

The Evaluation Study of Gamification Approach in Malaysian History Learning via Mobile Game Application

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Abstract – Gamification has blown up its popularity, hence the gamified solutions need to be designed carefully so that it can be successfully sustain longer and help to achieve the learning outcomes in education field. History learning need to adopt gamification elements to spark the attention from the educators and learners since history subject is a compulsory subject in secondary education level in Malaysia. This paper has evaluated and analyzed gamification approach in Malaysian History Learning via mobile game application, named History Learning Mobile Game (HLMG). The HLMG has been verified its components and validate its functions so that it is completely released and ready for implementation. Eventually, the HLMG also has been evaluated its effectiveness via a focus group study on user experience (UX), story, gameplay complexity, estimated average play session, engagement and historical content delivered. Overall the results and findings, the user experience (UX) of HLMG need improvements. However, the story, historical content delivered and estimated average play session are excellent for the effectiveness of HLMG. Gameplay complexity and engagement are sufficient for the effectiveness level of HLMG.

Keywords – Gamification; History Learning; Mobile Game Application

I. INTRODUCTION

In the 21st century, the potential of game as learning tool is growing fast and spark the attention from the educators to create more immerse and meaningful learning experiences among learners and facilitate the lifelong learning process. Game, is a system that presents a set of meaningful motivating challenges to the players, and provide problem-solving spaces where learning occurs [1]. When come to the education part, educational games are the complete system with the aims of training or teaching the players. According to Gopaladesikan study [2], it is predicted that approximately 40% of 1000 international organizations will use gamified elements in their products. These predictions make it much more imperative that gamification needs to be designed properly with the intent to incorporate meaningful objectives.

Since the gamification has blown up in popularity, we need to utilize gamified elements carefully so that the gamified solutions can be successfully sustained longer and help to achieve the stakeholders' requirements and objectives. Mobile

game application has the advantage of being able to use within and between contexts and can be seamless integrated into wider learning experiences that involve other forms of learning too [3]. These experiences can boost the developments of cognitive and collaborative skills [3]. Hence, critical thinking, communication, collaboration and creativity are the core skills in contemporary education so that can develop students' capability, divergent thinking skills and draw their attention to study.

History learning in Malaysia is a compulsory subject in secondary education level and pass the subject is a must to proceed their study in higher education. Nowadays, knowledge production and distribution which is mediated by social media tools or information and communication technology (ICT) devices need to transform to knowledge configuration from knowledge production [3]. From the previous study [4], teachers and student prefer other methods of history learning besides only referring to the textbook. The findings in this study is also supported creative methods in using textbooks in the main aspect to a student's motivation and engagement in learning history.

Therefore, this paper has evaluated and analysed gamification approach in Malaysian history learning via mobile game application. The application allows teachers to deliver the history contents via an application, named History Learning Mobile Game (HLMG). The researcher will review some existing history game and the utilization of gamification in history learning. Next, this paper will present the evaluation process, design and findings of the effectiveness study. Finally, the important features which make this gamified solution success will be presented. The researcher found that the implicit engagement and motivation which triggered by the learning contents and gamification features were vital for maximising thinking skills while in the history learning process.

II. GAMIFICATION IN HISTORY LEARNING

GBL is efficient to use in history learning, which use action despite of narration, develop personal satisfaction and motivation, suite for divergent learning styles and skills, reinforce mastery skills and cater an interactive context [6]. Moreover, the utilization of mobile devices as platforms for GBL also

provide better learning experience which allow users access history game ubiquitously. Thus, educators can incorporate these powerful tools into their teaching that can enrich and complement student's skill via game play [6]. The following reviews focus at game based learning or gamification elements that applied to educational history material, and how it effects educators and students alike.

Apotheon [7] is a heroic action game set within the vibrant world of Ancient Greek Mythology developed by Alientrap Games. The plot of the story has the player control an avatar, who has to ascend Mount Olympus, wrestle the divine powers from the Pantheon of Gods, and save mankind. This game is an action role-playing 2D side scroller, where the player is challenged to defeat historical Greek Gods. Players will be able to learn historical facts about the Greek Gods while immersed within the game. While this game is praised for its gameplay and visual style, its educational function serves as a secondary objective. As the gameplay focuses on action-oriented goals that involves player's precision and quick reaction, historical and educational facts delivered within the game is limited.

Total War is a personal computer strategy game series developed by The Creative Assembly in Horsham, UK for Windows and Mac [8]. The games combine turn-based strategy and resource management, with real-time tactical to set the flow of battles. All of the Total War games centre in a period of history where battles occur between conflicting parties. The game engages players using real time strategy and fantasizes some aspect of history as to increase level of immersion. While the game is not completely historically accurate, it managed to acquired and maintain player interest in the games for 16 years by using real time tactics emphasizing on player strategy.

View-Master® VR viewer [9] headset is an add-on device to a smartphone that projects a VR environment using the technology found within the headset itself and loads the VR scene using the smartphone. It works with a compatible smartphone to blend AR and VR, creating 3D spaces with gyroscopic sensors to create a higher level immersive experience. By overtaking the sense of sight and hearing of the players, they are brought into the game itself, leaving little room for distractions. Therefore, players are focused completely in their VR world to present the optimal time to teach [10].

III. EVALUATION DESIGN

Students' actions and behaviours during game play will be evaluated and recorded into player progress scene. This decision to restrict content material to one historical period is due to time constraints as the amount of content that can be introduced. The HLMG prototype will be verified its

specified requirements and game components such as menu navigation, challenges, arena, game manager and player progress. Adjustment was made for the developed components did not functioned as required as a game mechanic. After that, the HLMG was validated and evaluated at the end of the development process to determine whether it satisfies the specified requirements.

Eventually, the HLMG will be evaluated based on user experience, storyline, complexity of game play, estimated average play session, engagement and historical contents delivered via a focus group study. Five students who have playing games experience have participated this evaluation to determine its effectiveness and impact on history learning among students. They need to fill up the questionnaire which contains 9 items to evaluate the effectiveness level of the HLMG.

IV. RESULTS AND FINDINGS

Game verification have been done for HLMG to know whether objective of the mobile game components is functioning or not. Menu navigation, arena, challenge, game manager and player progress are functioning in good condition and pass the testing.

Validation is a process of evaluating software during or at the end of the development process to determine whether it satisfies specified business requirements. Table 1 has illustrated the game validation results for the HLMG. From the findings, the HLMG is met all the objectives of this study. HLMG, an open interactive educational tool has been implemented successfully. The HLMG enhance student's learning experience, provide an effective and available educational tool and increase a student's comprehension on their syllabus. Despite of this, the HLMG also assist educators for hands-on activities and efficient teaching a learning tool.

In evaluating the game's final prototype to similar games, the results of which are tabulated as Table 2 according to criteria. Overall the focus group study findings, the user experience (UX) of HLMG need improvements. However, the story, historical content delivered and estimated average play session are excellent for the effectiveness of HLMG. This can be seen in introductory scene and has been illustrated in Figure 1. Figure 2 also represents the players' objectives scene for HLMG. Gameplay complexity and engagement are sufficient for the effectiveness level of HLMG.

To conclude, the evaluation shows the game can be further improved to better achieve the objectives set out by the study. Further versions of the game would need to redesign the mini-games and each chapter's storyline in order to provide the players a more effective tool in learning history. Furthermore, additional of visual & audio would benefits the player by increasing the level of immersion of the game, therefore increasing the game's effectiveness as a tool

to help students perform in Malaysian Certificate of Education (SPM) history exam.

TABLE 1. The game validation results for the HLMG.

Research Objectives	Justification	Passed/ Failed
1. Implement an open interactive educational tool.	The end product is easily accessible via an apk file that can be run on Android devices from Android 4.0 and above. The game can be played by oneself or with a group, as the game focuses on story, therefore allowing more interaction between students and educators.	Passed
2. Assisting the educator.	As the game is portable, it can be used as a teaching tool both within the classroom and outside of it and is very handy for revisions as well.	Passed
3. Enhance a student's learning experience.	The game is an alternative to the traditional textbook method by introducing an interactive game based learning method to learn history.	Passed
4. Provide an effective and available education tool.	The game contains a quiz that can be used to determine the student's understanding of the game after a chapter's completion. In addition, the game can be played using mobile devices, therefore making it both portable and interactive.	Passed
5. Increase a student's comprehension on their syllabus.	As the chapters can be played repetitively the student can always revise a specific chapter to refresh the facts of the syllabus. Also, the quiz provides a quick evaluation tool for the students to review their comprehension on the syllabus.	Passed



FIGURE 1. The introductory game scene for HLMG.

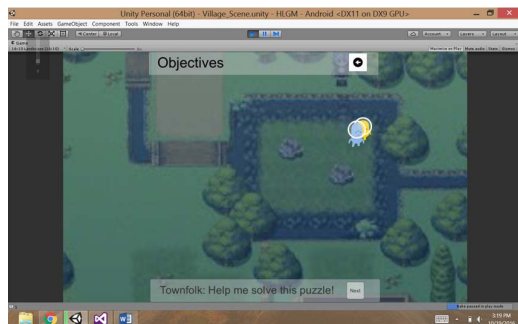


FIGURE 2. The players' objectives scene of the HLMG.

TABLE 2. The game criteria for the HLMG after evaluation.

Criteria	HLMG
User Experience (UX)	The UX is rather lackluster, due to lack of animations and disjointed graphics and themes.
Story	The story is consistent with the syllabus, and follows a narrative flow. Each chapter has its own unique narrative.
Gameplay Complexity	Simple, using only touch inputs. Challenges are easy to comprehend and overcome.
Estimated Average Play Session	8-20 minutes, depending on familiarity of the chapter.
Engagement	High engagement. Supported by natural flow of story and challenges.
Historical Content Delivered	Very high. Due to the game designed around delivering the content of history syllabus to the student.

V. CONCLUSION

In summary, while HLMG has obvious flaws and short comings in graphics which in turn influences the level of engagement. The game delivers what it needs to in terms of the historical content and a well-paced narrative flow. The level of player immersion can be increased by designing and improving upon the UX of the game and will greatly enhance to player's experience with the game.

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