

Blending Gamification and Augmented Reality in XploreRAFE⁺ Module: Intriguing Excitement and Promoting Collaborative Learning among Learners in Higher Education

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Abstract: Instructors worldwide have taken a different quest in their teaching journey in order to suit the needs of the alpha generation. The developments of Information and Communication Technologies have made this possible by offering new pedagogies, increasing its presence at every aspect of teaching methodologies. XploreRAFE⁺, a module that blends Gamification approach with Augmented Reality through the use of mobile devices, was developed by the researcher as one of the means to untraditionalize her teaching approach. This study presents descriptive qualitative analysis of how XploreRAFE⁺, when integrated in teaching courses at a tertiary level, was able to intrigue excitement and motivation, and enhance collaborative learning among learners. XploreRAFE⁺ was developed and employed to a group of 66 undergraduate, pre-service teachers currently enrolled in Educational Technology course in the Spring 2018 semester at Universiti Putra Malaysia. Through qualitative survey, the analysis of the findings suggest that the blending of gamification and augmented reality through XploreRAFE⁺ module was appealing to the students as it intrigued excitement and motivation. Moreover, collaborative learning was also evident through instilled team work and discussions made when students played the XploreRAFE⁺ game.

Keywords: Gamification, Augmented Reality, mobile devices, learning strategies, scholarship of teaching and learning

1. Introduction

Augmented Reality has increased its presence in an array of approaches in education. Its' main feature – which is the ability to enhance the real world elements by overlaying computer generated content (Krämer, 2017) such as audio, video, texts and 3D graphics to them, has allowed users to use it in a multitude of forms. Used with mobile technologies such as smartphones or tablets, Augmented Reality has opened up several possibilities and ways to be integrated into teaching, especially now that ICT has become a permanent demand in the education sector. Teaching in higher education has become increasingly challenging now that the alpha generations have stepped into colleges and universities. As 21st Century learners, they are digital citizens growing up with technologies surrounding them in their ordinary lives – constantly interacting with ICTs and infographics (Martín-Gutiérrez, Fabiani, Benesova, Meneses & Mora, 2015). Their nature has evolved. These learners are more dynamic, adaptive to new things, and most importantly, like challenges and want to be challenged. Because of this, teaching methodologies have taken a different quest from what it used to be not so long ago, where new visualization methods are increased and new pedagogies are developed.

Ubiquitous learning through Augmented Reality and mobile devices are one of the new pedagogies emerged in the digital era. One of the characteristics of Augmented Reality, namely location-based procedure, allows situated scaffolding which gives learners the right support or

guidance just at the right time (Bower, Howe, McCredie & Robinson, 2014). These scaffolding prompts help to enhance the learning experience and reduce learners' cognitive load (Yuen, Yaoyuneyong & Johnson, 2011; Krämer, 2017). When applied with relevant learning strategies, it is believed that Augmented Reality can bring teaching and learning to greater heights.

The challenges in getting learners to be engaged, participative, and motivated in lessons have increased. The Malaysian Education Ministry, in the Malaysian Education Blueprint 2015-2025 (Higher Education), has charted waves of transformation to accelerate improvements in Higher Education instructions so as to create new generation of Malaysian students to excel globally in a competitive environment (Ministry of Education Malaysia, 2015). With such aspiration, a change of mode of instruction at the higher education institution level is of a crucial need.

2. Study Background

Of late, gamification has become an emerging learning strategy in the field of education. Gamification in classroom instruction is defined as an approach whereby an instructor uses game mechanics in non-game context (Deterding, Khaled, Nacke & Dixon, 2011), namely in teaching, to create a fun and engaging learning atmosphere (Amir & Ralph, 2014). Basically, gamification in instruction uses the motivational power of games but in the context of education to enhance and diversify the teaching approach and foster self-driving behavior. In the past, scholars had discussed on the gamification's effect on students' motivation. It is seen as an innovative approach to foster motivation (Sailer, Hense, & Mandl et al., 2013) as it allows the freedom for trial-and-error and encourages "exploration, collaboration, and the exchange of ideas while removing unwanted pressures that can interfere with students' abilities" (Cohen, 2011, p. 17). When gamification is employed, users or students who played the game, should feel that the activity is important to them and thereby will be self-motivated to perform it.

In the context of this study, the research is focused on the module used by the researcher in conducting a lesson through the use Augmented Reality and mobile technologies, and blend with the gamification approach as a learning strategy. The module, which is named as XploreRAFE⁺, simulates the mechanics of "The Amazing Race" episodes from the American reality TV show, where participants work with partners to perform specific tasks within specific timeframe. XploreRAFE⁺ stands for eXploring (i) **R**eal world not bounded by the classroom walls, (ii) **A**ctive participation in teaching and learning activities, (iii) **F**un learning culture, and (iv) **E**ngaging students throughout the learning process, while [⁺] depicts the Augmented Reality feature embedded in the module.

The design of XploreRAFE⁺ applies game mechanics that triggers exploration and finding clues with competition elements. As such, learners are required to solve problems with their group members at ten stations that are located at several buildings within the faculty area. These stations are installed with hidden clues, which are primarily in the form of trigger images or smart objects for Augmented Reality. These printed clues have similar design templates that enable learners to quickly identify them when seen. Each trigger image, when scanned with an Augmented Reality app on mobile phones, will reveal overlay images in the form of texts or audio-visually that prompt learners to perform specific tasks or answer questions. The answers must be written in a booklet that each group gets. These tasks from ten stations need to be solved within a 60-minute time frame. The first three groups to reach the finishing line with all correct answers will win the game.

3. Research Questions

This study aims to explore learners' perceptions on how the gamification approach for learning together with the use of augmented reality can intrigue excitement and promote collaborative learning among pre-service teachers who were undergoing their undergraduate studies at the Faculty of Educational Studies, Universiti Putra Malaysia. Thus, the research question that drives this study is: "In what ways does the blending of gamification and augmented reality intrigue learners' excitement for learning and enhance collaboration among them?"

4. Methodology

The XploreRAFE⁺ module was employed to a group of 66 undergraduate students, who were pre-service teachers, currently enrolled in the FCE3401 Educational Technology course at the Faculty of Educational Studies, Universiti Putra Malaysia. Forty-one of them were First Year Guidance and Counselling pre-service teachers and 25 were Third Year Malay Language pre-service teachers. Before the game commenced, the researcher briefed the participants about the rules. Every participant has a prior experience in using an Augmented Reality app, which they have learned from a workshop that the researcher had conducted earlier in the semester. They were then divided into groups of four members which were randomly selected using a simple ice-breaking activity.

After a 60-minute play, the researcher debriefed all the students and asked them to participate in a qualitative online survey for their feedback. Their feedbacks were gathered using an online form platform that was accessible via a QR code provided by the researcher. The survey asked open-ended questions related to their experience on the XploreRAFE⁺ module and students were encouraged to share their experience and perceptions without character limitation for the form. A qualitative online survey research is deemed useful for this study as it allows the researcher to draw individual responses descriptively from a large group of students to get their individual perspectives (Merriam & Tisdell, 2016).

5. Data Analysis & Findings

A systematic grounded theory analysis was carried out; utilizing open coding method (Strauss & Corbin, 2008; Charmaz, 2006) and categorizing them according to themes. This had allowed the researcher to look for patterns and trends in the data, and ensured that important information is not left behind or overlooked (Yin, 2014). Through the process of data analysis, the survey responses are compiled according to the questions, read and re-read several times, so as to identify the emerging patterns and trends. The analysis of the findings reveals that the implementation of gamification and Augmented Reality through XploreRAFE⁺ module has (i) intrigued students' excitement for learning and (ii) promoted collaborative learning. These are discussed in the following sections. As a measure for human safe-guarding, only pseudonyms are used in this study in order to protect the participant-students' identities.

5.1 *Intrigues Excitement and Motivation*

The findings of this study have echoed previous scholars' work that emphasize the benefits of Augmented Reality, among others, foster learners' motivation (Sailer et al., 2013) through phenomenal experiences they had never observed in the real world (Yuen et al., 2011; Wu, Lee, Chang & Liang, 2013; Krämer, 2017). This is evident from the below excerpts:

I think XploreRAFE⁺ is an appealing game. Not only I get a lot of input today, but I also have a deeper understanding of the topics in this course. The way it is conducted, which is scanning the trigger images to reveal the Augmented Reality clues, makes it more interesting.

-Cassandra

This game is interesting as it instills excitement and motivation to learn. I hope this game can be done more frequently so that learning can be done outside the classroom and students can explore the space around them.

-Noah

I am excited to read the questions that appeared after we revealed them using the Augmented Reality apps. I learned extra knowledge today and I also get to refresh my memory on the previous topics that we have learned in lectures.

-Nora

Participants also found themselves become active learners as they participate in the game. In the survey excerpts below, participants explain how the Augmented Reality element intrigues their excitement to find clues and perform their tasks.

I am a bit exhausted by running but happy because I cannot wait to find the clues and scan the Augmented Reality images to look up for answers.

-Yuni

XploreRAFE⁺ helped me in my learning journey. I am also not bored because I learn something new and I am excited to play this game. I cannot sit still, I have to work hard to find the clues and answer the questions.

-Lim

We have to think fast to solve all the ten questions within a limited time. It is challenging but fun!

-Ayda

As pre-service teachers, the participants viewed XploreRAFE⁺ module as a creative approach that they can implement when they get into schools to encourage students to learn. The participants also mentioned the importance of integrating new technologies and innovative pedagogies to meet the demands of future generations.

I am elated, it is a creative approach in teaching and learning. Most of my colleagues are involved in the game. I plan to integrate this into my teaching when I become a teacher one day.

-Adam

There's a lot of excitement that sparked from this game. It's timely and definitely can motivate students to learn.

-Sofea

When I get into service, I want to use a variety of teaching techniques. This [XploreRAFE⁺] is going to be one of the approaches that I want to implement in my teaching.

-Leez

I feel that this game is imperative and [it] will have an impact on the 21st Century generations. They for sure need technologies in their learning and this [XploreRAFE⁺] can trigger their creativity and enhance their interest and motivation to learn.

-Adrian

It is evident from the findings that XploreRAFE⁺ module was able to intrigue excitement and motivation among learners. This learning approach that uses game mechanics in non-game context, which is implemented in XploreRAFE⁺, is able to create a fun and engaging learning atmosphere (Amir & Ralph, 2014). Especially through joined learning task that is featured in XploreRAFE⁺, students get to explore the concepts of a certain topic with minimum pressure (Cohen, 2011) as each tasks or question were performed jointly with their group members. This is discussed in the forthcoming section.

5.2 Promotes Collaborative Learning

The findings of this section are in congruent with scholars who emphasized that when Augmented Reality are used to perform joined learning tasks among group members, cognitive load are reduced (Yuen et al., 2011; Kramer, 2017) and in fact, interaction and collaboration among learners are fostered. These are evident from participant's responses which highlighted on team spirit and team work as follows:

This game instills team spirit among us as we helped each other to find answers to the questions revealed.

-Raef

XploreRAFE⁺ is an exciting game to play as it challenges our ability as a team to give our full commitment to solve problems.

-Ayden

I am truly intrigued by this game. It is very interesting and in time with the current developments in education. The approach has helped us to contribute to each other's learning and enhanced the team spirit among us.

-Irdina

Although the aim of XploreRAFE⁺ game are to get all correct answers and/or perform all required tasks correctly, the participants have quoted that they value collaboration more than just winning the game. They also emphasized that the increased participation and contribution among group members are among the valuable experience they gained from the game. These are exemplified in the following survey excerpts:

We can learn collaboratively, which were not usually can be achieved in a traditional classroom setting. Although we did not win, we were satisfied with our team work that was displayed throughout the race.

-Maria

We have to be active in this race. Each team member has to play their role so that we can solve all the questions correctly and systematically. We discussed a lot and managed to solve the questions within the time limit. We did great as a team.

-Joanna

Everyone worked together to find the clues. We were running to beat the time, but we strategized our game so that we can find the clues within the time frame and perform the tasks accordingly.

-Rysha

It [XploreRAFE⁺] reinforces collaboration among my team members. We have never worked closely before. We exchanged ideas and strategies to answer the questions given.

-Razin

The aforementioned data analysis echoed Cohen's (2011) study that found gamification elements will cause the learners to have an emotional attachment to the activity and thereby will be self-motivated to perform it. From the Augmented Reality stance, Kloper and Squire (2005) have also vouched that the characteristics of Augmented Reality fosters collaboration which further enhances in-depth learning through authentic investigations.

6. Conclusion

In the age of digital technologies, the nature of education transformation is charted towards fulfilling the demands of digital natives in order to make learning a meaningful experience for them. Several innovative pedagogies have to be charted and employed as emerging technologies surge exponentially. XploreRAFE⁺ is one of the learning approaches developed by the researcher as a means to tap in the current demands in the education sector. Through its implementation, the analyses and findings of this study suggest that the blending of gamification and Augmented Reality enables learners to be more active participant as the module's design was able to intrigue learners' excitement and motivation to learn. Moreover, learners have become an active contributor among their group members as the XploreRAFE⁺ module's characteristics supported collaborative activities which led to esteemed team work among them. It is hope that this module could, in a way or another, contribute to the waves of transformation charted by the Malaysian Education Ministry to fulfil the inspiration to engage learners in their own learning and instill soft skills, which can be achieved through collaborative learning. This study could also contribute to the scholarship of teaching and learning to the researcher herself and educators worldwide.

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