

ENHANCING MARKETING EDUCATION THROUGH GAMIFICATION: LEARNERS' CHARACTERISTICS AND MOTIVATION IN GAMIFICATION STRATEGIES

JAGANNATH KHAREL

126 Pages

The study investigates how the personality traits of marketing students influence their engagement with gamification elements and the resulting learning outcomes. Additionally, it explores how gamification, guided by Self-Determination Theory, enhances these outcomes, and motivates university marketing students. One hundred eleven respondents participated, testing eight hypotheses: seven examined the Big Five traits' influence on attitudes and engagement. At the same time, the final used the self-determination framework to analyze motivation in gamification. Respondents with openness and extraversion favored using gamified learning materials, with no gender differences observed. The study found that gamified learning elements, such as rewards, feedback, levels, challenges, and gamified simulation as educational technology, enhanced student engagement and understanding of marketing theories and concepts. Consistent with the Self-Determination Theory, autonomy, competence, and relatedness were crucial for maintaining motivation through gamification. These findings demonstrate the value of integrating gamified elements to optimize learning outcomes, bridge gaps in traditional teaching, and prepare marketing students for the world's new business challenges of the competitive marketing industry.

KEYWORDS: gamification; educational technology; marketing; personality traits; self-determination, simulation; learning outcomes.

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CHARACTERISTICS AND MOTIVATION IN GAMIFICATION STRATEGIES

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ACRONYMS AND ABBREVIATIONS

BFI: Big Five Intervention

Cor: Correlation

DV: Dependent Variable

EdTech: Gamification in Education Technology

H: Hypothesis

IV: Indirect Variables

OLS: Ordinary Least Squares Regression

SDT: Self-Determination Theory

CHAPTER I: BACKGROUND OF THE STUDY

The concept of "gamification," which originated in the digital media industry, is becoming increasingly popular across multiple disciplines, attracting significant interest from both industry professionals and academic researchers (Huotari & Hamari, 2017; Saleem et al., 2022). This trend extends beyond traditional gaming contexts and encompasses areas such as business, marketing, IT, educational and other industries (Hogberg et al., 2019; Huotari & Hamari, 2017; Dicheva et al., 2015; Saleem et al., 2022; Yang et al., 2017; Rodriguez et al., 2018) given as disruptive technology across a multitude of fields and industries (Bilos, 2022; Behl, 2022). This gamification phenomenon involves incorporating game elements into non-gaming contexts (Rodrigues et al., 2019) to engage users (Suh et al., 2018) and facilitate adaptive learning processes across various industries, including the marketing and education industries (Hassan et al., 2021; Bilos, 2022; Behl, 2022). Gamification nowadays has become a widespread practice across most industries, marketing to education integrating game-like elements into non-gaming contexts to engage users and enhance learning.

Gamification in education technology (EdTech) solutions involves strategic integration of games like elements and mechanics into educational platforms to enhance learner engagement, motivation, and retention (Deterding et al., 2011; Alsawaier, 2018). For example, gamification makes learning more rewarding, fun, and interactive for learners (Rodrigues et al., 2019; Jayalath & Esichaikul, 2020; Loureiro, Bilro, & Angelino, 2020). The integration of gamification in education technology enhances engagement, motivation, and knowledge retention (Saleem et al., 2022) though its elements like points, badges, feedback, levels, rewards, and challenges. By incorporating gamification elements like badges, and leaderboards, learners maintain heightened

engagement and motivation throughout their educational journey (Zainn, Chu, Shujahat & Perera, 2020; Rodrigues, Oliveira & Rodrigues, 2019). Therefore, understanding the latest digital innovative methods can strategically derive business to optimize learning initiatives, sustain learner engagement, and boost overall success.

In the digital marketing era, integrating gamification in EdTech solutions offers a competitive edge, enhancing business growth, market expansion and fostering active learner participation (Oliveira et al., 2023). In the current time, EdTech is not just about education, or about technology: much of it is also about business and marketing in the latest years and is part of it in all educational institutions in the digital era (Teras et al., 2020). Gamification in Edtech solutions has become a fast-emerging practice in the business world, with a growing number of organizations adopting gaming techniques and game-style rewards to increase users' engagement and learners' motivation (Loureiro et al., 2020, Oliveira, Souza, Reis, & Souza, 2021).

Using innovative teaching methods like gamification in addition lessons meets educational goals without relying on traditional classes or written handbooks, making learning more enjoyable and motivating (Mansouri, 2023). Ashley (2019) found that gamification, integrating marketing news exploration and data visualization, significantly boosted student confidence in marketing and data skills, fostering self-directed learning. Similarly, Alsawaier (2018) concluded that gamification addresses declining learner motivation, suggesting its application in college environments for recruitment, course content, and curricula.

However, understanding how learners' characteristics influence their experiences and motivational process with educational gamification remains an ongoing challenge. Whereas various psychological and behavioral effects of gamification have been separately investigated across different educational contexts, their findings are incompletely understood, especially with

regards to how the motivational processes and learners' characteristics influence and can be influenced by the game design. Addressing these gaps is crucial for optimizing the effectiveness of educational gamification strategies.

Problem Statement

The relevance of the research on gamification in education is emphasized by Behl, Jayawardena, Pereira et al. (2022), who define gamification as a disruptive innovation-a concept that equally conveys an opportunity and a risk. In the context of EdTech, it is supposed to denote a group of points, badges, and leaderboards used together with challenges and rewards for creating more interactive or enjoyable learning experiences for users. Given its potential to influence behaviour, gamification is a promising solution to these challenges (Alyoussef, 2021). The essential component of any game includes the clearly defined objectives, a scoring system, regular feedback, personal choice in task completion methods, and ongoing guidance (Costello, 2022).

However, there is also a lack of understanding regarding how learners' characteristics, such as demographics, cognitive traits, social aspects, and personality traits, influence their experiences with gamified educational interventions (Denden et al 2024). Nowadays, an increasing number of studies have aimed to integrate game design elements into education, while also focusing on identifying the consequences and antecedents of technology-enhanced learning and game-based learning (Ofosu-Ampong, Boateng, Anning-Dorson et al., 2020).

Based on my reviewing existing literatures, there is a need for comprehensive research to investigate how learners' characteristics shape their engagement, learning outcomes, and behaviors within gamified educational environments, particularly among university marketing

students and their motivational process. The main aim of the study is to examine the relationship between learners' characteristics, motivational process and their learning outcomes in the context of educational gamification, with a focus on university marketing students.

Research Questions

How do the personality traits of marketing students influence their engagement with gamification elements and learning outcomes in educational technology platform?

How does gamification enhance the effectiveness of learning outcomes and influence motivational processes, based on Self-Determination Theory, among university marketing students?

Objectives

To examine how personality traits of university marketing students influence their engagement with gamification elements and subsequent learning outcomes in an educational technology platform.

To investigate the role of gamification in enhancing learning outcomes and influencing motivational processes, guided by Self-Determination Theory (SDT), among university marketing students.

Organization of Thesis

This thesis is organized into five chapters, each addressing an essential aspect of my research, from the introduction to the conclusions.

The first part covers the introduction, which introduces the research topic and provides background information on gamification in EdTech and the global market. It outlines the

significant research problems, questions, and objectives that guide the study, underscoring their importance and engaging the reader.

Chapter two covers a literature review which explores crucial theories and prior studies related to gamification, its applications in marketing education, and the influence of learner characteristics on gamified learning outcomes. It provides a comprehensive overview of motivational theories such as Self-Determination Theory, Goal-Setting Theory, Flow Theory, and Expectation-Value Theory and their impact on Learners' Characteristics on Gamification.

Another section under the chapter outlines the study framework, developed from a comprehensive literature review. This framework, which is based on the identified theories and prior studies, concisely defines and explains the study hypotheses, clarifying the variables, their expected relationships, and the study's overall process, thereby providing a clear understanding of the research design.

Chapter three covers the research methodology, including the survey process, instruments, participant profiles, and data analysis techniques.

Chapter four analyses the results and interprets the findings, including the participants' profiles, using hypothesis testing, regression, correlation, ANOVA test, or F test analysis.

The concluding chapter five discusses the brief study results and their implications for educators and marketers. It also offers practical, actionable recommendations for future research, underlining their potential usefulness.

CHAPTER II: LITERATURE REVIEW

Gamification in EdTech and Global Market

Gamification has recently ignited considerable interest in academic and professional circles nowadays. Over the past decade, it has been successfully applied across various fields such as education, human-computer interaction, information studies, health, psychology, consumer behaviour, tourism, and others as a disruptive technology across many fields and industries (Bilos, 2022; Behl, 2022). According to analysts, marketing agencies, and scientists, the educational technology market is considered one of the most promising sectors in the global economy. This industry is rapidly evolving, primarily driven by advanced high-tech solutions for education and training (Januszewski & Molenda, 2013; Deliyannis & Kaimara, 2019; Almeida & Simoes, 2019).

While gamification is still in its early stages and evolving rapidly, its understanding of the phenomenon often arises from fragmented knowledge and various perspectives (Koivisto & Hamari, 2019). In theory, the gamification goals link with the fundamental marketing philosophy (Bilos, 2022). In gamification marketing, gamification effectively engages and motivates individuals through game-playing concepts, a strategy increasingly embraced by businesses.

In recent times, the educational technology market, EdTech, has shown significant growth, the dynamics of which exceed the growth of other markets attractive to startups (Patricio et al., 2018). EdTech includes such new educational solutions as educational applications, online learning platforms, educational games, adaptive educational systems, educational and social environments, new devices for training, new forms for testing knowledge, automation of

educational processes, innovative educational techniques, P2P (peer-to-peer) training, interactive educational projects, mobile learning, micro-learning, just-in-time learning and personal assistance in education (Suoranta et al., 2020; Timchenko et al., 2020). Thus, the EdTech market has experienced significant growth, surpassing other startup-attractive markets, offering various innovative educational solutions ranging from apps and online platforms to adaptive systems and mobile learning (Patrício et al., 2018; Suoranta et al., 2020; Timchenko et al., 2020). Thus, the EdTech market has grown substantially, surpassing other startup-attractive markets, offering diverse, innovative educational solutions.

Theories: Motivational Theories in Gamification

Motivation is crucial in driving learners' engagement and persistence in educational activities. Gamification, integrating game elements and design principles into non-game contexts, has emerged as a promising approach to enhance motivation and promote learning in educational technology. Drawing on various motivational theories, this section presents a comprehensive theory of motivation in gamification, aiming to explain how gamified elements influence learners' motivation and engagement in educational settings.

Self-Determination Theory

Self-Determination Theory (SDT) provides a foundational framework for understanding motivation in gamification. SDT posits that individuals are intrinsically motivated when their psychological needs for autonomy, competence, and relatedness are satisfied (Deci & Ryan, 2000). In gamified educational environments, autonomy can be supported by giving learners choices and control over their learning path. At the same time, competence can be fostered

through challenges that match their skill level. Additionally, promoting a sense of relatedness by facilitating collaboration and social interaction among learners can enhance intrinsic motivation in gamification (Ryan & Deci, 2017). A study found that course design successfully increased psychological needs fulfilment, and students received perceived outcomes (Rayburn, S W., Anderson et al. 2018).

In marketing theory, SDT can be applied in various ways to understand consumer behavior and design effective marketing strategies. According to Deci and Ryan (1985), extrinsic motivation is a drive to behave in specific ways based on external sources, resulting in external rewards (1985). Such sources include grading systems, employee evaluations, awards and accolades, and the respect and admiration of others. Conversely, intrinsic motivation originates internally. It stems from innate impulses that influence our actions, such as our fundamental beliefs, passions, and individual ethical compass.

Developed by Edward Deci and Richard Ryan, SDT focuses on intrinsic motivation and the factors that drive it, such as autonomy, competence, and relatedness.

Understanding this theory can help in designing gamified experiences that foster intrinsic motivation in learners. The SDT is a research-based framework concerning human motivation and personality within social settings, distinguishing between autonomous and controlled motivation.

Originating from experiments investigating the impact of external rewards on internal motivation, SDT has evolved over three decades to encompass five mini theories addressing various facets. These include the influence of social environments on intrinsic motivation, the development of autonomous motivation through internalization, individual differences in motivational orientations, the role of fundamental psychological needs for growth and wellness,

and the effects of different goal contents on well-being and performance. SDT has been applied to diverse areas such as cross-cultural motivation, close relationships, energy levels, mindfulness, and unconscious processes in behavior regulation. While initially developed through laboratory studies, SDT is also supported by applied research addressing social issues including health behavior change, education, psychotherapy, work motivation, sports, and prosocial behaviors (Deci and Ryan 2012).

Given the foundational principles and diverse applications of SDT) its insights extend beyond individual motivation to shape marketing strategies in realms such as business-to-business (B2B) interactions. This integration of psychological principles into marketing practices highlights the significance of understanding consumer behavior within the context of intrinsic motivation and autonomy (Mitchell et al., 2020).

SDT suggests that the quality of a learners' motivation could be more influential than the amount of motivation for performance prediction and behavior outcomes. It also argues that the need for support enhances intrinsic motivation and internalization, leading to better achievement (Good et al., 2022). SDT indicates that B2B marketing content that meets the needs of autonomy, competence, and relatedness can motivate potential buyers toward business success. For example, consumers may prefer a brand that makes them feel appreciated, empowered, and able to express their individuality (Yaghtin et al., 2020; Zhu and Chen., 2015).

The SDT offers (see figure in appendix 2.1. SDT) valuable insights into motivation within gamification, emphasizing the importance of autonomy, competence, and relatedness. In educational gamified settings, providing learners with choices and challenges suited to their skill level can enhance intrinsic motivation. Moreover, fostering collaboration and social interaction

among learners can further boost motivation. This understanding of SDT can inform the design of gamified experiences to effectively engage learners.

Goal Setting Theory

Goal Setting Theory emphasizes the importance of setting specific, challenging, and achievable goals to enhance motivation and performance (Locke & Latham, 1990). In gamification, goal-setting mechanisms such as progress tracking, badges, and leaderboards are commonly employed to help learners set and achieve learning objectives. By providing clear goals and feedback on progress, gamified educational technology motivates learners to strive for mastery and accomplishment (Deterding et al., 2011). Groening & Binnewies (2019) study found that while both goal-setting theory and gamification in Education technology have been utilized to enhance performance and engagement. Moreover, they studied around the exploration of digital achievements within gamification systems, with a focus on understanding their effectiveness in enhancing motivation and performance, optimal design considerations, and their similarity to classical goal-setting mechanisms. The study found that well-designed achievements can enhance motivation and performance, particularly through increased persistence, suggesting that achievements with high difficulty and limited quantity are most effective in providing a direct goal-setting function.

Flow Theory

Flow Theory describes a state of optimal engagement and immersion experienced when individuals are fully absorbed in an activity (Csikszentmihalyi, 1990). In gamified learning environments, fostering flow involves balancing the challenge level of tasks with learners' skill levels, providing immediate feedback, and maintaining a clear sense of goals and progress. By

creating flow-inducing experiences, gamification enhances learners' intrinsic motivation and enjoyment of the learning process (Hamari et al., 2014).

Expectancy-Value Theory

Expectancy-Value Theory posits that individuals' motivation is influenced by their expectations of success and the perceived value of the task or activity (Eccles and Wigfield, 2002). In gamified educational technology, rewards and incentives are strategically designed to increase learners' expectancy of success and enhance the perceived value of engaging with learning content. By aligning rewards with learners' goals and interests, gamification promotes motivation and persistence in educational activities (Keller and Suzuki, 2004).

Both intrinsic and extrinsic motivation are crucial factors in bolstering students' involvement in learning via gamified methods, prioritizing the fulfillment of fundamental needs such as competence, autonomy, and relatedness (Zainuddin et.al, 2020; Luarn et al., 2023). Games facilitate the incorporation of both intrinsic and extrinsic motivational aspects to create an atmosphere where participants are more driven to engage in the designated task. In line with the viewpoints, to ensure a proper and efficient integration of gamification tools in the classroom, it is essential to enhance and blend both intrinsic and extrinsic motivation within the educational setting (Saleem, Noori & Ozdamli, 2022).

Initially, gamification is closely associated with extrinsic motivation, involving game elements or rewards like money, points, and badges. However, motivation in gaming has predominantly been linked with intrinsic motivation because games are often perceived to possess an innate ability to motivate individuals, immersing them in enjoyable gameplay experiences (Zainuddin & Gommer, 2021, p.4). Zainuddin et al. (2020) highlight that game

elements "enhance a more enjoyable and captivating player experience, further enriching their gamified learning encounters" (p.7). By incorporating both extrinsic rewards and intrinsically satisfying designs, players embark on a journey of mastery, necessitating elements such as desire, incentive, challenge, reward, and feedback to foster learning engagement (p.9). According to Hartmann & Gommer (2021), games necessitate extrinsic motivation for students to initially engage and then internalize it for sustained involvement. Educational games, regarded as instructional tools empowering students to take ownership of their learning and facilitating experiential learning, are anticipated to intrinsically motivate students (p.18). In summary, while students' extrinsic motivation in gamification is crucial for providing incentives for learning, intrinsic motivation is pivotal in fostering learners' maturity and fostering their appreciation of progress in the learning journey.

Gamification in EdTech and Marketing Education

In the context of marketing education, exploring the impact of user background characteristics on gamified systems can provide valuable insights into student experiences and performance (Tsay et al., 2018). Understanding how student characteristics influence their attitudes towards gamified courses is crucial for designing effective learning experiences (Davis et al., 2018). Moreover, incorporating elements of gamification in marketing courses can enhance student motivation and engagement, as learners may expect and appreciate such interactive elements in their learning process (Dikčius et al., 2020). Gamified learning environments aim to motivate students using game elements, which can lead to increased engagement and improved learning outcomes (Nabizadeh et al., 2021). By considering factors such as cognitive load levels and students' attitudes towards gamified courses, educators can

tailor gamification strategies to better suit the needs and preferences of marketing undergraduates (Topu, 2023). Furthermore, the use of gamification in marketing education can empower students, enhance their knowledge acquisition, and promote active participation in learning activities (Humphrey et al., 2020).

Learners' characteristics play a significant role in how they engage with gamified learning environments. Studies have shown that learners' reactions to gamified mobile applications can be influenced by their characteristics (Erdoğan & Çakır, 2022). Additionally, the impact of challenge-based gamification programs on students' learning outcomes, motivation, and flow has been explored, indicating that learners who participate in such programs exhibit increased confidence and satisfaction (Kaya & Ercag, 2023). Gamified learning models have been developed to enhance programming skills and motivation in vocational schools, demonstrating that learners are more active, find gamified courses more interesting, and are more motivated compared to non-gamified courses (Soraya et al., 2019).

Research has also delved into the effects of cognitive load levels on students' attitudes towards gamified courses, highlighting the importance of factors like attention, relevance, and confidence in shaping learners' perceptions (Topu, 2023). Furthermore, gamification has been found to promote classroom engagement and prepare learners to take responsibility for their own learning (Mee et al., 2022). In the context of online learning environments, gamification strategies have been shown to support self-directed learning and improve learners' academic performance (Palaniappan & Noor, 2022). Moreover, gamification has been deployed in education to enhance learners' commitment, engagement, and knowledge dissemination, aligning with specific educational outcomes (Imran, 2022).

Gamified Simulation in Marketing Education

A marketing simulation provides a holistic business environment where students actively oversee competing firms, offering a comprehensive and integrated learning experience. In an ever more digitized world, numerous fields are embracing gamified simulation incorporating gaming elements into non-game contexts (Gupta et al., 2016) to enhance education endeavors. The concept of technology digitized simulation and gamification assessment in higher education is relatively new but offers potential to revolutionize classroom delivery (Arity, Vesty & Moloney, 2023). It found that Gamified simulations promote active learning by immersing students in realistic marketing scenarios where they must make decisions, solve problems, and respond to feedback in real-time. Arity et la., (2023) highlighted the benefits of employing serious games to ensure the validity of assessment process. For instance, a simulation could simulate a product or market entry strategy, requiring students to analyze market data, develop marketing plans and adapt their strategies based on market dynamics and competitors' actions. It encourages students to apply theoretical concepts in practical contexts, reinforcing their understanding and retention of course materials.

Gamified simulations promote active learning by immersing students in realistic marketing scenarios where they must make decisions, solve problems, and respond to feedback in real-time. For instance, a simulation could simulate a product launch or market entry strategy, requiring students to analyze market data, develop marketing plans, and adapt their strategies based on market dynamics and competitor actions (Ahmed & Sutton, 2017).

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in real-time. For instance, a simulation could simulate a product launch or market entry strategy, requiring students to analyze market data, develop marketing plans, and adapt their strategies based on market dynamics and competitor actions (Murillo-Zamorano et al., 2021).

The adoption of technology in higher education is now imperative rather than merely a desirable enhancement to educational delivery. Arity, Vesty, & Moloney (2023) examined how digital simulation, and serious games can enhance student engagement and aid to address cognitive load challenges experienced by students.

Gamified simulations can increase students' engagement by incorporating game like element like gamifications proactively enforces the end-users learning and decision-making behaviors. For example, simulation could simulate a product lunch or market entry strategy, requiring students to analytics market data, develop marketing plans, and adapt their strategies based on market dynamics and competition actions (Bolton, Chapman and Mills, 2019). The article described how marketing simulations harness digital disruption to enhance learning process and outcomes and prepare students for their future careers.

Figure (See in appendix 1.2) depicts (a) the Business Co-creation Triangle (modified from Zeithaml et al., 2013, and Crittenden et al., 2013) and (b) the Learning Co-creation Triangle. Digitized processes encompass various systems such as customer relationship management, sales force and service management, business analytics, pricing systems, and others.

Digitized interactions involve both purchase and non-purchase transactions, along with information exchange. Digitized communications span new media channels (e.g., Twitter, group chats) as well as traditional media channels. Digital technology and the Internet have not only

disrupted marketing but also revolutionized the education system and modern workplace alike(Honea, Castro, & Peter, 2017). Marketing simulations refer to online, artificial learning environments wherein decisions are crafted amid intricate and ever-changing scenarios, offering students real-time data and feedback (Lovelace, Eggers, & Dyck, 2016).

Influence of Gamification among Marketing Students

Bailey, Pritchard, and Kernohan (2015) found that their research-on-research study elucidated the role of gamification not just in participant engagement and data richness, but also in data validity. Dikcius et al., (2021) syndicate that while the incorporation of gamification elements directly contributes to student engagement and satisfaction within a course. Notably, the utilization of gamification elements appears more promising in marketing Massive Open Online Courses compared to other subjects, as it enables seamless integration of course content with gamification principles, especially in teaching about gamification elements as effective marketing tools. Therefore, there is an emerging need to understand this connection more deeply.

Jaskari and Syrjala (2023) propose four types of responses to the integration of gamification in learning among marketing students. According to their findings, social completeness is inclined to study collaboratively, deriving enjoyment from the social dimensions of gamification. Conversely, highly motivated completions exhibit ambition in their studies, embracing social learning while also being internally driven and accepting various gamification elements. Independent completion's, preferring solitary immersion in learning, gravitate towards noncompetitive and individualistic aspects of gamification. The research suggest that higher education institutions should consider the diverse motivations behind students' engagement with

games and tailor their gamification strategies accordingly to effectively engage and motivate students with varying preferences and tendencies.

Ashley (2019) conducted a study involving undergraduate marketing majors in a senior-level capstone course. Through an innovative approach integrating current marketing news exploration and data visualization practice, gamification significantly enhanced student confidence in marketing knowledge and data visualization skills, while also fostering self-directed learning readiness. Similarly, Alsawaier (2018) study concluded that the effect of gamification on motivation and engagement and the study found that gamification offers a partial solution to the current decline in learner motivation and engagement within the schooling system. College environments stand to gain significantly by gamifying graduate recruitment strategies, course content, and curricula.

Robson (2019) suggested that marketing educators interested in classroom gamification can adopt best practices identified in the research to enhance player engagement. The research noted that gamification was predominantly incorporated into blended or hybrid courses, which aligns with expectations given its digital nature, making it well-suited for integration into e-learning environments. It's important for industry practitioners and academics to investigate integrating gamification into service literature due to the significant overlap between gamification and marketing objectives and methods, highlighting the need to understand their synergy and implications (Huotari & Hamari, 2012). Dicheva et al. (2015) emphasized the encouraging outcomes of gamification's application in the education industry and underscored the need for further research to determine whether gamification can impact both extrinsic and intrinsic motivation among learners.

Influence of Learners' Characteristics on Gamifications

Gamification has garnered growing interest among researchers and professionals across different fields, including education, due to its potential to enhance learners' engagement and motivation. Nevertheless, there remains a lack of understanding regarding how learners' characteristics may impact their experiences with educational gamification (Denden et al., 2022). Nowadays, it's common to incorporate game elements and design into non-game contexts to enhance user motivation and engagement. Some influencing characteristics found were player type, age, gender, motivation, personality, and culture (Klock et al., 2015). Over the last decade, gamification has developed into a potent tool for creating positive experiences such as engagement and fun, it does produce positive effects and benefits (Hamari et al., 2014). Davis et al. (2018) identified positive trends regarding students' perceptions of the impact of gamification on their learning, achievement, and engagement with the course material.

Moreover, there's a growing trend of prosperous startups dedicated to integrating gamified elements into core activities (Pusztai, 2020). For instance, Codecademy employs game-like features to aid users in learning how to code. Additionally, there are companies like Badgeville that help traditional businesses gamify their services. Outdated teaching methods have spurred the search for new approaches suited to Generations Z and Alpha. Gamification, emerging in 2010, involves incorporating gaming elements into various contexts, presenting a promising solution (Pusztai, 2020). These preferred usage patterns are believed to arise from positive, inherently motivating "gameful" experiences generated by the incorporation of game and motivational features into a service (Hamari., Koivisto, & Sarsa, 2014).

Gamifying education can boost student engagement similar to the effects seen in gaming, thereby enhancing their skill development and maximizing learning potential. A study conducted

by Smiderle et al., (2020) revealed significant improvements in accuracy among students with specific personality traits, such as low agreeableness, low openness, and introversion, when using the gamified version. Additionally, gamification helped mitigate a reduction in accuracy observed in students with low conscientiousness. The study explored how gamification impacts individuals differently based on their characteristics. The results indicates that the effect of gamification depends on the specific characteristics of users.

In recent years, digital games have proven to be a highly effective tool for educating children, adolescents, and university students, owing to their significant motivational impact (Machado et al., 2018). The concept is referred to as "gamification" and seeks to incorporate elements of game design, commonly found in digital games, to evoke comparable engagement in settings outside of gaming (Wu, 2011). Kapp (2012) provided an additional definition of gamification as the "utilization of game-based mechanics, aesthetics, and game-oriented thinking to captivate individuals, stimulate action, facilitate learning, and address challenges." Davis et al., (2018) found positive trends with respect to students' perceptions of gamification's impact on their learning, achievement, and engagement in the course material.

Despite the abundance of literature emphasizing the significance of incorporating learners' traits into gamification, the understanding remains fragmented. In this context, Rapp et al. (2019) also underscored that numerous research inquiries pertaining to gamification have yet to be explored by human Computer Interaction researchers, particularly regarding the methods for developing more engaging and enjoyable gamified systems.

Categories for Classifying Learners' Characteristics

Reeves and Brackett (1998) identified four categories for classifying learners' characteristics and explained about FFM. These include: (1) physical attributes, encompassing demographic details like age, gender, specific skills, and disabilities; (2) cognitive traits, which pertain to attention span, memory, and intellectual abilities influencing information retention, problem-solving skills, and data processing; (3) social aspects, which relate to an individual's relationship within a group, including their position, self-perception, socialization, etc.; and (4) personality traits, encompassing various aspects of an individual's personality such as thought patterns, emotions, behavior, and physical activity. In this case, the behaviors can include how learners process information, communicate with peers or instructors, demonstrate problem-solving skills, and exhibit various aspects of their personality, such as assertiveness, openness, or persistence, during the learning process. Personality traits greatly influence academic success but understanding how these traits affect gamification can help design effective gamified learning interventions. This study explores how various learning styles and personality traits affect students' perception, engagement, and performance in a gamified learning intervention utilizing a marketing education.

The Big Five Inventory (BFI) is a self-report scale that measures the Big Five personality traits (extraversion, agreeableness, conscientiousness, neuroticism, and openness). The BFI has 44 subscales, items rated on a five-point Likert scale, developed by John, Donahue and Kentle in 1991 to provide a concise yet comprehensive measure of the five personality dimensions when there is no need for more finely differentiated measurement at the facet level. Extraversion Subscale, Agreeable subscale, Conscientiousness subscale, Neuroticism Subscale, and Openness

Subscale are used for significant subscales of the characteristics. While the BFI scales are brief and on a five-point scale with responses from 1(Disagree Strongly) to 5 (Agree Strongly), participants rate each BFI item, and scales are constructed by averaging the participant's response for all items in that domain which is suitable psychometric property.

While some studies have examined various types of learners' characteristics in educational gamification and discussed the types of learning outcomes and data collection methods utilized, there remains a gap in understanding how learners' characteristics impact learning outcomes in gamification studies. Denden et al., (2022) highlighted various impacts of learners' traits were observed on their interactions with educational gamification systems. It was found that most studies concentrated on the psychological effects concerning learners' perceptions of educational gamification systems and game design elements, rather than their behavioral outcomes. Therefore, the impact of gamification on learners' behavioral outcomes in educational gamification has not been clearly established, particularly when considering learners' characteristics in the design process to enhance learning experiences.

Hypothesis Development

Conceptual Framework

Based on the above discussion in literature reviews, this study explores how learner characteristics, particularly personality traits measured by the Big Five Inventory (BFI), affect engagement with gamified learning approaches in marketing education. The BFI, developed by John, Donahue, and Kentle (1991), assesses five personality dimensions: extraversion, agreeableness, conscientiousness, neuroticism, and openness, scored on a five-point Likert scale to provide reliable psychometric data on participant responses. By examining these traits, the

study aims to reveal how individual differences influence students' experiences, motivation, and learning outcomes in gamified settings.

Gamification has gained traction as a method to boost engagement and motivation in educational settings. However, there is a pressing need for a deeper understanding of how learners' unique characteristics—such as personality, demographics, and motivation—shape their experiences in gamified environments (Denden et al., 2024). Research indicates that these characteristics can significantly influence the effectiveness of gamified learning tools (Klock et al., 2015; Smiderle et al., 2020). Personality traits, categorized by the Big Five Inventory (BFI) and cognitive and social traits, may impact students' engagement, performance, and perceived learning outcomes in gamified educational contexts. Despite a growing body of literature, the need for more research to determine how learners' traits influence behavioral outcomes in gamified learning is urgent and significant (Rapp et al., 2019).

Motivation is critical to learners' engagement and commitment to educational activities. The incorporation of game elements and strategy principles into non-game contexts, known as gamification, has emerged as a promising approach to enhance motivation and promote learning in educational technology. This study hypothesizes that the effectiveness of gamification in marketing education varies based on learners' characteristics. It also suggests that gamified learning environments can significantly boost students' motivation and help them acquire additional skills such as competency and autonomy, offering hope for its application in marketing education.

After reviewing the literature, I measured autonomy, relatedness, and competencies in the context of contextual needs. Self-efficacy was measured using the adaptation of the scale in research performed by Spretizer (1995). The emotional engagement was measured using Rich et

al.'s (2010) scale. This section examines learner motivation in marketing education through Self-Determination Theory (SDT), focusing on autonomy, relatedness, and competence. In SDT, fulfilling these psychological needs enhances well-being, self-motivation, and internalization of goals (Deci & Ryan, 2000). Autonomy reflects freedom of choice, relatedness refers to feeling connected and valued in a group, and competence involves mastering the necessary skills for effective functioning (Deci & Ryan, 2000). Enhanced self-motivation is associated with deeper understanding, creativity, and problem-solving (Deci & Flaste, 1996). Measures include self-efficacy (Spreitzer, 1995) and active engagement (Rich et al., 2010). The detailed indicator for the framework is presented in Appendix I and Appendix II.

Hypothesis (Alternatives Hypothesis)

Hypothesis 1

Specific personality traits of marketing students, as measured by the BFI, significantly influence their engagement with gamification elements in EdTech platforms.

Hypothesis 2

Gender significantly moderates the relationship between learners' characteristics and their behavioral outcomes in educational gamification system.

Hypothesis 3

The relationship between accessible gamification learning elements in class learning platform and levels of positive engagement among marketing students is moderated by specific personality traits.

Hypothesis 4

Positive experiences and attitudes towards gamified courses significantly correlate with learners' perceived learning outcomes.

Hypothesis 5

Completion of tasks on gamified education platform significantly influence students' active engagement and active participation in gamified learning in marketing courses who desire to get higher score.

Hypothesis 6

Students' involvement in gamification processes positively influences their learning outcomes.

Hypothesis 7

Engagement in simulation practice will significantly enhance perceived learning outcomes by improving learners' understanding of marketing concepts.

Hypothesis 8

Students in Marketing engaging with a gamified learning approach will report higher levels of autonomy, relatedness, and competence, consistent with Self-Determination Theory.

Variables Defined for Hypothesis Analysis

For the hypothesis test, I used coding for each question such as var number (replacing question number) and defining the variables whereas needed. Predictors were defined carefully for regression model test. Dependent variable and independent variables were also defined for regression analysis to establish the relations among variables and measurement.

H 1:

H1: Measurability: I administered personality assessments following the Five Factor Model using 44 question sets for personality traits. Their responses collected and compared these personality traits to engagement levels with gamification elements in EdTech platforms.

Categorize respondents based on following category:

Openness to experience

Conscientiousness

Extraversion

Agreeableness

Neuroticism

Personality traits were compared with the responses on the variable ‘level of engagement in gamifications tools for learning marketing courses’ such as how engaged do they feel when interacting with gamified contents learning materials.

For this hypothesis:

Dependent Variable (DV) is engagement with gamification.

Indirect Variable (IV) is personality traits.

H 2:

The five personality traits from the Big Five Inventory factors (Extraversion, Agreeableness, Conscientiousness, Neuroticism, and Openness) were assessed with gender to

understand how the gender interact with personality traits for learning outcomes through engaging gamification tools and resources.

Here,

Independent Variable: Gender is the outcome variable representing gender (with 1 = Male and 2 = Female). Along with Independent Variables: The five personality traits are used as predictors.

Dependent variable (DV) is engagement with gamification.

H 3:

Similarity, the relationship between different psychological personality traits among psychological variables to understand how the personality traits affect learning outcome for effective learning through gamification tools.

Dependent variable is 'Positive experiences and attitudes towards gamified learning'.

Independent variable: Personality traits such Openness, Conscientiousness, Extraversion, Agreeableness, Neuroticism.

A linear regression test was conducted to analyses the hypothesis.

Alternatively, ANOVA test was conducted to analyses the hypothesis.

H 4

The respondents' positive experiences and learning attitudes were compared with their learning outcomes by measuring the correlation between the relationship variables.

The hypothesis was measured variables such using the gamified learning tools for learning improvement and perform better results such as “achieve higher score or levels”, “earn reward and points for the courses” based on their motivation toward engaging with gamified materials. This attitude relationship helped students learn the marketing theories presented in class. For example, response, I feel like I have a lot of input in deciding how to do work on class projects basis on the availability of gamified learning materials? For example, correlation test between the use of gamified learning materials used and academic performance or increase their points and level in the classes.

H 5

Correlation between the associated variables were tested and analyzed to understand how the completion of tasks on gamified education platform influence learners; active engagement and participation in marketing courses who desired to maintain higher score in courses.

H 6

This hypothesis focuses on the variables of how the students' involvement in gamified learning influences learners' learning outcomes. How the students' involvement in gamified learning resources helped them for better outcomes learning impact. Understanding concept of marketing and grasp marketing principles effectively and understand practical applications were considered the independent variables.

H 7

To analyze the relationship between students' learning attitudes using gamified resources and their perceived learning outcomes, a correlation analysis was conducted.

This was based on the hypothesis that students learning outcomes such as marketing concepts or marketing practices in real worlds through the simulation exercise helped for their learning outcome. Specifically, the study examined variables engagement in gamified simulation measured through the understanding of marketing concepts ‘the simulation used in classes helped me to understand the marketing concepts’. By testing the correlation between these variables, the analysis determined whether the participants in gamified learning environment were associated with improved comprehension of marketing concepts.

H 8

Although I tested the hypotheses using the above measurement, the other measurement focuses additional analysis according to by SDT. The section mainly focuses on the learning motivation of learners, and it's associated with other predictors such autonomy, relatedness, competency, and engagement. The responses from the survey 26 to 30, the factors were analyzed based on the responses.

The subsequent measurement involves assessing learners’ outcomes and linking them to students’ psychological needs as outlined by SDT. Perceived learning was measured using the perceptions survey.

CHAPTER III: METHODOLOGY

Survey Process

The data collection from university students in the marketing department at Illinois State University lasted a week of May 2024. Undergraduate and graduate marketing students were recruited to participate in the study via an email distributed by the university's instructors. The survey complied with ethical guidelines, followed guidelines such as informed consent and confidentiality of responses and prior communication about the data use, and assured participants. The participation from respondents was voluntary and followed the anonymity protocol.

Sample Recruitment

To ensure representativeness sample, the study recruited a sample of students with marketing backgrounds from undergraduate and graduate marketing classes. For the study, a total of 111 surveys were completed by participants. The respondents received extra credit for participating in the study. Student samples were selected randomly from marketing students, and before conducting the survey, ethical training was completed, and consent forms filled up to meet the independent research process and research protocol.

Students are familiar with gamification materials from simulation gamification courses or the use of gamified materials as study resources by themselves. The respondents have at least some or more experience using gamification in marketing studies.

This ensures the validity and reliability of our sample. For example, the students use gamification apps such as quizzes, videos, simulations, other websites and other resources having gamified elements for study or learning purposes as study resources. These respondents either participated in any learning activities of the gamified environment or the gamified simulation or were familiar with it.

Survey Instruments

A Qualtrics online survey form and question set was developed for mobile survey access. A total of 30 questions were set with 5-point scale Likert scale and other information. It allowed for easy distribution to many participants and efficient data collection.

Quantitative data were collected through the survey assessing students' gaming habits, participation in gamified learning activities, and perceptions of their learning process. It includes data collected based on Factor Model indicators for individual traits assessment. Specifically, to identify the learners' personality traits, I used the Five Factor Model (FFM) which is based on five dimensions, namely extraversion, agreeableness, conscientiousness, neuroticism, and openness. This model was expected to show the strongest fit to the data. I designed some other set of questions to address its research questions.

The variables were defined at questionnaires design phase before the actual survey and data collection process. The respondents' characteristics were obtained from various questionnaires. Then data was cleaned and proceeded including reliability tests to analyze the indicators for statistical analysis using R programming and R studio.

Participant Profile

Categories

Age in Years: Above 18

Gender: Male, Female, Non-binary/Third gender

Level of Education: Undergraduate, Graduate, Other

Participants' response with most used Game Genres

Action: 58%;

Adventure: 52%

Role-Playing = 24%

Puzzle= 43%

Sports= 50%

Simulations =51%

Strategy = 53%

Respondents' Gamified Learning Experience in Their University Career

Gamified simulations and digital flashcards/memory games are widely adopted, with over 30% of respondents using them frequently or as their most used tools.

Gamified quizzes/adaptive assessments and educational games see moderate use, with occasional usage rates around 20%.

Escape room challenges and AR/VR experiences have the highest rates of non-usage, with nearly a quarter of respondents never using them.

Data Analysis

Structural equation modeling was employed to examine the relationships between variables and test the hypotheses. Statistical techniques regression analysis with ANOVA and model fitness and correlation conducted. Variables were predefined for the hypothesis test.

Scoring

All questions were designed to categorize the responses from the survey. Each question was set in a scoring pattern. For example, questionnaires number 25, has 44 sub-questionnaires set with different the 5 Likert scales, even vice versa order to the response intentionally. After collecting data, the reverse responses were adjusted and reversed according to Big Five Intervention criteria. For these, the responses were recorded in reversed orders and different columns were created like in data frame in r programming software (R studio).

Scoring was set and adjusted according to the criteria for reverse scored items:

BFI scale scoring (“R” denotes reverse-scored items):

Extraversion: 1, 6R, 11, 16, 21R, 26, 31R, 36

Agreeableness: 2R, 7, 12R, 17, 22, 27R, 32, 37R, 42

Conscientiousness: 3, 8R, 13, 18R, 23R, 28, 33, 38, 43R

Neuroticism: 4, 9R, 14, 19, 24R, 29, 34R, 39

Openness: 5, 10, 15, 20, 25, 30, 35R, 40, 41R, 44

Table 1

Key Codes used for Trait Assessment

Item	Trait	direction
Q25_1	Extraversion	forward
Q25_2	Agreeableness	reversed
Q25_3	Conscientiousness	forward
Q25_4	Negative emotionality	forward
Q25_5	Open minded	forward
Q25_6	Extraversion	reversed
Q25_7	Agreeableness	forward
Q25_8	Conscientiousness	reversed
Q25_9	Negative emotionality	reversed
Q25_10	Open minded	forward
Q25_11	Extraversion	forward
Q25_12	Agreeableness	reversed
Q25_13	Conscientiousness	Forward

Q25_14	Negative emotionality	forward
Q25_15	Open minded	forward
Q25_16	Extraversion	forward
Q25_17	Agreeableness	forward
Q25_18	Conscientiousness	reversed
Q25_19	Neg Emotionality	forward
Q25_20	Open minded	forward
Q25_21	Extraversion	reversed
Q25_22	Agreeableness	forward
Q25_23	Conscientiousness	reversed
Q25_24	Negative emotionality	reversed
Q25_25	Open minded	forward
Q25_26	Extraversion	forward
Q25_27	Agreeableness	reversed
Q25_28	Conscientiousness	forward
Q25_29	Negative emotionality	forward
Q25_30	Open minded	forward
Q25_31	Extraversion	reversed

(Table Continues)

(Table Continued)

Q25_32	Agreeableness	forward
Q25_33	Conscientiousness	forward
Q25_34	Negative Emotionality	reversed
Q25_35	Open Minded	reversed
Q25_36	Extraversion	reversed
Q25_37	Agreeableness	reversed
Q25_38	Conscientiousness	forward
Q25_39	Negative Emotionality	forward
Q25_40	Open Minded	forward
Q25_41	Extraversion	reversed
Q25_42	Agreeableness	forward
Q25_43	Conscientiousness	reversed
Q25_44	Negative Emotionality	forward

Note: The codes were used to code and analysis for assessment of the personality traits based on BFI framework.

Table 2

Coding for Hypothesis Test

Response (coding)	Coding replaces
Var 7	age
var 8	gender
var 9	Academic performance
var 11_4	Simulation Practices
var 15_4:	High Score
var 16	Understanding Marketing
var 19	Gamification
Var 20	Engagement
vari 15	Traits
vari26_1	Gamification Experience
var 29_3	Learning Theories
Var 29_4	Learning in Class
Var 30_2	Effectively Learning

(Table Continues)

Var 30_1

Marketing Concept

Note: Variable details and replacement in coding

Test Modelling

Regression

Regression analysis was used to analyze the students' attitude test to understand the quantified relationship among different variables. Predictor variables such as personality traits, attitudes or behaviors affect the outcome of their performance in learning, test scores or understanding the marketing concepts in class. The model uses a least-squares approach to determine the line of best fit of the observed variables. It minimizes the sum of squares a mathematical function creates, making it a valuable tool for data analysis.

To correctly interpret the output of a regression model, the following main assumptions about the underlying data process of what is analyzed must hold:

- The relationship between variables is linear.
- The variables' variance and error term must remain constant.
- All explanatory variables are independent of one another.
- All variables are normally distributed.

Simple Linear Regression

$$Y = a + bX + u$$

Multiple Linear Regression:

$$Y = a + b_1X_1 + b_2X_2 + b_3X_3 + \dots + b_tX_t + u$$

where:

Y = The dependent variable you are trying to predictor explain

X = The explanatory (independent) variable(s) you are using to predict or associate with Y
 a = The y-intercept

b = (beta coefficient) is the slope of the explanatory variable(s)

u = The regression residual or error term

Hypothesis Testing Formula:

Fit the model

```
model <- lm(Y ~ X1 + X2 + X3, data = survey_data)
```

```
model <- lm(Y ~ X1 + X2 + X3, data = survey_data)
```

F-Test Analysis

This test evaluates whether at least one of the predictors is significantly related to the dependent variable. In R, this is included in the summary output as the F-statistic and its p-value.

Correlation Test

Pearson's Correlation test was conducted to measure the linear relationship between two continuous variables. The function tests the correlation between two variables x and y and provides the correlation coefficient, p-value, and confidence intervals.

```
cor.test(x, y).
```

The Pearson correlation coefficient (r) is the most common way of measuring a linear correlation. It is a number between –1 and 1 that measures the strength and direction of the relationship between two variables.

Pearson correlation coefficient (r)	Correlation type	Interpretation
Between 0 and 1	Positive correlation	When one variable changes, the other variable changes in the same direction.
0	No correlation	There is no relationship between the variables.
Between 0 and –1	Negative correlation	When one variable changes, the other variable changes in the opposite direction.

Reliability and Validity Test

Cronbach's Alpha

Cronbach's alpha test was performed to see if multiple-question Likert scale survey was reliable. It tells if the design of the test is accurately measuring variable of interest. The scales show acceptable reliability (Peterson, 1994), with alpha values exceeding 0.70.

Cronbach's Alpha

$$\alpha = \frac{K}{K-1} \left[1 - \frac{\sum s_y^2}{s_x^2} \right]$$

Where									
K	is the number of test item								
$\sum s_y^2$	is sum of the item variance								
s_x^2	is the variance of total score								

Table 3

Interpretation of Alpha

Interpretation	
Interpreting Alpha for Dichotomous for Likert Scale Question	
Cronbach's a	Internal Consistency
0.09 and above	Excellence
0.80 – 0.89	Good
0.70 -0.79	Acceptable
0.60 – 0.69	Questionable
0.50 -0.59	Poor
Below 0.50	Unacceptable

Note: Above 0.70 is acceptable

Although I tested the Cronbach's Alpha to measure a single to assess the overall reliability of the entire survey I calculate Cronbach's alpha for the entire set of questions. It has some only few variations, but both were above the 80 international reliability tests. Thus, I put the details of the result specific dimension of alpha test in the result and annexes.

Cronbach's alpha used to measure of internal consistency or reliability of a set of items on 5- Likert scale questionnaires (such as, *Never Used, Rarely Used, Sometimes Used, Often Used,*

Always Used; Strongly Disagree, Somewhat Disagree, Neither Agree nor Disagree, somewhat agree, strongly agree) during the survey that were intended to measure the same construct. It shows how well the items in a test or questionnaire are correlated with one another and how consistently they measure the underlying concept. The survey response data were analyzed using Cronbach's alpha across questions, employing 5-point Likert scale responses from survey, both individually and collectively. An alpha coefficient of .70 or higher is considered acceptable, signifying a good level of internal consistency within the dataset. The results of the alpha test analysis provide several key insights into the reliability of the survey dataset.

After collecting data, those the reverse responses were adjusted and reversed according to Big Five Intervention (BFI) criteria. For these, the responses were recorded in reversed orders and different columns in r programming software (R studio). Personality scale based on BFI was used to measure the characteristics of respondents during survey, which has 43-sub questions set with some of the reverse others.

Overall, after analysis the total Alpha Coefficient is found **0.86**. A value of 0.80 and above indicates good internal consistency, meaning the items are reliably measuring the same construct. The mean and standard deviation reflect the central tendency and spread of responses, and the inter-item correlation indicates moderate relationships between items.

Table 4

Result of Cronbach's Alpha

Codes	Raw Alpha	SDT Alpha	MEAN	SD
Var.11. learning	0.82	0.83	3.89	0.65
var14_var23	0.72	0.73	2.31	0.52
var.24_effective	0.86	0.86	3.59	0.68
var.25_personality traits	0.89	0.9	2.53	0.43
var26_autonomy	0.85	0.85	2.5	0.61
var27_relatedness	0.91	0.91	2.41	0.71
var28_competence	0.88	0.88	2.34	0.77
var29_learning_ motivation	0.87	0.87	2.2	0.69
var30_self-efficacy	0.89	0.9	2.3	0.64
Total	0.85	0.86	2.67	0.63

Note: Performing Cronbach's alpha analysis on individual question sets (subscales).

Table 5

Construct Reliability of Perceived Learning Measures

Construct of Reliability Test	Cronbach's Alpha
Autonomy	0.85
I feel like I have a lot of input in deciding how to do work on class projects basis on the availability of gamified learning materials.	
When I have the opportunity, I'm able to freely express my ideas and opinions while working on class activities	
feel like I can fully engage and express myself while working on class projects, especially when they involve gamified learning experiences.	
When it comes to class projects, I find there's ample opportunity to make decisions, especially in those that incorporate gamified learning methods.	
Competency	0.88
When gamified learning materials are accessible, I generally feel confident about my role in class activities	
On team or in class activity, I get many chances to show I am capable	
When I am working on team projects after going through the learning materials, I often feel very capable.	
Relatedness	

(Table Continues)

(Table Continued)

I enjoy collaborating with classmates when we have gamified learning materials	0.91
I collaborate well with my classmates on class activities involving game elements.	
I enjoy socializing with my classmates while working on assignment with game elements	
When working on a project with game elements I feel people on my teams care about me	
Learning Motivation	0.87
I'm motivated to put in effort and master class materials	
I work hard to learn everything in class and feel motivated to master the skills taught	
I am motivated to learn the theories presented in class.	
I am eager to learn and understand the practical applications taught in class.	
Self-Efficacy	0.89
When I use gamified materials, I feel more confident in applying concepts in general	
The gamified learning materials helped me grasp principles more effectively	

(Table Continues)

I found the gamified approach to learning courses enjoyable and
engaging

The gamified approach to learning increased my interest in the
subject

The items were averaged to for each construct. All scales measured in 5 Likert scale from strongly disagree to strongly agree. It shows more relevance as it has a different dimension of psychological traits. It is generally more appropriate to calculate Cronbach's alpha separately for each subscale as it helps to understand the internal consistency of each specific construct.

CHAPTER IV: RESULTS AND ANALYSIS

Description of the Study Participants

The demographic profile of the respondents consists of 111 participants, 45% male and 55% female, students from the marketing department at the Illinois State University. The majority of respondents for the study (45%) were aged 21-23, followed by 30% in the 18-20 age group. Educationally, 61% are undergraduates, while 39% hold graduate degrees (table 5).

Table 6

Respondents' Profiles

Respondents Profile		N	%
Gender	Male	50	45
	Female	61	55
	Total	111	100
Age Group	18-20	33	30
	21-23	50	45
	24-26	13	11.5
	27-29	4	3.5

(Table Continues)

University Student	30 and above	11	10
	Total	111	100
	Undergraduate	68	61
	Graduate	43	39
	Total	111	100

Note: N =111.

Distinct usage Patterns for Different Gamified Learning Tools

The survey reveals distinct usage patterns for different gamified learning tools:

Gamified simulations and digital flashcards/memory games are widely adopted, with over 30% of respondents using them frequently or as their most used tools.

Gamified quizzes/adaptive assessments and educational games see moderate use, with occasional usage rates around 20%, indicating balanced integration into learning environments.

Escape room challenges and AR/VR experiences have the highest rates of non-usage, with nearly a quarter of respondents never using them, pointing to potential barriers or lack of access to these tools. Gamified simulations and memory-based tools are the preferred methods, while advanced tools like AR/VR and escape rooms are underutilized, highlighting areas for possible improvement in accessibility or appeal.

Popular Genre among respondents

Action (58.56%) and Strategy (53.15%) materials are among the most popular.

Adventure (52.25%) and Simulations (51.35%) are also widely used.

Sports (49.55%) and Puzzle (43.24%) genres have moderate usage.

Role-Playing (24.32%) games are less frequently used.

Mean by Characteristics by Gender

It highlights key differences and similarities between males and females across the five personality traits. For Extraversion, males reported a mean score of 2.61, while females showed a marginally higher score of 2.70. Both genders had similar scores for Neuroticism ($M = 3.12$ for males, $M = 3.10$ for females) and Openness ($M = 2.57$ for males, $M = 2.58$ for females).

Analysis of Gender and Respondents' personality traits

This section assessed the hypothesis to determine whether the results support the null or alternative hypothesis. The characteristics of traits of respondents was examined to determine the relationship with sex. The table presents the results of t-tests conducted to compare the Big Five personality traits (Extraversion, Agreeableness, Conscientiousness, Neuroticism, and Openness) between two gender groups: males (Group 1) and females (Group 2) in Table 7.

Table 7

Personality (Characteristics) Difference by Gender (T-Statistics)

T-Test: Personality (Characteristics) difference by Gender			
Big Five Intervention (BFI)	Mean in group (M: F)	t-Statistics	P-Value
Extraversion	1.61, 2.70	-0.64295	0.5217
Agreeableness	2.172, 2.30	-1.2613	0.2101
Conscientiousness	2.33, 2.42	-0.71899	0.4737
Neuroticism	3.12, 3.10	0.17018	0.8652
Openness	2.56, 2.58	-0.098	0.9215

Note. For each subject, the logistic function was fit to target fixations separately. Mean parameter values for each of the analyses are shown for the Male and Female, as well as the results of *t* tests (assuming unequal variance) comparing the parameter estimates between the two genders.

None of the Big Five personality traits showed a statistically significant difference between males and females in this sample. The p-values for all traits are well above the common threshold of 0.05, indicating that any observed differences in mean scores between genders are likely due to random variation rather than a true underlying difference.

Females scored slightly higher on Extraversion, but this difference is not statistically significant. This suggests that gender does not play a major role in influencing these personality traits within the context of the data.

Hypothesis Test

Result 1

The alternative hypothesis is partially accepted that specific personality traits of marketing students, as measured by the Five Factor Model (FFM), significantly influence their engagement with gamification elements in EdTech platforms.

Defined variables

Dependent Variable (DV) is engagement with gamification.

Indirect Variable (IV) = Big Five Personality Traits

DV is the engagement level of participants with gamified elements in the education technology in marketing education which has 5-Likert Scales: Extremely Engaged, Very Engaged, Moderately Engaged, Somewhat Engaged and Not Engaged. To explain the engagement level of participants in gamified learning among campus students, it is explained by using the characteristics of participants, a series of factors for personality traits.

For this, I administered personality traits assessment following the Big Five Intervention, also called Big Five Intervention using the 44 set responses. To understand the linear relationship between variables, and how the student's engagement with gamified materials is explanatory with independent variables that were tested from the regression model. The fitness of the model shows helped to test the hypothesis 1.

Table 8

Specific Personality Traits Based on Five Factors Framework

Variables (H1)	(t) Statistics	P-value
(Intercept	1.35	0.17
Extraversion	0.47	0.63
Agreeableness	1.87	0.06 .
Conscientiousness	-1.4	0.16
Neuroticism	0.002	0.99
Openness	3.22	0.00 **

Note. Significance. codes: 0 ‘****’ 0.001 ‘***’ 0.01 ‘**’ 0.05 ‘.’ 0.1 ‘ ’ 1

It is found that this trait significantly affects engagement (Estimate = 3.22, p-value = 0.00). This indicates that university students in marketing education more in openness traits are more likely to engage with gamification elements in EdTech platforms. Within the Big Five personality traits, Openness emerges as the most notable predictor of engagement with gamification elements on EdTech platforms, followed by Agreeableness. While Agreeableness displays a marginal effect, the remaining traits do not influence engagement significantly.

Result 2

It rejects the hypothesis that gender significantly moderates the relationship between learners' characteristics and their outcomes with engagement with gamification.

Defined variables:

- DV is engagement with gamification.
- IV are Personality traits and Gender.

This model examines the relationship between the gender variable and the five personality traits from the Big Five Inventory. The fitness of the model is tested to understand the the with engagement of students in gamified materials' explanatory with independent variables, how the gender with personality traits that were tested through the regression model.

Table 9

Gender Moderation of Learner Traits and Behavioral Outcomes in Educational Gamification

Variables (H2)	(t) Statistics	P-value
(Intercept	1.59	0.11
Gender	-1.13	0.26
Extraversion	-0.96	0.33
Agreeableness	-1.18	0.23
Conscientiousness	0.05	0.96

(Table Continues)

Neuroticism	-0.008	0.99
Openness	0.83	0.40
Gender*Extraversion	1.11	0.26
Gender*Agreeableness	1.79	0.07
Gender*Conscientiousness	-0.32	0.75
Gender*Neuroticism	0.02	0.98
Gender*Openness	0.07	0.93

Note. Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

The lack of significant p-values for the interaction terms suggests that the results do not show compelling evidence to support the hypothesis that gender significantly moderates the relationship between learner characteristics and engagement with gamification.

Result 3

There are tests only partial support the hypothesis that the relationship between accessible gamification learning elements in class learning platform and levels of positive engagement among marketing students is moderated by specific personality traits.

Defined variables:

- Dependent variable: Gamification learning elements in class learning platform and levels of positive impact in marketing education among respondents (positive impact)

- Independent Variable: Personality traits.

One of the Big Five Personality traits, only the openness categories have a p-value of 0.003, less than the typical significance level of 0.05. It is statistically significant at the 5% level, suggesting it significantly affects the agreement of "Gamified learning" positively impacts students' understanding of concepts and retention of information of marketing studies. The other personal traits of respondents such as Extraversion, Agreeableness, Conscientiousness, Neuroticism were p-values greater than 0.05, which indicates they were not statistically significant at the 5% level. A regression test was conducted to analyze the statistics and significance of the variables.

Table 10

Influence of Gamification Accessibility and Personality on Student Engagement

Variables H3	(t) Statistic	P Value
(Intercept	1.36	0.17
Extraversion	0.24	0.80
Agreeableness	0.57	0.56
Conscientiousness	0.50	0.61
Neuroticism	0.58	0.55
Openness	2.95	0.00

Note: *Signif. codes:* 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

The variable “gamified learning” among personal traits shows that Mean Square of Residuals (0.479) which is the average unexplained variation. Mainly, Openness is the only personality trait that significantly affects gamification ($p = 0.00382$). The other traits (Extraversion, Agreeableness, Conscientiousness, and Neuroticism) do not have statistically significant effects on gamification ($p\text{-values} > 0.05$).

Alternatively, ANOVA test was also conducted to analyze the hypothesis.

Table 11

ANOVA TEST

Variables H3	Mean Square	F Statistic	P-value
Extraversion	1.11	2.31	0.13
Agreeableness	0.93	1.93	0.16
Conscientiousness	0.58	1.21	0.27
Neuroticism	0.00	0.00	0.95
Openness	4.19	8.75	0.00**

Note.Sig: codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

The overall model also shows that only the trait the personally traits, Openness explains a meaningful amount of variance in gamification, while the other traits do not contribute significantly to the variance.

Result 4

It supports the alternative hypothesis that positive experience and attitudes towards gamified courses significantly correlate with learners' perceived learning outcomes.

Defined variables:

Positive experiences and attitudes:

Attitude scores or survey responses about gamified experience like how the respondents get confidence and efficacy from the help of gamified learning materials to understand the concepts and project works.

Perceived learning outcomes:

The survey score or self-reported measure of how much the learner perceives they have learned.

The respondents' positive experiences and learning attitudes were compared with their learning outcomes by measuring the correlation between the relationship variables.

Table 12

Correlation Test of Perceived Learning

Variables (H4)	Pearson's correlation	(t) Statistics	P-Value
Attitude score with Gamification	0.34	3.7871	0.00
Attitude score with academic performance	-0.08	-0.90	0.36

Note.Sig: codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

The correlation coefficient (r) between positive experiences/attitudes of gamified elements or tools and academic performance (self-reported academic performance is 0.34). It shows a moderate positive correlation. The positive experiences/attitudes towards gamified courses increases, perceived learning outcome tends to increase. P-value is 0.00, which is highly significant ($p < 0.001$).

Correlation between response, gamified experience in academic setting such as response like, efficiency of doing class project and academic performance. At 95% confidence interval ranges from -0.26 to 0.10, which includes zero, confirms that the correlation is not significant. It shows there no significant correlation between attitude scores and academic performance.

Result 5

The model test supported the hypothesis that completion of tasks on gamified education platform significantly influences students' active engagement and active participation in course (learning) in marketing courses who desired to get higher score.

Defined variables:

Completion of tasks on gamified education platform:

Contributing factor such as Reward points

Contributing factor such as desire to achieve high scores or level.

Other factor such as motivation while engaging with gamified materials for learning such as

To learn the theories presented in class, and to learn.

To understand the practical application taught in classes.

Desire to earn rewards or points contributes most to respondents' completion on tasks on gamified education platform and the factor is positively associated with learning or understanding of marketing theories presented in class. The attitudes and performance were compared using correlation analysis, to understand the statistics and significance of variables.

Table 13

Pearson's Correlation

Variables (H5)	Pearson's correlation	T Statistics	P-Value
Attitude score with learning marketing	0.25	2.27	0.006
Attitude score (rewards) with learning practical skills	0.27	3.03	0.002
Academic score (points) with learning applications	0.26	2.89	0.004

Note.Sig: codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

The p-value is 0.006, which is statistically significant ($p < 0.05$). The real relationship between the two variables is positive at 95% confidence interval. Desire to earn rewards or points contributes most to respondents' completion on tasks on gamified education platform and the factor is also positively associated with "to learn and understand the practical applications taught in class". The p-value is 0.0029, which is statistically significant ($p < 0.05$).

The desire to achieve high scores or levels is the most significant factor contributing to respondents' completion of tasks on gamified education platforms. This desire is also positively

associated with a deeper understanding of the practical applications taught in class, making the research findings directly relevant to the work of educators, researchers, and practitioners in the field. The p-value of 0.004, which is statistically significant ($p < 0.05$), confirms a positive relationship between these variables at a 95% confidence interval.

Result 6

The model supports this alternative hypothesis that Students' involvement in gamification processes positively influences their learning outcomes.

Defined Variables:

DV: Learning outcomes

IV: Understanding marketing concept, Grasp marketing principles effectively, Understand practical applications.

The regression model explains 54.8% of the variance in dependent variable as indicated by the Multiple R-squared value. The Adjusted R-squared is 53.5%, meaning the model fits the data.

Table 14

Regression Model

Variables (H6)	T Statistics	P value
Intercept	0.16	0.000 ***
Marketing Concept	3.04	0.002 **
Learning Effectively	3.76	0.000 ***
Learning in Class	3.58	0.000 ***

Note. Sig: codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Result 7

The test supported that engagement in simulation practice within gamified learning environments significantly enhances perceived learning outcomes by improving learners' understanding of marketing concepts.

Defined variables

- Gamified Simulations
- Understand marketing concepts.

This output of a correlation model using survey data reveals that the relationship between the variable, "use of simulation practices" and "how it helps the students for learning marketing concepts better". The result shows that simulation practice is a statistically significant predictor with a positive relationship with learning marketing concepts. The correlation underscores the potential of simulation practice in enhancing students' understanding of marketing concepts.

Table 15

Pearson's correlation

Variables (H7)	Pearson's correlation	T Statistics	P-Value
Attitude score (rewards) with learning practical skills	0.35	4.025	0.000

Note. Sig: codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

It shows that the engagement increases, learning outcomes improve among university students. The correlation between Engagement in Simulation Practice and Learning Marketing Concepts is positive correlation, 0.35 at 95% confidence interval for the correlation in between 0.18 and 0.51. It implies that learning marketing concepts also tends to improve moderately as engagement in simulation practice increases.

The section focuses on the motivation of learners, and it's associated with other predictors such autonomy, relatedness, competency and engagement. The responses from the survey response number 26 to 30, the factors were analyzed based on the responses.

Result 8

The result support the alternative hypothesis that students in Marketing engaging with a gamified learning approach were reported higher levels of autonomy, relatedness, and competence, consistent with Self-Determination Theory.

Learners' Motivation Analysis Based on SDT

The section focuses on the motivation of learners, and it is associated with other predictors such autonomy, relatedness, and competency. These needs are primarily contextual marketing education, where self-motivation is critical for fostering creativity, responsibility, healthy behavior, and enduring change (Deci & Flaste, 1996). SDT suggests that the fulfilment of basic psychological needs leads to enhanced personal well-being, internalization of goals and values, and increased self-motivation (Deci & Ryan, 2000).

According to the SDT definition, autonomy implies the individual's ability to exercise freedom in choosing their path, relatedness means to the sense of connectedness to a group and the development of close, caring relationships with others, and competence involves possessing the necessary knowledge and skills to operate effectively in one's context, and mastering activities essential to functioning as a contributing member of a group (Deci & Ryan, 2000). Enhanced self-motivation is positively linked to improved conceptual understanding, increased creativity, and better problem-solving abilities (Deci & Flaste, 1996). Self-efficacy was measured

using the adaptation of the scale in research performed by Spretizer (1995). The emotional engagement was measured using Rich et al.'s (2010) scale.

The following measurement involves assessing learners' outcomes and linking them to students' psychological needs as outlined by Self-Determination Theory (SDT). Perceived learning was measured using the perceptions survey. In this context, I measured Autonomy, Relatedness, and Competencies after reviewing literature. Self-efficacy was measured using the adaptation of the scale in research performed by Spretizer (1995). The emotional engagement was measured using Rich et al.'s (2010) scale. The scales show acceptable reliability (Peterson, 1994), with alpha values exceeding 0.70.

Correlation Matrix

For the SDT, five indicators, autonomy, competency, relatedness, motivation, and self-efficacy examined to understand the construct of the variables and the student learning motivation towards the gamified learning environment and its relationship with the SDT variables. The correlation matrix shows relationships between the constructs of Autonomy, Competency, Relatedness, Motivation, and Self-Efficacy. The correlation coefficients between multiple variables of SDTs explored the relationship between the pairs of variables.

Table 16

Correlation Matrix by Five Indicators

SDTs	Correlation Matric				
	Autonomy	Competency	Relatedness	Motivation	Self-Efficacy
Autonomy	1	0.63	0.67	0.47	0.48
Competency	0.62	1	0.73	0.50	0.56
Relatedness	0.67	0.73	1	0.44	0.56
Motivation	0.47	0.50	0.44	1	0.57
Self-Efficacy	0.48	0.56	0.55	0.57	1

Note. Sig: codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

The correlation matrix indicated that the relationships among Autonomy, Relatedness, Competency, Motivation, and Self-Efficacy also showed that the relationship among higher levels of autonomy, competency and relatedness are associated with increased motivation and self-efficacy of students (learners) after having the gamified learning materials.

Additionally, autonomy was found correlated with Relatedness (0.67) and Competency (0.62), Motivation (0.47) and Self-Efficacy (0.49). Relatedness has a strong correlation with Competency (0.73), a moderate correlation with Self-Efficacy (0.56), and a weaker correlation with Motivation (0.44). Also, motivation has moderate correlations with Self-Efficacy (0.57) and weaker correlations with the other variables. Self-Efficacy is moderately correlated with all variables, with the strongest correlation being with Competency (0.57).

A correlation is considered strong when the Pearson coefficient is higher than 0.7, moderate when it is between 0.5 and 0.7, and weak when it is lower than 0.5.

Analysis of Variance Test

Analysis of Variance (ANOVA) test was used to assess whether there were statistically significant differences between the means of multiple independent variables. A variable, motivation was dependent variables and rest of the variables were independent variables of SDT for the testing. The ANOVA result indicated that the significance of individual variables and their interactions on a dependent.

Table 17

Analysis of Variance of the SDTs

Variance Analysis			
	Mean Sq	F value	Pr(>F)
Autonomy	11.76	46.08	9.74e-10 ***
Relatedness	1.48	5.803	0.01
Competency	2.487	9.744	0.002384 **
Self-Efficacy	4.964	19.447	2.72e-05 ***
Autonomy: Relatedness	0.239	0.936	0.33
Autonomy: Competency	0.068	0.266	0.607

(Table Continues)

(Table Continued)

Relatedness: Competency	0.950	3.722	0.05
Autonomy: Self Efficacy	0.967	3.789	0.0
Relatedness: Self Efficacy	0.063	0.247	0.62
Competency: Self Efficacy	3.281	12.853	0.00 ***

Note. Sig: codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Based on the result, higher F-values indicate that the factor explains more variability in the dependent variable. Autonomy, relatedness, competency, and self-efficacy variables are highly significant in one way ANOVA. The autonomy was found highly significant effect ($F(1,95) = 46.08, p < 0.001$) on the depend on variables. Self-efficacy ($p < 0.001$) found high significant along with Relatedness (0.002). Two-way interactions, only relatedness *competency ($p = 0.05$) and autonomy and self-efficacy found marginal significant. Autonomy, relatedness, competency, and self-efficacy all have significant individual effects in one-way ANOVA.

Ordinary Least Squares Regression

A second analysis was conducted using ordinary least squares regression to test self-determination theories of predictive power and determine the effectiveness of autonomy, relatedness, and competence on student outcomes (Nielson & Border, 2016).

I used the Ordinary Least Squares (OLS) regression to determine the relationship between outcome variable (dependent) and other independent variables. The variable motivation

was taken a dependent variable and autonomy, relatedness and competency were considered the predictors for the analysis.

Table 18

Ordinary Least Squares Analysis

Ordinary Least Squares Analysis (OLS) regression			
	Estimate	(t) statistics	P value
(Intercept)	0.86	4.12	7.36e-05 ***
Autonomy	0.22	2.14	0.03 *
Relatedness	0.13	0.28	0.07 *
Competency	0.29	2.69	0.008 **
Multiple R-squared (R2)			0.3007

Note. Sig: codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

In the OLS regression, the estimated baseline value of Motivation is 0.86 when all predictors are zero. The model explains 30% of the variability in Motivation, which suggests a moderate fit. The t-statistic is 4.12 with the intercept highly significant.

The coefficient for autonomy is 0.22 that indicates a one unit increase autonomy was associated with 0.22 increase in the motivation variable if other variables were constant.

Autonomy of the learners using gamification learning materials indicates that the effect of

autonomy is statistically significant ($p: 0.03$) at 5%. Coefficient of competency is 0.29 that implies that a one unit increase in competency is associated with 0.29 unit in dependent (motivation) variables. With a t-statistic of 2.69 and a p-value of 0.008, this variable is statistically significant at the 1% level ($p < 0.01$), highlighting a strong relationship between competency and the outcome. The multiple R squared indicated that about one third (30.07%) of the variance in the motivation factor of student learning using gamified materials explained by the independent variables (mainly autonomy and competency) in this model. Students reports of autonomy and competence were higher and statistically significant.

CHAPTER V: DISCUSSIONS OF THE RESULTS AND IMPLICATIONS

Discussion of the Results

In recent years, the concept of game-like elements and the use of gamification has surpassed the influence of not only the digital media industry but all disciplines, including the educational industry. In the gamification strategy, the game-like elements in the non-game context become more crucial in marketing education because the approach transforms abstract marketing concepts and theories into interactive experiences, enhancing students' motivation and interest in understanding real-world applications. Gamification strategies simulate consumer interactions that may support students in understanding consumer behaviors.

The study evaluated the hypothesis which indicated that certain personality traits influence marketing students' engagement in learning with gamification tools, as per the BFI model analysis. Only the personality traits with openness and extraversion significantly demonstrated positive engagement through accessible gamification learning elements in the class learning platform. It indicated that diversified learning approaches could optimize more positive influence outcomes among marketing students.

The finding supports the idea with Dikcius et al. (2020) that integrating gamification element in marketing courses could improve student motivation and engagement as the learners may anticipate and value interactive elements in their learning process. The finding of this study support the result a study conducted by Nabizadeh et al. (2021) that gamified learning environments include simulation practices that aim to motivate students using game elements, which can result in increased engagement and improved learning outcomes The result also

aligned with Davis et al. (2018) that positive trends with respect to students' perceptions of gamification's impact their learning, achievement, and engagement in the course material.

However, student gender and their personality traits have not found any association in terms of learning behavior or choice of gamified materials in learning. Students' learning the study results found a significant correlation between positive experiences or attitudes toward gamified materials' accessibility and learners' perceived learning outcomes, supporting the alternative hypothesis. Although it may not directly translate into better academic performance, it can still improve perceived learning outcomes. The result supports the findings of the study (Humphrey et al., 2020; Robson 2019) that gamified approach in learning promote engagement. The study result found that gamified elements such as points, badges, feedback, levels, rewards, and challenges create a more interactive and rewarding learning experience (Saleem et al., 2022; Zainn et al., 2020). Results of this study results showed that Gamification transforms passive learning into an active, interactive experience that is precious in marketing education. By incorporating game elements such as challenges, leaderboards, and rewards, students are more likely to engage deeply with course material.

Gamified activities facilitate marketing students to understand real-world marketing scenarios, such as campaign planning, customer engagement strategies, and data-driven decision-making, allowing students to develop competencies essential for their careers. The hands-on nature of gamified tasks encourages critical thinking, problem-solving, and creativity, which are core to effective marketing through marketing education. Distinct usage Patterns for Different Gamified Learning Tools among respondents reveals that gamified simulations and digital flashcards/memory games are widely adopted (with over 30%) and Gamified quizzes/adaptive assessments and educational games see moderate use (20%). It indicates that balanced

integration into learning environments. However, escape room challenges and AR/VR experiences have the highest rates of non-usage, with nearly a quarter of respondents never using them, pointing to potential barriers or lack of access to these tools.

Marketing education often requires connecting theoretical knowledge with practical application, a gap that gamified learning helps bridge. Students can apply theoretical concepts to realistic situations through simulations and interactive modules, making abstract ideas more accessible. In this context, the result shows that popular Genre among respondents shows that respondents are drawn to gamified activities that involve dynamic challenges and planning. Adventure (52.25%) and Simulations (51.35%) are also widely used, indicating an interest in immersive and exploratory experiences. Limited role-playing games implies that possibly due to limited access to role-playing-based educational materials or a preference for other types of engagement.

Applying the SDT approach, the gamified resources including game-like simulation has positive influence in student learning process and effective understanding the marketing concepts and application. Prior research has shown self-determination theory to explain positive outcomes of gamification materials used for marketing education. This study illustrated that gamified learning materials in marketing education help students achieve autonomy and competence, which lead to greater engagement and improved learning outcomes. This study supports a result by Deci and Ryan 2000 that SDT advances the individual learners are intrinsically motivated when their psychological needs for autonomy, competence, and relatedness are satisfied (Deci & Ryan, 2000).

The study found that gamified simulations and memory-based tools are the preferred methods, while advanced tools like AR/VR and escape rooms are underutilized, highlighting

areas for possible improvement in accessibility. These insights can help educators and developers focus on enhancing and promoting the most effective gamified learning tools while exploring strategies to increase the adoption of underused technologies. Based on popular genres, it was also found that Action, strategy, adventure, and simulation materials are the most favored, indicating that respondents prefer interactive and engaging formats.

The result indicates that marketing students need autonomy to feel engaged in the learning process, which not only increases learners' enjoyment but also enhances their learning outcomes. The significance of Deci and Ryan's work in understanding the intrinsic of learners also aligned with the study result. The result showed that it boosts student confidence and supports self-directed learning by making lessons enjoyable and motivating (Ashley, 2019; Mansouri, 2023). Moreover, competencies, autonomy along with relatedness are crucial for maintaining motivation, especially students have access to relevant gamified learning tools. These factors enable them to effectively apply the knowledge they have gained. The findings aligned with existing research, emphasizing gamification's role in boosting intrinsic motivation and engagement.

Apart from correlation analysis, the self-determination theory predicts the effects of autonomy, relatedness, and competence on marketing students' outcomes based on gamified learning, as determined using ordinary least-square regression, like prior research (Steven et al., 2018). Students who used the gamified learning materials reported high learning outcomes—learning complex ideas and abstract concepts using gamified tools in marketing education to better outcomes of marketing education. Students who use gamified technologies most in their learning process will likely have better motivation, autonomy, and efficiency in learning

outcomes such as retaining marketing concepts theories, understand real world marketing problems, and marketing scenarios in marketing education.

Implications

The study results implied that blending adequate and effective gamification elements including simulation into marketing education can significantly enhance student confidence, autonomy, and relatedness and promote self-directed learning. By offering lessons that are more enjoyable and motivating to learners, gamified approaches fulfil critical psychological needs based on different personality traits and create a more engaging and effective learning environment. It is crucial for educators and curriculum developers to consider incorporating game-based strategies for promoting student autonomy, relatedness, and efficiency, foster active learning, and ultimately improve educational outcomes. In the digitalized world, the gamification approach in marketing education in universities is leveraged to bridge gaps in traditional teaching methods, encouraging students to take ownership of their learning experiences, build essential competencies for future success, and prepare them for professional competitive words to address innovative marketing challenges. The study suggests that marketing students with different personality traits could benefit more if educational curricula incorporate diverse gamified materials that accommodate various learning styles. Indeed, further studies are recommended with larger, more diverse samples to strengthen and validate these findings.

Limitations and Delimitation of the Study

This study exhibits some limitations. It is My survey sample focused only on marketing students that led to limited representativeness in terms of different backgrounds and small sample

size due to time and resource constraints for data collection. Self-reporting Likert scales, self-assessment about academic performance and recalling past behaviors from the respondents were another issue that led to unreliable data in some instances.

Survey design limitations such as limited response options such as Likert scales would force participants to choose answers that don't fully reflect their views. Although I tested the reliability test for internal data consistency, the validity of the data is associated with different factors. However, the data meets the reliability test minimum standard. The study data were gathered in a single time, not in two periods of time controlling the group that may affect the results of the study.

The small sample sizes limited the range of statistical tests, resulting in non-significant findings even when relationships may exist. Additionally, the study focused solely on marketing students, making it difficult to generalize the results to other educational disciplines.

REFERENCES

- Alabdulkareem, E., & Jamjoom, M. (2020). Computer-assisted learning for improving ADHD individuals' executive functions through gamified interventions: A review. *Entertainment Computing*, 33, 100341.
- Al-Adwan, A. S., Albelbisi, N. A., Hujran, O., Al-Rahmi, W. M., & Alkhalifah, A. (2021). Developing a holistic success model for sustainable e-learning: A structural equation modeling approach. *Sustainability*, 13(16), 9453.
- Almeida, F., & Simoes, J. (2019). The role of serious games, gamification, and industry 4.0 tools in the education 4.0 paradigm. *Contemporary Educational Technology*, 10(2), 120-136.
- Alsawaier, R. S. (2018). The effect of gamification on motivation and engagement. *The International Journal of Information and Learning Technology*, 35(1), 56-79.
- Alyoussef, I. Y. (2021). E-Learning acceptance: The role of task–technology fit as sustainability in higher education. *Sustainability*, 13(11), 6450. and research (Vol. 2, pp. 102–138). New York: Guilford Press.
- Arity, V., Vesty, G., & Moloney, B. (2023). Digitized Simulation and Gamified Pedagogy in a First Year Accounting Core Subject. In *Handbook of Big Data and Analytics in Accounting and Auditing* (pp. 361-393). Singapore: Springer Nature Singapore.
- Bagdi, H., Pothabathula, S. V., Sharma, L., & Bulsara, H. P. (2023). The global market upsurge in web traffic and revenues during the epidemic: an exploratory research of e-learning companies. *International Journal of Development Issues*, 22(3), 418-444.

- Burke, B. (2016). *Gamify: How gamification motivates people to do extraordinary things*.
Routledge.
- Bai, S., Hew, K. F., & Huang, B. (2020). Is gamification “bullshit”? Evidence from a meta-analysis and synthesis of qualitative data in educational contexts. *Educational Research Review, 100322*.
- Bechkoff, J. (2019). Gamification using a choose-your-own-adventure type platform to augment learning and facilitate student engagement in marketing education. *Journal for advancement of Marketing Education, 27*(1).
- Behl, A., Jayawardena, N., Pereira, V., Islam, N., Del Giudice, M., & Choudrie, J. (2022). Gamification and e-learning for young learners: A systematic literature review, bibliometric analysis, and future research agenda. *Technological Forecasting and Social Change, 176*, 121445.
- Behl, A., Pereira, V., Jayawardena, N., Nigam, A., & Mangla, S. (2023). Gamification as an innovation: A tool to improve organizational marketing performance and sustainability of international firms. *International Marketing Review*.
- Bergmann, N., Schacht, S., Gnewuch, U., & Madche, A. (2017). Understanding the Influence of Personality Traits on Gamification: The Role of Avatars in Energy Saving Tasks. In *ICIS*.
- Bolton, R. N., Chapman, R. G., & Mills, A. J. (2019). Harnessing digital disruption with marketing simulations. *Journal of Marketing Education, 41*(1), 15-31.
- Boxser, M., & Agarwal, A. (2014). Why MOOCS might be just right for schools. *Huffpost Education*.

- Brem, A., Viardot, E., & Nylund, P. A. (2021). Implications of the coronavirus (COVID-19) outbreak for innovation: Which technologies will improve our lives? *Technological forecasting and social change*, 163, 120451.
- Buckley, P., & Doyle, E. (2017). Individualising gamification: An investigation of the impact of learning styles and personality traits on the efficacy of gamification using a prediction market. *Computers & Education*, 106, 43-55.
- Burke, B. (2016). *Gamify: How gamification motivates people to do extraordinary things*. routledge.
- Caruana, A., La Rocca, A., & Snehota, I. (2016). Learner satisfaction in marketing simulation games: Antecedents and influencers. *Journal of Marketing Education*, 38(2), 107-118.
- Clark, R. C., & Mayer, R. E. (2023). *E-learning and the science of instruction: Proven guidelines for consumers and designers of multimedia learning*.
- John Wiley & sons. Costello, R. (2022). Future directions of gamification in education. In *Research anthology on developments in gamification and game-based learning* (pp. 141-150). IGI Global.
- Codish, D., & Ravid, G. (2014). Personality based gamification-educational gamification for extroverts and introverts. In *Proceedings of the 9th CHAIS Conference for the Study of Innovation and Learning Technologies: Learning in the Technological Era* (Vol. 1, pp. 36-44). Ra'anana: The Open University of Israel.
- Cowan, K., & Ketron, S. (2019). Prioritizing marketing research in virtual reality: Development of an immersion/fantasy typology. *European Journal of Marketing*, 53(8), 1585-1611.

- Crittenden V., Peterson R., Albaum G. (2013). Technology and business-to-consumer selling: Contemplating research and practice. *Journal of Personal Selling & Sales Management*, 30, 103-109.
- Davis, K., Sridharan, H., Koepke, L., Singh, S., & Boiko, R. (2018). Learning and engagement in a gamified course: Investigating the effects of student characteristics. *Journal of Computer Assisted Learning*, 34(5), 492-503.
- Deci, E. L., & Ryan, R. M. (2000). The "what" and "why" of goal pursuits: Human needs and the self-determination of behavior. *Psychological inquiry*, 11(4), 227-268.
- Deci, E. L., & Ryan, R. M. (2012). Self-determination theory. *Handbook of theories of social psychology*, 1(20), 416-436.
- Dehghanzadeh, H., Farrokhnia, M., Dehghanzadeh, H., Taghipour, K., & Noroozi, O. (2024). Using gamification to support learning in K-12 education: A systematic literature review. *British Journal of Educational Technology*, 55(1), 34-70.
- Deliyannis, I., & Kaimara, P. (2019). Developing smart learning environments using gamification techniques and video game technologies. *Didactics of Smart Pedagogy: Smart Pedagogy for Technology Enhanced Learning*, 285-307.
- Denden, M., Tlili, A., Chen, N. S., Abed, M., Jemni, M., & Essalmi, F. (2022). The role of learners' characteristics in educational gamification systems: A systematic meta-review of the literature. *Interactive Learning Environments*, 1-23.
- Denden, M., Tlili, A., Chen, N. S., Abed, M., Jemni, M., & Essalmi, F. (2024). The role of learners' characteristics in educational gamification systems: A systematic meta-review of the literature. *Interactive Learning Environments*, 32(3), 790-812

- Denden, M., Tlili, A., Essalmi, F., & Jemni, M. (2017, October). Educational gamification based on personality. In *2017 IEEE/ACS 14th International Conference on Computer Systems and Applications (AICCSA)* (pp. 1399-1405). IEEE.
- Deterding, S., Dixon, D., Khaled, R., & Nacke, L. (2011, September). From game design elements to gamefulness: defining "gamification". In *Proceedings of the 15th international academic MindTrek conference: Envisioning future media environments* (pp. 9-15).
- Dichev, C., & Dicheva, D. (2017). Gamifying education: what is known, what is believed and what remains uncertain: a critical review. *International journal of educational technology in higher education, 14*, 1-36.
- Dicheva, D., Dichev, C., Agre, G., & Angelova, G. (2015). Gamification in education: A systematic mapping study. *Journal of educational technology & society, 18*(3), 75-88.
- Dikcius, V., Urbonavicius, S., Adomaviciute, K., Degutis, M., & Zimaitis, I. (2021). Learning marketing online: The role of social interactions and gamification rewards. *Journal of Marketing Education, 43*(2), 159-173.
- Eccles, J. S., & Wigfield, A. (2002). Motivational beliefs, values, and goals. *Annual Review of Psychology, 53*(1), 109-132.
- Eppmann, R., Bekk, M., & Klein, K. (2018). Gameful experience in gamification: Construction and validation of a gameful experience scale [GAMEX]. *Journal of interactive marketing, 43*(1), 98-115.
- Firsova, I., Vasbieva, D., & Abaev, A. (2023, November). A Gamification Conceptual Framework for Marketing Courses. In *International Conference on Professional Culture of the Specialist of the Future* (pp. 169-186). Cham: Springer Nature Switzerland.

- Folmar, D. (2015). *Game it up!: Using gamification to incentivize your library* (Vol. 7). Rowman & Littlefield.
- Fortes Tondello, G., Premasukh, H., & Nacke, L. (2018, January). A theory of gamification principles through goal-setting theory. *Hawaii International Conference on System Sciences*.
- Fortes Tondello, G., Premasukh, H., & Nacke, L. (2018, January). A theory of gamification principles through goal-setting theory. *Hawaii International Conference on System Sciences*.
- Cao, Y., Gong, S. Y., Wang, Z., Cheng, Y., & Wang, Y. Q. (2022). More challenging or more achievable? The impacts of difficulty and dominant goal orientation in leaderboards within educational gamification. *Journal of Computer Assisted Learning*, 38(3), 845-860.
- Freeman, M., & Freeman, A. E. (2013). The game of information systems higher education.
- Gagné, M., Parent-Rochelleau, X., Bujold, A., Gaudet, M. C., & Lirio, P. (2022). How algorithmic management influences worker motivation: A self-determination theory perspective. *Canadian Psychology/Psychologie canadienne*, 63(2), 247.
- Ghaban, W., & Hendley, R. (2018). Investigating the interaction between personalities and the benefit of gamification. In *Proceedings of the 32nd international bcs human computer interaction conference*. BCS Learning & Development.
- Ghaban, W., & Hendley, R. (2019). How different personalities benefit from gamification. *Interacting with Computers*, 31(2), 138-153.
- Good, V., Hughes, D. E., Kirca, A. H., & McGrath, S. (2022). A self-determination theory-based meta-analysis on the differential effects of intrinsic and extrinsic motivation on salesperson performance. *Journal of the Academy of Marketing Science*, 50(3), 586-614.

- Groening, C., & Binnewies, C. (2019). "Achievement unlocked!"-The impact of digital achievements as a gamification element on motivation and performance. *Computers in Human Behavior*, 97, 151-166.
- Gupta, S., Coles, T., Dumas, C., McBride, S. J., & Bradford, D. (2016, May). Gamer style: performance factors in Gamified simulation. In *Proceedings of the 2016 CHI Conference on Human Factors in Computing Systems* (pp. 2014-2025).
- Hamari, J., Koivisto, J., & Sarsa, H. (2014, January). Does gamification work?--a literature review of empirical studies on gamification. In *2014 47th Hawaii international conference on system sciences* (pp. 3025-3034). Ieee
- Harman, K., Koohang, A., & Paliszkievicz, J. (2014). Scholarly interest in gamification: a citation network analysis. *Industrial Management & Data Systems*, 114(9), 1438-1452.
- Hartmann, A., & Gommer, L. (2021). To play or not to play: on the motivational effects of games in engineering education. *European Journal of Engineering Education*, 46(3), 319-343.
- Hassan, M. A., Habiba, U., Majeed, F., & Shoaib, M. (2021). Adaptive gamification in e-learning based on students' learning styles. *Interactive Learning Environments*, 29(4), 545-565.
- Hogberg, J., Shams, P., & Wästlund, E. (2019). Gamified in-store mobile marketing: The mixed effect of gamified point-of-purchase advertising. *Journal of Retailing and Consumer Services*, 50, 298-304.
- Honea, H., Castro, I. A., & Peter, P. (2017). Evidence items as signals of marketing competencies and workplace readiness: A practitioner perspective. *Journal of Marketing Education*, 39(3), 145-161.

- Humphrey Jr, W., Laverie, D., & Muñoz, C. (2021). The use and value of badges: Leveraging salesforce trailhead badges for marketing technology education. *Journal of Marketing Education*, 43(1), 25-42.
- Huotari, K., & Hamari, J. (2012, October). Defining gamification: a service marketing perspective. In *Proceeding of the 16th international academic MindTrek conference* (pp. 17-22).
- Huotari, K., & Hamari, J. (2017). A definition for gamification: anchoring gamification in the service marketing literature. *Electronic markets*, 27(1), 21-31.
- Imran, H. (2023). An empirical investigation of the different levels of gamification in an introductory programming course. *Journal of Educational Computing Research*, 61(4), 847-874.
- Januszewski, A., & Molenda, M. (Eds.). (2013). *Educational technology: A definition with commentary*. Routledge.
- Jaskari, M. M., & Syrjälä, H. (2023). A mixed-methods study of marketing students' game-playing motivations and gamification elements. *Journal of Marketing Education*, 45(1), 38-54.
- Jaskari, M. M., & Syrjälä, H. (2024). One Solution Does Not Fit All: Reward-Based and Meaningful Gamification in Higher Education. In *Practices and Implementation of Gamification in Higher Education* (pp. 22-49). IGI Global.
- Jayalath, J., & Esichaikul, V. (2020). Gamification to enhance motivation and engagement in blended eLearning for technical and vocational education and training. *Technology Knowledge and Learning*. <https://doi.org/10.1007/s10758-020-09466-2>.

- John, O. P., & Srivastava, S. (1999). The Big-Five trait taxonomy: History, measurement, and theoretical perspectives.
- John, O. P., Donahue, E. M., & Kentle, R. L. (1991). Big five inventory. *Journal of personality and social psychology*.
- K., & Stead, S. (2023). It is really not a game: An integrative review of gamification for service research. *Journal of Service Research*, 26(1), 3-20.
- Kapp, K. M. (2012). The gamification of learning and instruction: Game-based methods and strategies for training and education. Pfeiffer.
- Kaya, O. S., & Ercag, E. (2023). The impact of applying challenge-based gamification program on students' learning outcomes: Academic achievement, motivation and flow. *Education and Information Technologies*, 28(8), 10053-10078.
- Keller, J. M., & Suzuki, K. (2004). Learner motivation and e-learning design: A multinationally validated process. *Journal of Educational Media*, 29(3), 229-239.
- Kietzmann, J., & Pitt, L. (2016). Using simulations in the marketing lassroom. *Journal of Marketing Education*, 38(2), 71-72.
- Klock, A. C., Gasparini, I., Pimenta, M. S., & de Oliveira, J. P. M. (2015). Everybody is playing the game, but nobody's rules are the same": Towards adaptation of gamification based on users' characteristics. *Bulletin of the IEEE Technical Committee on Learning Technology*, 17(4), 22.
- Koivisto, J., & Hamari, J. (2019). The rise of motivational information systems: A review of gamification research. *International journal of information management*, 45, 191-210.

- Kumar, J., Herger, M., Deterding, S., Schnaars, S., Landes, M., & Webb, E. (2013). Gamification@ work. In *CHI'13 Extended Abstracts on Human Factors in Computing Systems* (pp. 2427-2432).
- Liao, Z., Huang, Q., Huang, S., Tan, L., Shao, T., Fang, T., ... & Shen, H. (2020). Prevalence of internet gaming disorder and its association with personality traits and gaming characteristics among Chinese adolescent gamers. *Frontiers in Psychiatry, 11*, 598585.
- Locke, E. A., & Latham, G. P. (1990). A theory of goal setting and task performance. Prentice-Hall.
- Loureiro, S. M. C., Bilro, R. G., & de Aires Angelino, F. J. (2020). Virtual reality and gamification in marketing higher education: a review and research agenda. *Spanish Journal of Marketing-ESIC, 25*(2), 179-216.
- Lovelace, K. J., Eggers, F., & Dyck, L. R. (2016). I do and I understand: Assessing the utility of web-based management simulations to develop critical thinking skills. *Academy of Management Learning & Education, 15*(1), 100-121.
- Luarn, P., Chen, C. C., & Chiu, Y. P. (2023). Enhancing intrinsic learning motivation through gamification: a self-determination theory perspective. *The International Journal of Information and Learning Technology, 40*(5), 413-424.
- Machado, R. S., Oliveira, I., Ferreira, I., das Neves, B. H. S., & Mello-Carpes, P. B. (2018). The membrane potential puzzle: A new educational game to use in physiology teaching. *Advances in Physiology Education, 42*(1), 79–83.
- Mansouri, E. (2023). Development of gamification as addiction education and examining its effects on students' motivation and enjoyment. *Bangladesh Journal of Medical Science, 22*(3).

- Mee, R. W. M., Rao, Y. S., Pek, L. S., Abd Ghani, K., Von, W. Y., Ismail, M. R., & Shahdan, T. S. T. (2022). Gamifying education for classroom engagement in primary schools. *Int J Eval & Res Educ ISSN, 2252(8822)*, 1361.
- Mitchell, R., Schuster, L., & Drennan, J. (2017). Understanding how gamification influences behaviour in social marketing. *Australasian Marketing Journal, 25(1)*, 12-19.
- Mitchell, R., Schuster, L., & Jin, H. S. (2020). Gamification and the impact of extrinsic motivation on needs satisfaction: Making work fun?. *Journal of Business Research, 106*, 323-330.
- Mouna Denden, Ahmed Tlili, Nian-Shing Chen, Mourad Abed, Mohamed Jemni & Fathi Essalmi (24 Aug 2022): The role of learners' characteristics in educational gamification systems: a systematic meta-review of the literature, Interactive Learning Environments, DOI: 10.1080/10494820.2022.2098777
- Murillo-Zamorano, L. R., López Sánchez, J. Á., Godoy-Caballero, A. L., & Bueno Muñoz, C. (2021). Gamification and active learning in higher education: is it possible to match digital society, academia and students' interests?. *International Journal of Educational Technology in Higher Education, 18*, 1-27.
- Nabizadeh, A. H., Jorge, J., Gama, S., & Gonçalves, D. (2021). How do students behave in a gamified course?—A ten-year study. *IEEE Access, 9*, 81008-81031.
- Nielson, B. E., & Border, T. (2016). Teaching and Training Future Sales Professionals How to Negotiate with Real World Experience. *Journal for Advancement of Marketing Education, 24*.

- Noorbehbahani, F., Salehi, F., & Zadeh, R. J. (2019). A systematic mapping study on gamification applied to e-marketing. *Journal of Research in Interactive Marketing*, 13(3), 392-410.
- Ofosu-Ampong, K. (2020). The shift to gamification in education: A review on dominant issues. *Journal of Educational Technology Systems*, 49(1), 113-137.
- Ofosu-Ampong, K., Boateng, R., Anning-Dorson, T., & Kolog, E. A. (2020). Are we ready for Gamification? An exploratory analysis in a developing country. *Education and Information Technologies*, 25, 1723-1742.
- Oliveira, R. P., Santos, I. L., de Souza, C. G., Reis, A. D. C., & de Souza, W. M. (2023). A study on the relation between industry 4.0 technologies and gamification in e-learning. *Interactive Technology and Smart Education*, 20(4), 449-474.
- Oliveira, R. P., Souza, C. G. D., Reis, A. D. C., & Souza, W. M. D. (2021). Gamification in e-learning and sustainability: A theoretical framework. *Sustainability*, 13(21), 11945.
- Palaniappan, K., & Noor, N. M. (2022). Gamification strategy to support self-directed learning in an online learning environment. *International Journal of Emerging Technologies in Learning (iJET)*, 17(3), 104-116.
- Peterson, R. A. (1994). A meta-analysis of Cronbach's coefficient alpha. *Journal of consumer research*, 21(2), 381-391.
- Pillai, R., & Sivathanu, B. (2020). Adoption of AI-based chatbots for hospitality and tourism. *International Journal of Contemporary Hospitality Management*, 32(10), 3199-3226.

- Pillai, R., Sivathanu, B., & Dwivedi, Y. K. (2020). Shopping intention at AI-powered automated retail stores (AIPARS). *Journal of Retailing and Consumer Services*, 57, 102207.
- Po-An Hsieh, J. J., & Wang, W. (2007). Explaining employees' extended use of complex information systems. *European journal of information systems*, 16(3), 216-227.
- Pusztai, K. K. (2020). Gamification in higher education. *Teaching Mathematics and Computer Science*, 18(2), 87-106.
- Rapp, A., Hopfgartner, F., Hamari, J., Linehan, C., & Cena, F. (2019). Strengthening gamification studies: Current trends and future opportunities of gamification research. *International Journal of Human-Computer Studies*, 127, 1–6.
- Rayburn, S. W., Anderson, S. T., & Smith, K. H. (2018). Designing marketing courses based on self-determination theory: Promoting psychological need fulfillment and improving student outcomes. *Journal for Advancement of Marketing Education*, 26(2), 22-32.
- Reeves, T. C., & Brackett, F. (1998). User characteristics checklist. Adresi: http://mime1.marc.gatech.edu/mm_tools/ucc.html
- Renz, A., Krishnaraja, S., & Schildhauer, T. (2020, June). A new dynamic for EdTech in the age of pandemics. In *Conference Paper presented at ISPIM innovation conference virtual*.
- Rezvani, A., Khosravi, P., & Dong, L. (2017). Motivating users toward continued usage of information systems: Self-determination theory perspective. *Computers in Human Behavior*, 76, 263-275.
- Rodrigues, L. F., Oliveira, A., & Rodrigues, H. (2019). Main gamification concepts: A systematic mapping study. *Heliyon*, 5(7).

- Rodríguez, M., Díaz, I., Gonzalez, E. J., & González-Miquel, M. (2018). Motivational active learning: An integrated approach to teaching and learning process control. *Education for Chemical Engineers*, 24, 7–12.
- Ryan, R. M., & Deci, E. L. (2017). Self-determination theory: Basic psychological needs in motivation, development, and wellness. Guilford Publications.
- Ryan, R. M., & Deci, E. L. (2017). *Self-determination theory: Basic psychological needs in motivation, development, and wellness*. Guilford publications.
- Saleem, A. N., Noori, N. M., & Ozdamli, F. (2022). Gamification applications in E-learning: A literature review. *Technology, Knowledge and Learning*, 27(1), 139-159.
- Schraepel, N. (2013). Gamification as Simulatization of the Real. Leuphana University. Sebastian Deterding, Dan Dixon, Rilla Khaled, and Lennart Nacke. 2011. From game design elements to gamefulness: defining "gamification". In Proceedings of the 15th International Academic MindTrek Conference: Envisioning Future Media Environments (MindTrek '11). ACM, New York, NY, USA.
- Smiderle, R., Marques, L., Coelho, J. A. P. D. M., Rigo, S. J., & Jaques, P. A. (2019, July). Studying the impact of gamification on learning and engagement of introverted and extroverted students. In *2019 IEEE 19th International Conference on Advanced Learning Technologies (ICALT)* (Vol. 2161, pp. 71-75). IEEE.
- Spreitzer, G. M. (1995). Psychological empowerment in the workplace: Dimensions, measurement, and validation. *Academy of management Journal*, 38(5), 1442-1465.
- Smiderle, R., Rigo, S. J., Marques, L. B., Peçanha de Miranda Coelho, J. A., & Jaques, P. A. (2020). The impact of gamification on students' learning, engagement and behavior based on their personality traits. *Smart Learning Environments*, 7(1), 3.

- Soraya, D. U., Smaragdina, A. A., Nidhom, A. M., Putra, A. B. N. R., & Ningrum, G. D. K. (2019, January). Developing Gamified Learning Models for Vocational Schools to Enhance Programming Skills and Motivation. In *2nd International Conference on Vocational Education and Training (ICOVET 2018)* (pp. 274-277). Atlantis Press.
- Subhash, S., & Cudney, E. A. (2018). Gamified learning in higher education: A systematic review of the literature. *Computers in human behavior*, 87, 192-206.
- Suh, A., Wagner, C., & Liu, L. (2018). Enhancing user engagement through gamification. *Journal of Computer Information Systems*, 58(3), 204-213.
- Tanouri, A., Kennedy, A. M., & Veer, E. (2023). An implementation framework for transformative gamification services. *Behaviour & Information Technology*, 1-33.
- Teräs, M., Suoranta, J., Teräs, H., & Curcher, M. (2020). Post-Covid-19 education and education technology ‘solutionism’: A seller’s market. *Postdigital Science and Education*, 2(3), 863-878.
- Timchenko, V. V., Trapitsin, S. Y., & Apevalova, Z. V. (2020, September). Educational technology market analysis. In *2020 International Conference Quality Management, Transport and Information Security, Information Technologies (IT&QM&IS)* (pp. 612-617). IEEE.
- Topu, F. B. (2023). Effects of Cognitive Load Level on Students’ Attitude towards the Gamified Course. *Journal of Learning and Teaching in Digital Age*, 8(1), 93-112.
- Tsay, C. H. H., Kofinas, A., & Luo, J. (2018). Enhancing student learning experience with technology-mediated gamification: An empirical study. *Computers & Education*, 121, 1-17.

- Turan, Z., Avinc, Z., Kara, K., & Goktas, Y. (2016). Gamification and education: Achievements, cognitive loads, and views of students. *Int. J. Emerg. Technol. Learn.*, 11(7), 64-69.
- Ugur-Erdogmus, F., & Çakır, R. (2022). Effect of gamified mobile applications and the role of player types on the achievement of students. *Journal of Educational Computing Research*, 60(4), 1063-1080.
- Vesa, M., & Harviainen, J. T. (2019). Gamification: Concepts, consequences, and critiques. *Journal of Management Inquiry*, 28(2), 128-130.
- Vos, L. (2015). Simulation games in business and marketing education: How educators assess student learning from simulations. *The International Journal of Management Education*, 13(1), 57-74.
- Vos, L., & Brennan, R. (2010). Marketing simulation games: student and lecturer perspectives. *Marketing Intelligence & Planning*, 28(7), 882-897.
- Wang, A. I., & Tahir, R. (2020). The effect of using Kahoot! for learning—A literature review. *Computers & Education*, 149, 103818.
- Williamson Yang, Y., Asaad, Y., & Dwivedi, Y. (2017). Examining the impact of gamification on intention of engagement and brand attitude in the marketing context. *Computers in Human Behavior*, 73, 459-469.
- Williamson, B. (2021). Meta-edtech. *Learning, Media and Technology*, 46(1), 1-5.
- Williamson, B. (2022). Big EdTech. *Learning, Media and Technology*, 47(2), 157-162.
- Wu, M. (2011). Gamification from a company of pro gamers. Retrieved August 20, 2018, from <https://community.khoros.com/t5/Science-of-Social-Blog/Gamification-from-a-Company-of-Pro-Gamers/ba-p/19258>.

- Yaghtin, S., Safarzadeh, H., & Karimi Zand, M. (2020). Planning a goal-oriented B2B content marketing strategy. *Marketing Intelligence & Planning*, 38(7), 1007-1020.
- Yamani, H. A. (2021). A conceptual framework for integrating gamification in elearning systems based on instructional design model. *International Journal of Emerging Technologies in Learning (Online)*, 16(4), 14.
- Vallerand, R. J. (2000). Deci and Ryan's self-determination theory: A view from the hierarchical model of intrinsic and extrinsic motivation. *Psychological inquiry*, 11(4), 312-318.
- Zainuddin, A., & Gommer, L. (2021). To play or not to play: on the motivational effects of games in engineering education. *European Journal of Engineering Education*, 46(3), 319-343.
- Zainuddin, Z., Chu, S. K. W., Shujahat, M., & Perera, C. J. (2020). The impact of gamification on learning and instruction: A systematic review of empirical evidence. *Educational research review*, 30, 100326.
- Zeithaml V. A., Bitner M. J., Gremler D. D. (2013). *Services marketing: Integrating customer focus across the firm* (6th ed.). New York, NY: McGraw-Hill.
- Zeithaml, V. A., Bitner, M. J., & Gremler, D. D. (2018). *Services marketing: Integrating customer focus across the firm*. McGraw-Hill.
- Zhang, D., Zhao, J. L., Zhou, L., & Nunamaker Jr, J. F. (2004). Can e-learning replace classroom learning? *Communications of the ACM*, 47(5), 75-79.
- Zhu, Y. Q., & Chen, H. G. (2015). Social media and human need satisfaction: Implications for social media marketing. *Business horizons*, 58(3), 335-345.

APPENDICES

APPENDIX I: STUDY FRAMEWORK: SDT

Figure 1

Self-Determination Components

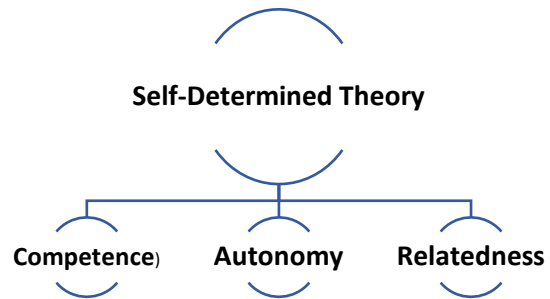



Figure 2

SDT

Self-determination theory: SDT

Quality of Behavior						
	Nonself-determined					Self-determined
Type of Motivation	Amotivation	Extrinsic Motivation				Intrinsic Motivation
Type of Regulation	Non-regulation	External Regulation	Introjected Regulation	Identified Regulation	Integrated Regulation	Intrinsic Regulation
Perceived Locus of Causality	Impersonal	External	Somewhat External	Somewhat Internal	Internal	Internal

APPENDIX II: ASSESSMENT INDICATORS FOR PERSONALITY TRAITS

Figure 3

Assessing Personality Traits

Disagree strongly 1	Disagree a little 2	Neither agree nor disagree 3	Agree a little 4	Agree Strongly 5
<u>I see Myself as Someone Who...</u>				
___ 1. Is talkative				___ 23. Tends to be lazy
___ 2. Tends to find fault with others				___ 24. Is emotionally stable, not easily upset
___ 3. Does a thorough job				___ 25. Is inventive
___ 4. Is depressed, blue				___ 26. Has an assertive personality
___ 5. Is original, comes up with new ideas				___ 27. Can be cold and aloof
___ 6. Is reserved				___ 28. Perseveres until the task is finished
___ 7. Is helpful and unselfish with others				___ 29. Can be moody
___ 8. Can be somewhat careless				___ 30. Values artistic, aesthetic experiences
___ 9. Is relaxed, handles stress well				___ 31. Is sometimes shy, inhibited
___ 10. Is curious about many different things				___ 32. Is considerate and kind to almost everyone
___ 11. Is full of energy				___ 33. Does things efficiently
___ 12. Starts quarrels with others				___ 34. Remains calm in tense situations
___ 13. Is a reliable worker				___ 35. Prefers work that is routine
___ 14. Can be tense				___ 36. Is outgoing, sociable
___ 15. Is ingenious, a deep thinker				___ 37. Is sometimes rude to others
___ 16. Generates a lot of enthusiasm				___ 38. Makes plans and follows through with them
___ 17. Has a forgiving nature				___ 39. Gets nervous easily
___ 18. Tends to be disorganized				___ 40. Likes to reflect, play with ideas
___ 19. Worries a lot				___ 41. Has few artistic interests

____20. Has an active imagination

____42. Likes to cooperate with others

____21. Tends to be quiet

____43. Is easily distracted

____22. Is generally trusting

____44. Is sophisticated in art, music, or
literature

Scoring:

BFI scale scoring ("R" denotes reverse-scored items):

Extraversion: 1, 6R, 11, 16, 21R, 26, 31R, 36

Agreeableness: 2R, 7, 12R, 17, 22, 27R, 32, 37R, 42

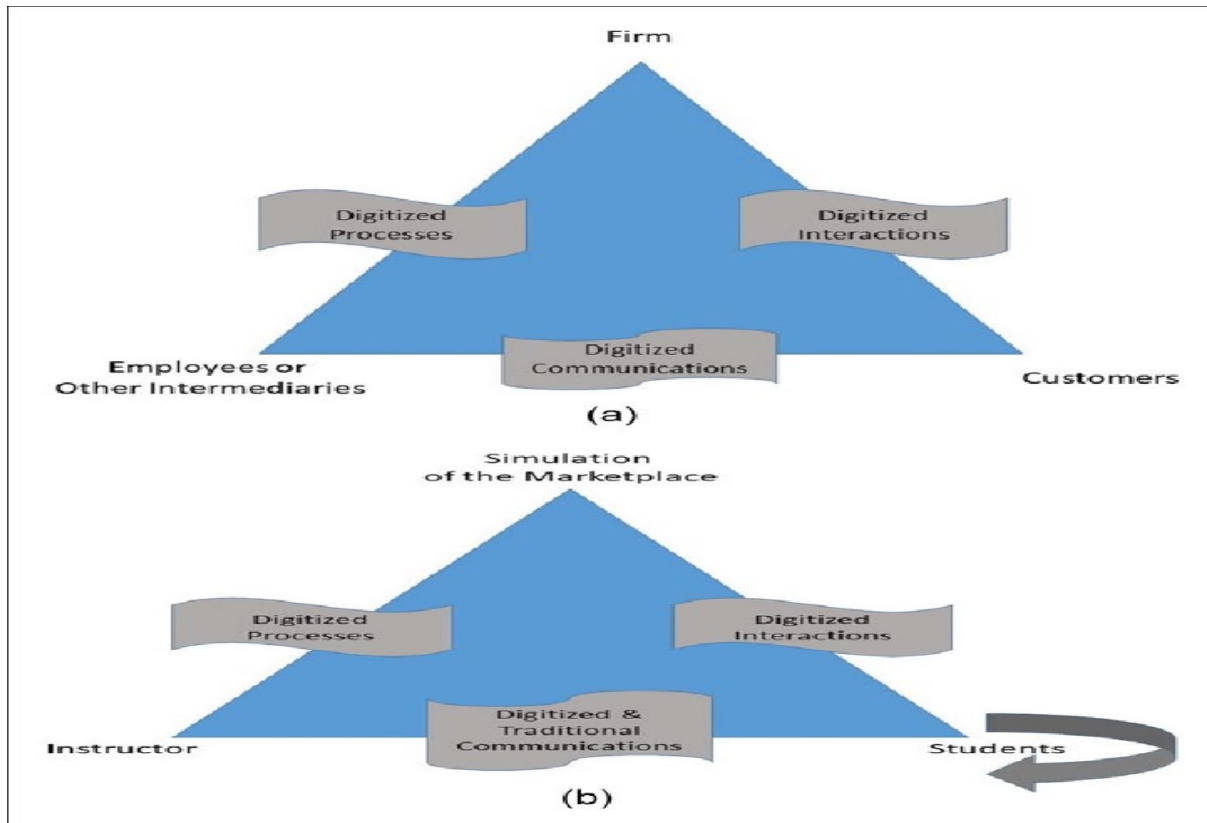
Conscientiousness: 3, 8R, 13, 18R, 23R, 28, 33, 38, 43R

Neuroticism: 4, 9R, 14, 19, 24R, 29, 34R, 39

Openness: 5, 10, 15, 20, 25, 30, 35R, 40, 41R, 44

Figure 4

Interaction of Simulation of and Learning



APPENDIX III: DEFINED VARIABLES FOR HYPOTHESES

Variable Defined for each hypothesis.

H1:

Defined variables

Dependent Variable (DV) is engagement with gamification.

Indirect Variable (IV) = Big Five Personality Traits

H2: Defined variables:

DV is engagement with gamification.

IV is personality traits and Gender.

H3:

Dependent variable: Gamification learning elements in class learning platform and levels of positive impact.

Independent Variable: Personality traits

H4:

Defined variables:

Positive experiences and attitudes: Attitude scores or survey responses about gamified courses. Response “I feel like I have a lot of input in deciding how to do work on class projects basis on the availability of gamified learning materials”?

Perceived learning outcomes: The survey score or self-reported measure of how much the learner perceives they have learned.

Variables:

Competition of tasks on gamified education platform:

“Desire to earn rewards or points” factor contribute most to your completion on tasks on gamified education platform.

“Desire to achieve high scores or level” factor contribute most to your completion on tasks on gamified education platform

Motivation while engaging with gamified materials for learning.

To learn the theories presented in class, and to learn.

To understand the practical application taught in classes.

H6:

Variables:

Learning outcomes: Gamified learning materials have positively impacted my understanding of concepts and retention of information- positively impacted

Understanding marketing concept: When I use gamified materials, I feel more confident in applying concepts to understand the marketing concept.

Grasp marketing principles effectively: The gamified learning materials helped me grasp principles more effectively.

Understand practical applications: the gamified learning materials helped me grasp principles more effectively- motivation while engaging with gamified materials: Student eager to learn and understand the practical applications taught in classes.

H7

Defined variables

Gamified Simulations: Gamified Simulations, engagement in simulation practice “students’ experience with gamified learning.

Understand marketing: How do simulation help in learning “The simulation used in class helped me to understand marketing concepts

H8

Defined variables

Hypothesis based on Self-Determination Theory (SDT).

The section mainly focuses the learning motivation of learners and it’s associated with other predictors such autonomy, relatedness, competency, and engagement. The responses from the survey, the factors were analyzed based on the responses.

The subsequent measurement involves assessing learners’ outcomes and linking them to students’ psychological needs as outlined by SDT in the context of gamified learning.

APPENDIX IV: RESPONSE ABOUT USE OF GAMIFIED PLATFORM AND GENRE USED

Table 19

Participants' Responses Based on Their Practices in Gamification Platforms

Statement	Never Used	Rarely Used	Occasionally Used	Frequently Used	Most Used
Gamified Learning Platform	11.08	17.03	13.81	4.82	6.25
Educational Games	5.99	17.47	20.00	9.64	3.13
Gamified (adaptive) Quizzes and adaptative Assessment	8.08	13.97	20.00	9.64	6.25
Gamified Simulations	5.69	9.17	16.19	30.12	37.50
Digitalized Flashcards and Memory Games	5.69	9.17	16.19	30.12	37.50
Escape Room Challenges	24.85	8.30	2.86	2.41	3.13
AR and VR Experience	22.46	8.73	4.29	8.43	0.00
Gamified Learning Challenge	16.17	16.16	6.67	4.82	6.25

Note: Sample Size (N): 111

The survey shows distinct usage patterns for different gamified learning tools:

Most Popular Tools: Gamified simulations and digital flashcards/memory games are widely adopted, with over 30% of respondents using them frequently or as their most used tools.

Moderate Adoption: Gamified quizzes/adaptive assessments and educational games see moderate use, with occasional usage rates around 20%, indicating balanced integration into learning environments.

Low Adoption Tools: Escape room challenges and AR/VR experiences have the highest rates of non-usage, with nearly a quarter of respondents never using them, pointing to potential barriers or lack of access to these tools.

Table 20

Most Gamified Materials Used by Respondents

Activity (Genre)	N	%
Action	65	58.56
Adventure	58	52.25
Role-Playing	27	24.32
Puzzle	48	43.24
Sports	55	49.55
Simulations	57	51.35
Strategy	59	53.15
Others	5	4.50

Note: Sample Size (N): 111

Note: Sample: 111. Multiple responses. About 51% respondents reported that they are used to simulations (51%), Puzzle (49.55%), Strategy (53.15%), role playing (25%) and some of them also used to played action (58.56%), Adventure (52%) and sports (49%).

APPENDIX V: SURVEY QUESTIONNAIRE

Q1. Consent

Q2 Which course are you taking the survey for? (

(Hide the information purposefully)

Q3 If you selected "other" in the question above, please specify below

Q4 If you are receiving credit for participation, please enter your name below. Your name will not be linked with your responses, and your name is only collected for providing you course credit

Q5 First Name

Q6 Last Name

Q7 What is your age group?

- ☐ 18 to 20 years (1)
- ☐ 21 to 23 years (2)
- ☐ 24 to 26 years (3)
- ☐ 27 and 29 Years (4)
- ☐ 30 and above (5)

Q8 Which gender identity do you most closely identify with?

- ☐ Male (1)
- ☐ Female (2)
- ☐ Non-binary / third gender (3)

Q9 How would you rate your academic performance this year so far? (*self-report: based on your individual perception of your semester/last year's grades, effort, OR overall academic achievement during your studies*)?

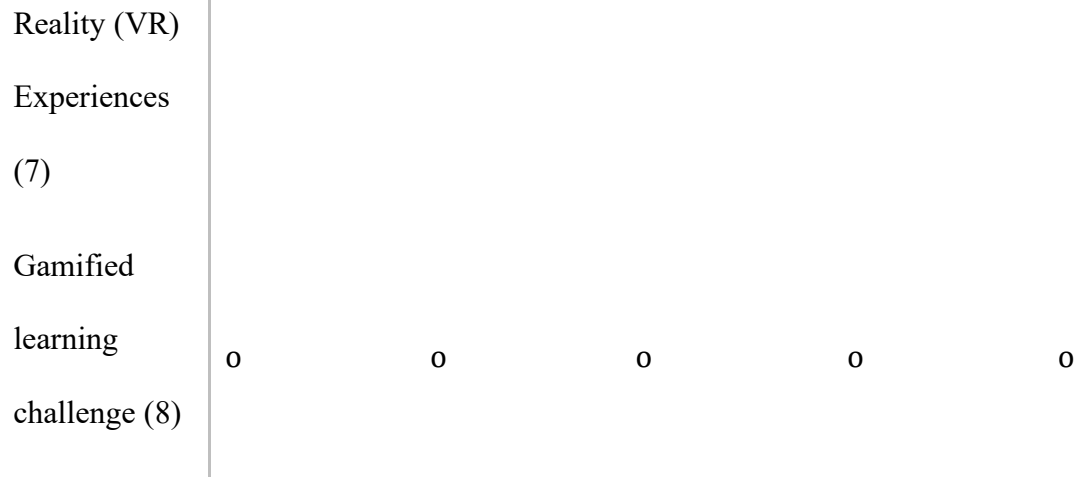
- ☐ Below Average (1)
- ☐ Average (2)
- ☐ Above Average (3)
- ☐ Excellent (4)

Q10 The following questions pertain to your experiences with any learning materials ("Gamified Learning Materials" that use game-like experiences designed to enhance engagement and learning. Some examples include: memory games, gamified simulations, escape room challenges, Augmented Reality (AR) or Virtual Reality (VR). Basically, any learning materials that have game elements assigned by your professor(s)

Q11 In your experience with gamified learning, which type of material have you used the most during your college career?

	Never used (1)	Rarely used (2)	Occasionally used (3)	Frequently used (4)	Most used (5)
Gamified Learning Platforms (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Educational Games (2)	0	0	0	0	0
Gamified (adaptive) Quizzes and adaptive Assessments (3)	0	0	0	0	0
Gamified Simulations (4)	0	0	0	0	0
Digitalized Flashcards and Memory Games (5)	0	0	0	0	0
Escape Room Challenges (6)	0	0	0	0	0
Augmented Reality (AR) and Virtual	0	0	0	0	0



Q12 Referring to your most recent gamified study materials, how often did/do you use them over the course of the semester?

Q13 Which of the following game genres do you prefer? (Please select most preferred multiple answers)

- ☐ Action (1)
- ☐ Adventure (2)
- ☐ Role-playing (3)
- ☐ Puzzle (4)
- ☐ Sports (5)
- ☐ Simulation (6)
- ☐ Strategy (7)
- ☐ Other (8)

Q14 Do you think gamification makes learning more fun?

- ☐ Strongly disagree (1)
- ☐ Somewhat disagree (2)

- ☐ Neither agree nor disagree (3)
- ☐ Somewhat agree (4)
- ☐ Strongly agree (5)

Q15 What factors contribute most to your completion of tasks on gamified educational platforms?

	Strongly Disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly Agree (5)
Desire to earn rewards or points (1)	0	0	0	0	0
Interest in the subject matter (2)	0	0	0	0	0
Competing with friends or peers (3)	0	0	0	0	0
Desire to achieve high scores or levels (4)	0	0	0	0	0

Q16 The simulation used in class helped me to understand marketing concepts (if applicable)

- ☐ Strongly disagree (1)
- ☐ Somewhat disagree (2)
- ☐ Neither agree nor disagree (3)
- ☐ Somewhat agree (4)
- ☐ Strongly agree (5)

Q17 The simulation used in class enhanced my critical thinking skills (if applicable).

- ☐ Extremely unlikely (1)
- ☐ Somewhat unlikely (2)
- ☐ Neither likely nor unlikely (3)
- ☐ Somewhat likely (4)
- ☐ Extremely likely (5)

Q18 How do you feel about using gamified learning materials in courses other than a simulation

?

- ☐ 1. Not engaged at all (1)
- ☐ 2. Somewhat engaged (2)
- ☐ 3. Moderately engaged (3)
- ☐ 4. Very engaged (4)
- ☐ 5. Extremely engaged (5)

Q19 What is your level of agreement with the statement?

"Gamified learning materials have positively impacted my understanding of concepts and retention of information"

- ☐ Strongly Agree (1)
- ☐ Agree (2)
- ☐ Neutral (3)
- ☐ Disagree (4)
- ☐ Strongly Disagree (5)

Q20 How engaged do you feel when interacting with gamification contents compared to not-gamified contents learning materials?

- ☐ Extremely engaged (1)
 - ☐ Very engaged (2)
 - ☐ Slightly engaged (3)
 - ☐ Moderately engaged (4)
 - ☐ Not engaged at all (5)
-

Q21 Which gamification elements do you find most motivating and effective in enhancing your learning experience? *(Select all that apply)*

- ☐ Badges (1)
- ☐ Points (2)
- ☐ Competition (3)
- ☐ Leaderboards (4)
- ☐ Challenges (5)
- ☐ Rewards (6)
- ☐ Interaction (7)
- ☐ Social (8)

Q22 Have you noticed any correlation between your engagement levels and the completion of tasks on gamified educational platforms?

- ☐ Yes, higher engagement leads to higher completion rates (1)
- ☐ Yes, but there's no significant correlation (2)
- ☐ No, engagement levels don't affect completion rates (3)

- ☐ I'm not sure (4)

Q23 Please rate your problem-solving skills (based on your self-assessment)?

- ☐ Very high (1)
- ☐ High (2)
- ☐ Moderate (3)
- ☐ Low (4)
- ☐ Very low (5)

Q24 Which of the aspect of gamified learning materials do you feel effective?

	1. Strongly Disagree (1)	2 - Disagree (2)	3 - Neutral (3)	4 - Agree (4)	5 - Strongly Agree (5)
Ranking shifts based on performance (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Leaderboard view showcasing top performers. (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Platform- wide competition view (3)	0	0	0	0	0
Activity of selecting the best answers or solutions (4)	0	0	0	0	0
Accumulatin g scores or points (5)	0	0	0	0	0
activity of being awarded new stars or badges (6)	0	0	0	0	0

Q25 Here are a few characteristics that may or may not apply to you. Please select the best options next to each statement to indicate the extent to which you agree or disagree with that statement.

I see Myself as Someone Who

	Disagree strongly (1)	Disagree a little (2)	Neither agree /nor disagree (3)	Agree a little (4)	Agree Strongly (5)
Is talkative (1)	0	0	0	0	0
.Tends to find fault with others (2)	0	0	0	0	0
Does a thorough job (3)	0	0	0	0	0
Is unhappy (4)	0	0	0	0	0
Is original, comes up with new ideas (5)	0	0	0	0	0
Is reserved (6)	0	0	0	0	0
Is helpful and unselfish with others (7)	0	0	0	0	0

Can be somewhat careless (8)	0	0	0	0	0
Is relaxed, handles stress well (9)	0	0	0	0	0
Is curious about many different things (10)	0	0	0	0	0
Is full of energy (11)	0	0	0	0	0
Starts quarrels with others (12)	0	0	0	0	0
.Is a reliable worker (13)	0	0	0	0	0
Can be tense (14)	0	0	0	0	0
Is ingenious, a deep thinker (15)	0	0	0	0	0
Generates a lot of enthusiasm (16)	0	0	0	0	0

Has a forgiving nature (17)	0	0	0	0	0
Tends to be disorganized (18)	0	0	0	0	0
Worries a lot (19)	0	0	0	0	0
Has an active imagination (20)	0	0	0	0	0
Tends to be quiet (21)	0	0	0	0	0
Is generally trusting (22)	0	0	0	0	0
tends to be lazy (23)	0	0	0	0	0
Is emotionally stable, not easily upset (24)	0	0	0	0	0
Is inventive (25)	0	0	0	0	0
Has as assertive personality (26)	0	0	0	0	0

Can be cold and aloof (27)	0	0	0	0	0
Perseveres until the task is finished (28)	0	0	0	0	0
Can be moody (29)	0	0	0	0	0
Values artistic, aesthetic experiences (30)	0	0	0	0	0
Is sometimes shy, inhibited (31)	0	0	0	0	0
Is considerate and kind to almost everyone (32)	0	0	0	0	0
Does things efficiently (33)	0	0	0	0	0
Remains calm in tense situation (34)	0	0	0	0	0

Prefers work that is routin (35)	0	0	0	0	0
Is outgoing, sociable (36)	0	0	0	0	0
Is sometimes rude to others (37)	0	0	0	0	0
Makes plans and follows through with (38)	0	0	0	0	0
Gets nervous easily (39)	0	0	0	0	0
Likes to reflect, play with ideas (40)	0	0	0	0	0
Has few artistic interests (41)	0	0	0	0	0
Likes to cooperate with other (42)	0	0	0	0	0

Is easily distracted (43)	0	0	0	0	0
Is sophisticated in art, music, or Literature (44)	0	0	0	0	0

Q26 What are your thoughts on the following statement concerning your experience with class projects when utilizing gamified learning materials?

	Strongly Disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly agree (5)
I feel like I have a lot of input in deciding how to do work on class projects basis	0	0	0	0	0

on the
availability
of gamified
learning
materials. (1)

When I have
the
opportunity,
I'm able to
freely
express my
ideas and
opinions
while
working on
class
activities (4)

feel like I can
fully engage
and express
myself while
working on

0

0

0

0

0

0

0

0

0

0

class
projects,
especially
when they
involve
gamified
learning
experiences.

(5)

When it
comes to
class
projects, I
find there's
ample
opportunity
to make
decisions,
especially in
those that
incorporate
gamified

o

o

o

o

o

learning
methods. (6)

Q27 What are your thoughts on the statement concerning your experience with peers or teams while participating in gamified learning materials?

	Strongly Disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly Agree (5)
I enjoy working with classmates when we have gamified learning materials (1)	0	0	0	0	0
I collaborate well with my classmates on class activity involving	0	0	0	0	0

game					
elements (4)					
I enjoy					
socializing					
with my					
classmates					
while	0	0	0	0	0
working on					
assignment					
with game					
elements (5)					
When					
working on a					
project with					
game					
elements I	0	0	0	0	0
feel people					
on my teams					
care about					
me (6)					

Q28 What are your thoughts on the statement regarding your competence when engaging with gamified materials?

	Strongly Disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly Agree (5)
When gamified learning materials are accessible, I generally feel confident about my role in class activities (1)	0	0	0	0	0
On team or in class activity, I get many chances to show I am capable (6)	0	0	0	0	0

When I am
working on
team
projects, I
often feel
very capable.
(7)

0 0 0 0 0

Q29 What are your thoughts on the statement concerning your motivation while engaging with gamified materials?

	Strongly Disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly Agree (5)
I'm motivated to put in effort and master class materials	0	0	0	0	0
I work hard to learn everything in class and feel	0	0	0	0	0

motivated to
master the
skills taught

I am
motivated to
learn the
theories
presented in
class.

0 0 0 0 0

I am eager to
learn and
understand
the practical
applications
taught in
class.

0 0 0 0 0

Q30 What are your thoughts on using gamified learning approach overall?

Strongly Disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly Agree (5)
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When I use gamified materials, I feel more confident in applying concepts in general	0	0	0	0	0
The gamified learning materials helped me grasp principles more effectively	0	0	0	0	0
I found the gamified approach to learning courses	0	0	0	0	0

enjoyable and
engaging

The gamified
approach to
learning

increased my
interest in the
subject (16)

I would
recommend
gamified
learning
materials for
marketing
education to
others based
on my
experience

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