

Educational Games as an Active Learning Strategy for University Students

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***Abstract** The aim of this study was to review student opinions towards educational games as an Active Learning Strategy (ALS). Case study method, role playing, group discussions and presentations, and many other ALSs are used by faculty members to enhance their lectures. However, an educational game is an innovative teaching strategy which can be successfully used as an ALS in universities. Student engagement, motivation, and satisfaction can be increased by using educational games in the classroom. This study summarizes the findings of a survey conducted at Sirindhorn International Institute of Technology, Thammasat University, Thailand. This paper presents fourth year undergraduate students' preferences of ALSs, before and after they experience a series of educational games, and their attitudes about "games" as an ALS. From the initial survey, it was identified that students preferred to use case-study method, role playing, and group discussions and presentations as ALSs. However, after their exposure to educational/business games in the form of card/board games, their preference changed. Majority of the respondents preferred to use "games" as an ALS. They believed that games create entertainment. Furthermore, most students agreed that team spirit, leadership qualities, and critical thinking can be improved by incorporating games with lectures. Moreover, students like to select courses with educational games. Therefore, this is a great opportunity for educational game developers to carefully design games according to the respective syllabi.*

*Keywords: Educational Games, Active Learning Strategy (ALS),
University Students*

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Introduction

The lecture method has been the most widely used instructional strategy in university education for many years. It is still considered as an important way of communicating information, though the usefulness of other strategies is being examined widely. University lecturers like to use interactive teaching/learning techniques, where necessary.

Active learning is an instructional strategy in which students are involved in the learning process. Behavioral engagement (good behavior), emotional engagement (positive attitude) as well as cognitive engagement (thinking pattern) are important aspects when students are involved in the learning process (Fredricks, Blumenfeld, & Paris, 2004). There are strategies, such as case study method, role playing, group discussions and presentations, and many more, which can be employed to actively engage students in the learning process. One of the techniques which can be used to increase student attention is games. Improving interpersonal communication and critical thinking, promoting collaboration, peer learning and teamwork, and increasing motivation are some of the benefits of Active Learning Strategies.

Although computer games have become increasingly popular, the value of educational card and board games still remains. Su, Cheng, and Lin (2014), stated that among various types of games, a card game is the most advantageous in enhancing student learning. They have stated that cards are physical and can be played anywhere and it increases face to face interaction between players as well. Many card games are used in English language teaching and medical education. The purpose of this study was to compare the results of an initial survey (before students play games) and a final survey (after they play many games) in order to identify the applicability of educational games as an Active Learning Strategy, and identify students' attitudes about card/board games.

Past research work on educational games

Previous research show that educational games have the ability to draw students into the learning process and to encourage

them to participate in a more interactive environment. Much literature related to computer/video games in education could be found. However, the use of card/board games for university education seems rare in the literature. Mostly, card games have been used in medical education, especially to teach biological concepts, physiological concepts, and language education. Rajashekar and Bellad (2016), mentioned about a card game to teach concepts of physiology. They have stated that an educational card game is an effective supplementary educational tool which improves students' ability to analyze and retain knowledge for a long time. To teach human immunology, Su et al. (2014), introduced a card game. According to them, developing a suitable instructional method was a challenging issue. Gaudart (1999), has done a research on the usage of games for English teaching and concluded that games allow learners to completely utilize the language that they have learned, by involving in the communication process throughout the game.

Games can be a very useful teaching aid in education. Koh, Kin, Wadhwa, and Lim (2012), have introduced a model for the adoption and use of games in the classroom. According to that model, push factors (policies and curriculum, environment support), demographic factors (level of teaching, years of experience, subject taught) and pull factors (personal interest, gaming mindset) influence the game adoption and use. Tobias, Fletcher, and Wind (2014) stated that students with limited prior knowledge need great assistance to learn, but those with good prior knowledge could succeed with a little assistance. Games can be beneficial for students who fail to succeed with traditional teaching methods. Furthermore, a strong encouragement to play games may be a better solution for low motivated students for learning.

Methodology

Respondents

The respondents of this study were fourth year undergraduate students of Sirindhorn International Institute of Technology (SIIT), Thammasat University, Thailand who followed the course module "Entrepreneurship for IT Business Development" in 2017. This course module was open for all departments in SIIT as a free elective, in the second semester of the fourth year. Forty-one

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respondents answered the survey questionnaire. Majority of the respondents were male students, as shown in Figure 1.

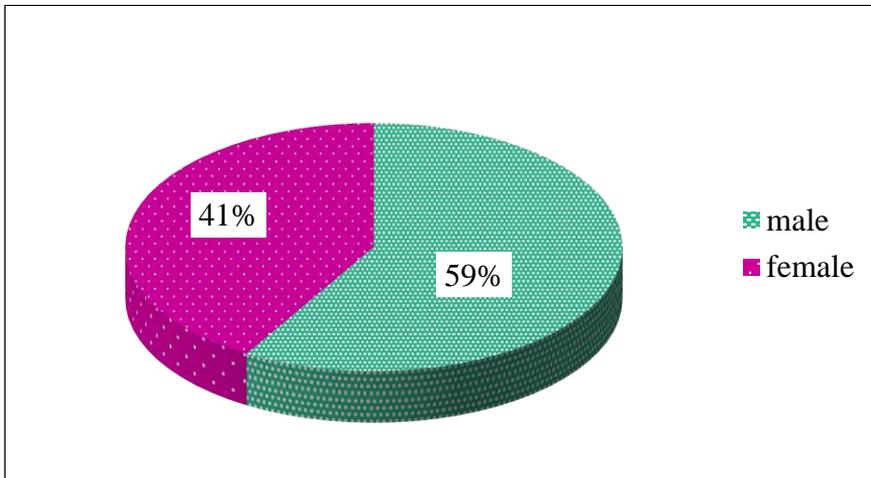


Figure 1. Respondents

Procedure

The initial survey was conducted on the first day of the lecture series. Printed questionnaires were distributed for the initial survey. The students participated in a series of business/educational games for three months. After their midterm exams, an online survey was conducted with the purpose of understanding the change in attitude towards various types of active learning strategies and their attitude towards games.

The business/educational games

Students had the opportunity to participate in the following business/educational games during the first half of their second semester of the fourth year.

- 1) BASE* Fishery game (BASE-Fishery) - Tangible game, catching fish in non-transparent bag to learn “the tragedy of commons”.

- 2) BASE Mass Manufacturing Production game (BASE-MMP) - Tangible board game to experience and learn business tactics related to mass manufacturing.
- 3) BASE Jewelry supply chain Management Game (BASE-JMG) - Tangible board game with cards to study supply chain management.
- 4) BASE Agricultural business board game (BASE-AGRI) - To understand the basic economic concepts of agriculture business.
- 5) Product Life Cycle game (PLC) – Educational card game to understand features and strategies of Product Life Cycle concept.

*(*BASE is defined as the brand name of author Hamada's business game series since 2007.)*

Results

The following sub-sections summarize the results of the initial survey conducted on the first day of the lecture series and the final survey conducted just after the mid-term exam.

Preferred teaching method

Students were asked to mention their preferred teaching method in both surveys. Figure 2 shows the results. The term “Before” refers to the time before the students experienced the series of games and “After” denotes after their exposure to the above-mentioned games.

From the initial survey, it was found that 27% of the respondents preferred one-way lecture method. That is, teacher speaks, students listen (passive learning). However, after they played various games their preference have moved towards the two-way lecture method which is, learning through participation (active learning).

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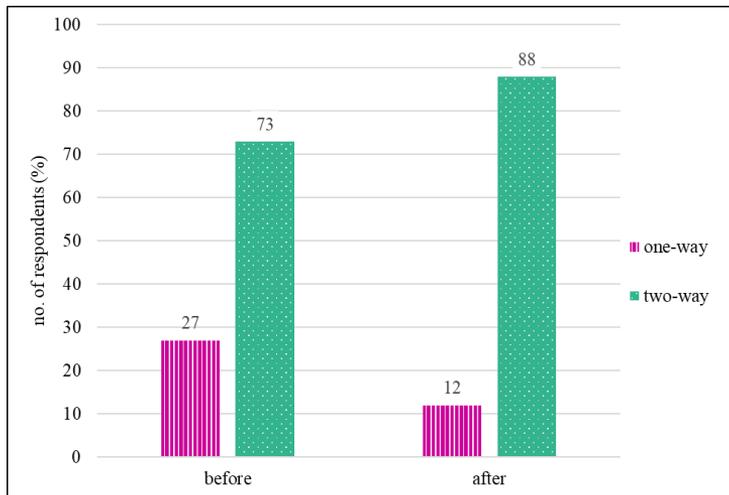


Figure 2. Preferred teaching method

Student preferences towards learning strategies

Students were asked to rank their preferences (from 1-5) for the learning strategies, namely, case study method, role playing, group discussions and presentations, and games. Figure 3 depicts the weighted ranked preferences for each learning strategy, before and after students played business/educational games.

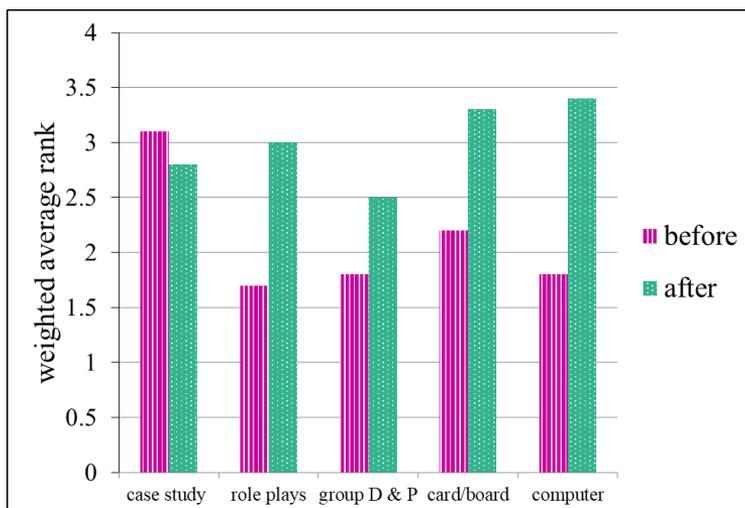


Figure 3. Weighted ranked preferences

Case study method was the most popular method according to the results of the initial survey. Student interest towards more engaging strategies (role plays, group discussions and presentations, and games) has increased after playing many games. The respondents have experienced case study method (24%), and group discussions and presentations (18%). Experience of games within lectures was low (7%). Furthermore, the respondents prefer to incorporate educational games with subjects such as marketing (24%), economics (20%), and supply chain management (15%). Some respondents (14%) like to learn mathematics, statistics, and calculus using educational games.

Game preferences

Figure 4 shows the change of student preferences towards the selected game types.

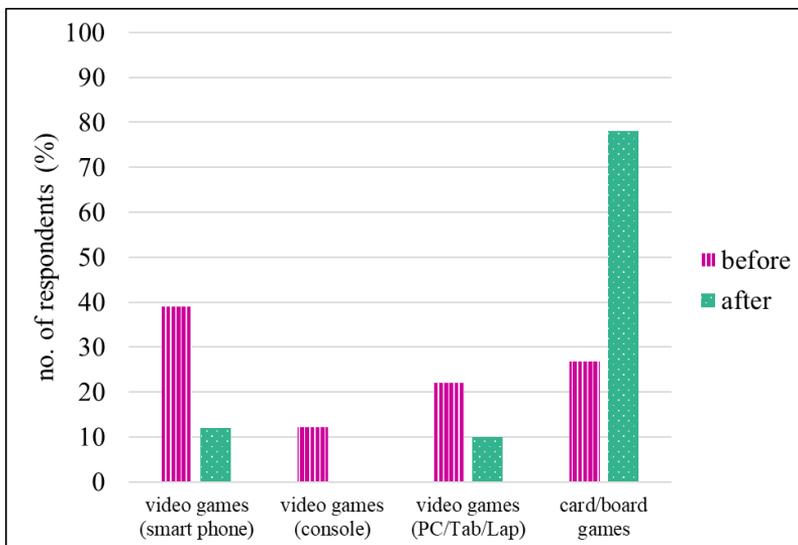


Figure 4. Preferences-game types

According to Figure 4, before students played games in the classroom, their highest preference was for games using smart phones. However, after playing series of games, their interest has shifted towards card/board games. A remarkable increase of preference towards card/board games could be seen, where 78% of the respondents have selected card/board games as the most preferred game category out of the given categories.

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Duration of educational card/board games

Respondents were asked to mention the most preferred time duration to play educational card/board games. Figure 5 illustrates the results.

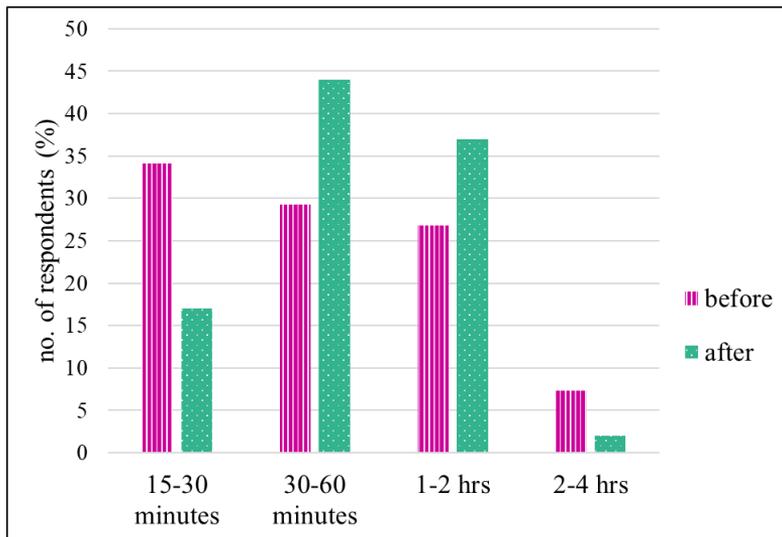


Figure 5. Preferences-game duration

According to the final survey, majority of the respondents (44%) preferred to play games of 30-60 minutes duration. Their attitude towards long duration games was low.

Perceptions towards educational card/board games

Figure 6 summarizes the responses towards various statements given. Respondents were asked to mark their level of agreement on a 5-point Likert scale, with 1 being “strongly agree” and 5 being “strongly disagree.”

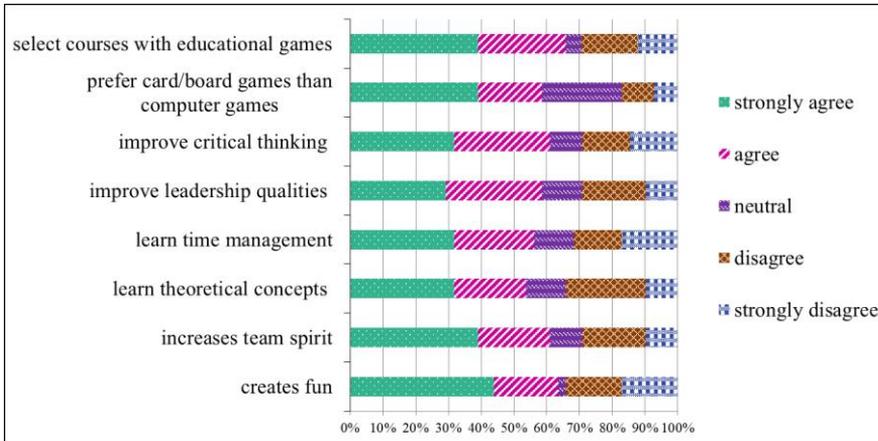


Figure 6. Respondents’ attitudes towards educational card/board games

As shown in Figure 6, the majority (64%) preferred educational card/board games because of the entertainment they gain by playing. Nearly 50% of the respondents think that they can learn theoretical concepts better if they play educational card/board games. Around 60% of the respondents think that they can improve critical thinking and leadership skills. Fifty-six percentage (56%) think that they can learn time management, and 66% of the respondents would like to select courses with educational card/board games.

Discussion and Conclusion

Based on the survey results, it can be concluded that educational card/board games can be used as an effective Active Learning Strategy (ALS) for university education in the next decade. Authors confirm that students were greatly impressed, and their motivation towards game-based learning increased, after their exposure to the games. To improve games, student feedback is quite essential. However, developers must be careful with endless expansions which make the game much complex (Hamada, 2016).

Educational game developers can develop card/board games which can be played within a limited time. Furthermore, they must consider factors such as expected learning outcomes, learning styles,

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and attitudes of the students as well. A small number of students have a negative attitude towards educational card/board games.

According to the views of Tobias et al. (2014), collecting attitudinal data on educational games may be important, since researchers and game designers indicate that games which are specially designed for educational purposes are not much fun to play compared to those designed only for fun.

In this study, the authors did not study learning styles of students. Understanding student learning styles is important to improve the effectiveness of learning (Amir, Jelas, & Rahman, 2011). Amir et al. have mentioned six learning styles based on student behavior namely, independent, avoidant, dependent, collaborative, participative, and competitive. Students who belong to avoidant style show high rate of absenteeism and are not keen on participating in classroom activities. Game based learning may be one of the best solutions to change their attitudes. Winners of the game can be awarded more points for their assessments (of the related subjects), in order to increase their enthusiasm and to motivate other students towards the gaming culture.

There are some other barriers to adopt games in the classroom. Large class sizes may prevent implementation of games. In such a case, the instructor in charge can get the support of Teaching Assistants. Instructors' pre-class preparation is a vital factor in implementing games in the classroom successfully. Lack of support from higher authorities may prevent instructors from using games in the classroom. Universities should understand the value of game-based learning, and give faculty members more exposure to games by organizing gaming sessions, workshops, and conferences. An interest and positive attitude towards games can be created by giving an opportunity to participate in game-based learning activities. A well-managed educational game can be used as a successful ALS, despite other external barriers. There is a good opportunity for game developers to design educational games to suit the needs of university students.

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