Feasibility study on gamification approach for learning a software engineering subject

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ABSTRACT – Gamification methods have been applied in various environments and for different purposes such as enterprise work- places, education, pervasive health care, e-commerce, human resource management and many more. This paper describes a study that has been carried out to determine the feasibility for using gamification for learning a Software Engineering subject. Intervention session and questionnaires were administered during the study. The findings revealed that Kahoot can engage and motivate students in learning particularly in subjects that involve lots of theoretical terms where they need to do lots of reading. The initial study and findings can be used to add alternatives and improve the teaching and learning process for subject that involve many terms.

1. INTRODUCTION

A software engineering subject is very important to every computer science student as it will give an overview on the principles, techniques and process required for the development and construction of computer software. Nowadays the common traditional teaching and learning methods in software engineering subjects are quite dull and monotonous due to the theoretical nature of the subject. These drawbacks of the traditional approach affect the software engineering student engagements elements such as participation, performance and emotions. In order to improve and enhance student engagement in software engineering class, a gamification approach is introduced. The proposed approach is said to encourage students to learn more effectively and proactively. In this study, the gamification mechanism is used in the teaching and learning process particularly for the Software Engineering subject. We gathered feedback from 59 computer science students who took the Software Engineering subject and the data analysis was done with SPSS software. The results show positive response from the students which indicates that gamification helps them to engage in learning.

Some problems and issues that arise from software engineering fresh graduates are poor in communication skills, leadership style, ego, gender issue, poor documentation skills, misinterpretation of requirements and incorrect requirements [2,4]. This could be due to many causes, but one of them is engagement in learning the subject.

Gamification on the other hand, refers to service design aimed at providing game-like experiences to users, commonly with the end-goal of affecting user behavior by providing gameful experiences [1].
More specifically, the paper is to answer the following research questions:

- What is the current existing problem of student engagement in software engineering subjects?
- Is it feasible to use gamification approach in learning the subject?

2. METHODOLOGY

In the following subsection, the preparation and the process of this evaluation is described. In this study, 59 computer science respondents are selected from one public university in Malaysia. Since the case study was not merely surveys or questionnaires but a series of learning activities, a large sample would not be possible. Due to time, money and work-force constraints, only a very small number of respondents were chosen.
Kahoot[3] is chosen as the platform. Kahoot is known as a web game-based learning platform that makes learning fun to learn in any subject, in any language, on any device and for all ages. During the intervention, all the students will experience gamification in software engineering class. At the end of the study, the students will answer a set of questionnaires.

3. DISCUSSIONS AND FINDINGS

A survey has been conducted through questionnaires to get the students' perspectives on the gamification approach in learning Software Engineering (SE). For this study, questionnaires has been distributed to 59 students from computer science students who took SE subjects. The questionnaire was distributed at the end of their semesters and the respondents have experienced both traditional and gamification in learning software engineering subjects. Table 1 shows the number of respondents by their age's group. This table showed that

the respondents are in their 20's and most of the respondents are age 21 years old which translated at 58% from the total respondent.

Table 1 Demographic Data - Respondents by Age Group

Age	Frequency	Percentage
20	1	2%
21	34	58%
22	19	32%
23	4	7%
27	1	2%
Total	59	100%

For questions *"How do you evaluate your ability in Software Engineering subject?"* From the results, none of the student rate them as an advanced learner/user in software engineering. They are most likely to rate themselves as a beginner, translated as 66% and the rest rated themselves as an intermediate, which translated as 34%. Beginner comes from the male student which is 74%.

Question on *"Student perspectives on the current way of teaching and learning in SE class".* Most of the students strongly agree that they had never missed the Software Engineering class for this semester but most of them rated neutrally to the question asking if the software engineering subject is their favourite subject. In terms of performance, 47% of the respondents agree that Kahoot helped them in their studies and 39% of the respondent agree that Kahoot helped them to get better understanding on the topic discussed in class. 42% of the respondent agree Kahoot helped them to understand the topic covered in class much easier. About 44% of the respondents agree that Kahoot helped them to identify which topic should they focus more. So we can see that gamification helps student to improve their understanding of software engineering subjects and gamification also helps students identify their strengths and weaknesses in the topic learned in the class which will determine where their focus should be.

4. CONCLUSION

From the results of the initial study, it can be concluded that Kahoot is user-friendly and benefits both instructors and students. The feasibility study proved that Kahoot can engage and motivate students in learning particularly in subjects that involve lots of theoretical terms and need to do lots of reading. However necessary modifications need to be done for more accurate results. First, the sample size need to be bigger for representative results and findings. Second, the intervention time need to be longer fo example few semesters.

REFERENCES

[1] Huotari, K., & Hamari, J. (2012). Defining gamification. *Proceeding of the 16th International Academic MindTrek Conference on - MindTrek '12.*

[2] Hayat, F., Ali, S., Ehsan, N., Akhtar, A., Bashir, M. A., & Mirza, E. (2010). Requirement elicitation barriers to software industry of Pakistan (impact of cultural and soft issues). *2010 IEEE International Conference on Management of Innovation & Technology.*

[3] Kahootcom. (2018). Kahoot!. Retrieved 1 June, 2018, from https://kahoot.com/

[4] Kumari, S. N., & Pillai, A. S. (2013). A survey on global requirements elicitation issues and proposed research framework. *2013 IEEE 4th International Conference on Software Engineering and Service Science*.