FACTORS CONTRIBUTING TO THE PERFORMANCE OF ACC GAME

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Introduction

Accounting as one of the subjects in business education, has functions in developing individuals' skills, knowledge, attitudes and values in life. Accounting is an essential part of business education in which much of our daily life is governed and affected, by the results and application of business. However, learning professional subjects in accounting is not like reading a novel, memorizing, or even like just mastering the accounting terms. In other words, it is very challenging, especially for the non-accounting students. Non-accounting students in general find accounting as a challenging subject and they rarely can see its relevance. This can be a vicious circle. Since accounting is taught in a progressive way, with each week providing a foundation for the next, poor attendance contributes to study difficulties. Any classes missed lead to problems in catching up, which in turn can lead to further demotivation. The various groups of students from different backgrounds studying accounting faced numerous problems. Accounting is defined as the art of classifying, recording, summarising and interpreting the financial statements and is used by both the internal and external users to make decisions. The nature of accounting that involves numbers and mathematical formulas may create negative perceptions to students who do not have knowledge in accounting. The students may assume that the accounting subjects are hard to understand and thus lose interest to learn the subject. A key issue here is the lack of motivation for the students in realizing about the relevance of accounting in their particular subject.

> ***"Research about students should be a primary mission of accounting education research. We should be interested in how students learn."***
> ***(Apostolou et al. 2001.)***

Learning accounting can be challenging for students regardless of whether or not they have taken the subject during secondary school. This is supported by prior research which stated that students may find studying accounting difficult as this subject is not a major subject for their course. However, due to the university's requirement, some courses still have to include the "Introduction to Financial Accounting" subject in their study plan. In Universiti Teknologi Mara (UiTM), students from various courses, for example, Faculty of Administrative Science and Policy Studies (FSPPP), Faculty of Computer & Mathematical Sciences (FSKM) and Faculty of Sports Science and Recreation (FSR) are required to take the accounting subject. This is to prepare them to have more skills and become marketable in the current job market in line with Industrial Revolution 4.0.

However, some students are having difficulties in understanding the basic accounting equation and classification even though a lot of examples and exercises had been done in lectures and tutorials. For this accounting subject, if they are unable to understand the basic concept of accounting equation and classification, they will face difficulties in understanding the double entry system for the next class and so on. This will make students become bored and frustrated throughout the learning process. Therefore, in order to overcome this problem, an initiative is taken by a group of lecturers to create and conduct an educational game in teaching the accounting subject. This initiative serves as a supplement to the traditional pedagogy to enhance students' understanding regarding this topic. The game named Accounting Classification Card (ACC Game) was developed to collaborate active learning approach by incorporating games into accounting courses. The game will focus on accounting equation and classification as this is the fundamental of accounting. This innovative game which was extended from the previous edition will take 60 minutes to prepare students with a solid knowledge of accounting concept.

After playing the game, students were asked to answer a questionnaire to indicate their feedback of the ACC Game. The result from the questionnaires were tested using PLS-SEM. The analysis was done to test the relationship between 3 indicators (i) motivation, (ii) learning strategies and (iii) game feature to student's performance of ACC Game. Thus, the purpose of this study is to examine the factors contributing on the performance of ACC game. The rest of the paper will be followed by literature review, data analysis result and conclusion.

Literature Review

The type of teaching methodology and approaches of the educator can make the subject seemed easy or difficult by most of the students. According to Renninger and Hidi (2011), there is a vast transformation in psychological and physiological processes when the information received captures our interest or not. Students at large rely on visual

representations and other learning tools and sources in order to understand a certain topic. Therefore, when educators do not make use of teaching aids students may have a hard time understanding lessons because educators still explain topics on a complex level even though students are not able to capture the lessons (Bacay et al, 2015).

Students at this age of rapid technology advancement are digital citizens. They are growing up with the availability of technology enhancement in many aspects including in teaching and learning in which provides them a learning process with high-quality learning outcomes. Therefore, in order for students to be active participants with strong motivation and engagement in their own learning, educators have to use different teaching methods and approaches rather than traditional methods. The task of the educators in delivering the knowledge through traditional approaches such as group discussions and class activities is becoming more challenging due to the rapid changes in the learning environment that are depending in the online environment and social network (Hitchens & Tulloch, 2018). Technological approach such as using visual aids in delivering knowledge to enhance the comprehension and interest appropriate to the topic as well as to assist lecturers in creating a collaborative learning environment (Wilder, 2015). Different approach such as gamification in education will be able to enhance the learning skills of the students due to the similar characteristics between gamification and game (Smiderle et al., 2020).

The use of games and simulations in delivering knowledge to students have advantages due to the ability of the approach to capture the attention of the students in the classroom as compared to the traditional settings. A study by Shanklin and Ehlen (2007) suggests that the game approach is able to enhance the learning attitude among students and simultaneously helps student to achieve better results in the assessments. As an entertaining learning approach, games can turn the behaviour of the students from a passive person to the active participants through teamwork, collaboration and interaction with other players (Ashwin 2005; Chin & Zakaria 2015). Likewise, students who are involved in the games are able to gain more knowledge and obtain higher scores in test and examination, improve problem-solving skills, enhance cognitive growth and adaptive to the changing environment (Albrecht & Green 2008). Hitchens and Tulloch (2018) conducted a study on the relatedness, competence and autonomy of a gamification and found that a majority of the students perceived the activity as useful, enjoyable and educationally beneficial.

In the current education system, the lack of engagement and motivation of students to participate actively in the learning process poses as a major problem. As a result, educators try to use new techniques and approaches to enhance students' activity and motivate them to participate in learning. It was deducted that rewarding the efforts and attaining results by awards, leads to increased motivation for participation and activity. That conclusion is the outcome on the use of game elements in the learning process. Gamification is not directly associated with knowledge and skills. Gamification affects students' behaviour, commitment and motivation, which can lead to improvement in knowledge and skills (W. Hsin-Yuan Huang, D.Soman, 2013). Students are motivated to play the learning games should the game provides them benefits and enable them to enhance their scores in the subject (Hays 2005). Therefore, it is hypothesised that:

H1: Motivation has a positive effect on the game performance.

Successful game design and features allows the students to play the game in a positive and enjoyable environment. Gamification hat are designed with interesting features helps to improve the level of understanding among the players and simultaneously increase their satisfaction in completing the game (Peng, Lin, Pfeiffer & Winn 2012; Ryan et al. 2006). The desirable output and great impact of the game may not be achieved through limited features and content (Whitton & Moseley 2012). Thus, it is hypothesised that:

H2: Game features has a positive effect on the game performance.

The game was conducted in group, therefore each member in the group is encouraged to discuss among them in providing answers for the transactions given. The collaboration and teamwork may help them to score higher marks rather than working on individual basis. The collaboration among students as a strategy in playing the game leads towards shared, relevant and goal-oriented activities (Kim et al. 2015) as well as positive learning behaviours (Alsawaier 2018, Smiderle et al. 2020). Hence, the hypothesis postulates that

H3: Learning strategies has a positive effect on the game performance.

Research Methodology

Sample and measuring variable

The sample for this study consists of 106 non-accounting students who were taking financial accounting subject. The students were required to play the ACC game before answering the online questionnaires. Three predictors namely

motivation, learning strategies and game features were used as independent variables in this study. Meanwhile, students' performance was used as a dependent variable in determining the effects of the Accounting Classification Card (ACC) game on performance of the students in the accounting classification topic. The scales for the constructs were adapted from Kebritchi et al. (2010). Motivation was measured by eight items, learning strategies was measured by 5 items, game features was measured by 6 items and lastly performance was measured by 4 items.

Procedure of the game

The game will take 60 minutes and the student needs to complete answering the question in the time given. For the first 13 minutes, students will be occupied with e-content notes on classification of accounting topic. Once they finished reviewing the notes, students will take 7 minutes for self-evaluation. Then, students will form a group consisting of five members and start playing the game in 30 minutes. After the game ended, students will be given another 7 minutes to re-evaluate their performance. The tools used in this game are game board and an accounting classification colour magnetic card. The colour magnetic card was creatively designed to enable students to play and learn this educational game interactively. The instructions of the game will be given before the game is started. To make it more interesting and to encourage higher team spirit, students (player) were divided into groups consisting of 5 members in each group.

Results and Discussion

Profile of Respondents

A total of 106 students participated in this study. These respondents comprised of 13 (12.3) % male and 93 (87.7%) females. In addition, a majority of the respondents are from the Science Policy and Corporate Administration course ie. 77 (72.6%) while the remainders are from the Science Computer course ie. (27.4%). Only 30 students (28.3%) have taken accounting subject in their previous courses.

PLS-SEM Analysis

The hypothesized relationships in the research model were analysed using the PLS-SEM through the assessment of two consecutive phases namely measurement model and structural model. The validity and reliability of the measurement model was assessed using internal consistency reliability, indicator reliability, convergent validity and discriminant validity. For internal consistency reliability, the measurement model is satisfactory when the composite reliability (CR) of each constructs exceed the threshold value of 0.7. Item's loadings are used to assess the indicator reliability. A measurement model is satisfactory when each item's loading is at least 0.7. The convergent validity is evaluated using Average Variance Extracted (AVE), where the threshold value must be at least 0.5. Fornell and Larcker's (1981) criterion was used to measure the discriminant validity. A measurement model has discriminant validity when the square root of the AVE exceeds the correlations between the measure and all other measures. As the results, the values of the indicators loadings, indicator's reliability, average variance extracted (AVE) and composite reliability that were obtained in the measurement model assessment exceed the threshold values, thus the reliability and validity of the research model in this study is achieved. The results for the reliability and validity are shown in Table 1. Fornell & Larcker's criterion was applied to assess the discriminant validity and the results in Table 2 shows that the indicators represent their construct and at the same time differ from the other constructs, (Forner & Larcker 1981; Urbach & Ahlemann 2010). Discriminant validity is achieved when the square root of AVE exceeds the correlations between the measure and all other measures. The results of discriminant validity of this study confirmed that the Fornell and Larcker's criterion is met.

Table 1. Measurement model

Construct	Items	Loadings	CR	Alpha	AVE
Motivation	M1	0.845	0.920	0.900	0.953
	M2	0.829			
	M3	0.825			
	M4	0.794			
	M5	0.795			
	M6	0.588			
	M7	0.758			
	M8	0.792			
Game Features	F1	0.794	0.920	0.895	0.657
	F2	0.781			
	F3	0.808			

	F4	0.844			
	F5	0.800			
	F6	0.834			
Learning Strategies	LS1	0.705	0.844	0.772	0.522
	LS2	0.728			
	LS3	0.787			
	LS4	0.765			
	LS7	0.716			
Performance	P1	0.886	0.943	0.920	0.806
	P2	0.911			
	P3	0.887			
	P4	0.907			

Table 2. Discriminant validity (Fornell & Larcker's Criterion)

	Features	Learning Strategy	Lecturer Involvement	Motivation	Performance
Features	**0.811**				
Learning Strategy	0.738	**0.722**			
Motivation	0.805	0.749	0.629	**0.770**	
Performance	0.729	0.724	0.565	0.761	**0.898**

The structural model was then assessed once the measurement model was completely evaluated and provides satisfactory results. The validity of structural model was assessed by obtaining the coefficient of determination (R^2) and path coefficients value. The (R^2) examines the explanatory power, where it indicates the amount of variance in the endogenous constructs (performance) that is explained by the exogeneous variables. The significance of path coefficients value for all hypothesized relationships were obtained through the bootstrapping procedure with 1000 sub-samples (Chin 1998). The t-values were used to evaluate the statistical significance of each path coefficient. The bootstrapping results indicate that only hypothesis 1 (H1) and hypothesis 2 (H2) were supported. For H1, the results show that motivation has positive and significant effect of student's performance (t-value= 2.829) while H2 on the relationship between learning strategies and performance was significant at t-value= 1.970. Meanwhile, for hypothesis 3 (H3) for the relationship between game features and performance (t-value=1.147) was not supported. The results also reveal that motivation is the strongest predictor (β=0.366) on student's performance, followed by learning strategies (β=0.286) and lastly game features. Table 3 shows the result for path coefficients, p-values and t-values of the structural model.

Table 3. Path Coefficients, p-values, and t-values

Path Relationship	H	Beta Value	t-value	p- values	Decision
Motivation -> perf	H1	0.366	2.829*	0.004	Supported
Learning strategy->perf	H2	0.286	3.082	0.002	Supported
Features -> perf	H3	0.197	1.147	0.252	Not Supported

*t >1.645 are significant at $p < 0.05$ (one-tailed)

The purpose of this study is to examine the factors contributing to the performance of ACC game. The factors that contributed to this study consist of motivation, features and learning strategy. Overall, the result shows that motivation and learning strategy have positive significant effect on the performance of ACC game. On the other hand, features of the game have a positive effect but did not significantly support the performance of the ACC game.

The result shows that motivation highly contributed to the performance of the ACC game. It explains that the ACC game motivates them to learn accounting classification and equation. The students also clearly identify a high level of understanding on the accounting classification which in turn enhanced their confidence level in learning the accounting subject. In addition, this ACC game is able to adapt and interactive learning style in class which captures students' interest compared to using non-traditional method. The learning strategy also contributed to the performance of the ACC game. The students were thinking critically in answering the ACC game as their strategy to get a high score. Besides, they discuss with other group members and carefully choose the card in answering the question. They also memorize key words to remind them of the important concepts in the ACC game. In summary, students have successfully implemented strategies

in completing the game and simultaneously improving their understanding in accounting classification.

Features is not a significant predictor towards performance of the ACC game. The design and tools in this game do not affect the performance of the ACC game. This explains why the students put more emphasis in answering the game rather than focusing on the design and tools of this game.

Conclusion

The game is believed to create a more fun learning approach as compared to the traditional method. It helps students to become active participants and can add an element of business reality to the classroom. The combination of learning and entertaining through the creative game encourages students to find the accounting subject as an interesting subject to learn. Moreover, the concept of creative learning through games is able to enhance the students' skills particularly in communication and teamwork.

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