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Exploring the Usability and Engagement of Students in an Educational Board Game on Personal Financial Planning

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Abstract: Traditional teaching approaches lack engagement, personalization, flexibility, and effective evaluation, thereby limiting learning outcomes. Consequently, these systems face challenges in engaging students, meeting their individual needs, adapting to diverse learning situations, and accurately assessing their competency. Educational board games (EBGs) offer a dynamic and engaging learning experience through play and personalized learning, promising optimal outcomes to overcome these obstacles. The objective of this study is to investigate how usability influences student engagement using the MEEGA+ evaluation approach during EBG play in a Personal Financial Planning course at Universiti Teknologi MARA (UiTM) Cawangan Melaka, Kampus Bandaraya Melaka. This quantitative study involved a self-administered questionnaire and a purposive sample of 200 bachelor's degree students in the course. PLS-SEM was utilized to assess the model and hypothesized relationships. The operability and accessibility of educational games significantly enhanced student engagement, underscoring the utility of board games for learning through play. Usability, experience, and engagement should be integral considerations in instructional game design. The MEEGA+ assessment model can be applied to evaluate game-based learning across various EBGs. Board games have the potential to enhance educational outcomes, underscoring the necessity for further research in game-based learning. The study also suggests that the MEEGA assessment model can assist designers and educators in developing effective game-based learning experiences.

Keywords: *Usability, Student engagement, MEEGA+ assessment model, educational board game.*

1. Introduction

For a prolonged period, education has heavily relied on conventional instructional methods, characterized by lengthy lectures and an emphasis on rote memorization (Onofrei & Ferry, 2020; Wong, 2018). Critics argue that these methods often fall short of enhancing students' learning outcomes, particularly in sustaining their attention (Martin & Martinez, 2016). While some students thrive in lecture-centric environments, others struggle without opportunities for discussion and individualized attention (Byusa, Kampire & Mwesigye, 2022; Platz, 2022). Studies by Begy (2017) and Ghazal, Al-Samarraie, and Wright (2020) indicate that student's express dissatisfaction with their learning outcomes and report lower levels of individualized attention under traditional instructional methods. Moreover, these approaches are frequently inflexible and fail to adapt to diverse situations or student groups (Onofrei & Ferry, 2020; Wong, 2018), diminishing their effectiveness in today's varied and ever-changing classrooms. Barbara (2019) and Fjaellingsdal and Klockner (2020) discovered that integrating project-based learning and problem-solving activities with traditional methods enhances students' critical thinking, creativity, and teamwork, leading to a better understanding of the material. Recognizing these limitations, researchers and educators are actively seeking new teaching approaches that better align with the needs of contemporary students.

This shift has given rise to individualized lessons and interactive learning activities as potential strategies to enhance students' interest, motivation, and performance in the classroom. Educational board games (EBGs) have emerged as a topic of discussion, with proponents suggesting that they may offer more effective learning experiences compared to traditional methods (Barbara, 2019; Fjaellingsdal & Klockner, 2020). The educational objectives of EBGs focus on improving learning experiences and academic performance by fostering critical thinking, collaboration, active learning, and problem-solving skills (Martin and Martinez, 2016; Gibson and Douglas, 2013; Barbara, 2019). In recent years, educators have come to recognize EBGs as valuable teaching tools, in addition to their historical popularity as forms of entertainment and social interaction (Fjaellingsdal & Klockner, 2020; Hoy, 2018). Unlike traditional educational methods such as reading or listening, EBGs actively involve players in the learning process. The dynamic and engaging nature of gaming transforms learning into

a fun, relevant, and memorable experience. Within the framework of the game, students actively participate in decision-making, problem-solving, and critical thinking, promoting an environment of active learning (Barbara, 2019; Begy, 2017; Fjaellingsdal & Klockner, 2020).

Despite the acknowledged advantages of facilitating various learning contexts of usability (Gibson & Douglas, 2013; Wong, 2018), a critical examination of EBGs is essential. The primary objective of this study is to investigate the influence of students' usability on engagement when implementing an EBG within the context of a Personal Financial Planning course. Petri, Von Wangenheim, and Borgatto (2016; 2017) utilized the MEEGA+ evaluation methodology to collect data on how effectively the EBG was used and its impact on student involvement. The results of this study aim to contribute to existing knowledge on educational game design and shed light on successful strategies for integrating EBGs into lesson plans. Ultimately, the study aspires to provide teachers and instructional designers with valuable insights to enhance the use of EBGs in the Personal Financial Planning course, leading to improved learning outcomes and a more engaging class overall. This study employed the MEEGA+ evaluation model to examine the influence of usability on student engagement in the context of implementing an EBG for a Personal Financial Planning course. The exploration begins by reviewing existing literature on EBGs and their potential to enhance student engagement. Following a summary of the study objectives and research methods employed, the results are presented and analyzed. The conclusion section of the paper reflects on the implications of the study for the utilization of EBGs and evaluates potential recommendations for further research.

2. Literature Review

The origins of teaching and learning can be traced back to ancient civilizations, where oral practices and apprenticeships served as the primary modes of education. These early methods laid the foundation for the more structured approaches to teaching and learning prevalent today. As societies evolved and the demand for education increased, the establishment of organized learning environments such as schools and colleges became imperative (Onofrei & Ferry, 2020; Wong, 2018). Traditional teaching methods, such as lectures and rote memorization, have persisted in educational institutions globally for an extended period, owing to their ease of use and the ability to convey information efficiently to large audiences (Fjaellingsdal & Klockner, 2020; Hoy, 2018). Despite their widespread use, these methods have faced significant criticism for their perceived inability to effectively enhance learning outcomes. Previous studies suggest that traditional methods may diminish students' interest in learning, adversely impacting their overall educational experiences (Byusa, Kampire, & Mwesigye, 2022; Platz, 2022). The passive absorption of knowledge through lectures or repetitive memorization can hinder students from actively engaging in the learning process. Consequently, students may struggle to develop critical thinking skills, problem-solving abilities, and a deep understanding of the subject matter (Begy, 2017; Byusa et al., 2022). A lack of interest in conventional teaching methods has also been correlated with poor academic performance and limited knowledge retention. When information is presented passively, students may find it challenging to remember and apply what they have learned in real-life situations, leading to a loss of interest and motivation in the learning process (Fjaellingsdal & Klockner, 2020; Onofrei & Ferry, 2020).

In response to the changing landscape of education, educators have recognized the necessity to explore new teaching methods that better align with the diverse preferences and needs of students. Recently, alternative approaches to teaching and learning have gained attention for offering a fresh perspective on educational delivery and increasing student engagement. Notable features of these methods include the potential to address issues associated with conventional teaching approaches, often characterized by passive methods such as lectures. New tools, interactive learning activities, and personalized teaching strategies are creatively employed to create dynamic and engaging learning environments. These elements enable teachers to customize each student's learning experience, fostering engagement, critical thinking, and problem-solving skills (Ben Itzhak et al., 2023; Byusa et al., 2022; You, Omonib, Laisserc, McGowand, Wakasiakab, Macleane, & Chimwaz, 2022). EBGs have garnered attention as a promising method to teach and learn in innovative ways (Lavendera et al., 2019). Specifically designed to make learning enjoyable and interesting, EBGs align with educational goals while captivating students' interest. EBGs prove effective in increasing students' enthusiasm for learning, sustaining motivation, and facilitating more effective learning by seamlessly integrating elements of fun and education. In contrast to traditional teaching methods, EBGs provide students with opportunities to

apply their knowledge in real-world scenarios (Ben Itzhak et al., 2023; Byusa et al., 2022; You et al., 2022). Frequently, these games incorporate real-life obstacles, situations, and choices, allowing students to actively participate in the learning process. EBGs successfully blend entertainment and learning by embedding educational content and objectives into the gaming experience, thereby motivating students to learn, and fostering a genuine interest in the subject matter.

Model for the Evaluation of Educational Games (MEEGA+): The MEEGA+ pedagogical framework, developed by Petri, Von Wangenheim, and Borgatto (2016; 2017), highlights the significance of board games as potent tools for teaching and learning. An acronym for the "Model of Educational Experiences based on Games and Analysis," MEEGA+ acknowledges video games as platforms providing realistic learning experiences fostering cooperation, critical thinking, and problem-solving. Unlike conventional evaluation systems, MEEGA+ recognizes and harnesses the inherent features of games to enhance the learning process. This paradigm shift suggests that gaming can substantially improve comprehension and retention, turning educational experiences into more engaging and inspiring endeavors. Teachers can harness the attention-grabbing and inspirational characteristics of games by incorporating game-based learning activities, making education more enjoyable and interactive for students. The MEEGA+ evaluation model facilitates the assessment of game usability, ensuring successful and captivating learning experiences (Petri et al., 2016; 2017). According to MEEGA+, educators can employ motivation, user experience, usability, engagement, and pleasure to craft EBGs that are both engaging and enjoyable for students. Evaluating EBG usability allows instructors to enhance design and implementation, addressing game-related obstacles for students. This assessment identifies accessibility flaws or design features that may impede learning or cause frustration. By addressing these issues, educators can make games inclusive and accessible to all students, irrespective of their background or ability.

Usability and Student Engagement in EBGs: In the creation of EBGs, user usability significantly influences student engagement and learning outcomes. The MEEGA+ evaluation model, designed with user usability in mind, contributes to the creation of successful game-based learning experiences. This approach encompasses aesthetics, learnability, operability, and accessibility (Ben Itzhak et al., 2023; Petri et al., 2016; 2017). The visual design, graphics, and presentation of EBGs impact students' motivation, immersion, and understanding of the game material. Focusing on aesthetics enhances the user experience, making it more attractive and interesting. Learnability, another critical aspect of the MEEGA+ evaluation model, assesses how well students grasp game mechanics, rules, and goals. Clear tutorials or introductions are essential to help students quickly comprehend the game's purpose and rules, while intuitive and responsive game controls and navigation contribute to a seamless experience.

A simple interface and smooth gameplay are crucial for providing students with an enjoyable time. The MEEGA+ evaluation model places a premium on accessibility, ensuring that EBGs are accessible to students of all abilities and requirements. Inclusion features, such as alternative modes of interaction or adjustable difficulty levels, make the game more accessible to students with disabilities or special needs (Ben Itzhak et al., 2023; Petri et al., 2016; Petri, 2017). EBGs, being interactive, challenging, and enjoyable, have the potential to enhance student engagement in learning. Their competitive and cooperative nature promotes collaboration, socialization, and communication among students. Research indicates that students who engage in board games are more likely to perform well academically, displaying increased motivation to study, better retention of information, and the ability to apply knowledge in new situations. Additionally, critical thinking, problem-solving, and communication skills are fostered in actively engaged students.

Hypotheses Development: The MEEGA+ evaluation model establishes the significance of enhancing various learning outcomes within the framework of EBGs, encompassing student engagement, information retention, and problem-solving abilities (Ben Itzhak et al., 2023; Petri et al., 2016; Petri et al., 2017). This model delineates the primary determinants impacting efficacy and overall user experience, including visual aesthetics, learnability, usability, and accessibility. While existing research has explored the immediate advantages of EBGs in terms of student engagement, there remains a gap in studying the enduring impacts of sustained involvement. Current research on EBGs and engagement has been limited in scope, often focusing on specific demographics or populations, such as elementary school children. Thus, a comprehensive examination is warranted, exploring the impact of board games on engagement across diverse populations and subject areas.

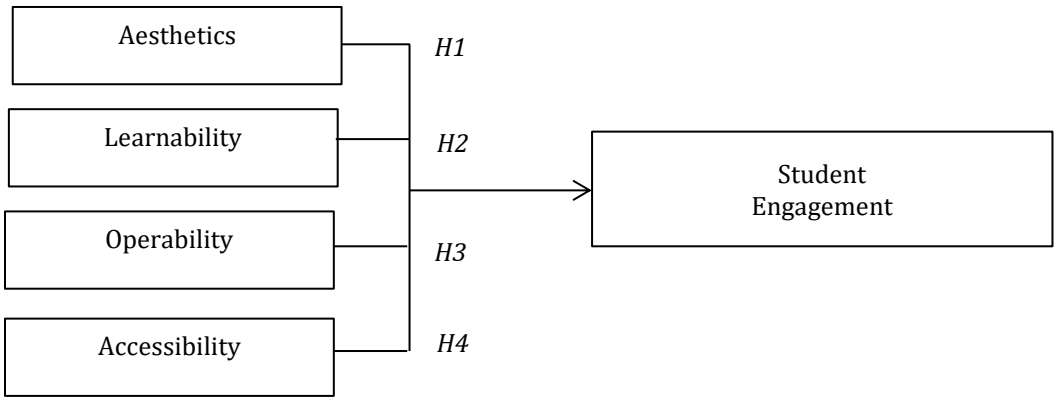
The usability of educational gaming platforms significantly influences students' use of EBGs for learning activities (Barbara, 2019; Begy, 2017; Ben Itzhak et al., 2023; Byusa et al., 2022; You et al., 2022). A user-friendly game enhances the learning experience, making students more interested and driven to study. Conversely, a complex game may lead to frustration and diminish enthusiasm, hindering the learning process. The visual aesthetics of a game play a crucial role in its appeal (Ben Itzhak et al., 2023; Petri et al., 2016; Petri et al., 2017). Engaging visuals enhance motivation and immersion in the learning process, while unappealing aesthetics may evoke negative emotions and reduce engagement.

Learnability, the capacity for students to grasp game mechanics, regulations, and objectives, is crucial for effective engagement (Ben Itzhak et al., 2023; Petri et al., 2016; Petri et al., 2017). A straightforward and comprehensible game promotes confidence and a desire to participate, while complexity may hinder engagement and lead to diminished learning outcomes. Operability, reflecting the ease with which pupils can utilize the game, influences the overall usefulness of players. User-friendly controls and accessibility enhance the gaming experience, fostering more engagement. Conversely, disorganized or complex controls may elicit frustration and impede effective engagement with the learning material.

Accessibility significantly impacts a player's performance (Ben Itzhak et al., 2023; Petri et al., 2016; Petri et al., 2017). To optimize the gaming experience, creating an EBG that accommodates a wide range of student profiles fosters inclusivity and ensures equal opportunities for all students. In contrast, inaccessible games hinder complete involvement and impede students' ability to benefit from the educational experience. To analyze the impact of usability on student engagement, the following hypotheses were developed:

a) H1: Aesthetics positively influence student engagement in playing EBG.
b) H2: Learnability positively influences student engagement in playing EBG.
c) H3: Operability positively influences student engagement in playing EBG.
d) H4: Accessibility positively influences student engagement in playing EBG.

Figure 1: Proposed Research Framework



3. Methodology

This study employed a quantitative approach to systematically gather data, utilizing established methods such as surveys, experiments, and observational studies. This methodology relies on accurate, unbiased, and quantitative data to examine hypotheses and formulate forecasts for a population, making it particularly useful for identifying causal connections or making predictions. The data collection involved questionnaires with multiple items, assessed using a five-point Likert scale, ranging from one ("strongly disagree") to five ("strongly agree"). Participants were current undergraduate students pursuing a bachelor's degree in the Personal Financial Planning course at the Faculty of Business and Management, UiTM Cawangan Melaka, Kampus Bandaraya Melaka. A purposive sampling strategy was employed, and data were collected from various programs, including Finance, Human Resource Management, International Business, Marketing, and Office Management. Out of 300 distributed questionnaires, 200 (66.67 percent) yielded completed responses for further data analysis.

The questionnaire comprised three components. Firstly, participants responded to demographic inquiries. Subsequently, they answered questions related to usability components, including aesthetics, learnability, operability, and accessibility. Lastly, participants provided information on the student engagement variable. The survey questions were adapted from Petri et al. (2016) to assess the quality of educational games in terms of usability and student engagement. Ten items were used to assess usability, covering four main components: aesthetics (two items), learnability (three items), operability (two items), and accessibility (three items). Items measuring student engagement were derived from the study conducted by Maroco, Maroco, Campos, and Fredricks (2016). The study evaluated hypotheses using Partial Least Square Structural Equation Modelling (PLS-SEM) and Smart PLS 3.2.8 software.

Social science researchers employ PLS-SEM to predict theoretical frameworks. SEM, specifically PLS-SEM, is ideal for predicting and analyzing causal links between observable and unobserved variables. Its ability to handle complex models with many variables and connections, non-normal data, and small sample sizes makes it popular (Hair, Hult, Ringle, & Sarstedt, 2017). The weighted averages of observable data were used to depict latent variables in this investigation. A two-step PLS-SEM technique, involving verification of the measurement and structural models, was conducted using a sample of respondents. This validation process ensured the quality of empirical work, assessing internal consistency, indicator reliability, convergent validity, discriminant validity, and multicollinearity. The PLS-SEM structural model's explanatory and predictive capacity was evaluated using the coefficient of determination, effect size, path coefficients, predictive relevance, and relative impact.

4. Results

The investigation commenced with the utilization of IBM SPSS Version 29 for the initial phase of data analysis, followed by the implementation of Smart-PLS software. The dataset comprised 200 surveys, and a meticulous analysis revealed no missing values, indicating that respondents had answered all the questions. The demographic composition of respondents showed that 69.0 percent were female, while 31.0 percent were male. Regarding academic programs, the majority (60.0 percent) were enrolled in the Finance program. Additionally, 18.5 percent were pursuing studies in Marketing, 17.5 percent in Human Resource Management, and a small percentage of 2.0 percent focused on International Business and Office Management. Table 1 presents a detailed analysis of the participants' demographic data.

Table 1: Demographic Data (n=200)

Items	Frequency	Percent
Gender		
Male	62	31.0
Female	138	69.0
Ethnicity		
Malay	100	100
Sabah	0	0
Sarawak	0	0
Academic Programs		
Finance	120	60.0
Human Resource Management	35	17.5
International Business	4	2.0
Marketing	37	18.5
Office Management	4	2.0

Confirmatory factor analysis was employed to assess item reliability, convergent validity, and discriminant validity. Hair et al. (2010) recommended testing loadings, composite reliability (CR), and average variance extracted (AVE) for convergent validity. In Table 2.0, all item loadings exceeded the acceptable 0.5 threshold. All constructs had CRs between 0.740 and 0.930, surpassing the 0.70 cut-off (Nunnally, 1978; Gefen, Straub, & Boudreau, 2000). The AVE values were also 0.5 or higher, supporting Bagozzi and Yi's (1988) recommendation. On average, latent variables explained almost half of the variation in observable measurement items (Fornell & Larcker, 1981).

Table 2: Convergent Validity of the Reflective Items in the Measurement Model

Constructs/Items	Loadings	CR[a]	AVE[b]
Aesthetics (AES)			
AES1	0.889	0.911	0.836
AES2	0.939		
Learnability (LEA)			
LEA1	0.496	0.799	0.583
LEA2	0.833		
LEA3	0.900		
Operability (OPE)			
OPE1	0.909	0.888	0.799
OPE2	0.879		
Accessibility (ACC)			
ACC1	0.77	0.930	0.817
ACC2	0.965		
ACC3	0.963		
Student Engagement (ENG)			
ENG1	0.635	0.740	0.243
ENG2	0.675		
ENG3	0.634		
ENG4	0.424		
ENG5	0.254		
ENG6	0.389		
ENG7	0.132		
ENG8	0.453		
ENG9	0.445		
ENG10	0.596		

Notes: Loadings = ≥0.708; AVE = ≥0.50; CR = ≥0.70 – 0.90 (Hair, Risher, Sarstedt & Ringle, 2019).

Component discriminant validity was assessed using the heterotrait-monotrait correlations (HTMT) criteria. Henseler, Ringle, and Sarstedt (2015) argued that the commonly used Fornell-Larcker criteria have limited sensitivity and may not reveal discriminant validity concerns as well as the HTMT criterion. Inter-construct correlations did not surpass 0.90 in Table 3.0, indicating that none met the HTMT.90 criteria, thus showing no discriminant validity.

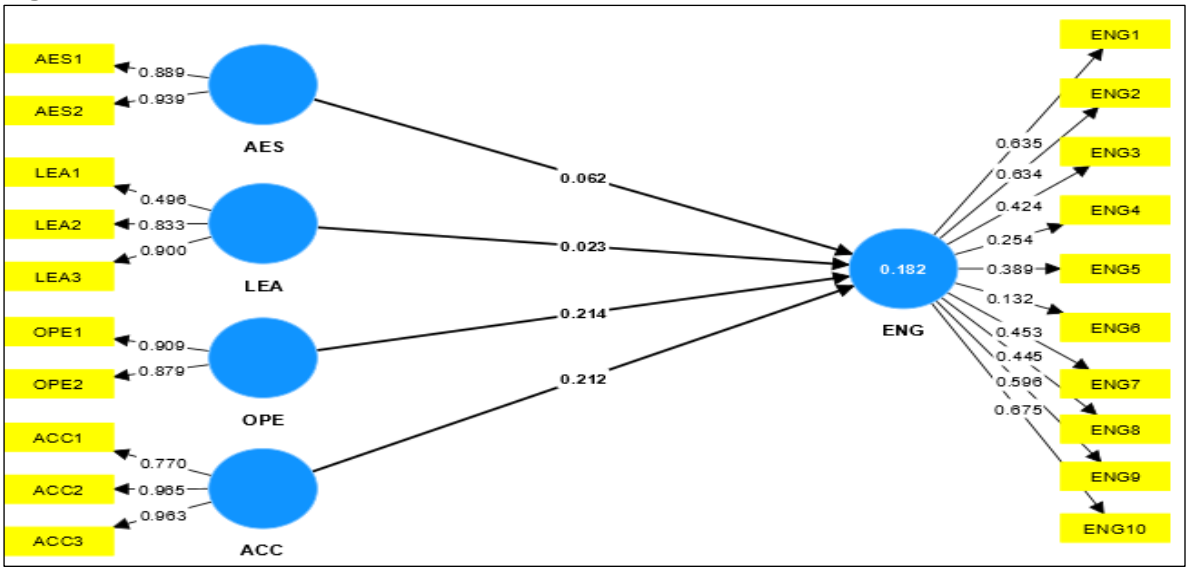
Table 3: Heterotrait-monotrait Correlations (HTMT) Criterion

Construct	ACC	AES	ENG	LEA	OPE
ACC					
AES	0.678				
ENG	0.447	0.371			
LEA	0.573	0.631	0.445		
OPE	0.652	0.54	0.503	0.981	

Notes: HTMT < 0.85 (Hair et al., 2015; Hair et al., 2019).

SPSS (version 29) and Smart PLS (version 4.0) were employed for PLS-SEM to maximize the explained variance of dependent latent variables (Hair, Black, Babin, & Anderson, 2010). As described in the preceding chapter, the measurement model was tested for internal consistency, indicator, convergent, and discriminant validity. Hair, Sarstedt, and Ringle (2012) used PLS-SEM to test the study's assumptions in two stages: the measurement model and the structural model. Bootstrapping was employed to test path coefficients and data. The non-parametric technique employed repeated random sampling to generate route connection data for hypothesis testing and standard error identification (Hair et al., 2010). Figure 2.0 depicts the measuring model and framework.

Figure 2: Measurement Model

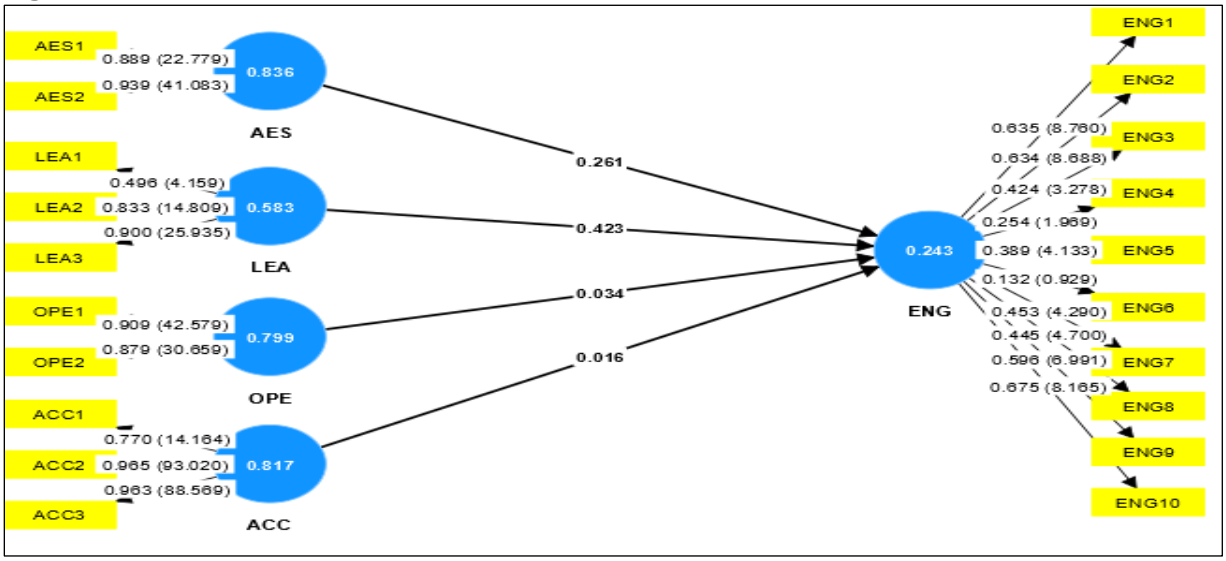


Hypotheses Testing: The first hypothesis (H1) links aesthetics to student engagement in EBG. The study found no significant relationship between aesthetics and student involvement (β=0.062, t=0.64, p-value=0.261). Thus, H1 is not supported. The second hypothesis (H2) indicates a relationship between student engagement in EBG and learnability (β=0.023, t=0.195, p-value=0.423). Therefore, H2 is statistically not supported. The third hypothesis (H3) suggests a link between operability and student engagement in EBG (β=0.214, t=1.84, p-value=0.034). Thus, H3 is significantly supported. The fourth hypothesis (H4) indicates a significant relationship between accessibility and student engagement in EBG (β=0.212, t=2.154, p-value=0.016). H4 is significantly supported. Given that both outcome variables were statistically significant, the model summary findings were statistically significant. It is possible to explain the 24.3 percent variation in student engagement, which has an R-square value of 0.243. For the model, a p-value of less than 0.05 means at least one of the hypotheses is supported (Hair et al., 2017; Henseler et al., 2015).

Table 4: Path Coefficient and Hypotheses Testing

Hypotheses	Relationships	t-Value	p-Value	Decisions
H1	Aesthetics (AES) → Student Engagement (ENG)	0.640	0.261	Not Supported
H2	Learnability (LEA) → Student Engagement (ENG)	0.195	0.423	Not Supported
H3	Operability (OPE) → Student Engagement (ENG)	1.840	0.034	Supported
H4	Accessibility (ACC) → Student Engagement (ENG)	2.154	0.016	Supported

Figure 3: Structural Model



5. Conclusion and Recommendations

The results of this study provide valuable insights into the relationship between usability components and student engagement in EBG. The evidence indicates that operability and accessibility significantly impact student engagement, but aesthetics and learnability have less influence. Operability, which refers to the degree of ease with which students can navigate and interact with the game, has been recognized as a critical factor that affects student engagement in gaming (Ben Itzhak et al., 2023; Petri et al., 2016; Petri et al., 2017). EBGs that have intuitive controls and seamless navigation augment students' capacity to interact with the game and maintain their interest throughout the duration of play. Effortlessly and easily maneuvering through the game improves the user's experience, hence increasing student engagement and interest in the learning activity. Moreover, the importance of accessibility in EBG was acknowledged as a crucial aspect influencing student engagement. When a game is accessible to all students, regardless of their talents or limits, it promotes inclusion and guarantees fair engagement (Barbara, 2019; Ben Itzhak et al., 2023; Byusa et al., 2022; You et al., 2022). Students with easy and frequent access to the game are more likely to feel empowered and motivated to gain information. On the other hand, limited access to the game might lead people to feel excluded and hinder their active involvement, thus affecting their educational accomplishments.

This study demonstrated that aesthetics, pertaining to the visual allure and beauty of the game, did not have a noteworthy impact on student engagement. This conclusion is corroborated by prior research carried out by Ben Itzhak et al. (2023), Petri et al. (2016), and Petri et al. (2017). While aesthetics is often seen as an important aspect of user experience, research suggests that in the case of EBGs, factors such as operability and accessibility have a more pronounced effect on student involvement. These findings have practical implications for the design and development of EBGs. Enhancing the whole learning process may be achieved by giving priority to operability and accessibility in game design, hence facilitating more student engagement. Integrating simple controls, intuitive interfaces, and inclusive features might potentially boost student motivation, engagement, and knowledge retention. However, it is important to highlight that this study specifically focused on the impact of usability factors on student engagement in EBG. Further work is necessary to explore alternative attributes and contextual factors that may interact with usability and influence the outcomes of interaction. Moreover, conducting research on the long-term effects of consistent engagement and analyzing its impact on different demographics and academic disciplines would improve our thorough understanding of the relationship between usability, student engagement, and educational outcomes in board games. When assessing the findings, it is important to consider the existing limitations of the present study.

The initial sample for this study consisted only of undergraduate students who were presently enrolled in a certain course at a particular institution. The findings may possess restricted applicability to diverse student populations or educational contexts. The findings may not apply to different educational levels or diverse student populations with distinct characteristics and histories. Future inquiries should consider including a more diverse group of individuals to enhance the applicability of the findings. Moreover, the measuring tool used in this study relied on self-report measurements. Despite efforts to ensure the precision and reliability of the altered survey questions, self-report evaluations are vulnerable to potential biases such as social desirability bias or memory recall bias. Participants may display response bias by offering responses that they see as more favorable or struggle to accurately recall their experiences of involvement. Utilizing additional study approaches, such as observations or interviews, might enhance our understanding of student engagement in EBGs. Moreover, the use of a cross-sectional strategy in this study presents constraints on the ability to establish causal relationships between usability characteristics and student engagement. A static representation of data is insufficient to capture the dynamic nature of interaction and the multitude of changes that might happen over a period.

To get a more thorough understanding of the relationship between usability characteristics and student engagement, it would be beneficial to conduct further longitudinal studies that track engagement levels over an extended period. Furthermore, this study primarily focused on evaluating the usability elements, such as aesthetics, operability, accessibility, and learnability. While these criteria have been shown to significantly influence student engagement, it is important to acknowledge that other factors, such as game content, instructional design, and individual student characteristics, may also play a role. To get a more comprehensive understanding of the factors that impact student engagement in EBGs, next research should investigate a

broader range of variables. Ultimately, the study was conducted inside a controlled setting, perhaps limiting the applicability of the findings to a broader context. The artificial nature of the study environment and the specific conditions under which the games were played could not accurately capture the complexities and nuances of real-world educational settings. When assessing the outcomes, it is essential to consider the practical constraints and contextual factors that might affect student engagement in actual educational environments.

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