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Shall We Play A Game? Examining the Influence of a Play-Based Learning Approach Using LEGO Bricks on Higher Education Students' Perception of Academic Stress and Continuation Intention

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ABSTRACT: In recent years, the higher education landscape has been overshadowed with concerns on student anxiety and increasing dropout rates. Students' desire to excel in their studies and the challenging nature of their courses exacerbates the dire state of academic stress and continuing intentions. Building on the profound positive impact of play-based learning at gauging students' interest and promote favourable learning experiences, this study seeks to examine the impact of play-based learning using Lego bricks and Brickit mobile application on self-perception of academic stress and continuation intention among students. Findings of this study support the integration of playful elements into teaching practices to reduce academic pressure and foster sustained learning.

KEYWORDS: play-based learning; academic stress; continuation intention; LEGO bricks

1. Introduction

In commerce courses, students were expected to tackle a wide range of subjects such as economics, finance, accounting, marketing, and management. Due to the interdisciplinary nature of these courses, the workload could be demanding, and students might experience pressure to excel in each of these areas in order to succeed in the program. In the rapidly evolving world, scholars have also argued that contemporary teaching approaches should be predominantly based on innovative and interactive creativity so that students could utilise the knowledge taught more flexibly and be better prepared to deal with unexpected situations [1]. As such, curriculum alignment and appropriate andragogical considerations were crucial for facilitating students' learning experiences. Among the many approaches, play-based learning, which is regarded as a practice for socialising, relaxing, competing, and having fun, might play an important role [2].

In particular, the play-based learning approach was a teaching method that involved playful, learner-directed elements along with a certain degree of facilitator guidance and scaffolded learning objectives [3]. Although it was challenging to precisely define "play," there was general agreement that its main functions were to help players experience emotional enjoyment, stimulate active and minds-on thinking, and facilitate engagement [4, 5].

Integrating play-based learning into the classroom therefore helped to develop a supportive learning environment that benefited students in several domains, including promoting positive cognitive and physical development, encouraging social and emotional well-being, and reinforcing academic skills [6, 7]. In addition, this teaching approach introduced students to problem-solving skills through strong connections to real-world scenarios and encouraged experiential learning [8, 9].

In view of the promising potential of play-based learning, this pedagogy has increasingly become a focus in the literature. To contribute to the existing body of knowledge, this study investigated the effectiveness of a play-based learning approach using LEGO bricks on university students' self-perception of academic stress and their intention to continue their studies. To better understand the relationships among the constructs, this study also examined the role of gender in students' evaluation of the playful learning approach.

2. Literature Review

In the context of higher education, play was considered effective as it created an environment of "fun, spontaneity, relationship and connection, silliness or goofiness, creativity, and imagination" [10]. When embedding play into learning, it was also important to ensure that the planned activities were actively engaging, meaningful, socially interactive, iterative, and purposeful [5]. From a theoretical perspective, self-determination theory could be applied to explain the use of play-based learning and its subsequent impacts on students' learning experiences. The theory postulated that "an understanding of human motivation requires consideration of innate psychological needs for competence, autonomy, and relatedness". In other words, satisfying these psychological needs through play could improve students' intrinsic motivation, thereby leading to high-quality learning. Along the same line, play-based learning had also been consistently found to have a positive impact on learning outcomes. For instance, play-based learning that involved the use of guided imagery assisted students with self-regulation, either by energising or calming them in preparation for learning [11]. Importantly, play-based learning emphasised exploration and experimentation in 'safe' environments, where failure was accepted and recognised as a valuable part of the learning process [12]. Consequently, this reduced the pressure to perform and made learning feel more natural and enjoyable rather than burdensome. Following this rationale, the following hypothesis was proposed:

H1: There was a positive relationship between students' evaluation of the play-based learning approach and their self-perception of academic stress.

Furthermore, understanding students' continuation intention toward play-based learning was equally important, as it helped educators design curricula that maintained interest and motivation over time, ultimately leading to better educational outcomes. Roeser and Peck (2009) [13] suggested that positive feelings toward a learning approach might influence learners' interest, and this heightened psychological state often accompanied sustained engagement with the learning content over a given period. From a marketing perspective, an individual's satisfaction with an experience such as play-based learning influenced his or her continuation intention [14]. Therefore, the following hypothesis was proposed:

H2: There was a positive relationship between students' evaluation of the play-based learning

approach and their continuation intention.

Figure 1 illustrates the conceptual model of this study.

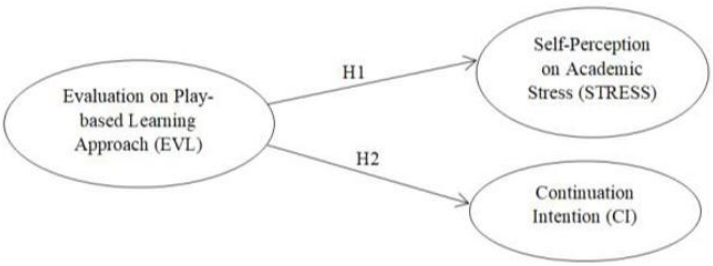

Figure 1. Conceptual model.

3. Methodology

3.1. Sampling and data collection.

The target study population consisted of 105 students enrolled in selected classes of a commerce undergraduate programme. Considering that the mid-semester period is often the best time for students and academics to engage in dialogue about learning progress and to make any necessary mid-course adjustments, a play-based learning activity using LEGO bricks was conducted in Week 6 of Semester 1, 2024. A group-play activity was implemented in which students, working in groups of four to five, applied the knowledge learned in class to a practical scenario by constructing a LEGO model. To create a dynamic and engaging classroom experience that blended creativity with technology, students were also encouraged to use the Brickit mobile application, which can scan a pile of LEGO bricks and suggest possible builds. At the end of the activity, student groups were requested to present their LEGO models and explain the theories or principles applied, while justifying their design choices. Subsequently, an online survey was distributed to the students after the class to measure the impact of their exposure to the play-based learning approach. A total of 100 complete responses were collected.

3.2. Measures.

The cross-sectional questionnaire was designed by adapting items and scales from previous studies. Specifically, 11 items measuring students' evaluation of the play-based learning approach were adapted from Jensen and Rørbæk (2022) [15] and were measured using a seven-point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree). In addition, six items measuring self-perception of academic stress were adapted from Bedewy and Gabriel (2015) [16], while three items measuring continuation intention were adapted from Bhattacherjee (2001) [17]. The items for these two constructs were measured using a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). Additionally, demographic questions were included in the questionnaire.

3.3. Analytical Method.

Both descriptive and statistical analyses were conducted using the IBM SPSS version 24 statistical software package. Prior to examining the proposed conceptual model and hypotheses, five assumptions of univariate linear regression were assessed, namely linearity,

independence of residuals, homoscedasticity, presence of outliers, and absence of collinearity [18]. Subsequently, regression analysis was performed to test the proposed hypotheses. The data were analysed using the mean scores of the assessed constructs, which were calculated for each set of Likert-scale items [19].

3. Results and Discussion

3.1. Respondents profile.

The demographic profile of the respondents is presented in Table 1. The sample consisted of 54% male and 46% female participants. In terms of academic standing, the majority of respondents were in Year 1, with 27% enrolled in Year 1, Semester 1, and 39% in Year 1, Semester 2. A smaller proportion of students were in Year 2, with 6% in Semester 1 and 8% in Semester 2. Meanwhile, 16% of the respondents were in Year 3, Semester 1, and 4% were in Year 3, Semester 2. With regard to students' origin, 44% of the respondents were local students, whereas 56% were non-local students. Overall, the sample reflected a relatively diverse composition in terms of academic level and student origin.

Table 1. Demographic profile of respondents (N = 100).

Demographic Variable	Category	Frequency (n)	Percentage (%)
Gender	Male	54	54.0
	Female	46	46.0
Year of Study	Year 1, Semester 1	27	27.0
	Year 1, Semester 2	39	39.0
	Year 2, Semester 1	6	6.0
	Year 2, Semester 2	8	8.0
	Year 3, Semester 1	16	16.0
	Year 3, Semester 2	4	4.0
Origin	Local	44	44.0
	Non-local	56	56.0

3.2. Hypotheses testing.

The results of the simple linear regression analysis are presented in Table 2. The findings indicated that students' evaluation of the play-based learning approach significantly predicted their perceived academic stress ($\beta = 0.355$, $t(95) = 3.683$, $p < 0.001$). This result suggested that students who evaluated the play-based learning approach more positively tended to report higher levels of perceived academic stress reduction. Students' evaluation of the play-based learning approach was also found to predict their continuation intention ($\beta = 0.174$, $t(95) = 1.713$, $p = 0.006$). This finding indicated that a more favourable evaluation of the play-based learning approach was associated with a stronger intention among students to continue engaging with such learning methods. As shown in Table 2, students' evaluation of the play-based learning approach explained 12.6% of the variance in perceived academic stress ($R^2 = 0.126$, $F(1,94) = 13.564$, $p < 0.001$). Meanwhile, the same predictor explained 3% of the variance in continuation intention ($R^2 = 0.030$, $F(1,94) = 2.935$, $p < 0.01$). These findings suggested that the play-based learning approach had a measurable influence on both perceived academic stress and students' intention to continue using this learning approach. Nevertheless, this study acknowledged potential endogeneity concerns associated with the reliance on survey

data, particularly when perception-based indicators were employed. Future studies could consider adopting quasi-experimental designs to better assess differences in self-perceived academic stress and continuation intention between students who were exposed to play-based learning and those who were not. Such approaches could help corroborate or contrast the findings of this study.

Table 2. Results of simple linear regression analysis.

Hypothesis	Path	Beta (β)	t-value	p-value	R^2
H1	EVL → STRESS	0.355	3.683	< 0.001	0.126
H2	EVL → CI	0.174	1.713	0.006	0.030

Note: EVL = Evaluation of Play-Based Learning; STRESS = Perceived Academic Stress; CI = Continuation Intention.

3.3. Discussion of results.

The results indicated that a positive assessment of the play-based learning experience was associated with lower levels of academic stress. This finding was consistent with the notion that incorporating "play" into education could reduce stress related to academic activities by creating a more enjoyable and engaging learning environment [11, 12]. Moreover, the findings revealed that students' positive evaluations of play-based learning enhanced their intention to continue participating in such learning approaches. This result aligned with prior research suggesting that positive learning experiences promote sustained engagement and interest among students [13, 20]. Nevertheless, the relationship between students' evaluation of play-based learning and continuation intention was relatively weaker. This may indicate that students did not perceive activities such as playing with LEGO bricks as directly relevant to their long-term career goals. In particular, commerce students might view LEGO-based activities as enjoyable but peripheral, rather than closely related to their professional aspirations in fields such as finance and accounting.

This study contributed to the existing literature on innovative pedagogical strategies in higher education by empirically examining the effects of play-based learning using LEGO bricks and the Brickit mobile application. The findings provided empirical support for integrating playful elements into teaching practices to reduce academic stress and promote continued engagement in learning activities. Practically, these insights may assist educators in designing more engaging and supportive learning environments, particularly in higher education contexts where students often experience high levels of academic pressure, anxiety, and risk of disengagement.

Several limitations of this study should be acknowledged. First, the data collected provided only a snapshot of the impact of play-based learning on students' self-perception of academic stress and continuation intention. A longitudinal approach could offer deeper insights into how these outcomes evolve over time. Second, the sample was limited to commerce students enrolled in selected classes of a commerce undergraduate programme. This may have introduced potential sampling bias and restricted the generalisability of the findings. Future studies could replicate this research in different academic disciplines and institutional contexts to validate the results. Finally, future research may explore play-based learning designs that incorporate stronger cognitive and metacognitive components. Such designs could further support the development of students' emotional resilience, motor skills, social-emotional competencies, linguistic abilities, executive functioning, mathematical reasoning, and self-

regulation skills [7, 11], which are essential for thriving in increasingly dynamic and collaborative learning environments.

4. Conclusions

This study provides empirical evidence on the effects of a play-based learning (PBL) intervention in higher education commerce courses. A well-received PBL activity using LEGO bricks significantly strengthened students' intention to continue engaging with such methods, highlighting its potential to foster sustained learning interest. The relationship with academic stress was complex, suggesting that a single intervention may not directly reduce broader perceptions of academic pressure. Limitations include the cross-sectional, post-test-only design and reliance on self-reported data, which restrict causal inference and may introduce bias. Future research should employ longitudinal or quasi-experimental designs, examine repeated PBL exposure, and consider individual differences such as personality or prior experience. Despite these limitations, the study demonstrates the practical value of integrating playful, experiential elements into tertiary teaching and offers a replicable model for using LEGO Serious Play to enhance engagement, well-being, and persistence in demanding academic programs.

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Author Contribution

All authors contributed equally to the conceptualization, methodology, formal analysis, investigation, data curation, writing of the original draft, review and editing of the manuscript, supervision, project administration, and funding acquisition. All authors have read and approved the final version of the manuscript.

Competing Interest

The authors declare no competing interests.

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