

**UNIVERSITI TEKNOLOGI MARA**

**GAMIFICATION AND AUGMENTED  
REALITY DESIGN MODEL FOR  
ENJOYMENT IN TAJWEED  
LEARNING**

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Thesis submitted in fulfilment  
of the requirement for the degree of  
**Doctor of Philosophy**  
**(Computer Science)**

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## **AUTHOR'S DECLARATION**

I declare that the work in this thesis was carried out in accordance with the regulations of Universiti Teknologi MARA. It is original and is the results of my own work, unless otherwise indicated or acknowledged as referenced work. This thesis has not been submitted to any other academic institution or non-academic institution for any degree or qualification.

I, hereby, acknowledge that I have been supplied with the Academic Rules and Regulations for Post Graduate, Universiti Teknologi MARA, regulating the conduct of my study and research.

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## ABSTRACT

Gamification is the use of game elements for engagement in the non-game field. As an emergence approach particularly in learning, previous studies have applied various methods such as three-dimensional (3D) objects and virtual reality use to maximize enjoyment and engagement. One of the promising ways is by applying augmented reality. However, little studies and no empirical evidences are found. The complexity of augmented reality to be designed in the gamification and learning fields might be one of the factors in lacking empirical evidences. Before gamification can be engaged, enjoyment in a gamified environment is crucial, which has been less investigated in the current gamification field. On the other hand, tajweed learning is known to be a dry and plain learning process which causes many attempts to utilise technological approach for attracting the learners, specifically children. Previous studies showed that the correct tajweed rule articulations were very worrying particularly in Malaysia. Many endeavors including new technologies and approaches exposure were strived by academicians, researchers, and the government to cater with the problems. Of that matter, since tajweed learning is the most crucial knowledge for a Muslim, tajweed learning has been selected as the case study in the study. To cope with the aforementioned problems, this study aims to propose a gamification and augmented reality design model for tajweed learning in relation to enjoyment. The following objectives are outlined to support the main aim: (i) to determine the design components of enjoyment in relation to gamification and augmented reality for tajweed learning, (ii) to validate the proposed design model through a prototype for tajweed learning, and (iii) to evaluate the effectiveness of the prototype in terms of enjoyment and tajweed learning performance. Literature review II, expert consultation II, document review and ADDIE (analysis, design, development, implementation, and evaluation) methodology was implemented to achieve objective (i) and (ii). The outcome of objective (i) is a design model and a prototype for objective (ii). The design model was reviewed by ten and twelve experts in two cycles of review phases. After the second review, the model was well accepted by the experts with some modifications. A prototype was implemented based on the design model. Then, reaction evaluation (enjoyment) and learning evaluation (performance) for experimental study were conducted. A total of 198 children participants and 362 audio and video data were analysed for both enjoyment and performance evaluations. The ANOVA and post hoc analyses showed that the prototype was likely to elicit more enjoyment compared to Group A and Group B approaches, but not for Group C in terms of concentration, clear goals, autonomy, competence, immersion, and feedback measurement of enjoyment. For learning evaluation, participants in Group D (based on the design model) exhibited the most error decrease in tajweed articulation for Quranic recitations compared to the other groups. All these findings showed that the design is effective in terms of enjoyment elicitation and performance for the learning environment, particularly for the selected case study, tajweed learning. This study has produced the following outcomes, along with achieving all the objectives: (i) a gamification and augmented reality design model for enjoyment, (ii) a functional prototype for tajweed learning to validate the design model, and (iii) empirical findings from the study act as the proof-of-concept of the design model.

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