

CONFERENCE PROCEEDING

Monopoly Board Games for Effective Learning: Science and Mathematics Facts and Formulas

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ABSTRACT

The recent pandemic of COVID-19 is a challenging time to all sectors such as healthcare, agriculture, economic industries including education system. The transition of physical learning to online learning due to lockdown of COVID-19 was challenging to the school students. The new teaching method might harm the proper classroom settings and the online learning could cause the students to lose their focus in class. In aligned with Education 4.0, monopoly board game was developed as alternative method for effective learning to stimulate brain function and improve memory skill for the student, while retaining their focus to learn. It also to increase knowledge about science and mathematics, make the students to remember all the important terms and formulas and show ways on how to solve difficult questions without wasting time. The board game can be used at school or at home to enhance the students' learning. The board games can be used as an entertainment tool while discussing important issues and solving common problems with friends and family.

Keywords: *board games, monopoly, effective learning, school*

INTRODUCTION

Recently, the pandemic had impacted various sectors in Malaysia, including the education sector, wherein students of all ages have to take lessons and courses online (Sawarkar *et al.*, 2020). The teaching institution like schools and universities has to quickly adapt with the transition mode of the delivery mode of teaching to ensure the learning process for the students can be continue as usual. However, according to (Paiz, 2020), the online class might cause the students to lost their focus as there is no guarantee that the students will pay full attention during the class. Based on the survey that has been carried out, there are at least 75% of students feel stress and lost their focus in class due to the transition of traditional teaching to online class due to COVID-19 and 78.6% of students feel that mathematics and science subjects are difficult to learn and understand.

Various studies have come up with many suggestions on how to overcome this particular problem. The introduction of board games such as Monopoly, chess and scrabble can be used as learning materials for the students to enhance their focus alongside to maximise their learning experience at home. Not only it is the mainstream for education purposes, but it also shows the value of teamwork and a great way for students to get off from their gadgets every day.

The main objective of board games is, to develop an effective learning tool using board games in enhancing students' focus and maximize their learning

experience at home and to encourage and promote critical thinking and problem-solving techniques. This board game contains general science and mathematics, which range from common questions to high-level thinking skill questions which is suitable for all ages (around 6 years old or above) to play.

MATERIALS AND METHODS/ METHODOLOGY

A quantitative survey using Google form was used to collect response from primary and secondary school students in Klang Valley area. The questionnaire was designed based on 3 sections consist of demographic behaviours, their difficulty to understand and memorise Mathematics and Science facts and formulas and the interest to use board games as educational materials in school and during free time. The data collected were analysed using Microsoft Excel. Next, the Monopoly board games was developed as an educational tool for students to learn Mathematics and Science in easier way and effective learning. Finally, another set of survey was sent to the same respondents to determine the effectiveness of the modified board games.

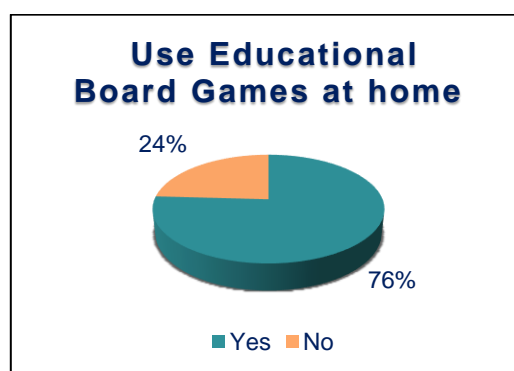
RESULTS AND DISCUSSION

Mathematics and Science

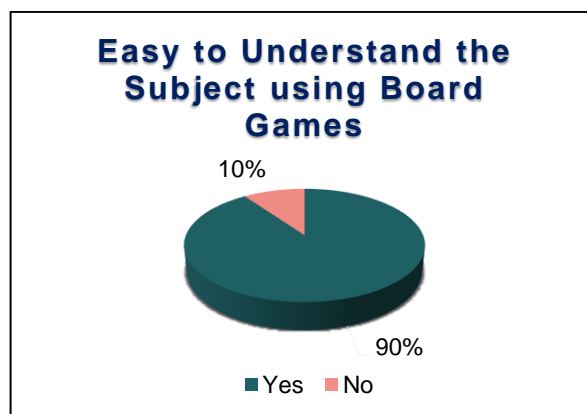
Mathematics and Science are both subjects that is important to be mastered by students who are motivated to enter science, technology, engineering, and mathematics (STEM) fields after completing their high school years. However, there is a decline in students' performance and interest to learn these two subjects in schools due to the difficulty of the subjects. Apart from that, the discontinuities between students' learning experience in class and real-life application caused the students tend to lost motivation in engaging in class (Nasir *et al.*,2017). As shown in Figure 1, after the students have tried to use this proposed board games, 92% of students are agreed that the board games are useful to be used as educational tools, 76% of them voted that they will use this board games at home and 90% of them think that it is easier to understand the Mathematics and Science better by using this board games. Hence, from this survey it can be concluded that this monopoly board games can enhance the students' experience in learning and help them to master the subject better despite of the limitation of having the class face to face in school due to pandemic COVID-19.



(a)



(b)



(c)

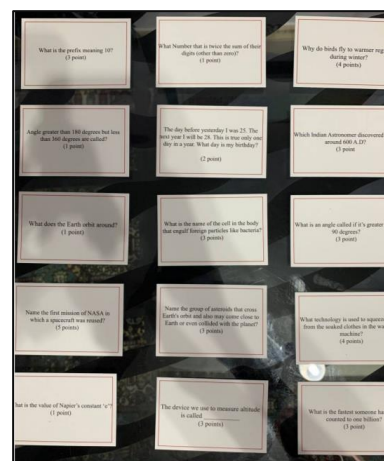
Figure 1: Results outcome of students are agreed; (a) to use board games as educational tools; (b) easy to understand the subject through board games; and (c) to use educational board games at home.

Gamification as a tool

Gamification is a tool to enhance the learning process and as adding element to encourage the participation. In aligned with Education 4.0, gamification can foster positive and healthy competition among the students alongside to achieve the intended learning goals and objectives. It helps the student to grab the concept of the subjects easily and in effective way which saves their time. Board games is one of types of the gamification. This game indeed is a way to satisfy both of students' needs and requirements. It also sharpens the students' focus and teaches about important of learning general knowledge about Science and Mathematics. This Monopoly based board game includes a board, 4 statues, 75 cards of potions and boosts 25 questions on the board with additional of more than 100 questions as shown in Figure 2.



(a)



(b)

Figure 2: Monopoly Educational Board game; (a) Board game; and (b) Sample of questions.

CONCLUSION

This proposed monopoly board games for Science and Mathematics can be used as an educational tool for teaching in class and at home for any age. It is able to sharpen students' minds on critical thinking and problem-solving questions as well as to make the students easy to understand the subject.

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