GAMIFIED YOUR LEARNING IN THE CLASSROOM: DESIGNING AND DEVELOPING AN EDUCATIONAL GAME PROTOTYPE AS A FORMATIVE ASSESSMENT FOR DIPLOMA STUDENTS IN UTMSPACE MALAYSIA

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ABSTRACT - Education is now heading towards Fourth Industrial Revolution. Most students and teachers opt to have many choices of online learning applicable and available on open online application. Equip with smart technology, Internet access and classroom facilities, students and teachers have their own awareness on the suitability and other choices of online learning and educational mobile game. This paper will cover the student's insight on online learning in the classroom, designing the suitable educational game for classroom and developing the prototype. The initial investigation was done with students of Diploma Computer Science in UTMSPACE Kuala Lumpur, to get their perspectives of a good concept of technology and innovation towards fourth industrial revolution. This study present the results on student's perception on other alternatives of current teaching and learning in a classroom with formative assessment done using online game, which enhance student's motivation and immediate knowledge assessment. Next stage is to design and develop the mobile game using suitable technique. The design will be based on the fun elements as agreed by students during the preliminary investigation. The expected findings from this research will be an educational game prototype for Diploma UTMSPACE students.

Keywords: Online learning, Gamification, Educational Game, Participatory Design, Fun Elements.

1. INTRODUCTION

Gamification term was first used by Nick Pelling (2002) in the presentation of TED event. The concept of learning that applied the game mechanism and game design to enhance motivation among the students is quite new and there's still pull and push factor to implement it. However, towards Fourth Industrial Revolution, more education center applies online learning and gamification method in teaching and learning. The gamification concept is to ensure the students to achieve the learning objectives through formative assessment especially in the classroom. Since the evolving of technology in this decade, most lecturers find many

alternatives in the website to design game in their teaching activities. However some application outsourced may have some constraints such as fees and privacy issues. To design such application suitable for the higher education may need some special attention such as design and development process. A few techniques can be applied to enhance the design features of the application game. This research is purposely to design and develop prototype game for undergraduate students, and the case will be focused on Computer Science Department, PPD UTMSPACE Kuala Lumpur. In accomplishing this main purpose, there are two objectives outlined for this study, which are 1) to design and develop a suitable educational mobile game using participatory design technique and 2) to test the educational game prototype among the target users.

2. MATERIALS AND METHODS

Digital learning games are the proof for successful transformation of games into effective tools in shaping the student's learning experience. Today, most of educational games heavily rely on content rather than entertainment [1]. However, since we are heading towards fourth industrial revolution, gamification in learning is quite common in education institutions. The findings of Iten & Petko, (2016) show that students are much anticipated on the subject that they want to learn from the game, while the fun in the game will distract them from engaging and focusing on the learning process. Conflicting with these findings, Israel, Alexander, Futurist, & Consulting, (2017) explained that in a blended learning, the emotional dimension is needed to make the game engaging.

2.1 Fun Elements in Online Educational Game

The emotional dimension is also known as aesthetics in a game (Hunicke, LeBlanc, & Zubek, 2004). Agreeing with this, Obrist, Förster, Wurhofer, Tscheligi, & Hofstätter, (2011) also mentioned that the mistakes in the existing game design nowadays lie on the heavy educational content rather than taking into account the gameplay features. Fun elements is needed to be embedded in a simple and focused formative assessment game especially done in a classroom.

Figure 3.1: Fun Elements embedded during design process. Adapted from [5]

2.2 Participatory Design Method

To help the users on the educational game design features, participatory design (PD) technique was seen as a prominent technique [6] in gather all the ideas and features of the user's need. We employ research design by [7] in order to capture the design activities and development of the prototype based on the collaboration. The following Figure 2 is PDEduGame framework process, which is a general concept of the research design in delivering the educational mobile game prototype.

Figure 3.2 PDEduGame Framework Process to guide the design and development of the prototype.

Based on the framework process, we will explain further on participatory design technique in this methodology and also the fun elements anticipated by students to be tailored in the prototype. In design workshop, there are 3 sessions that will be arranged, that includes designing game concept, designing game storyboard and designing game mock-ups. The following fig. 3.3 is the design game concept and

storyboard. The selected students are identified from the preliminary investigation where we use purposive questionnaires.

3. RESULTS AND DISCUSSION

3.1. Subtitle

The game testing is done in 3 methods, which are black box testing, unit testing and user's testing. The black box testing and unit testing is done within the implementation process, for changes made in the system is standardize. Next step is to distribute the questionnaires form to the respondents who has done the user's testing. The responds and comments received are perceived as the guidance in accomplishing the modification process to fulfil the user's requirements and needs. In the other hand, the feedbacks received are needed to complete the game and the cooperation given is valuable. Refer to the time constraints; the customer needed will enhance some characteristics in the game in the real implementation of the game. Table 1 shows the results after the SPACE Play Testing and Table 2 below shows two methods of testing done for unit testing and user testing in the classroom.

Table 1 Fun Elements preferred in SPACE Play Game testing phase.

Fun Elements	Frequency (n=60)	Percentage (%)
Narrative (Game Story)	48	80
Fantasy (Illustration & Colour)	52	86.7
Challenge (Competition & Countdown Time)	51	85
Sensation (Music or Touch)	36	59.3
Expression (Reward Display & Sound)	52	86.7
Discovery (Game Level & Content)	43	71.7
Fellowship (Sharing & Converse with Friends)	48	80
Submission (Accumulation of Point Over time)	51	85

Table 2 Testing Phases.

Unit Testing	User Testing
	

3.3 Modification Phase

Once the testing was done, we distribute the questionnaires form to the respondents. The responds and comments received are based on the feedback received from the sample; each of them owns a different thought and according to their importance and disability. Most of the respondent wanted the list of answers to be displayed on their game interface, thus in the modification phase we display the answers in text. A few of the students have colour blindness disability; therefore in modification phase we change the game colour according to stage 2 of colour blindness. Finally, the top 5 players and list of players in Lobby interface is

not fixed of computer window's scale, hence we modified the image into a smaller scale.

4. CONCLUSION

The Space Play Online Game is a prototype game produced to be example of formative assessment tools, especially during the class lesson to ensure the students are really engaged in the learning. Using the same platform of Space Play Online Game, we hope to add varieties of activities that increase the classroom engagement in the future project.

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