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Enhancing Flipped Classroom with BeeMSee Board Game

Norhilmi Muhammad[1], Nur Izzati Ab Ghani[1], Farah Roslan[1], Nizaita Omar[2], Fazida Karim[3]

[1]Faculty of General Studies & Advance Education, Universiti Sultan Zainal Abidin, Gong Badak Campus, 21300 Kuala Nerus, Terengganu, Malaysia, [2]Faculty of Islamic Contemporary Studies, Universiti Sultan Zainal Abidin, Gong Badak Campus, 21300 Kuala Nerus, Terengganu Malaysia, [3]Faculty of Business and Management, Universiti Sultan Zainal Abidin, Gong Badak Campus, 21300 Kuala Nerus, Terengganu, Malaysia

Email: norhilmimd@unisza.edu.my

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Abstract

Business Model Canvas (BMC) is an essential topic in Fundamentals of Entrepreneurship. Most students face difficulties in learning BMC because of their lack of conceptual understanding of nine boxes in BMC: customer segments, value propositions, channels, customer relationships, revenue streams, key resources, key activities, key partnerships, and cost structure. To minimise the difficulties, this innovation has introduced BeeMsee as an educational board game for teaching and learning BMC topics in flipped classroom approach. The main objective of this innovation is to provide students with learning materials that increase their understanding and motivation of BMC through a game-based learning approach. This BeeMSee board game is built based on activity theory to provide both fun and learning by facilitating the learning of BMC. It consists of a board, tokens, money, and two types of cards. This innovative BeeMSee board game enables effective collaboration among students, allowing them to contextualise learning within their learning experience and increase their enjoyment simultaneously. It also cultivates students' creativity, critical thinking, communication, and personal and social competencies. They can also prepare questions for the lecturers before coming to the class. Hence, students had more time for discussion during the synchronous learning with the lecturer. This product has the potential to be patented and commercialised. It is aimed at university students and improving the general public's understanding of business decision-making.

Keywords: Flipped Classroom, Game-based Learning, Board Game, Business Model Canvas

Flipped Classroom

A flipped classroom is growing as a unique approach to advancing student understanding and retention and efficiently using class time (Van Alten et al., 2019). Howell (2021) found that the flipped classroom process encourages students to learn and is more valuable than traditional face-to-face or online teaching. The flipped classroom approach expects students to take charge of their learning and decisions throughout the pre-class, in-class, and post-class phases (Prust et al., 2015). Instead of spending class time presenting the content and concepts of a particular topic, students are required to engage with the online content before coming to class and thus be ready to apply their newly acquired knowledge through classroom interactions with other students and the instructor (Milman, 2020). The instructor supplies students in the pre-class phase with learning materials to acquire the necessary exposure to the in-class phase. Figure 1 below describes the differences between the traditional classroom approach and Flipped Classroom Approach pictured by (Dove & Dove, 2015).

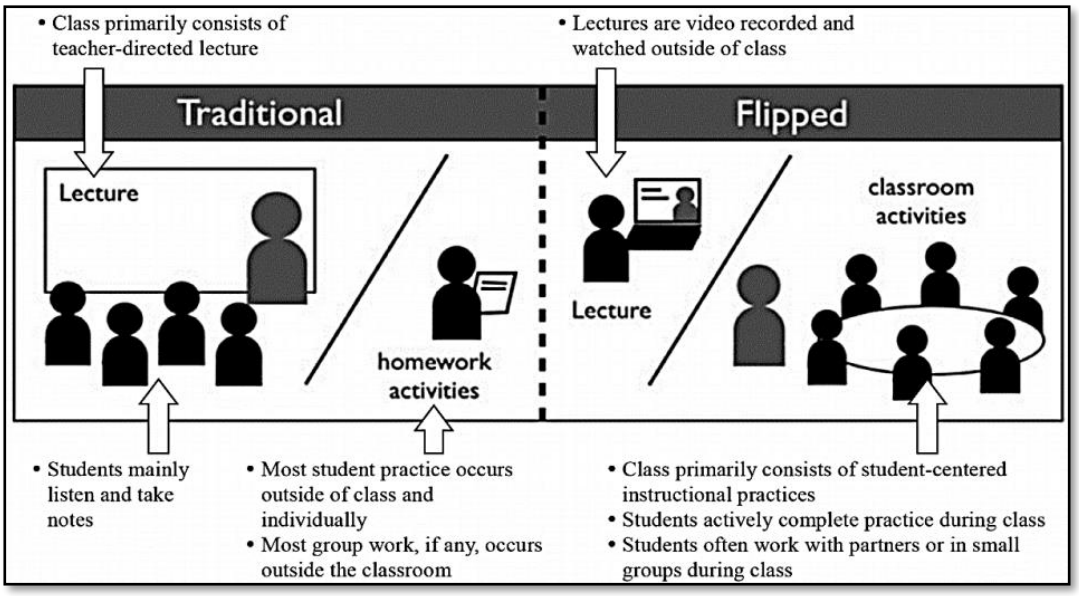

Figure 1: the differences between traditional classroom approach and Flipped Classroom Approach

According to Unal & Unal (2017), flipped classroom activities can take various forms, such as printed materials, online readings, quizzes, audio lectures, and instructor-made videos to encourage self-regulated student learning (Table 1). Students involved in a flipped-classroom approach must obtain an opportunity to complete a given task, for instance, quizzes before or at the start of class. Throughout the in-class phase, students are provided with relevant activities according to learning objectives such as discussion, experiment, argumentation, reflection, and group presentation with minimal support from the instructor (Motameni, 2018). For instance, through group discussions, students listen to the different viewpoints of teammates and learn through experience how teammates communicate and process ideas. This learning atmosphere enhances students' ability to review, analyse and evaluate information. Subsequently, the cultivation of critical thinking skills through active collaborative learning takes place (Brewer & Movahedazarhouligh, 2018). Finally, in the post-class phase, students are exposed to different assignments or quizzes as an enrichment activity to strengthen their knowledge gained from the previous phases (Al-Samarraie et al., 2019).

Table 1
Flipped Classroom Activities

Phase	Main Activities	Additional Activities
Pre- Class	• Watching instructional videos • Competing Online Exercises (Taking Notes & Quizzes)	• Reading Text Materials • Completing Online Discussions
In -Class	• Brief Content Review • Short Lecture or Question and Answers • Group Activities (Worksheets and/or projects)	• Individual Practices (Worksheets) • Student Presentations • Quizzes
Post – Class		• Completing self-evaluation or reflection

Significantly, the instructor's most important role is guiding students in thinking and discussion, as well as giving professional feedback and advice, thus allowing students to actively and interactively apply what they have learned in realistic, hands-on projects (Hart et al., 2021; Hwang & Wang, 2015; Phillips & Trainor, 2014). It has been stated that the practice of the flipped classroom style of teaching and learning offers several advantages, for example, improving self-paced learning, students' engagement, and increasing interaction between students or between students and instructors (Daud et. al., 2021; Luo et al., 2020; Gomez-Lanier, 2018; Mok, 2014). Likewise, Al-Samarraie et. al (2019) found that the flipped classroom also increases students' involvement in the collaborative task as students may develop positive perceptions about the learning process for the mastery of the topic during the pre-class phase. These perceptions can encourage students to communicate with their instructors during the in-class phase, inspiring them to deeply understand the learning materials given during the pre-class phase. Furthermore, Lee and Wallace (2018) stated that students who participated in flipped classrooms achieved higher average marks than those in the non-flipped classroom. Other gains include promoting thinking inside and outside the classroom and facilitating active learning (Howell, 2021; Abdullah & Mamat, 2018).

Game-Based Learning

Game-Based Learning (GBL) are games with an educational objective considered one of the most recent methods to support learners create meaningful learning experiences (Krath et al., 2021). Presently, there has been an increase in GBL as part of the learning process to engage and motivate students across education levels (Zabala-Vargas et al., 2021). GBL is a game that identifies learning outcomes embedded into the gameplay to encourage learning (Liu et al., 2021). Therefore, it provides complimentary learning activities to immerse students further into the learning process (Foster & Shah, 2020). GBL represent various kinds of games, whether computer or non-computer games, with or without computer support that use games for learning or educational purposes (Hooshyar et al., 2021; Lopez-Fernandez et al., 2021). Certainly, GBL is not only about offering enjoyable activities for students to play but also supports activities that introduce concepts and guide students towards a learning objective (Teichmann et al., 2020; Hanafiah et al., 2019). Notably, numerous studies have proven the efficiency of GBL over traditional learning methods (Platz, 2022; Krath,2021). The use of board games in the education context has proven to have a significant effect on learning, reflecting the achievement of players and the cultivation of intrinsic motivation

(Zhang, 2022; Hartt et al., 2020; Leonardou et al., 2020). Instructors are suggested to use GBL to create an effective classroom learning environment (Saleh et al., 2020). Principally, GBL encourages students to engage in playing a game to increase their enjoyment of the learning process. These situations will likely enhance the players' engagement and participation in the lessons (Borit & Stangvaltaite-Mouhat, 2020). Likewise, Celik (2020) suggests that incorporating the game method into non-game contexts has increased students' willingness to learn, making education more permanent. Other studies have shown that GBL with high levels of engagement leads to positive student attitudes, behaviour, and retention in an enjoyable learning environment (Janakiraman et al., 2021; Xu et al., 2021). Notably, GBL allows students to participate in problem-solving actively, explore alternatives, and make mistakes in a more secure environment (Lee-Cultura et al., 2022; Moon & Ke, 2020; Carpenter et al., 2020). The objective of this study is to:

- Provide students with a game-based learning approach via the BeeMSee board game.
- Evaluate students' understanding and motivation of BMC learning experience through the BeeMSee board game.

Board Games as Part of The Flipped Classroom Model

The Business Model Canvas (BMC) offers a process of exploration and analysis before writing a business plan. The BMC is a business management tool that provides a comprehensive framework for describing and understanding the crucial elements of any business enterprise (Sparviero, 2019). It differs from a business plan, a more formal, detailed description of an initiative. Both describe the business model, but in varying levels of detail, with the canvas outlining the business model on a single page (Osterwalder & Euchner, 2019). BMC is a crucial topic in the Fundamentals of Entrepreneurship course. Mostly, students often struggle applying BMC because they do not have a clear idea of what the business model canvas elements are and how the business activities should be aligned (Rytkonen & Nenonen, 2014). Addressing the problem, the BeeMSee board game was developed as one of the game modules to facilitate students. The gap between what students know and what they need to know is called the zone of proximal development (Wass & Golding, 2014), where the educator's role is essential in guiding students through a complex task. It provides 'learning through play, which aims to help students seamlessly understand and apply a BMC concept for their business activities. This game has been developed based on learning theories and applying game-based learning methods. To enhance the innovative element in the product, Augmented Reality (AR) technology has been installed, adding a layer of digital information to make it more interactive and fit for the Internet of Things (IoT) era.

Description of the BeeMSee Board Game

The BeeMSee board game aims to increase knowledge and understanding of BMC. The board game is used as a game, while AR technology is implemented in the video description for more interactive learning. On the other hand, an animal avatar is used as the narrator's character and conveys knowledge and activities about BMC. The BeeMSee board game was developed based on Constructivist Social Theory (Vygotsky, 1962), which assumes learning is a social activity. Based on this assumption, this game design applies these theoretical features to the game. By emphasising student-centred strategies, cooperative and collaborative learning elements have been used. This learning also has a problem-solving element in the form of a game narrative.

This game is suitable for being played by 2 to 4 players at a time. While the playtime is about 20 minutes to 30 minutes. Overall, the game consists of a board game, a dice, 100 chips, 20 Mind Test Cards, and 40 Trivia Knowledge Cards (Figure 1). Throughout the game, players will go through the boxes that explain the procedure for business model concepts. Players will learn about the nine blocks in BMC via the Trivia Knowledge Card. They will also be tested related to the knowledge through a Mind Set Quiz Card. Players who successfully answer the questions will get chip coupon rewards with varying score values. For more interactive and fun, players can use the Augmented Reality (AR) BeeMSee application to scan and view the video related to the BMC concept. This BeeMSee game will end when the player reaches the end of the box. As a learning outcome from this game, players will get a clear picture of the concept of BMC.

Figure 2: BeeMsee Board Game

Method

A survey was done amongst UniSZA Bachelor of Accounting students with 60 students to explore the effectiveness of BeeMSee board game usage in teaching BMC topics. The questionnaire's objective was to obtain students' feedback on the BeeMSee board game. After finishing the game, students were required to answer a set of questionnaires consisting of several statements relating to the game. Participants were asked to evaluate to what extent they agreed with the statements on a scale from 1 to 5. In this study, eight questionnaires are given to students using the Likert Scale format of strongly disagree (1), disagree (2), neutral (3), agree (4), to strongly agree (5). The data are analysed using XL Stat 2021.1 to identify the positive or negative aspects of the game following the questions were asked.

Finding and Discussion

The Likert scale outcome from respondents showed that on all eight questions, the percentage of students rating the statements 4 (Agree) or 5 (Strongly Agree) is significantly higher (Table 2). The result supports our idea that students perceive learning the Business Model Canvas concept through BeeMSee to be suitable and attractive. Statement 1 is rated moderately positive, showing that students are inspired because they can explore something

new in this topic. For statement 2, students were rated positively because their motivation while playing are increased. This finding shows that most students would be able to gain knowledge through the game, even if short time. Statement 3 and 4 were also rated positively by the students as they understood the contents while playing. This result reveals that BeeMSee can stimulate Business Model Canvas knowledge while the students play the game. Statement 5 to 9 were rated positively because students enjoyed playing the game while understanding the learning objectives (Figure 3). For statement 5, most students (70%) strongly agreed that the BeeMSee was exciting and fun to play. Only 4.7% of the students strongly disagree that it was fun for them and 5% neither disagree nor agree with the statement.

Table 2
Students' response for the five evaluation measures

Statement/Degree of agreement	**1**	**2**	**3**	**4**	**5**
Q1) Learned much about the topic with game	11 (18.3)	7 (11.7)	15 (25)	9 (15)	18 (30)
Q2) Game increased motivation	5 (8.3)	9 (15)	11 (18.3)	10 (16.7)	25 (41.7)
Q3) Would to play again	3 (4.7)	1 (1.7)	6 (10)	10 (16.7)	40 (66.7)
Q4) Game level appropriate with the learning content	4 (6.7)	4 (6.7)	12 (20)	12 (20)	28 (46.7)
Q5) Game is a fun learning method for this kind of topic	3 (4.7)	-	3 (5)	12 (20)	42 (70)
Q6) Game increased concentration	3 (5)	1 (1.7)	6 (10)	10 (16.7)	40 (66.7)
Q7) Game character increased interest	4 (6.7)	5 (8.3)	9 (15)	5 (8.3)	37 (61.7)
Q8) Game helped to learn more about the topic	4 (6.7)	5 (8.3)	9 (15)	8 (13.3)	34 (56.7)

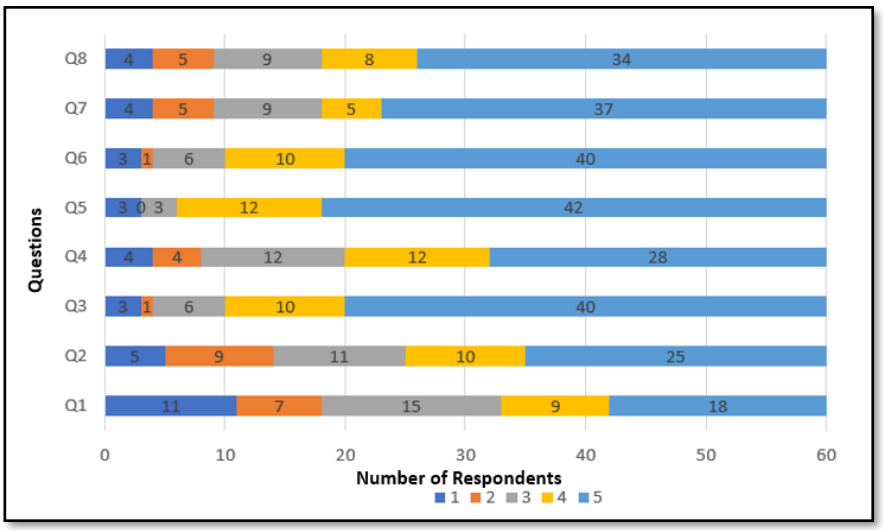

Figure 3: Likert Response

This BeeMSee board game has a lot of usefulness in an educational environment. It can increase knowledge about business management among students and business start-ups through interactive methods. The BeeMSee board game can be used as a guide for teachers to create awareness and promote business management skills to school students. This product is undoubtedly very scalable in its application to different fields since it promotes entrepreneurship across different educational fields. Furthermore, it can be used as part of a training module for future people in business and the ministry to develop a comprehensive program to promote entrepreneurship.

Conclusion

BeeMsee board game has been developed mainly for university students and business start-ups to enhance their interest and understanding of BMC since this topic is decisive in business decision-making. This game board can also benefit lecturers and trainers in innovative teaching and training, making students more appreciative of the BMC topic and making the learning method more pleasant and entertaining during flipped classroom. Therefore, the BeeMSee board game delivers an innovative and desirable kind of experience for non-business background students in learning entrepreneurship and provides an opportunity to improve traditional classroom teaching using game-based learning.

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