

Teaching methods and enhancing students' engagement in a classroom

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Abstract

This study tries to examine how two different teaching strategies have an impact on students' engagement in an Economics class. Both strategies were challenging, but one has been used since 1990s, and one more in the recent five years. Using the teaching method of cooperative learning and a newer method of gamification, the Economics instructors tried to examine students' participation in the class. To what extent these teaching strategies enhance teamwork and learning abilities was also examined. Both the studies were done in Economics classrooms in a public university in Malaysia. Undergraduates were first taught using these two different strategies and then a self-administered questionnaire was used. Using descriptive analysis and t-test, findings show that majority of the students in both types of classes enjoyed the class and found more student engagement and teamwork. As more organisations in this digital era practice the "working in teams" concept, policy implications include the encouragement of the use of different strategies and more educational games in the classrooms at the higher educational level. Other than having a more enjoyable session, these different teaching strategies will inculcate the teamwork concept among students, preparing them for the labour market.

Keywords: Cooperative learning, gamification, student engagement, e-learning

Introduction

We are in the period of the fourth Industrial Revolution (IR 4.0) and the era of cyber-physical production systems (Martin, 2017). The education system plays a significant role in a nation's success in adapting to this new era. For developing countries, poor performance of the education systems can lead to a handicap in preparing workers with the relevant skills (Patrinos, 2018).

In Malaysia, graduate employability is 75% and the Ministry of Education is seeking to increase it to more than 80% by the year 2025 (MOE, 2013). The issues with graduates as reported by employees in the country are a lack of critical thinking and communication skills, language proficiency and teamwork (MOE, 2013). Some suggested ways to improve the critical thinking and communication skills within the higher education learning environment are through student engagement (Robinson & Hullinger, 2008), such as using collaborative learning/cooperative learning (Gokhale, 1995) and educational gamification (Morris et al., 2013).

Within the traditional learning structure, student engagement is a catalyst for students' success in school (Klem & Connell, 2004). In fact, academic engagement during college was found to have a positive differential effect on early career earnings (Goodenow, 1993; Willingham et al, 2002).

Through the national Education Blueprint 2015-2025, the Malaysian government inspires a learning environment that is "less focused on traditional, academic pathways" and emphasizes outcomes and active usage of technologies and innovation (MOE, 2013). The use of technology such as online learning can be a catalyst to success in students' grades and attitudes to learning (Robinson & Hullinger, 2008).

While cooperative teaching strategies promote student engagement as they involve teamwork and active class discussions, the use of technology in a classroom will also prepare the students and the learning institutions for IR4.0. The question arises as to whether we can increase student engagement through a technology-based gamification teaching environment and a cooperative teaching strategy.

To answer the above questions, this paper compares two outcomes of teaching strategies in an Economics class. The objectives of the study are (1)

to analyse students' participation and engagement in an offline e-learning gamification quiz, and (2) to compare the findings of this study with the outcome of a cooperative learning study conducted earlier. In both studies, the objective of study was to determine to what extent these teaching strategies enhance teamwork and learning abilities.

Literature review

Gamification is the use of game mechanics and game design techniques, such as the awarding of points, rewards or other incentives, in non-game contexts (Muntean, 2011). A cooperative learning approach is an instructional use of small groups so that the students can work together in maximising their own and other members' learning (Johnson et al., 1991).

One of the greatest and inevitable challenges educators face is determining the most effective teaching strategies for their students. Understanding and assessing student involvement in learning can help teachers design the most effective curriculum and determine how students learn best.

Gamification

Gamification is the craft of deriving fun and adding game elements and effectively applying them to productive activities (Pelling, 2011). Gamification is the use of game metaphors, game elements and ideas in a context different from that of the games used to increase motivation and commitment, and to influence user behavior (Marczewski, 2013). The use of game thinking and game mechanics in non-gaming context is a teaching technique that uses social gaming elements to deliver higher education. Recent studies have shown that this attempt seems very promising in different areas (Akpolat & Slany, 2014).

Losup and Epema (2014), who applied two gamification-based courses, found that the passing rate was over 75% at the first attempt. Studies show that gamification is correlated with an increase in the percentage of passing students, and in the participation in voluntary activities and challenging assignments. Gamification seems also to foster interaction in the classroom and trigger students to pay more attention to the design of the course.

Baharin et al. (2015) also found that students receive more satisfaction through the efficiency and effectiveness of online learning because they use information and communications technology (ICT) in their learning. Studies also show that gamification confirmed the effect of raising learning motivation and fun in the context of a theory-loaded content (Taspinara, Schmidta & Schuhbauerb, 2016)

In other words, the whole process of implementing gamification plays a crucial role. For this reason, gamification can be a powerful solution to address motivational problems within learning or working contexts, as long as they are well designed and are built upon well-established implementation models. The incorporation of gamification frameworks in online learning environments is an increasing trend. With proper integration of gamification in the field of e-learning into higher education, a positive impact on the learning process can be achieved, such as higher satisfaction, motivation and greater engagement of students.

Cooperative learning

Cooperative learning is one of the most commonly used forms of active pedagogy. Taking place through an individual's interaction with his or her environment and peers, cooperative learning is largely based on the idea that students learn through social contexts (Adams & Hamm, 1990).

Cooperative learning, as Johnson and Johnson (1989) defined, has five essential components: (a) positive interdependence searching for a common goal, (b) face-to face interactions, (c) individual and social accountability, (d) use of interpersonal skills, and (e) group-processing skills.

Cooperative learning has increasingly become a popular form of active pedagogy employed in academic institutions. Tsay and Brady (2010) explored the relationship between cooperative learning and academic performance in higher education, specifically in the field of communication. They assessed cooperative learning using seven components, as proposed by previous literature such as Johnson et al. (1991) namely group processing, motivation, competition, dependability, accountability, interactivity, and use of collaborative skills. Studies basically show that cooperative learning is a strong predictor of a student's academic performance. A significant positive relationship was found between the degree to which grades are

important to a student and his or her active participation in cooperative learning (Johnson & Johnson, 2009). The survey of educational research demonstrates cooperation, in comparison with competitive and individualistic efforts, results in higher achievement and greater productivity, more caring, supportive, and committed relationships, and greater psychological health, social competence and self-esteem.

Studies show that both learning strategy and motivation level had a significant effect on the Physics learning achievement. These are all in line with most previously conducted studies including Shimazoe & Aldrich (2010) and Turgut and Gülşen (2018) which compare the effects of cooperative, competitive, and traditional situations on students' achievement in different content areas (Johnson, Johnson & Smith, 1991). The results of these studies are also supported by the literature which indicates that improvements in student achievement are associated with the use of cooperative learning techniques (Slavin, 1992). In an experimental study among accounting students in Malaysia, it was found that students in the cooperative learning class performed better in their Economics lesson compared to the traditional class (Zain, Subramaniam, Rashid & Ghani, 2005). The fundamental findings of those studies indicated that students' productivity in cooperative learning settings is higher than in traditional learning.

Studies also showed that students enjoyed being more active in class and appreciated the input and perspectives of peers (Herrmann, 2013).

The cooperative learning literature has focused a lot on "structures" assuming that if structures supported positive interdependence and individual accountability, students would engage in promoting interaction (Johnson & Johnson, 2009).

Methodology

Universiti Teknologi MARA is the largest public university in Malaysia with a student population of more than 160,000, with more than 13 state campuses. Most programmes and faculties offer Basic Economics as a core subject needed to pass the subject.

An offline gamification quiz

A quiz in the form of an offline e-game was given to several groups of undergraduate students taking Economics classes in mid-2017. A total of 192 students were involved in the educational game. Students in the classes were divided into small groups. Each group took turns to answer a quiz question according to a given time limit. The quiz was prepared using Microsoft PowerPoint and was presented using PowerPoint slides.

The gaming element of the quiz involved a random component played using an illustrated wheel. To answer a question, a representative from each group was required to spin the wheel by pressing a key on the computer keyboard to begin and end the spin to a selected question. Each question was allocated certain marks, depending on the level of difficulty of the question. The questions were set according to the levels of cognitive learning required by the university curriculum, based on Bloom's Taxonomy. An interactive response using an emoticon and sound followed each correct or wrong answer.

The gaming quiz had the objective of making specific students answer the chosen question. During the quiz, the lecturer and students would discuss and correct any questions wrongly answered. The game is also a means to encourage healthy competition among the students through attempting to get the highest marks and attempting to answer before the specified time limit ended.

A survey questionnaire was administered to the students after the quiz. Questions include demographic profile, enrolment information, students' awareness and perception about the technology used in class and e-learning tools being used in educational institutions. There were also questions on the effectiveness of the game as a tool for learning in terms of elements of fun, suitability of the game for revision purposes and for the subject in hand, and students' level of engagement in the classroom. The questionnaire ended with some statements to elicit what they liked or disliked about the educational game. Analysis was done using descriptive analysis.

Cooperative learning technique

As for the cooperative learning technique, the study was done earlier. The participants for the study comprised 61 students from the Faculty of

Accountancy from the same university. These students, who are from two different classes, were subjected to two different methods of teaching for one semester that lasted 13 weeks. One class was randomly designated as the treatment or experimental group and comprised 31 students, while the other class which was the control group comprised 30 students. The experimental class was taught using the cooperative learning technique while the control class was taught using the traditional lecture approach.

The independent variable of this research design is the instructional strategy (cooperative learning vs. traditional approach) and the three dependent variables are students' achievement, attitude towards the subject and attitude towards the strategy. Students' achievement was measured by the final examination results. Two sets of questionnaires were administered to measure the attitude of the students towards the strategy and the subject.

To compare students' attitudes towards the subject, both classes were administered with a questionnaire which had ten items. The items were worded in such a way as to find out how they felt about the subject, how interesting or boring they found it, whether they were able to concentrate during class and whether they were able to complete their work and the given assignments within the stipulated time. However, to examine the attitude of the students towards the strategy, only the treatment class was given a questionnaire. Section A of the questionnaire contained 15 items to determine how members interacted during class and also their response towards classroom activities using the cooperative learning approach. Section B of the questionnaire contained two open-ended questions on what they liked most and what they disliked most about the cooperative learning strategy. A reliability test was done and the Alpha Cronbach coefficient showed a score of above 0.75 for both sets of questionnaires. The students were asked to rate their level of agreement for each item on a five-point Likert scale (1 = Least Agree to 5 = Very Strongly Agree).

Findings

As shown in Table 1, a total of 192 students from three different faculties from Universiti Teknologi MARA, Malaysia participated in this survey. The undergraduates were from the Faculty of Accountancy (n=84), Faculty of Business and Management (n=88), and Faculty of Administrative Science

and Policy Studies (n=20). Of them, 73% (n=141) were full-time students taking classes during weekdays, while 27% (n=51) were taking flexible learning programs. From these respondents, 68% were females and the remaining 32% were males. Most of the students (61%) were from the age group of less than 20 years old, while 20% were between 20 and 23 years old, and 19% were above 23 years old.

Table 1: Demographic profile of respondents

Item	Description	Percentage
Gender	Male	32
	Female	68
Age	< 20 years	61
	20-23 years	20
	>23 years	19
Bachelor's Degree Programme	Accounting	44
	Administrative Science	10
	Human Resource	6
	Marketing	13
	International Business	11
	Operation Management	16
Mode of Study	Full-time	73
	Flexible learning	27

Students were evaluated on their experience doing the Economics quiz through the game. A 5-point Likert scale questionnaire was given to the students after the Economics quiz. As Table 2 shows, the students found the class enjoyable and fun. But most importantly, more than 85% of them found that revising the lesson using a game had allowed them to understand their lesson well and made them feel connected. The educational e-game had also achieved its objective to increase students' engagement as they found the group activity and game enjoyable, suitable for class discussion and appropriate for an analytical subject like Economics. Overall, the students exhibited a high level of engagement during the quiz and recommended that a similar technique of learning be applied to other courses they were taking.

Table 2: Respondents' responses upon experiencing the educational game

Statement	Mean	Agree & strongly agree (%)	Neutral (%)	Disagree & strongly disagree (%)
The lesson was very enjoyable.	4.41	92	7	1
I was able to understand the concepts taught well.	4.21	88	10	2
I enjoyed working in groups	4.28	89	10	1
I find it fun learning.	4.39	93	6	1
It makes me feel connected.	4.24	88	11	1
It is very suitable for revision purpose.	4.31	91	8	1
I hope to have more Economics lessons using this method.	4.28	87	11	2
I would like to recommend that other lecturers also use this innovative method	4.2	85	12	3

When asked what the students liked the most about the educational e-game, slightly more than half of them answered that it enhanced cooperation among group members and improved communication among them (58%) and was fun and exciting (53%). Slightly less than half of the students felt that the game made them understand the lesson better through assistance from their peer friends (42%) and the game led to the exchange of ideas and opinions (41%).

Table 3: What the respondents liked about the educational game played

Statement	Percentage
Cooperation among friends and better communication among members.	58
Fun and exciting.	53
Get to understand lesson better with assistance from friends.	42
Get to exchange ideas and opinions.	41
Get to know friends better.	12

It is enlightening to find that students did not have much negative attitude or feeling towards the educational game even though most were not familiar with the use of e-games during their regular class lessons. More than half (62%) of the respondents liked the game and only 6% felt that members were uncooperative.

Table 4: What the respondents disliked the most about the educational game

Statement	Percentage
Nothing/Liked it all	62
Difficult to compromise	19
Some members do not completely cooperate	17
Other reasons such as too noisy, depend on friends	15
Too much time wasted by some members	10
Uncooperative group members	6

As for the cooperative learning class, an independent t-test was done to compare what the students perceived about their social skills and student engagement in the two different classes. As revealed in Table 5, the results clearly demonstrate that the students who were exposed to the cooperative learning approach had a significantly higher mean with regard to their social skills compared to the students in the control class. The difference was significantly different as indicated by the p-value.

Table 5: Students' perceptions towards their social skills

Class	Instructional Strategy	Number	Mean	Standard Deviation	t- value	p-value
A	Cooperative Learning	31	4.37	0.44393	7.327	0.000
B	Traditional Approach	30	3.48	0.49586		

Other than the questionnaire administered to compare the social skills of students in the two different classes, the group presentation was a better measure of the social skills. Both classes were required to do a group presentation of a given assignment. Both classes were given the same questions, the same preparation time and the same presentation time. The students from both classes had on average the same marks for facts and contents. However, it was noted that all groups in the cooperative learning class had higher marks for the presentation. The students in the cooperative learning class also revealed qualities such as leadership and teamwork whereby they took the lead in answering questions, helped their group members who were in distress or who could not answer, and discussed among themselves before the leader concluded by giving the answer. They also gave moral support to each other and stood together as a group and explained each answer confidently from the start of the presentation until the end. These findings agreed with past studies.

Conclusion and recommendations

Some major conclusions from this paper suggest that firstly, tertiary level students enjoy different strategies employed in the classroom. Secondly, the gamification technique enhances student engagement and cooperation among students. Thirdly, students in a cooperative learning class showed more positive communicational and social skills compared to the students in the lecture class. Fourthly, students in general enjoy educational games when used as class activities during lessons. Even relatively older students at higher education level enjoy class lessons which are enriched with games. Finally, and most importantly, the students worked better in teams in both the gamification class and the cooperative learning class.

The effectiveness of teamwork is very pertinent in the current digital era and globalised economy with labour from various countries in a work environment. The use of technology-aided education will enhance the learning process as it is more interesting and more creative than the traditional mode of teaching and learning without the use of technology. The fast development of ICT and the use of electronic gadgets in everyday life has allowed games to be increasingly significant for the young generation. Thus, using games for educational purposes such as for Economics education would allow lessons to be more effectively learnt and for students to be more engaged in class. Educational games when used during class sessions encourage the exchange of ideas, cooperation, and communication, and generate excitement. It also can be established that cooperative learning promotes a positive relationship among students with a tendency to be more cooperative among the peer members in discussing and solving problems.

However, the use of games and cooperative learning techniques in higher education is still very scarce in many universities in Malaysia. The main reason is time constraints and rushing to complete the syllabus. Given the ease of technology to enhance and aid learning in class, the use and development of e-learning materials with gamification included for student engagement should be encouraged.

As gamification through various e-learning applications can bring two critical advantages among students who will soon join the labour force, the importance of using gamification as a method of teaching at higher educational institutions cannot be taken lightly. Besides, educators who are looking for better ideas to make their Economics class interesting should try these two different teaching strategies to enhance student engagement and teamwork. Further research into attributes of students and a larger sample size in different classroom environments would shed more light on the effect of this method of learning outcomes.

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