent means of gauging students' academic achievements. This approach facilitated measuring and evaluating student performance by predetermined learning outcomes. Although gamification has proven effective, it is essential to recognise that Education is constantly changing. While a significant amount of research supports the benefits of gamification, educators must continue to innovate

their teaching strategies to ensure that students remain interested and engaged in the learning process (Sousa-Vieira et al., 2015).

The fusion of AI with gamification promises a transformative educational experience. AI can personalise learning pathways, offering students a tailored educational journey (Tapalova et al., 2022). While apprehensions about AI's potential to replace specific roles exist (Holes et al., 2019; Tahiru, 2021), it is essential to perceive AI as an invaluable ally rather than a competitor. Embracing AI as an augmentative tool rather than a replacement ensures we harness its capabilities to enrich daily educational processes. The advent of AI is one such transformative wave, promising to recalibrate the very essence of Education. While it is naive to assume that AI will remain an outsider in this evolution, it is equally critical to discern the genuine potential of AI from the surrounding hyperbole (Holmes et al., 2019). AI's influence has expanded significantly in both scope and depth. One notable example of this phenomenon is the proliferation of virtual assistant software, which has fundamentally altered the conventional dynamic between teacher and student.

Furthermore, as Tahiru (2021) has pointed out, AI has made significant strides within the Education sector by streamlining administrative tasks like paperwork. AI technology can automate a wide range of tasks, such as handling paperwork and reducing the administrative burden on teachers. By freeing up their time and resources, educators can focus more on interacting with students directly, which creates a more vibrant and responsive learning environment. This shift brings tangible benefits as students find themselves at the heart of this enriched environment, leading to a renewed enthusiasm for learning, as shown in a study by Huang et al. in 2021. Nevertheless, the promise of AI transcends mere administrative efficiency. At its core, AI harbours the potential to revolutionise instruction by offering personalisation (Tapalova et al., 2022) at an unprecedented scale. AI can process and analyse large amounts of data, which can be used to create personalised learning experiences for students (Tahiru, 2021). The collaboration between human expertise and AI's analytical capabilities holds great promise in transforming passive learning into active learning, where students are active participants in their Education journey. This approach ensures that every student's unique needs and learning style are catered to, resulting in a more effective and efficient education system (Cui et al., 2018).

3. Understanding Student Disengagement

Understanding the complex and intricate reasons for reduced student involvement requires a comprehensive and multi-dimensional strategy (Bond et al., 2020). Research has shown that low attendance can have a considerable impact on students. When they miss classes, they are deprived of the valuable opportunity to engage with their teacher and peers. Consequently, they miss out on seeking clarification, establishing connections between prior knowledge and new ideas, and taking comprehensive notes on the lesson material (Fernandes & Martins, 2016). Conversely, a unique perspective emerges when we consider the influence of emotional intelligence on engagement. Some researchers argue that a student's emotional intelligence quotient can profoundly shape their

academic engagement, especially given its established connection to educational outcomes (Maguire et al., 2017). Engagement, in its essence, encapsulates a student's psychosocial state. It spans behavioural, emotional, cognitive (as discussed by Fredricks, Blumenfeld & Paris, 2004 in Kahu & Nelson, 2018), and even sociocultural aspects (Kahu & Nelson, 2018) of their educational journey. A prevailing sentiment in academic circles underscores motivation as the precursor to engagement. This perspective positions motivation as the unseen engine, propelling and sustaining behaviour (Bond et al., 2020). The logic is straightforward: Students' intrinsic desire to learn directly influences their class participation, amplifying their learning outcomes (Pinter et al., 2020).

According to a study by Khalid in 2017, the impact of class participation on students was examined. The study found that most participants agreed on the importance of active engagement in the learning process. Specifically, 84.5% of respondents acknowledged the positive effects of class participation. Additionally, 68.67% of participants confirmed that class participation significantly contributes to student coordination. These findings suggest that participating in class is crucial in enhancing academic outcomes. Furthermore, Pinter and team's observations in 2020 revealed that Subotica Tech, College of Applied Sciences, had a typical 25% dissipation rate, indicating that many students are absent at the beginning of the examination cycle. These findings highlight the challenges educators and institutions face in ensuring regular attendance and engagement, particularly in the virtual learning environment.

Cultivating student motivation is a fundamental aspect that serves as a critical determinant of academic success (Collaço, 2017). When educators craft captivating activities and insightful evaluations, they engage students and ignite their intrinsic desire to learn (Ibanez et al., 2014). This kindled spark then acts as fuel, facilitating the application of the knowledge and skills they have garnered. As articulated in academic literature, motivation can be classified into two paradigms: extrinsic and intrinsic (Gordon et al., 2018; Pinter et al., 2020). While extrinsic motivation propels individuals through external rewards or incentives, intrinsic motivation derives from an inner sense of purpose or the sheer joy of an activity (Gordon & Grey, 2018). It is crucial to acknowledge the delicate balance between these motivators. Teachers must exercise caution to boost extrinsic motivation with rewards without dampening intrinsic motivation (Hanus & Fox, 2015). The responsibility, therefore, lies in harmoniously balancing these factors. Highlighting intrinsic motivators can often foster profound comprehension and ingenuity (Pinter et al., 2020).

Extensive research in HE has revealed a robust correlation between regular student attendance and academic achievement. Students who attend lectures regularly tend to perform better academically, while those who miss classes unnecessarily risk impeding their academic progress (Khalid & Khalid, 2017; Kahu & Nelson, 2018; Mbua, 2023). It is essential to acknowledge that the issue of non-attendance is not a new problem limited to the current decade. Despite the efforts of academic and governmental bodies, the issue remains unresolved primarily. Many universities, which are centres of intellectual growth, do not have a standardised policy for attendance across departments and

institutions. This lack of consistency may worsen the problem, as Cohn and Johnson (2006) noted.

4. Gamification in Education

Gamification involves integrating game mechanics into non-game contexts, increasing engagement and motivation (Deterding et al., 2011). Doing so can lead to achieving specific goals, such as developing a sense of loyalty and commitment (Ofosu-Ampong, 2020; Yordanova, 2020). This technique transforms boring activities into interactive experiences (Welbers et al., 2019) by implementing a game-like structure that rewards sustained efforts and acknowledges positive contributions (Mystakidis, 2020). The concept of gamification strives to merge the pleasurable and intriguing aspects of games with the organised atmosphere of educational environments. In this scenario, engagement pertains to the enthusiastic involvement of participants throughout the gameplay. When engaged players are more inclined to feel driven to confront the obstacles ahead and less prone to contemplate abandoning the activity (Dias, 2017), this union aims to create experiences that are both educationally profound and intrinsically enjoyable.

Incorporating gamification in educational landscapes has consistently showcased many benefits, primarily in motivation and heightened student engagement (Barna & Fodor, 2018; Ar & Abbas, 2021; Pinter et al., 2020; Khaitova, 2021). Various gamification mechanics can be effectively applied in HE and utilised in different ways and for multiple teaching methodologies and purposes (Subhash & Cudney, 2018). However, the integration of gamification is not a trivial task. Crafting a gamified curriculum demands the same, if not more, dedication as curating conventional lessons, necessitating educators to invest significant time and intellectual effort. When judiciously implemented, badges and leaderboards can spark a sense of healthy competition among learners (Pinter et al., 2020). Although gamification could be applied to educational applications, challenges might arise due to differing attitudes towards gaming, particularly in older adults (Barna & Fodor, 2018). Finding a delicate balance between these elements is vital, prioritising collaboration over competition.

Furthermore, while specific gamified components can be potent motivators, they must be cautiously employed. As posited by Hanus and Fox (2015), indiscriminate use of rewards, badges, and leaderboards might inadvertently lead to undesirable classroom dynamics. Thus, educators must not get swayed solely by the allure of gamification but should critically evaluate empirical evidence before weaving it into their teaching fabric.

The burgeoning interest in the potential of gamification's pedagogical potential is palpable, with its versatility making it apt for both traditional classroom settings and online learning paradigms (Matsumoto, 2016). This approach seeks to metamorphose routine curricular activities into immersive, game-like interactions, aiming to craft courses that are not just informative but also intrinsically motivating (Mystakidis, 2020). A testament to the effectiveness of gamification is evident in some academic institutions' adoption of digital badges to incentivise undergraduate class attendance. As evidenced

by Abramovich et al. (2013) and Joseph et al. (2021), such initiatives have bolstered student attendance and intrinsic motivation.

The digital age has brought innovative educational tools to transform traditional learning landscapes. One of these tools is gamified platforms, such as Kahoot, which are powerful instruments in bridging the gap between technology and pedagogy. They offer a unique blend of engagement and learning that is gaining recognition in academic circles. A group of researchers conducted a study on the effectiveness of using it. The study found that Kahoot can boost motivation and help students develop social competencies. Educators used Kahoot-based assessments aligned with the curriculum's objectives to gauge academic understanding and encourage student competition (Ibanez et al., 2020).

5. The Role of AI in Enhancing Education and Gamification

The term AI encompasses creating computer systems capable of performing tasks previously achievable by humans. AI is classified into three primary areas: Data Mining (examining vast amounts of current and past data to identify significant patterns), Natural Language Processing (educating computers to comprehend and process natural languages), and Machine Learning (facilitating machines to learn and enhance their performance through statistical algorithms) (Modi & Gochhait, 2023). AI is recognised for its prowess in data analysis (Rahmari et al., 2021) and as a pivotal tool in enhancing educational methodologies and gamification (Ghai & Tandon, 2023). Considered a hallmark of technological advancement, AI is equipped to address some of the most complex challenges (Tai, 2020). AI is a specialised system that enables machines to possess human-like cognitive abilities (Tahiru, 2021). In the context of HE, a notable gap exists in understanding AI's pedagogical and ethical dimensions, necessitating insights from educators. In academia, AI's potential has been met with genuine enthusiasm.

Incorporating AI in Education denotes a substantial alteration in technology and teaching methods (Pisica et al., 2023). The extensive capabilities of AI can open doors to truly tailored, dynamic, and ultimately fruitful learning journeys. The advent of AI in HE has been propelled by advancements in information and communication technologies, as highlighted by Crompton and Burke in 2023. Moreover, the prowess of AI extends beyond adaptive learning. It also serves as a sentinel, vigilantly monitoring a student's academic trajectory. In a groundbreaking study, Huang et al. (2023) showcased the efficacy of an AI-driven video recommendation system within a flipped classroom setup. This avant-garde system harnessed data from learning management systems to gauge student engagement levels. Employing cluster analysis for grouping, it segregates students based on their motivational profiles. Interestingly, the research findings underscored the system's efficacy. Students, especially those with moderate motivation levels, demonstrated pronounced improvements in engagement and learning outcomes when exposed to this tailored AI-driven pedagogical approach.

The interdisciplinary community of AI in Education (AIED) brings together experts from diverse fields, including computer science, Education, and psychology, who share a common goal of improving Education through AI. Despite significant advancements in intelligent educational systems, student disengagement continues to pose a challenge. As a result, there is a growing interest in leveraging gamification and AI to create personalised and compelling learning experiences (Bittencourt et al., 2018). The development of Intelligent Tutoring Systems (ITS) marks a significant milestone. These systems are highly regarded for adapting to individual learning requirements and providing accurate student guidance (Tapalova et al., 2022). The ITS design involves a fusion of expert knowledge in mathematics and physics and proven pedagogical strategies that enhance learning. These systems are advanced educational tools that adapt in real-time to the individual needs and evolving understanding of students. They offer diverse educational experiences in multiple formats, utilising various AI models to provide a rich and personalised learning experience (Holmes et al., 2019; Crompton & Burke, 2023).

Nonetheless, AI has proven to be a valuable asset in language acquisition. Learners can use AI-powered chatbots as virtual conversational partners to sharpen their linguistic abilities. Thanks to advanced natural language processing capabilities, these chatbots provide instantaneous feedback, helping students to improve their fluency. Such interactive tools offer an immersive and responsive learning environment that transcends traditional language learning paradigms (Haristiani, 2019).

Although AI technologies in Education, including ITS, promise efficiency and personalisation, they also bring about a paradigm shift in the role of educators. While such technologies can automate repetitive tasks like grading, the goal is to free educators to focus on more nuanced aspects of teaching. However, a challenge arises when some technological tools risk overshadowing educators by delivering superior personalised learning experiences or relegating teachers to rudimentary roles. This can lead to educators strictly adhering to pre-defined scripts or merely prepping technology for student use, diluting the essence of human-centric teaching (Holmes et al., 2019).

As mentioned, integrating game-like elements into academic curricula has fostered student engagement, motivation, and active participation (Loos & Crosby, 2017). When implemented thoughtfully, gamification can make learning more captivating and help students stay committed to their academic pursuits. This study highlights the effectiveness and value of gamified approaches, suggesting that they can breathe new life into traditional pedagogical methods and enhance the overall educational experience. The relationship between AI and Education is complex. While tools like ITS and chatbots can offer unparalleled personalisation (Haristiani, 2019; Crompton & Burke, 2023), it is crucial to maintain a balance that ensures technology complements, rather than replaces, the invaluable human touch in Education.

Teachers need to address the distinct needs of students born in the mid-1980s to mid-1990s (Generation Y) and mid-1990s to early 2000s (Generation Z), who have grown up with the internet and social media as a vital part of their daily lives and socialisation since

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childhood. Today's youth have been exposed to digital devices and platforms early, giving them a distinct digital proficiency that sets them apart from previous generations (Barna & Fodor, 2018). One solution to address this is to incorporate AI, which excels at processing vast amounts of data and extracting meaningful insights. In Education, AI has the potential to revolutionise the way students learn. AI can develop customised learning paths by analysing student data (Babu & Moorthly, 2023). Essentially, AI ensures that Education is no longer a one-size-fits-all model, recognising each student's individuality and providing a tailored learning experience based on their unique needs, preferences, and pace. This level of personalisation, once unattainable, has the power to transform Education, making it more engaging and effective.

However, as highlighted by Hooda et al. (2022), while the potential of assessment in the gamified context is significant, there is a gap in its effective implementation. Traditional assessment strategies might not seamlessly fit into the dynamic and interactive world of gamified learning. Herein lies the potential of AI. With its ability to analyse performance in real-time, AI can provide nuanced, immediate feedback, guiding students through their learning journey and ensuring that the assessment is not just about grades but about growth, learning, and continuous improvement.

AI has immense potential to enhance gamification (Pisica et al., 2023) by enabling the incorporation of personalised features into gamified systems. AI technology makes it feasible to create tailor-made rewards and game elements that reflect an individual's past behaviour, choices, and data analysis (Modi & Gochhait, 2023). Although a vast amount of literature is dedicated to AI (Pisica et al., 2023), there is a limited amount of literature on the use of AI in the Gamification of HE (Yang et al., 2023). Several research papers have proposed the integration of AI and Gamification to address the shortcomings of traditional gamification methods. These studies propose creating a tailored digital assessment system that utilises big data analytics, AI, behavioural psychology, and neuroscience to account for dynamic user traits and real-time user engagement. The aim is to elevate the customisation and flexibility of assessments (Bezzina et al., 2022; Modi & Gochhait, 2023; Yang et al., 2023).

6. Challenges, Considerations and Future Directions

Gamification is a promising approach to Education in the modern era. As mentioned, it involves incorporating gaming elements into academic curricula to create more interactive and dynamic learning experiences, rekindling student motivation and deepening engagement. However, the adoption of gamification is not without its challenges. As observed, one of the primary concerns associated with gamification is the technological readiness of educational institutions. A robust and reliable technology infrastructure is essential to implement gamification effectively. However, not all institutions have access to cutting-edge technology or adequate resources to maintain and update it, leading to inconsistent adoption rates across different institutions. This can potentially widen the educational gap and leave some students behind.

Apart from the logistical challenges, using gamification in Education may present a series of ethical concerns. As Education becomes more digitised, privacy and security concerns around student data become more private (Barril & Tan, 2017). Educational institutions must ensure that they have adequate measures in place to protect student data. Another ethical challenge is ensuring that gamified resources are accessible to all students, regardless of their socio-economic background. This can be a significant challenge as not all students have equal access to technology and related resources. One of the primary obstacles to implementing gamification in Education is the potential reluctance of the parties involved. Teachers who have invested significant time and effort into refining their instructional approaches may hesitate to embrace a gamified curriculum. They may question the efficacy of gamification or worry about compromising academic rigour.

Similarly, students accustomed to conventional teaching methods may feel uneasy about transitioning to a gamified learning environment. While gamification holds immense promise, its implementation is complex and fraught with logistical and philosophical challenges. For gamification to truly revolutionise Education, all parties must approach it with a clear understanding of its potential and pitfalls, making informed decisions prioritising educational integrity and student engagement.

AI is a game-changing technology that has the potential to revolutionise Education (Zalte, 2023). AI can create personalised learning experiences for students by analysing their data and designing customised learning paths. It can also provide real-time feedback about their performance, enabling them to adjust teaching methods better to suit individual needs. However, like gamification, it has its challenges; one of the primary concerns associated with AI is the ethical use of student data. Educational institutions must ensure that they have adequate measures in place to protect student privacy and prevent the misuse of their data.

Additionally, there is a risk that AI could widen the educational gap between high and low-income students. Another challenge is ensuring that AI promotes educational integrity and does not compromise academic rigour. Educators must be mindful of AI's potential biases and limitations and use it with traditional teaching methods to create a well-rounded learning experience. AI can potentially transform Education, but its implementation must be carefully planned and executed.

One of the most promising future directions in tertiary Education is the integration of gamification and AI to increase student motivation and engagement. This combination can revolutionise students' engagement with their studies, help them stay motivated, and encourage them to participate actively. AI-powered learning journeys can be personalised for each student's academic progress, creating an immersive and captivating learning environment that departs from traditional teaching methods. This can help students stay engaged and motivated throughout their educational journey and significantly increase attendance rates. Moreover, instant and timely feedback is crucial for effective learning, and AI can provide it seamlessly. By integrating AI-powered feedback mechanisms in gamified contexts, educators can create the perfect balance of challenges and motivations that encourage learning, significantly improving learning outcomes. This can help students achieve their academic goals and enhance their

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educational experience. In addition, AI can optimise collaborative learning by matching student groups in gamified scenarios based on patterns and preferences, fostering individual and collective growth. This can result in personal academic growth and collective intellectual advancement of the student community, making Education more enjoyable.

In summary, a comprehensive approach is required to integrate AI and gamification in tertiary Education. This approach should consider various factors, such as pedagogical, ethical, and technological considerations. By addressing these multifaceted aspects, students can enjoy a fulfilling academic experience that could lead to increased attendance rates, improved learning outcomes, and enhanced collaborative learning environments.

7. Conclusion

The lack of student engagement and non-attendance pose primary challenges in HE. However, this approach aims to create an immersive and engaging educational environment that can significantly enhance classroom attendance and boost student engagement. With technological advancements, innovative teaching techniques are becoming more prevalent. Among them, gamification stands out for its ability to incorporate game-like elements into non-gaming scenarios. Studies have shown that gamification has the potential to increase motivation, enhance learning outcomes, and encourage active participation.

By combining gamification with AI, Education can be revolutionised, allowing for personalised gamified modules that provide individualised and fluid learning experiences. This method enhances student engagement and tailors the learning experience to meet each student's unique needs, with AI's capability to analyse large datasets and provide intelligent recommendations. Despite the potential benefits of this approach, significant obstacles exist, including technical, financial, and institutional barriers. There are also ethical concerns regarding data protection and equitable access, which must be addressed to ensure that all can realise the benefits of this approach. Furthermore, some educators and learners may need more time to embrace these new techniques, highlighting the need for a harmonious integration that balances traditional teaching values with innovation. Comprehensive research strategies are necessary to ensure success. In-depth studies involving broader demographics are needed to validate the benefits and identify possible drawbacks. The possibilities of AI in augmenting gamified educational elements are vast, promising an engaging and fulfilling academic journey.

Although technology-assisted teaching has advantages, it is crucial to remember that Education should strive for authentic understanding and holistic development. Ultimately, a thoughtful and knowledgeable approach will safeguard the essential principles of Education and maximise the advantages of AI and gamification. In summary, combining AI and gamification offers an exceptional prospect for the HE industry. It can transform Education by delivering tailored and captivating learning

encounters. A careful and informed strategy is crucial to optimise the benefits of AI and gamification to ensure the integrity of Education remains intact. Integrating AI and gamification can elevate class participation and stimulate student involvement, leading to better academic outcomes and a fulfilling educational journey that can address issues like attendance.

A crucial aspect to be defined in the future of this project is exploring how traditional education can effectively collect sufficient data to leverage the power of AI. In addition to surveys, feedback, and image capturing, other methods of data acquisition can also be considered, such as observing student behaviour and collecting data through quizzes and assessments. However, it is crucial to ensure that these methods are implemented in a way that upholds privacy and ethical considerations and that the data being collected is used in an unbiased manner.

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