

FEEDBACK ON ADDING GAME ELEMENTS AND QUIZZES IN ENGINEERING THEORETICAL SUBJECTS

Mohammad Abdullah¹, Soo Kum Yoke²

¹*Chemical Engineering Studies, College of Engineering, Universiti Teknologi MARA Johor (UiTM), Pasir Gudang Campus, Johor, Malaysia*

²*Academy of Language Studies, Universiti Teknologi MARA Negeri Sembilan, Rembau Campus, N. Sembilan, Malaysia*

Email: ¹moham3767@uitm.edu.my, ²sooku607@uitm.edu.my

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ABSTRACT

Engineering subjects that are heavily theoretical may cause students to get bored and lose interest in engineering studies. It will not only make students fall asleep but also prevent them from comprehending the specifics of the subject matter. In view of this, several ways can be used to ensure the learning atmosphere is more effective and less boring, such as quizzes, games, and interactive learning. Therefore, this paper intends to give feedback regarding adding games and quizzes in theoretical subjects. Adding games and quizzes in the classroom makes learning activities more cheerful, and students are always eager to focus on learning. Among the games that can apply are puzzle games, Kahoot, and Jenga. Adding games makes students more competitive in answering the questions asked in class and, simultaneously, makes them quickly understand the theory learned in class. This paper describes students' responses to using games and quizzes in theoretical subjects in class. To get feedback, surveys with game and quiz components were used to gauge student happiness and the quality of instruction in the classroom. Students gain from adding game and quiz components to theoretical subjects in few ways: they learn more quickly, do not feel sleepy, and the classroom is more upbeat and understandable.

Keywords: Theoretical subject, games, quizzes, feedback, classroom

1.0 INTRODUCTION

The incorporation of games in theoretical subjects has been a topic of interest in education research in recent years. Students who study a subject that includes a thorough theoretical understanding of the course material for an engineering programme tend to pay less attention in class and frequently feel sleepy (Mihara, 2018). Apart from that, it is difficult for them to focus clearly when the lecturer is teaching theoretical subjects because they used to focus on subjects that contain elements of calculation and mathematics. Fun should incorporate into the teaching of theory courses to improve the learning environment and students' comprehension of the material (Cheung & Ng, 2021).

Games, tests, discussions, puzzles, competitions, and so forth are entertaining ways to teach theoretical subjects (Jääskä & Aaltonen, 2022; Taib et al., 2021; Razak et al., 2022). Diaz-Ramirez (2020) further reiterates that when games applied to education, they can motivate and engage students in their learning process. According to Leitao et al. (2022), motivation and student involvement are the most crucial elements determining a teacher's efficacy. Motivation is indispensable in the process of learning to achieve high academic performance.

In a meta-analytic review of digital educational games, the result found that game-based elements added for content learning were more effective, especially when it came to studies involving science and computer learning in STEM areas (Gui et al., 2023). In a field experiment with a gamified app, the result shows that adding game elements such as progression, rewards, and competition to a quiz format improved student engagement and motivation.

Manzano-León et al. (2021) examined the impact of educational gamification on student motivation and academic performance. The results demonstrated the potential influence of educational gamification on students' motivation, commitment, and academic success. Although there are many elements in gamification, in this feedback study, only two elements were identified, namely games and quizzes. Therefore, the purpose of this study is based on student feedback on the elements of games and quizzes which included in the learning session of the engineering theoretical subject.

2.0 METHOD AND RESULTS

The engineering course CHE323 Palm Oil Manufacturing and Application, which solely stresses theoretical components in the learning scale and syllabus, was the one selected for this investigation. Thirty-four students from classes J4EH1104B and J4EH1104E for the October 2022–February 2023 semester session made up the student population used in this study. The gender distribution is in Figure 1. After the learning process incorporating game components and quizzes, the feedback questions were asked in class to gather input from the students. The overall process of data collection is in Figure 2.

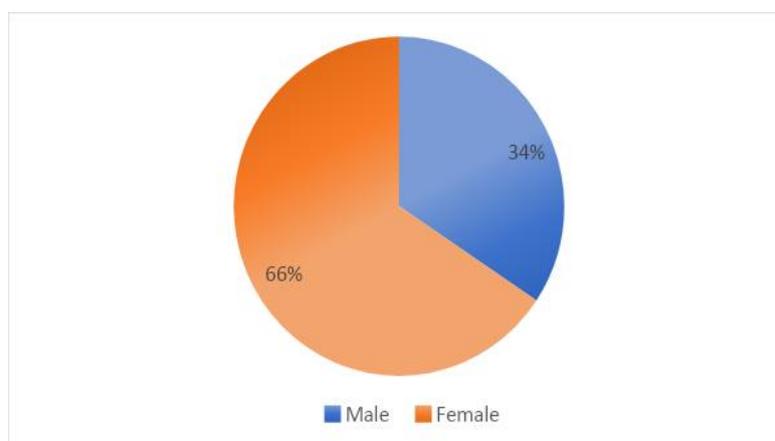


Fig. 1: Gender distribution for this feedback study

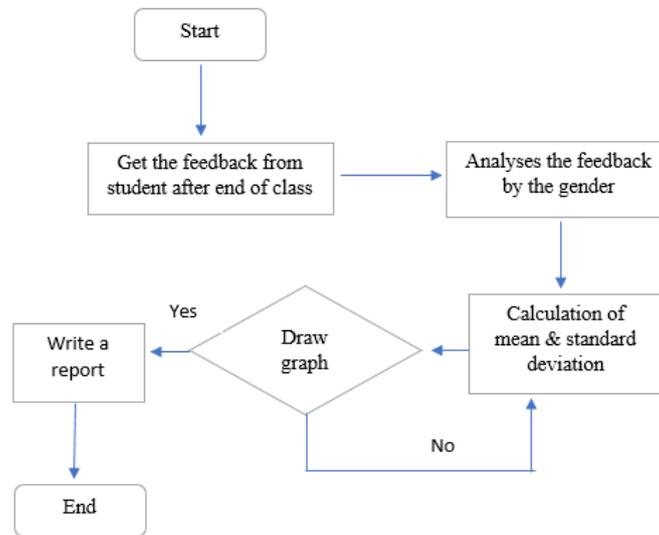


Fig. 2: The feedback data collection procedure flow

The following is the addition of games and quizzes in the teaching of theoretical subjects:

Elements of games and quizzes combined at one time can cause the learning environment to become more interactive, which will cause two-way communication between students and lecturers (Adipat et al., 2021). Before responding to the quiz questions based on the subject's theoretical notes, the students in this study must complete two kinds of games: coloured drawings and block puzzle games. The game activities used in class for the CHE323 Palm Oil Manufacturing and Application subject depicted in Figures 3 and 4. The students are divided into groups, with four people in each group. This study employed a quiz game with coloured images made using crayons as the answers for topics that include theory. It discovered that a large number of students were able to provide accurate answers because they were eager to illustrate what they had, in theory, learned earlier. The transfer of knowledge through drawing gives a good understanding effect on learning (Yu & Li, 2022).

Prior to students responding to quiz questions, there were additional game components that incorporate problem-solving exercises (Figure 4). Students were more willing to respond to questions when they were asked, according to observations and classroom activities. On the other hand, they were considering the answers to quiz questions when they were concurrently doing puzzles and obstacle games. Problem-solving or mission-based games also contribute to the provision of an efficient learning environment for pupils when they are studying comprehensive theory subjects (Liu & Israel, 2022).

As Figures 5, 6, and 7 demonstrate, feedback regarding the usage of game features and quizzes could enhance learning. Over 90 percent of students agreed that the theory disciplines should have an interactive learning component, according to the data broken down by gender. Over 95 percent of the students expressed agreement that games and quizzes could help them comprehend and retain the material covered in class. Over 95 percent of students felt

that receiving feedback on games and quizzes could encourage them to understand theoretical courses.



Fig. 3: A component of the drawing game: As a response to a quiz administered by the lecturer, students must apply the theoretical knowledge they have acquired into a coloured picture.



Fig. 4: Elements of solution games, like challenge games and block puzzles: To decide who will respond to the lecturer's quiz questions first, students must finish the game activities before responding to the questions.

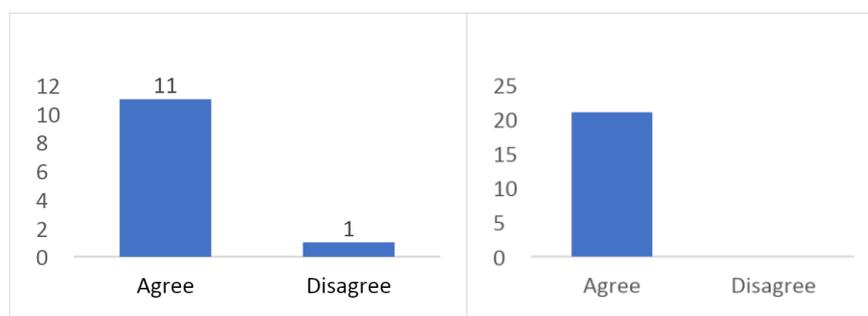


Fig. 5: Responses to the theoretical topics: The necessity of adding an interactive component to learning.

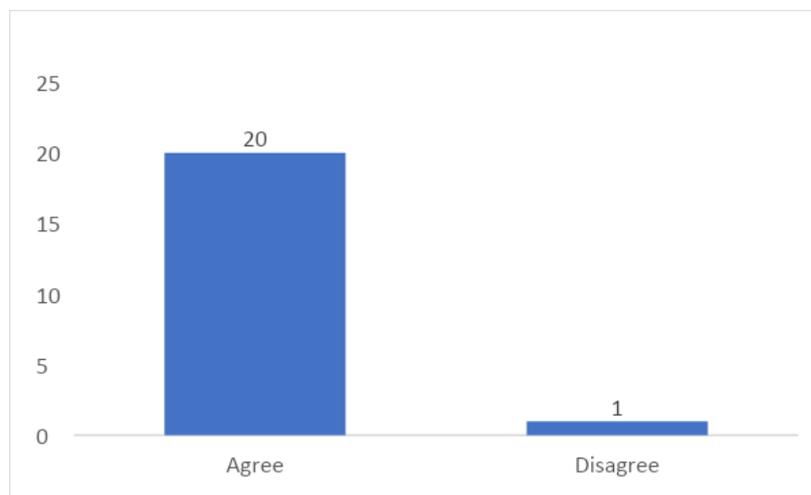
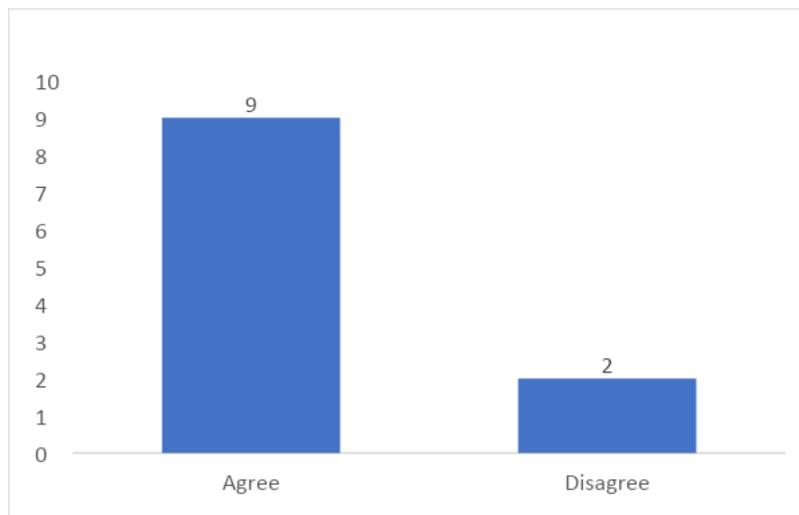


Fig. 6: Feedback on games and quizzes can easily make the student understand and remember the taught in the classroom.

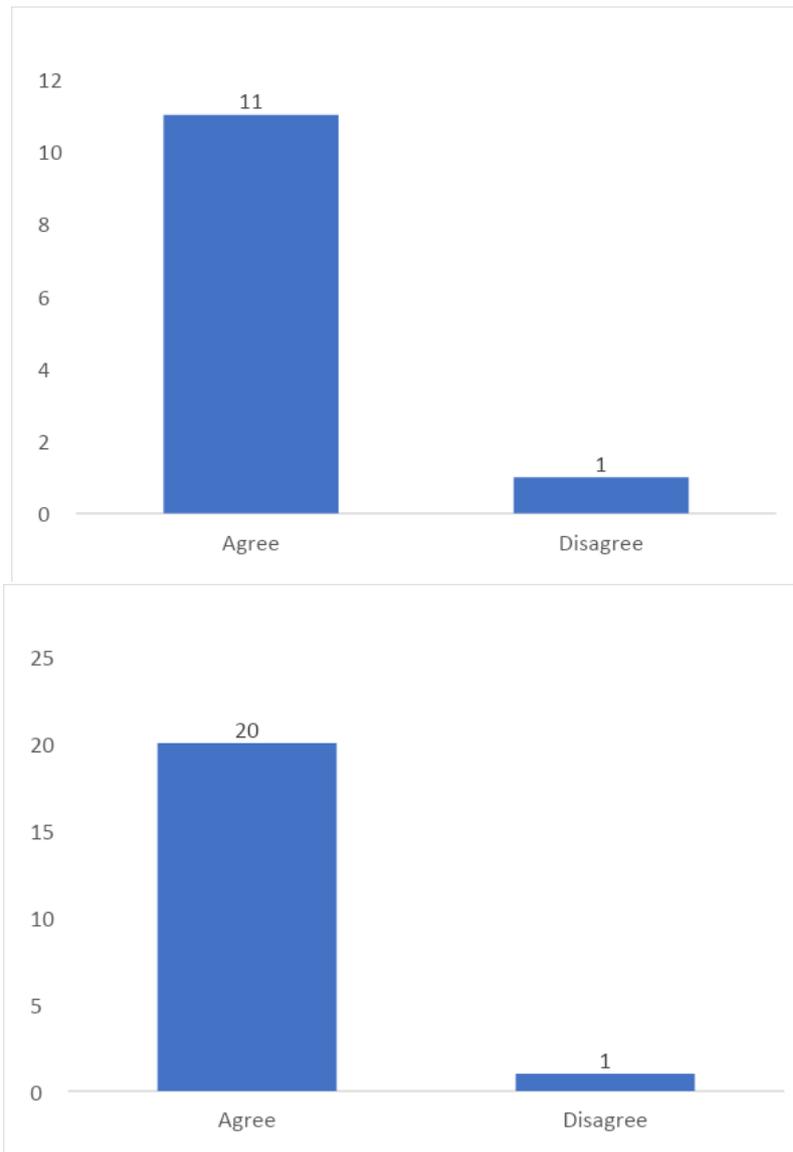


Fig. 7: Feedback on games and quizzes can motivate students to learn theoretical subjects.

3.0 CONCLUSION

The students found out that the game elements and quizzes that were added to the theoretical subjects helped them tremendously to learn, understand, and memorize the theoretical aspects. The elements of games and quizzes make students more active in theory classes, which always considered as boring compared to subjects that contain elements of calculation (Selvi et al., 2018). The positive feedback has shown that elements of games and quizzes should inserted into the theoretical subjects so that students understand better. The improvement for the next study is regarding additional student feedback on the suggestions of game elements that should be include in the theoretical subjects.

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