Borneo Engineering & Advanced Multidisciplinary International Journal (BEAM)
Volume 3, Issue 1, May 2024, Pages 18-23

Gamification: Enhancing Financial Education and Motivation in Non-Accounting Students

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Full Paper

Article history
Received
22 January 2024
Received in revised form
15 April 2024
Accepted
15 April 2024
Published online
15 May 2024

Abstract

This study examines the acceptance and impact of gamification in delivering financial concepts to non-accounting students. This innovative approach involves incorporating game elements to enhance students' understanding and interest. Game elements such as challenges, rewards, and competitions are integrated into financial learning, thereby increasing m otivation and student engagement. Through empirical research, data is analyzed to assess the acceptance and effects of gamification. The study involves pre- and post-assessment tests using the T-Test method with 66 non-accounting students, specifically Diploma in Business Studies students taking the Business Accounting course. They were divided into a control group (traditional method) and a gamification learning group. The results demonstrate the effectiveness of this approach, with students in the gamification group achieving higher performance. Positive feedback from students indicates the effectiveness of gamification in capturing interest and motivation for complex topics. This study provides valuable insights into the effectiveness of gamification in delivering financial concepts to non-accounting students, contributing to higher learning innovation. Recommendations for further research include conducting more in-depth investigations, particularly in non-accounting courses at higher education institutions.

Keywords: - Gamification, financial education, motivation in learning

1. Introduction

In today's ever-evolving era of education, the use of technology and innovation in the learning process is becoming increasingly important. One interesting innovation that has expanded in recent years is the use of gamification to help non-accounting students understand finance. Gamification combines gaming and technology elements to enhance the effectiveness and enjoyment of learning. Gamification can be used as an alternative or supportive learning method in accounting education (Koç, 2023). In particular, the application of gamification using scan code technology on game boards (Wu et al., 2018), known as Scanning Code (SC), has gained popularity in the field of business accounting education.

The potential of integrating emerging technologies like Quick Response (QR) codes and Augmented Reality (AR) into traditional textbooks to enhance education in the 4.0 era (Toma & Turcu, 2022). These technologies have the potential to address current educational challenges and improve the quality of education. According to Aini et al. (2020), gamification can help educators assess the competence of their students while creating a more interactive and innovative learning environment. By incorporating gaming elements and scan code technology, teaching and learning can be made more engaging and stimulating for students.

In the context of financial learning, the importance of technological integration is widely recognized. In this regard, the exploration of gamification with scanning codes on the Scanning Code (SC) board game has proven

to be highly effective. This application not only improves the achievement of course information but also facilitates smoother communication between teachers and students. Additionally, various learning activities such as quizzes, tests, and assignments can be organized more effectively (Palau et al., 2003).

The focus of this study is to investigate the attitudes and achievement abilities of students in the use of gamification learning with scan codes on Scan Code (SC) board games, as well as their relationship with academic performance. The research subjects consist of students enrolled in the Business Accounting course for the Business Studies Diploma program at Polytechnic Mukah, Sarawak. By exploring the potential of gamification with scan codes on Scan Code (SC) board games, this study aims to highlight the importance of innovative and engaging teaching and learning methods in the field of accounting education.

The specific objectives of this study are as follows:

1. To study students' attitudes towards the use of gamification in learning financial concepts.
2. To analyze the effect of gamification on the understanding of financial concepts among non-accounting students.
3. To assess the relationship between students' acceptance of gamification and their academic performance in Business Accounting courses.

The project intends to explore the following research questions to fulfill these goals:

1. How do students feel about the application of gamification to the idea of learning finance?

1 What is the effect of gamification on the understanding of financial concepts among non-accounting students?

2 How is students' acceptance of gamification related to academic performance in the Business Accounting course?

The use of technology in the accounting field has undergone significant changes, particularly in accessing and analyzing data. Kumar (2020) suggests the use of technical sheets in accounting applications as a new method of analyzing accounting data. However, learning accounting, especially in the Business Accounting course, is often considered challenging. In the diploma program of business studies, the course is elective, with 38% of female students and 62% of male students opting to take business accounting courses. The performance of students on this course tends to be low, with the majority achieving a D level or below in the final exam (see Fig. 1).

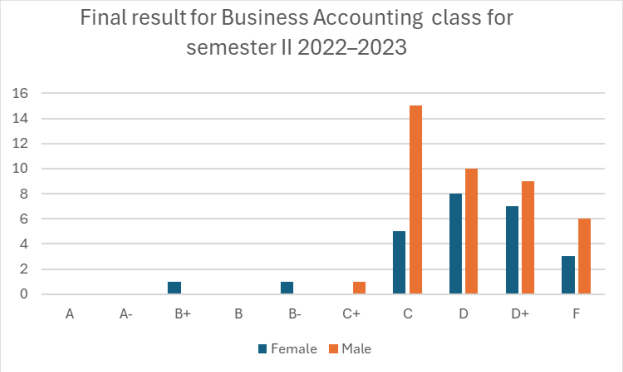

Fig. 1. Final examination results for male and female students taking Business Accounting.

The goal of gamification, which has been implemented as a learning approach in the Business Accounting course, is to solve this difficulty by making the learning process more dynamic and interesting. Technology, gaming components, and constructivism techniques are all combined in gamification learning using scan codes on the Scanning Code (SC) game board.

According to the theoretical basis of constructivism, cognitive structures are developed through new experiences and information. In a recent study, two groups were compared: the traditional learning group (DPM1A) and the gamification learning group (DPM1B). Scan code technology was used on SC game boards to facilitate the study. The outcomes demonstrated that gamification of instruction improved students' academic achievement. Additionally, differences based on gender were observed.

It was found that students who had a positive attitude towards gamification learning showed better academic performance. The use of technology, game elements, and constructivism through gamification learning by scanning the code on the SC game board can lead to more innovative accounting education. Additionally, the study suggests that there is a need for further research on the impact of gamification on non-accounting students on a broader level. The findings of this research can contribute to increasing the acceptance of gamification and understanding its impact on presenting financial concepts to non-accounting students.

Additionally, it is important to explore the long-term impact of scan code technology on SC gaming boards on students' understanding of financial concepts and its implications for improving the business finance curriculum. As shown in Fig. 2, this can also increase the number of digital learnings accessible through mobile facilities.

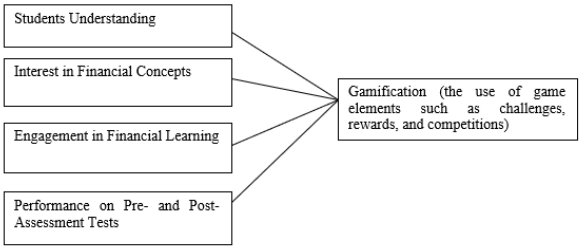

Fig. 2. Gamification as collaborative learning resources in technological education, (Páez-Quinde et al., 2023)

Learning through games is an effective way to enhance students' motivation and academic performance (Rohaila & Fariza, 2017). Students tend to show higher motivation to participate in unstructured learning, such as gamification (Chung, Shen & Qiu, 2019). This aligns with the theory that students tend to show greater interest in unstructured learning. Gamification, with its elements of challenge and reward, keeps players eager to try again and again (Sholahudin & Yenti, 2022). Therefore, the integration of gamification with scan code technology on the SC game board has the potential to increase students' motivation and improve their understanding of financial concepts.

Conclusively, the purpose of this research is to investigate the influence and acceptance of gamification in teaching non-accounting students' financial concepts. The objectives of the study include evaluating students' attitudes towards gamification, analyzing the effect of gamification on the understanding of financial concepts, and assessing the relationship between students' acceptance of gamification and their academic performance. By investigating these aspects, this study aims to contribute to the field of accounting education and highlight the potential benefits of gamification with scan codes on Scan Code (SC) board games. Further research is needed to explore the effects of gamification on non-accounting students at a broader level and to examine the long-term impact of scan code technology on SC gaming boards on students' understanding of financial concepts.

2. Methodology

The research was conducted on all students who had enrolled in the Business Accounting course at the Department of Commerce, Polytechnic Mukah, Sarawak in the first semester. A sample of 66 students was selected from the population based on their scores between 50% and 70%. They were randomly assigned to two groups - the Traditional Learning Group (DPM1A=32) and the Gamification Learning Group (DPM1B =34).

The study utilized questionnaires divided into sections to collect demographic data such as age, gender, and educational background of the respondents. The second section included questions related to student attitudes toward gamification learning. The third section explored the perceived effect of gamification use on students' learning outcomes. The questionnaire utilized in this research study was adapted from a previous investigation by Supathanarangsri et al. (2020).

The survey used a five-point Likert scale to gauge participants' responses, ranging from "strongly disagree" to "strongly agree" (Sekaran & Bougie, 2016). Data was collected for this study by distributing questionnaires to two groups: the traditional learning group and the gamification learning group. Respondents were given instructions to fill out the questionnaires based on their views and experiences of gamification learning. Scan code technology was introduced on the SC game board to enhance the learning experience, which added an innovative dimension to the study.

The collected data was analyzed using descriptive statistical methods to formulate statistics such as mean, maximum, average, and standard deviation. The T-test was employed to assess significant differences between the Traditional Learning Group (DPM1A) and the Gamification Learning Group (DPM1B). The study utilized the Pearson correlation test to evaluate the relationship and strength of the factors analyzed. Ethical considerations were carefully considered throughout the study. The privacy rights of the respondents were given top priority, and their anonymity was ensured. The participants were informed of the study's purpose and were given the option to withdraw at any time without any adverse consequences.

The study's results will be presented anonymously and used solely for research purposes. Ethical guidelines were followed to ensure participant well-being and rights. The study evaluated whether gamification improves financial concept learning in non-accounting students. The research objectives were addressed by employing a single control group with two sub-groups: the traditional learning group and the gamification learning group. The primary tool used was a questionnaire, and the data collected were analyzed using descriptive statistics, the T-test, and the Pearson correlation test. Ethical considerations were considered to ensure the participants' privacy and rights were safeguarded.

3. Result and Discussion

Based on the objectives of this study, the results showed a deep understanding of the acceptance and impact of the use of gamification in learning financial concepts among non-accounting students. Analysis of the questionnaire helps to achieve the first objective, which is to study the attitude of students toward the use of gamification. Each question has a standard deviation value and a mean value, with an average mean of 4.68. Students showed a high acceptance rate of 62% of female students agreeing compared to male students on learning through the gamification method, which has the potential to increase student motivation and engagement, as shown in Table 1.

Table 1. Students' views on the use of gamification to learn financial concepts (Devendren & Nasri, 2022)

Item	Mean	Std Deviation
Could you please clarify if you agree that using gamification can increase the engagement levels of financial education?	4.68	0.705
Do you think gamification can boost your interest in financial concepts?	4.74	0.686
Do you agree that playing games helps students learn financial concepts?	4.80	0.684
How much do you think gamification can help you understand money better?	4.83	0.571
Do you think gamification can help you learn finance?	4.76	0.703
Is gamification making learning about finance more enjoyable for you?	4.82	0.630
Do you agree that you have a good experience learning financial concepts by using technology like SC game board code scanning?	4.76	0.658
Does gamification help you understand financial concepts better and feel more confident?	4.83	0.622
How much does gamification encourage you to learn about money matters?	4.68	0.705
Do you agree to increase gamification in financial education to increase effectiveness?	4.67	0.730
Total average mean	4.68	

The study evaluates the positive impact of gamification on financial literacy, using standard deviation and mean values for each question. The mean value is 4.73. Female students were more agreeable than male students who engaged in gamification learning using scan codes on the Scanning Code (SC) game board showing an improvement in understanding financial concepts compared to traditional learning groups such as Table 2.

Table 2. Effect of gamification on financial concept understanding among non-accounting students (Rosli, Khairudin & Saat, 2019)

	Mean	Std Deviation
How much do you think using game-like aspects to study financial concepts may improve your comprehension of the subject?	4.76	0.703
Do game elements aid financial learning and retention?	4.74	0.686
Did using technology, such as scan codes on SC game boards, improve your understanding of financial concepts?	4.80	0.613
How much does gamification assist in connecting financial concepts with real-world situations?	4.73	0.646
Is financial learning more engaging with gamification to help maintain focus?	4.74	0.640
Do you agree that incorporating gamification in learning can enhance the understanding of financial concepts?	4.73	0.669
How much does gamification boost students' enthusiasm and interest in learning financial concepts?	4.62	0.718
Using gamification is an effective way to enhance financial literacy	4.76	0.583
The study explores the correlation between students' acceptance of gamification and their performance in Business Accounting courses.	4.71	0.651
Total average mean	4.73	

The third objective is to study how students' academic performance in the Business Accounting course relates to their acceptance of gamification. Each question has a standard deviation value and a mean value, for which the mean value is 4.66. The results showed a very highly positive relationship between gamification acceptance and academic achievement of students, showing that the higher the acceptance of gamification, the better the academic performance as in Table 3.

Table 3. The relationship between students' acceptance of gamification and academic performance in Business Accounting courses (de Oliveira Durso, Reginato & Cornacchione, 2019)

	Mean	Std Deviation
How much do you believe that using gamification to understand financial topics can boost your interest and motivation for Business Accounting courses?	4.56	0.636
Do you also think that learning about finance using games and scan code technology has improved your academic achievement in business accounting courses?	4.71	0.602
Do you agree that your experience is very positive during gamification learning about academic achievement in the Business Accounting course?	4.67	0.664
Do you feel that acceptance of gamification can give you additional impetus to achieve better academic performance?	4.77	0.652
How much do you believe that doing well academically in the Business Accounting course is directly tied to your comprehension of financial concepts through gamification learning?	4.62	0.651
Do you agree that there is a relationship between the enjoyment of learning through gamification and the academic performance achieved in the Business Accounting course?	4.65	0.712
Total average mean	4.66	

The study's T-test results show a significant difference in the acceptance and efficacy of gamification in teaching non-accounting students' financial concepts between the

Traditional Learning Group (DPM1A) and the Gamification Learning Group (DPM1B). The following are the study's objectives:

a) This study aims to explore students' perspectives on the use of gamification in education

A t-test was used to compare the interests of two groups: A (n=32, M=52.59, SD=7.255) and B (n=34, M=72.91, SD=7.779). When doing a statistical hypothesis test, the alternative hypothesis (H1) contends that a substantial difference exists between the two populations, while the null hypothesis (H0) implies that there isn't.

The study examined how well gamification and conventional approaches to teaching financial concepts compare. A T-test reveals that the Gamification Learning Group (DPM1B) exhibited a significantly greater rate of adoption of the gamification approach in comparison to the Traditional Learning Group (DPM1A). At a confidence level < 0.05, this suggests a true difference between the two groups. The mean score for DPM1A was 52.59, while for DPM1B, it was 72.91, which suggests a substantial difference supported by the T-test results ($p < 0.05$). Moreover, over 60% of female students agreed that gamification methods could improve their motivation and engagement in learning. This indicates that gamification has the potential to be an effective and engaging learning approach for students.

b) The objective of this study was two-fold: to analyze the impact of gamification on the understanding of financial concepts

The purpose of the study was to find out how well gamification may enhance students' comprehension of financial concepts. Group A ($n = 32$, mean = 1.52, SD = 0.504) and Group B ($n = 34$, mean = 63.06, SD = 2) were the two groups that were examined. The study found that DPM1B outperformed DPM1A in terms of academic achievement, with significant differences between the two groups ($p < 0.05$). Moreover, female students responded better to gamification learning, showing greater improvement in understanding financial concepts than in traditional learning groups. These findings suggest that gamification can be an effective strategy to enhance the motivation and learning outcomes of non-accounting students in Business Accounting courses. The study provides valuable insights for education providers to design and implement dynamic and engaging learning strategies to cater to the needs of today's digital-savvy learners.

c) The study aimed to investigate the relationship between gamification acceptance and academic performance in Business Accounting courses

The acceptance of gamification, as indicated by a Pearson correlation coefficient of 0.808 ($p = 0.00$, two-tailed) in a sample of n=66 students, underscores a strong positive relationship between gamification acceptance and academic performance. These findings align with the study's objective, suggesting that the positive correlation is potentially driven by factors such as increased engagement, motivation, interactive learning experiences, instant feedback mechanisms, intrinsic motivation, practical application of knowledge, consideration of individual learning styles, and the integration of technological literacy.

4. Conclusion

This study concludes that using gamification to teach finance to non-accounting students has a significant positive impact. Students responded positively to the use of game elements and scan code technology in learning, which was reflected in the significant T-test values. The study found that gamification improves understanding of financial concepts and that students who engaged in gamification learning using scan codes on the Scanning Code (SC) game board achieved better performance compared to traditional learning groups. The study also found a strong relationship between gamification acceptance and academic achievement.

The implications of this study suggest that education institutions should consider implementing gamification learning strategies into their Business Accounting curriculum to improve students' motivation, acceptance, and academic achievement. Furthermore, the study proposes measures to increase the effectiveness of gamification activities. This study contributes to the understanding of the impact of gamification in learning financial concepts and provides a platform for further research and the improvement of innovative learning practices in higher education. This study concludes that using gamification to teach finance to non-accounting students has a significant positive impact. Students responded positively to the use of game elements and scan code technology in learning, which was reflected in the significant T-test values. The study found that gamification improves understanding of financial concepts and that students who engaged in gamification learning using scan codes on the Scanning Code (SC) game board achieved better performance compared to traditional learning groups. The study also found a strong relationship between gamification acceptance and academic achievement.

The implications of this study suggest that education institutions should consider implementing gamification learning strategies into their *Business Accounting* curriculum to improve students' motivation, acceptance, and academic achievement. Furthermore, the study proposes measures to increase the effectiveness of gamification activities. This study contributes to the understanding of the impact of gamification in learning financial concepts and provides a platform for further research and the improvement of innovative learning practices in higher education.

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