THE MIXED MODE STUDY ON GAMIFICATION IN EDUCATION TO ENHANCE TEACHING AND LEARNING PROCESS

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ABSTACT

Gamification in education is the utilization of game elements in the teaching and learning process. The concepts of gamification make the possibility of making classroom itself like a game. The study is aimed to present the details of a mixed mode study to identify the features of gamification in education to increase the teaching and learning process in the classroom. The objective of this study is to examine the effectiveness of gamification features for enhancing the teaching and learning process in the classroom. The participants for this study were 46 students from a local higher education institution. The quantitative data were gathered with the questionnaires and qualitative data were collected with interviews and observations. The analysis data will uncover: (1) to what extent enjoyment of gamified classroom affect their learning experience; (2) how motivation and reward system are relevant to the adaptivity of gamified classroom; (3) to determine how far the utilization of audio visual and navigation are related to the gameplay experience in gamified classroom. The participants perceive positive (mean=4.049) on audio, visual and navigation elements of gamification in the classroom. This also support by the qualitative data, 97.8% participants have very positive gameplay experience via Prezi in gamified classroom. They felt great, interesting, fresh and interactive of the learning content in gamified classroom and felt fun, easy and happy when they are learning in gamified classroom.

Keywords—Gamification, Gamified Classroom, Mixed Mode.

INTRODUCTION

The current trend in educational field for 2016, which is on the peak of hype cycle are digital assessment, learning analytics, Competency-based education platforms; Virtual Reality or Augmented Reality applications in education, smart machine education applications, Massive Open Online Course (MOOC) platform, and others are still on the rise side. However, adaptive learning platforms, big data in education, gamification and others are in the phase of sliding into the trough [1]. Although it is slightly coming down, the expansion of the internet and mobile technologies have led to use of tools to motivate and engage youths in their daily life. Gamification, by applying game mechanics to non-gaming environments, such as educational field, has proven to be capable of engaging users and leading to the creation of habits and social change [2].

There is an undeniable theoretical benefit from applying gamification into variant field of study, especially it can motivate younger generation to engage with the gamified classroom, and then lead to enhance the teaching and learning process in the classroom study. It provides the potential to generate the stimuli to amplify the small wins generating engagement, user habit and lastly feeding up a progress loop that leads to social change [2].

Furthermore, maximizing enjoyment and engagement of students and inspiring them to learn are the advantages of gamification in education. The utilization of game-like rule systems, player experience and the roles of cultural to stimulate students' attitude [3]. Avatars, background audio, voice recording, characters, images, video, rewards, interactivity and navigation are the features or components of gamification that can be embedded to motivate and engage students to learn [4-5]. However, the integration of gamification in education still need further investigations and empirical data to show what extent gamification in education can impact on the students teaching and learning process.

Thus, this study is mainly to present the details of a mixed mode study to determine the gamification features in enhancing students teaching and learning process in the classroom via Prezi. The aim of this study is to examine the effectiveness of gamification features to enhance teaching and learning process in the classroom. Next part is some background studies on gamification in education and gamification in the classroom as well as their effectiveness studies. The design and method of the study will be discussed and

findings will be tabulated and presented. Finally, conclusion will be made after the discussion of the analysis results.

BACKGROUND STUDY

There are tremendous studies have been carried out to investigate the effectiveness of using game in teaching and learning of various subjects. Gamification also become the trend in teaching and learning since it can engage students effectively, stimulate students interest, retain their focus and remain a positive attitude in the teaching and learning process. Thus, gamification has the potential to enhance teaching and learning process via the gamified classroom. Table 1 has tabulated a number of studies that have been conducted to identify the outcome of a change in teaching and learning environments and its evidence where available. Most of the study also used mixed mode study to investigate the impacts or effectiveness of gamification and their results also shown positive responds on motivation, engagement and academic performance. However, there is one of the study had shown the negative results that students did not show any significant improvements on their assignment, performance after they completed gamified experience [4].

Table 1
Summary of previous studies regarding to gamification in education

Authors	Year	Area of study	Results	Used Methods
Dominguez et al. [4]	2013	The impacts of gamification learning experiences	Students who completed the gamified experience got better scores in practical assignments, performed poor in written assignments and less participate in class activities	Experimental study - Qualitative and quantitative
Hanus & Fox [5]	2015	Longitudinal study on effects of gamification in the classroom	Students in the gamified courses shown less motivation, satisfaction and empowerment over time than those in the non-gamified class.	Survey
Cakiroglu et al. [6]	2017	Influence of gamified ICT course on engagement and academic performance	The combination of gamification elements provide a positive motivational impact on engagement and indirectly affect the academic achievement.	Qualitative (interview) and quantitative (Engagement Scale)
Marti-Parreno, Segui-Mas & Segui-Mas [7]	2016	Teachers attitude towards and actual use of gamification	Teachers shown positive attitude towards gamification in private universities than public universities.	Exploratory study
Lister [8]	2015	The effect of gamification on students motivation and performance at the post-secondary level	The gamification elements can motivate students and support student achievement in post-secondary environments	Mixed method study – qualitative and quantitative

METHODOLOGY

This research will investigate the effects of gamification in the classroom by using Prezi, specifically studying the enjoyment of gamified classroom affect their learning experience; the possible effect of how motivation and reward system of the gamification features relevant to the adaptivity of gamified classroom and what extent the utilization of audio, visual and navigation affect the gameplay experience of gamified classroom. Prezi, a cloud-based presentation software is used to study the gamification features in the teaching

and learning process. There are 46 students of Foundation of Computing had participate this study. These students have explored themselves to Prezi for six hour classes, two hours for each class.

Questionnaires were used to collect quantitative data from the participants on enjoyment, motivation and reward system, utilization of audio, visual and navigation in gamified classroom via Prezi. The perceptions of the participants on the integration of gamification features in their classroom teaching and learning via Prezi have been examine by using the questionnaires. This questionnaire consisted of 20 items and 5-point Likert scale ranging from 1 to 5 (1-strongly disagree; 2-disagree; 3-neutral; 4-agree; 5-strongly agree) were used to rate the questionnaire. First part of the questionnaire was used to gather student demographic data, such as gender, age group, past playing game experience.

After filled up the questionnaire, the participants will be interviewed to collect qualitative data for further information. The interview used to collect data on student perceptions or thoughts on gaming experience, learning experience, adaptivity and gameplay experience. The interview consisted of 13 open-ended questions, which were modified from the previous study (8). The summary from the interview will be present after analysed the qualitative data. Discussion and conclusion will be made after combine both quantitative and qualitative results.

RESULTS AND DISCUSSIONS

As mentioned above, there are total of 46 students have participated this study. 36 male students and 10 female students, who are aged from 16 to 20 year old have perceived the enjoyment of their learning experience during the gamified classroom, perceptions on motivation and reward system that embedded in gamified classroom via Prezi, audio and visual as well as navigation of gamified classroom. The questionnaire and interview results, aimed to evaluate the potential effectiveness of gamification in education can affect the teaching and learning process.

4.1. Enjoyment of learning experiences vs Learning experience

Table 2 has illustrated the score mean for the selected items on enjoyment of their learning experience during conducted gamified classroom via Prezi. Of 46 students, there are 84.78% students felt curious of exploring lecture content in gamified classroom via Prezi and 86.96% of students were engaged immerse in learning. The mean of the tested item for the enjoyment is 4.000. This means that students agree with the enjoyment of their learning experience when they are studying in gamified classroom, they felt curious, engaged when they were exploring the learning content via Prezi. They also felt entertained in their learning via Prezi, with men score = 3.913.

Table 2
Mean score for perceptions on enjoyment of learning experience from gamified classroom

Item	Statement	Mean
E1	I feel curious of exploring the lecture content	4.043
E2	I feel entertained in learning	3.913
E3	I am engaged immerse in learning	4.043

Furthermore, when compared to traditional classroom which used PowerPoint Slides, almost all students would select Prezi for their learning. The interactive and game-like features of gamification in education can motivate and engage students to learn. Some of the positive quotes from the students are shown as below:

P11: "We may lose our concentration easily in normal traditional classroom. However, we can stay connected for long time via Prezi."

P17: "Prezi is so interactive and it is very eye catching, entertain and make us fun, enjoy and focus easily when we are learning via Prezi."

P20: "If compared to normal classroom, I choose Prezi to learn because of the flawless transition."

P33: "I prefer to use Prezi due to its animation, graphics and colours."

P38: "Prezi is more interactive, PowerPoint slides is boring with text only."

Almost 95.5% students felt enjoy and engaged in the learning experience from the gamified classroom through Prezi. To conclude this, students truly felt enjoyed, entertained and engage with the learning process. At the same time, they also give a very positive response on their learning experience from the gamified classroom. The class

observation also found that students are more focus and concentrate on their learning in gamified classroom due to its interactive and game-like features.

4.2. Motivation and reward system vs Adaptivity

To examine the motivation and reward system features that adopted in gamified classroom, two selected statement which obtained high mean score has been shown in Table 3. Of 46 students, 84.78% of them can focus what they are learnt from gamified classroom. Overall, the mean score for the perceptions on motivation and reward system that adopted in gamified classroom is 3.935.

Table 3
Mean score for perceptions on motivation and reward system that adopted in gamified classroom

Item	Statement	Mean
MR1	I can focus what am I going to learn	4.022
MR2	I am motivated in learning	3.848

If gather further data on motivation and reward system, adaptivity is important to enable us to know what features of gamified classroom that increase their learning via Prezi. To answer this, students are asked about the special features of Prezi: zooming user interface, narrative, rewards and engagement. The interview results have quoted as following list:

P6: "It attracts me to have the "power" to learn."
P10: "It motivates me to learn."
P14: "Reward system would benefit me in the learning environment."
P17: "The engagement makes me can remember the things even after many days."
P25: "The slides enable me to remember the points that is hard to memorise."
P36: "I believe Prezi increases immersive and make students to be more engaged."
P41: "Prezi gives the opportunity for me to remember any topic in an effective way because I can watch and listen to it as a movie. That's the best feature!"
P2: "It allows us to customise slides."
P4: "Narrative features are very capable to explaining something."

There are 86.36% students gave positive response on zooming interface features of Prezi. 81.81% of students perceived positive on reward system and engagement that offered in gamified classroom. From the positive results that shown in questionnaire and interview, gamification in education offered reward system, engagement and zooming interface is truly attract students to learn and increase the teaching and learning process.

4.3. Audio, visual and navigation of gamified classroom vs Gameplay experience

Next, this study also revealed the perceptions on audio, visual and navigation features of gamified classroom from the questionnaire. Table 4 has tabulated the mean score for the perceptions on audio, visual and navigation features of gamified classroom. Of 46 students, 82.60% of them can listen background sound clearly and 80.4% of them can be guided with the provided pathway, explore and navigate while they learning via Prezi. The overall mean score for audio, visual and navigation features of gamified classroom via Prezi is 4.049.

Table 4
Mean score for perceptions on audio, visual and navigation that adopted in gamified classroom

Item	Statement	Mean
AVN1	I will be guided with pathway that provided	3.935
AVN2	I can explore and navigate while I am learning	4.065
AVN3	I can navigate the gamified experience easily	4.087
AVN4	I can listen the background sound clearly	4.109

When asked to describe their feeling about the gameplay experience, during the interview, 97.8% students give positive responses on this, such as interactive, attractive, interesting, engage, creative, exciting and playful. The followings are some positive quotes from the students:

P20: "It is attractive."
P34: "I feel very comfort than the traditional PowerPoint presentation."

P17: "More interesting and attractive."

P10: "It would be interesting to learn something new."

P15: "I think it would be interesting."

P19: "Prezi has way more interactive features and allows the users more control over their content."

P41: "Very interesting and great way to present."

P32: "An interesting way of presentation but it has too much of distraction."

P31: "It's kind of fun."

P37: "Fun and happy as well as enjoy every moment."

P45: "Prezi create more fun, happy and easy for students to absorb the knowledge since the environment is very comfort."

P35: "Easy and less boring."

To conclude this, there are 90.9% students give positive gaming and gameplay experience while they are studying by using Prezi. They feel great, interesting, fresh and interactive of the learning content in Prezi and more fun, easy and happy when they study by using Prezi. This is because of the utilization audio, visual graphics, animations, video and navigation features. These features enable students are attracted with the gameplay experience and increased their learning. Although the zooming user interface, animation and background music are the most like features by the respondents, these features also dislike by some respondents. The music or audio in Prezi is the main problem that hinder the participants' gameplay experience.

CONCLUSION

All in all, the mixed mode method results have shown the positive responds from the participants on gamified classroom via Prezi. With the advantage and features of gamification, enjoyment, reward system, motivation, graphics, animation, audio and navigation, students are attracted and engaged in the gamified classroom. Indirectly, this also improve the teaching and learning process in the gamified classroom with the interview results on students learning experience, gaming or gameplay experience and adaptivity of gamification. The authors hope these useful data can provide the design features of gamification in education can be implemented and embedded in future teaching plan so that students can learn effective in an interactive gamification environment.

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