The Effectiveness of Gamification in Finance Education

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Abstract
The Finance educators today face many challenges in providing an effective learning environment to their students: the millennials, who are the digital natives. They have different learning styles and require new teaching and learning process that have triggered the main problems in education today. It is no longer possible to assume that the learning could be accomplished solely by linguistic resources and/or crowded slides of confusing texts and formulas. Hence, this study investigates the effectiveness of gamification in finance education. The participants in this study were 50 students from two classes who registered Financial Management course at Politeknik Kuching Sarawak. One class of 26 students was randomly selected as the experimental group which employed the gamification technique in teaching and learning while another class of 24 students was assigned as the control group with normal traditional curriculum activities. The formative assessment indicates that learning via gamification result in higher learning performance. A questionnaire was also developed to elicit the participants' views towards the gamification technique. The results reveal that the gamification technique allured their interest and enhanced their motivation to learn. It is hoped that the findings of this paper will contribute to the improvement of quality in finance education by incorporating the gamification whenever applicable.

Keywords: Gamification, Game Based Learning, Finance Education, Blind Kahoot!

Introduction

The today's students, the millennials, who are the digital natives, are brought up with visual practices and digital technologies. They have different learning styles and attitude towards the learning process that have triggered the main problems in education today. Yap (2016) found that many lecturers are still using conventional teaching and while they are explaining and writing on the board, some of the students will copy the same thing onto their notes, some are day dreaming or even sleeping. There are several reasons for drop-outs or low performance especially in TVET education: the students' boredom, lack of engagement and absenteeism that caused the students less willing to attend the lecture. Hence, the educator should identify pedagogically which content are difficult to learn and how gamification can tackle the issue of students' motivation and engagement during their learning process.

As the concept in Finance is difficult to comprehend, the students may adopt strategy like memorizing the formulas in order to achieve good grades at the expense of understanding the rationale of doing so. For instance, even though the students have learnt the standard deviation in statistic course during semester one in polytechnic and also during their secondary school, most of them still do not understand the meaning of standard deviation. Therefore, they are not able to understand how the standard deviation can be applied to measure risk. These obstacles may cause them to feel depressed, frustrated or cynical which are not present in the gaming environment where the students who had done with the work, will leave the game and go to another level of game that's more challenging. This is further enhanced by instant gratification to keep them engaged and motivated.

Effective pedagogic approaches are vital in Finance education to maintain high quality teaching and to engage and motivate students in learning. Gamification offers a new approach that can help the educators in finding the balance between achieving their objectives and catering to evolving students' needs. As such, it is vital to identify what are the gamification elements that enhance learning engagement in Financial Management course and how to construct a new learning approach in Financial Management course through gamification. Hence, this study intends to explore the use of gamification as a pedagogic approach to engage and motivate the students' learning in Finance education. The hypotheses that there is no significant difference in students studying with gamification between treatment and control group is tested.

Literature Review

People like playing games as it is fun and entertaining. These features grab hold the players and motivate them to keep playing (Hamari et al., 2014). Gamification involves the use of game elements in non-game context (Deterding et al., 2011). The gamification guru, Yu-kai Chou defines gamification as "the craft of deriving all the fun and addicting elements found in games and applying them to real-world or productive activities". In the context of learning, gamification is an application of gaming elements to real life tasks to influence behavior, improve motivation and enhance engagement (Marczewski, 2012).

In today's digital generation, gamification has become a popular tactic to encourage specific behaviours, and increase motivation and engagement (Dominguez et al, 2013;

Huang and Soman, 2013; Paisley, 2013). In support, Hamari et al. (2014) showed that gamification has considerable potential in enhancing students' motivation and engagement in the learning task as well as enjoyment over them. Graziela (2014) further highlight that gamification can provide an innovative, creative and investor student who actually tries, takes risk and in time makes mistakes. This is supported by Kapp (2014) who showed that the gamification promotes motivation and facilitates effective learning via the adoption of game elements, mechanics and game-based thinking.

As gamification serves the purpose of mitigating the negative emotions and feelings that the students usually come across in traditional forms of education, it encourages the students to learn by employing the learn-by-failure technique that is popular in game-like environments, where students can make mistakes and try again without the embarrassment factor that they usually face in classroom education. This is proposed by Lagendahl et al. (2016) that the gamification elements in education can be classified into three types: the surface elements are visuals that quantify the player's performance; the underlying dynamics are the elements that summarize the condition of a game including freedom to fail, feedback, progression, narrative and choice; and the gaming elements that create the gaming experiences for players in non-game activities like challenge, competition and enjoyment. However, it does not mean that a gamified learning program must possess all these elements.

Another strand of studies focuses on the effectiveness of gamification in enhancing the students' learning performance. There are several studies that demonstrate gamification as a powerful learning tool which could result in higher students' learning performance (Divjak & Tomic, 2011; Ashraf et al., 2014; Hung et al., 2014; de-Marcos et al., 2016). Researchers found that gamification provides a learning environment that promotes students' interest and motivation in learning which subsequently result in good learning achievement. However, it should be highlighted that gamification has to be appropriately designed in order to exert a positive impact on the realization of educational goals.

Methodology

There are many gamification platforms available nowadays which are freely available for everyone. This study adopts Kahoot! which allows students to join the Kahoot! session by entering the code given by the instructors using their smart phones, tablets or ordinary computers. In addition, the Kahoot! platform encompasses all the five factors that determine learning engagement as described by Whitton (2011). This is supported by the past findings that demonstrate the effectiveness of Kahoot! in providing positive impact on motivation and engagement of students in learning as they perceived Kahoot! has made their learning enjoyable, easy to use, interactive and helping them to understand their subjects better (Zarzycka-Piskorz, 2016; Plump & La Rosa, 2017; Tan, Ganapathy & Manjet, 2018).

Nevertheless, the past literature has mainly focused on the use of Kahoot! for review, formative assessment or to re-energise the class. This study looks into the new idea in Kahoot!, the Blind Kahoot! proposed by a science teacher Stephanie Castle in New York, in teaching the measurement of risk and return in Financial Management course. The Blind Kahoot! is designed to induce the students' curiosity, promotes

understanding and reinforcement in learning a new concept. Compare with the conventional use of Kahoot!, Blind Kahoot! employs assessment to learn instead of assessment of what has been learned. It is all about building and reinforcing knowledge brick by brick in a single game.

The Blind Kahoot! session in this study consists of 21 questions. The opening of the Blind Kahoot! session is designed with the introduction of the game to enable the players to know what are expected to learn. This is done by using a "Blind" question to ask something completely new (how to measure the risk) to the players to spark their curiosity. The answer is explained by the instructor and this is followed by a series of questions focused solely on what they have just learned. Another "Blind" question is then raised to teach the subtleties (how to measure the return). This is followed by another series of questions escalating in difficulty to let the students apply what they have learned. The cycle repeats for the concept of coefficient variance and finally, the questions aim to instill compound reinforcement are raised to help the players consolidate everything they have learned in the Blind Kahoot! session.

The real teaching situations in Financial Management course are used to analyse the gamified learning program. Students who enrolled in Financial Management course are selected. One class of 26 students was randomly selected as the experimental group which employed the gamification technique (Blind Kahoot!) in teaching and learning while another class of 24 students was assigned as the control group with normal traditional curriculum activities.

The same lesson was presented to both classes but only the experimental group was exposed to the Gamification technique. On the other hand, in the control group, the content was conveyed verbally and the same content was used during both lessons to avoid confounding effects on the experiments. A formative test was then administered to gain the students' learning outcomes from both classes. The purpose was to identify whether the learning outcomes from the experimental group made differences as compared to the control group.

Ronald (2005) proposed to use multiple sources of evidence such as student's performance and student's ratings in measuring the pedagogical effectiveness. By drawing on different sources of evidence, a more accurate and reliable decision can be derived as the strengths of each source will outweigh the weaknesses of the other sources. Hence, the observation of student behaviour during the gamified lesson was conducted while a questionaire was also developed to elicit the participants' perceptions from the experimental group towards adopting Gamification in learning Finance. The questionnaire comprised of 10 questions which were rated on a five-point Likert Scale from strongly disagree to strongly agree.

Findings

The mean scores of the quiz in Risk and Return Measurement are tabulated in Table 1. The experimental group recorded remarkable higher means than the control group. This supports the hypothesis that using the Gamification technique enhances students performance.

Table 1: Mean score of the formative test

Group	Mean score	Standard Deviation
Experimental	87.5	2.26
Control	79.6	5.34

In regards to the classroom observation of students' behaviour, it is noteworthy to highlight that the majority of the students demonstrated the immediate indicators of engagement (Mandernach et al., 2011) as in Table 2 during the Blind Kahoot! session.

Table 2: Observation of students' behaviour during the Blind Kahoot! session

1.	Actively listened and looked at the screen
2.	Highly focused attention
3.	Actively responded to each of the questions
4.	Questioned or discussed with their peers
5.	Demonstrated body language that it was fun and interesting with smiles and laughter

The results pertaining to the perceptions of the experimental group towards Gamification technique were also inspiring (as in Table 3), indicating the usefulness of Gamification technique in enhancing their learning. Almost all students were strongly agreed that the Blind Kahoot! session is interesting and they have fun playing the game. The most encouraging findings would be the high scores in the students' engagement where almost all focus on each item in the Kahoot! session and respond to it. Students also like the fun and excitement from the competitiveness feature and were motivated by the prospect of winning. This has fostered them to pay more attention during the lecture.

The interest, engagement and motivation fostered thus help the students to understand the lesson. They also agreed that the Kahoot! session successfully reinforce their learning. Almost all strongly agreed that Gamification should be used as a learning tool in Finance.

Table 3: Perceptions of the experimental group towards Kahoot!

		Mean
1	I find Blind Kahoot! interesting	4.96
2	I have fun playing the Blind Kahoot!	4.96
3	I focus on each item or question in the Blind Kahoot! session	4.96
4	I respond to each item or question in the Blind Kahoot! session	4.96
5	I like the competitiveness in the Blind Kahoot! session	4.96
6	I am motivated by the prospect of winning in the Blind Kahoot! session	4.96
7	I pay more attention during lectures because I hope to win in the Blind Kahoot! session	5.00
8	The Blind Kahoot! session helped me to understand the Risk and Return Measurement	4.96
9	The Blind Kahoot! session helped me to reinforce my learning of the Risk and Return Measurement	4.96
10	Blind Kahoot! should be used in other finance modules	4.96

Conclusion

This study shows how gamification could be coupled with mobile learning in higher education to engage learners and enhance the learning performance. The results shed light on the adoption of Gamification in Finance education that contains the game elements: the combination of challenge, competition and interaction to make the students enjoy the process of learning. It is proven to be effective in fostering the students' engagement and interest to learn in Financial Management course and leads to a higher academic performance. Specifically, this study demonstrates that Blind Kahoot! enables the players to master a new finance concept relatively quickly through a fun and engaging atmosphere. It is not only a great tool for learning terminology but can also be used to introduce a new topic.

From the pedagogical perspective, this study provides useful insights into the learning styles required by the millennial students. By testing the effectiveness of gamified classroom over traditional classroom, it reveals important information about what works. It is hoped that the findings of this paper will encourage the Finance educators to integrate the gamification into their pedagogy to maximise the learning experience.

Finally, it should be noted that there is possibility that the increased students' interest, engagement and motivation are simply due to the short term novelty factors generally associated with the introduction of new technology and learning techniques. Besides, this study examined one mode of gamification only and the sample for this study was drawn from one polytechnic. Hence, further study across a number of institutions is needed to assess whether it is sustainable and applicable to other context.

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