EFFECT OF GAMIFICATION IN E-LEARNING PORTAL ON POLYTECHNIC STUDENTS

Noorazwani bt Alias[1]

[1]Politeknik Seberang Perai
noorazwani@psp.edu.my

ABSTRACT

It is important for educator to make their teaching and learning process as attractive as possible. In order to do that, different approaches were applied so that students will give their full attention in class. Gamification is one of the examples that helps educators to catch students' attention. The study investigate the effect of adding gamification to a quiz in e-Learning portal on polytechnic students. The result point out that students tend to be more engage to the quiz and enjoy the quiz at the same time. Result also shows that students feel gamification helps to increase their learning too.

Keywords: Gamification, e-learning, badges

1. Introduction

One of the things that educators concern about is how to get their students' attention in class. Nowadays, classroom is no more a talk and chalk session. Technology is now spreading and growing not only in our daily life but also in education. Students nowadays are easily blending in the technology and educator are now facing and dealing with the generation Z which we know "they are extremely technology savvy" (Anjali Singh, 2014). Students nowadays are good at gadgets and internet. They use it frequently for socializing, exploring, playing and also learning.

When technology went wider, then comes e-Learning. Clark and Meyer (2016) define E-Learning as "instruction delivered on a digital device that is intended to support learning". However, there is a trend where students used e-Learning only at the beginning and began to slowing down after that. A study shows that there are many factors that affect learner's satisfaction when they use e-Learning. One of them is variety in assessment (Sun et al., 2008). Chris Rust (2004) lists out some arguably reasons why we should developed a variety of assessment and some of them is interest, motivation and flexible learning. In order to catch students' interest through e-Learning and to make them actively participate in online activities, gamification has been applied.

Gamification according to Deterding et al. (2011) is "the use of game design elements in non-game contexts." The most common application of gamification in our daily life would be loyalty program or reward program offered by a company to their customer. Reward or point are rewarded when customer makes purchases frequently. Huang (2013) have classified game design elements into self-elements and social elements. Self-elements helps students to recognizing self-achievement such as badges, points or level. Social-elements such as leaderboards put students along with other students where achievement are made public. Gamification has been widely used in educational context to engage students to become more active and motivated towards achieving certain goals.

However, this study focuses on gamification of assessment in e-Learning portal. The objective of this research is to evaluate the effect of gamification on polytechnic students and recommends some suggestion on improving e-Learning usefulness in class.

2. Literature Review

Lister (2015) made an analysis of the literature and she found that points, badges and achievement, leaderboards and levels are the most common game mechanics have been used.

A study which focuses on using badges by Juho Hamari (2015) found that participants in gamified condition tend to be more active and take part in activities.

However, another study from Yuki et al. (2016) which introduced a quiz with ranking found that 56% of students which is more than half of them answered low motivation towards ranking. The study suggest that competitive-mind of each students do effect the effectiveness of ranking to their motivation.

Barata et al. (2013) compared the gamified course to its non-gamified version and found that students considered the gamified instance to be more motivating, interesting and easier to learn as compared to other courses.

However, there is a study that found a different result. Hanus and Fox (2015) found that motivation, satisfaction and empowerment level of participants in gamified course decrease over time. Participants in non-gamified course showed even higher final exam scores than participants in gamified course. They concluded that gamification did not helps enhancing students' learning outcomes.

3. Method

This study implemented a quantitative research method. A survey was conducted to evaluate the effectiveness of the gamified online quiz through three dimension: engagement, enjoyment and learning. The survey was a modified version of a questionnaire obtained from previous study from Cheong et al. (2013) that observed the effect on games on learning. Each questions contained answer in a Likert Scale from 1 (strongly disagree) to 5(strongly agree).

4. Participants

All 30 participants for this study were students from Politeknik Seberang Perai. There were 9 boys and 21 girls were registered on DBM2033 Discrete Mathematics course.

5. Procedure

A platform of DBM2033 Discrete Mathematics was created in Polytechnic e-Learning portal. Students were asked to enroll to the platform at the beginning of the semester. This platform contain lecture notes and assessment uploaded by lecturer and will be used for the whole semester. A quiz was added in the platform and named as "Zappy Quiz". Zappy Quiz contains 10 random questions from Topic 3: Graphs and Trees from Discrete Mathematics subject. Questions were constructed in different structure to avoid pressure on students. For example true and false question, multiple answer question, and short answer question. See Figure 1 for example of question.

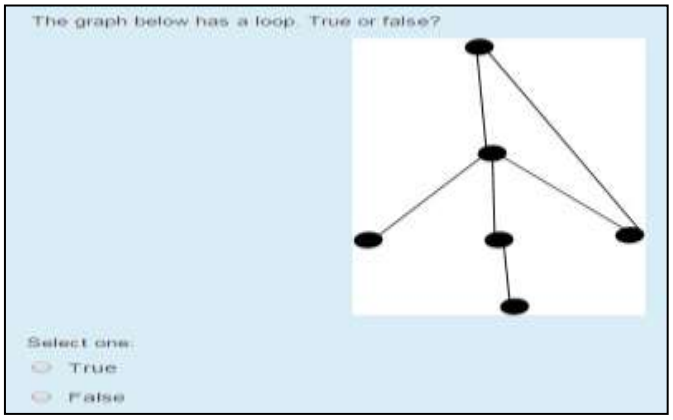

Figure 1. Example of true or false question

8 badges were created and designed to engage students to answer the quiz. For example, Bravo badge required students to answered 5 consecutive question correctly. The Time Keeper badge required students to be the first 10 person to answer it first. For each different badges, students will be rewarded with different points. See Table 1 for example.

Table 1. List of badges

Badge	Badge Description	Points Rewarded
100% Master	Reach 100% marks in Zappy Quiz	1500
80% Master	Reach 80% marks in Zappy Quiz	1000
60% Master	Reach 60% marks in Zappy Quiz	800
40% Master	Reach 40% marks in Zappy Quiz	500
The Bookworm	Access at least 3 lecture notes	300
Bravo 5	Answer 5 consecutive answer correctly	500
Time Keeper	Be the first 10 to answer Zappy Quiz	200
Effort Stamp	Complete the online survey	250

Flow of the quiz is as follow:
1) Inform students about the quiz
2) Inform students about the badges, points and leaderboard ranking system
3) Students answer the quiz
4) Leaderboard ranking reveal in the class
5) Students answer the survey

6. Result

Table 2. Score of Engagement

Item	Statement	Min	Max	Mean
E1	I wanted to complete the quiz	3	5	4.62
E2	I wanted to explore all the options available to me.	3	5	4.54
E3	I do care how the quiz ended.	2	5	4.42
E4	I felt engaged in the quiz	1	5	4.00
E5	I felt excited during the quiz.	1	5	4.19
	Average	2	5	4.35

Table 2 shows the mean of the survey for engagement. The result shows that mean for each questions are quite high. The maximum mean is 4.62 for item E1 and minimum mean is 4.00 for item E4. The average mean for engagement is 4.34.

The result shows that, 92.3% wanted to complete the quiz and 84.6% of them do care how the quiz ended. This shows that the students were engage enough with the quiz.

They were eager to finish the quiz and care how the quiz will ended. 92.3% wanted to explore all the options available. 77.8% felt engaged in the quiz. 84.6% felt excited during the quiz.

		Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
E1	I wanted to complete the quiz	0%	0%	7.70%	23.10%	69.20%
E2	I wanted to explore all the options available to me.	0%	0%	7.70%	30.80%	61.50%
E3	I do care how the quiz ended.	0%	3.80%	11.50%	23.10%	61.50%
E4	I felt engaged in the quiz	3.80%	0%	19.20%	46.20%	30.80%
E5	I felt excited during the quiz.	3.80%	0%	11.50%	42.30%	42.30%

Table 3. Responses on Engagement

Table 3 shows the mean of the survey for enjoyment. The maximum mean is 4.31 for item J1 and minimum mean is 4.00 for item J3. The average mean for enjoyment is 4.17.
From the result, we can say that majority of the students enjoyed the online gaming quiz because 84.6% stated that they felt happy and 80.8% felt cheerful during the quiz. 38.4% stated that they felt worried during the quiz. It might be happened because of the implementation of the leaderboard. However, 30.7% of them disagree and they did not worried about the quiz. The result suggest that, badges give positive effects for the students while leaderboard setting distracted students.

Table 4. Score of Enjoyment

Item	**Statement**	**Min**	**Max**	**Mean**
J1	I feel happy when playing the quiz	1	5	4.31
J2	I feel refresh when playing the quiz	1	5	4.19
J3	I feel cheerful when playing the quiz	1	5	4.00
	Average	1	5	4.17

Table 4 shows the mean of the survey for learning. The maximum mean is 4.62 for item L4 and minimum mean is 4.50 for item L2. The average mean for learning is 4.17.

Generally, all students react in a positive side. 92.3% of the students felt that playing the quiz improved their learning performance. 88.5% felt that their learning productivity increase when playing the quiz and 88.4% believed that playing the quiz enhanced their learning effectiveness. When ask if by playing the quiz can helped them achieving better grade, 96.1% agree.

Table 5. Responses on Enjoyment

		Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
J1	I feel happy when playing the quiz	3.80%	0%	11.50%	30.80%	53.80%
J2	I feel refresh when playing the quiz	3.80%	0%	19.20%	26.90%	50.00%
J3	I feel cheerful when playing the quiz	3.80%	3.80%	11.50%	50.00%	30.80%

Table 6. Score of Learning

Item	Statement	Min	Max	Mean
L1	Playing the quiz improves my learning performance	2	5	4.58
L2	Playing the quiz increases my learning productivity	2	5	4.50
L3	Playing the quiz enhances my learning effectiveness	2	5	4.54
L4	Playing the quiz helps to achieve better grades	2	5	4.62
	Average	2	5	4.56

Table 7. Responses on Learning

		Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
L1	Playing the quiz improves my learning performance	0%	3.80%	3.80%	23.10%	69.20%
L2	Playing the quiz increases my learning productivity	0%	3.80%	7.70%	23.10%	65.40%
L3	Playing the quiz enhances my learning effectiveness	0%	3.80%	7.70%	19.20%	69.20%
L4	Playing the quiz helps to achieve better grades	0%	3.80%	0%	26.90%	69.20%

7. Conclusion

We had performed a quiz with badges and leaderboard ranking and analyzed its effect on students from three aspect: engagement, enjoyment and learning. As the result, 77% of the students felt that they are engage with the quiz. 92.3% of them showed that they have interest to explore the options available in the quiz. This shows that students are interested with the game mechanic introduced to them. Majority of them enjoyed doing this activities with 84.6% felt happy and 80.8% felt cheerful when playing the quiz. It was found that 88.5% agree that playing the quiz helps them to increase their learning productivity. In conclusion, we can conclude that applying gamification into assessment using e-Learning portal do give positive effect on polytechnic students. Game mechanics such as badges tend to trigger interest among student and increase their engagement in activities. However, a well-prepared platform with gamification elements need to be planned carefully. Choosing the wrong elements might yield into a negative result. Therefore, future research should study a specific game elements that suit with specific subject or students' education level. Future research should also be conducted in a longer period of time to analyze the effectiveness in academic performance.

References

Barata, G., Gama, S., Jorge, J., & Gonçalves, D. (2013, September). Engaging engineering students with gamification. In Games and Virtual Worlds for Serious Applications (VS-GAMES), 2013 5th International Conference on (pp. 1-8). IEEE.

Cheong, C., Cheong, F., & Filippou, J. (2013, June). Quick Quiz: A Gamified Approach for Enhancing Learning. In PACIS (p. 206).

Clark, R. C., & Mayer, R. E. (2016). E-learning and the science of instruction: Proven guidelines for consumers and designers of multimedia learning. John Wiley & Sons.

Deterding, S., Dixon, D., Khaled, R., & Nacke, L. (2011, September). From game design elements to gamefulness: defining gamification. In Proceedings of the 15th international academic MindTrek conference: Envisioning future media

environments (pp. 9-15). ACM.
Embi, M. A. (2011). e-Learning in Malaysian higher education institutions: Status, trends, & challenges. Department of Higher Education Ministry of Higher Education.
Hamari, J. (2015). Do badges increase user activity? A field experiment on the effects of gamification. Computers in human behavior.
Hanus, M. D., & Fox, J. (2015). Assessing the effects of gamification in the classroom: A longitudinal study on intrinsic motivation, social comparison, satisfaction, effort, and academic performance. Computers & Education, 80, 152-161.
Huang, W. H. Y., & Soman, D. (2013). Gamification of education. Research Report Series: Behavioural Economics in Action, Rotman School of Management, University of Toronto.
Lister, M. C. (2015). Gamification: The effect on student motivation and performance at the post-secondary level. Issues and Trends in Educational Technology, 3(2).
Rust, C. (2004). Developing a variety of assessment methods. Enhancing practice: reflections on assessment, 1.
Singh, A. (2014). Challenges and Issues of Generation Z. IOSR Journal of Business and Management, 16(7), 59-63.
Sun, P. C., Tsai, R. J., Finger, G., Chen, Y. Y., & Yeh, D. (2008). What drives a successful e-Learning? An empirical investigation of the critical factors influencing learner satisfaction. Computers & education, 50(4), 1183-1202.
Tanaka, Y., Uwano, H., Ichinose, T., & Takehara, S. (2016, September). Effects of Gamified Quiz to Student's Motivation and Score. In Games and Virtual Worlds for Serious Applications (VS-Games), 2016 8th International Conference on (pp. 1-4). IEEE.