Fire Safety Awareness through Instructional Game

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ABSTRACT

Instructional game is a good way in motivating everyone in learning the knowledge and skills needed for certain topic. Fire safety Awareness Game is an instructional game built by using software called Macromedia Flash and published as android package (apk) to be used as a mobile application. It is designed for everyone to educate people about the fire safety awareness. The game can be easily downloaded by scanning the QR code. Three different environments are provided in the game where users can choose from. The three environments are outdoor, inside a building and inside a house. In each environment, user can choose most suitable tools to extinguish the fire and the correct techniques applied when facing a fire emergency. Other than that, mini games are provided for users to assess their knowledge on fire safety awareness. Hints are provided throughout the game in order to help the user. At the end of this game, users will be able to raise their fire safety awareness.

Key Words: mobile application, learning, instructional game

1. INTRODUCTION

Nowadays, teaching profession is not just focus on delivering the knowledge and skill to students. Lecturers have to make sure students really can grab the knowledge and skill delivered to them. So, choosing an efficient teaching and learning methodology is also very important. Instructional game is one of the methodologies that can be applied in the teaching and learning process.

According to Oxford Dictionary, game is an activity that people take part in because from game, they can be amused and have a lot of fun. However, according to Hays (2005), game is defined as "*an artificially constructed, competitive activity with a specific goal, a set of rules and constraints that is located in a specific context* ". Both definition give the impression that game is just for enjoyment and do not achieve any learning objective. If the game created enables users to learn or achieve certain learning objective, then it can be considered as instructional game (Hays, 2005).

According to Ariffin, *et al.* (2014), game–based learning has been applied in various fields such as education, marketing and even military. Game has been played by people around the world. Since game has been popular among the younger generation, educator can utilize game in developing an instructional game.

Fire safety awareness game is a mobile application designed specifically to raise fire safety awareness among the students. The game will help to educate students about fire safety awareness while they are playing the game for fun. The game will teach users how they can protect themselves in fire emergency situation. For example, the correct procedures applied to escape from a building that is on fire. Besides that, the game application contains a QR code where user can just scan it if they wish to download the game. Other than that, this game will help user to remember all the fire safety rules. Without this instructional game, students tend to show lack of interest if they are given all the theories to remember.

The rest of this paper is organised as below: section 2 reviews on researches about instructional game; section 3 describes the prototype and system walkthrough; section 4 discusses the instructional game and the last section concludes the overall paper.

2. LITERATURE REVIEW

Klein and Freitag (1991), conducted a study to determine whether the use of instructional board game has any effect on motivation. From the study, it is found that four motivational components which

consisted of attention, relevance, confidence and satisfaction are significantly affected by instructional board game. Bai *et al.*, (2012) also conducted a study to determine whether the use of a 3-D instructional game has any effect on middle school student in term of achievement and motivation for the subject mathematic. The findings from the study stated that students acquire more knowledge from the instructional game and manage to maintain students' motivation in learning the algebra mathematic. The findings suggested that instructional game as a methodology in teaching and learning of the subject mathematic brings a lot of benefits for the students. Matsuda (2008) mentioned that teaching and learning method should be changed and one of the approach mentioned is computer-based approach which include computer simulation.

Instructional games developed must have certain features or characteristic that makes them suitable as a teaching and learning methodology. Gee (2005) stated that as developers of instructional game, they should ensure user of the game can really experience the real fire emergency situation as the virtual character in the game, so that knowledge and skills intended will be delivered to user. According to Hirumi *et al.* (2010), game technology is advancing in much faster pace compared to the improvement of game design and effectiveness of the game. In order to develop an effective instructional game that can achieve the course learning outcome, instructional designer should be given training in instructional game design in optimizing game-based learning. Dempsey (1996) discussed in his paper the criteria that need to be considered in choosing an instructional game. The criteria mentioned include simplicity, adaptability, potential for educational use, difference from other game in its category and ability to be played by a single player. The finding from the study revealed that adventure, arcade, board, simulation, puzzles and word games are game categories that can be chosen for teaching and learning of courses that are related to solve a problem or make a certain decision.

3.0 PROTOTYPE AND SYSTEM WALKTHROUGH

This game application is developed by using Macromedia Flash. This is an offline game application running on top of Android Operating System. The structure of this game is categorized into two main modules, the adventure module and mini game module. Once the game application is launched, it started with a main page as shown in figure 3.0.

Figure 3.0: Main Page

There are four buttons in the main page, mainly, 'Adventure', 'Mini-Game', 'Setting' and also 'Scan Me!' button. 'Adventure' button is the path to be re-directed to the adventure module; 'Mini-Game' is for the mini game module, 'Setting' is for game setting menu, and 'Scan Me!' launch the QR code for the game client download link.

Adventure module mainly has three topics to explore. There are 'Indoor Fire Awareness', 'Building Fire Awareness' and 'Outdoor Fire Awareness'. The logic of this application is to stimulate fire accident that might happen in the three possible situations, and users have to make their decision to save their own life. This application will lead user to the safety precaution and also steps to take if there are fire incidents taken place.

Refer to Figure 3.1 below, after the 'Adventure' mode button is clicked, user will be redirected to the 'Adventure Board' menu page. In this page, there are 4 buttons. 'Back' or 'Home' button, 'In Door' Button, 'Building' button and also 'Outdoor' button.

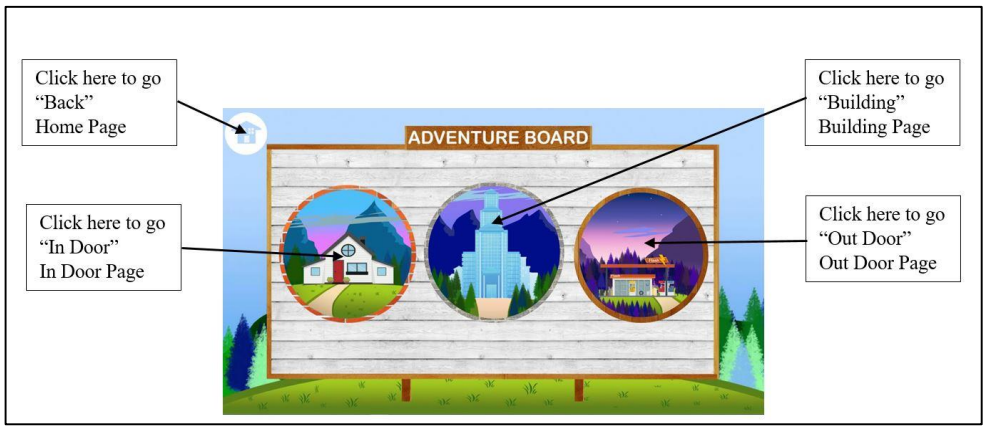

Figure 3.1: Adventure Mode

Refer to Figure 3.2 below, once the 'Indoor' button is pressed, user will be redirected to an adventure of saving themselves from a fire incident in the Indoor Scenario. There will be a narrator telling the current scenario, and user has to choose their correct action. There are two choices to be chosen, one with the correct answer, the other is the incorrect answer. If user has chosen the incorrect answer, user will be redirected to 'You Lose Page' telling user that his choice is incorrect.

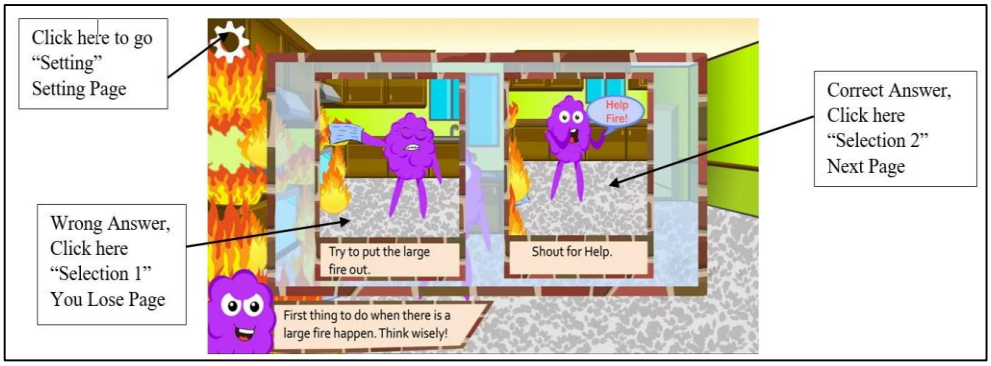

Figure 3.2 Adventure Content Designs for Indoor Topic

Refer to Figure 3.3 and Figure 3.4 below, it shows the content for 'Building' and 'Out door' Topic. The game algorithm is the similar as the one for Indoor Topic. The narrator of the game explains the scenario of fire incident which might happen inside a building, then, there will be two actions to be chosen by user. User has to decide the most correct action to be taken if the fire incident happened.

Figure 3.3 Adventure Content Designs for Building Topic

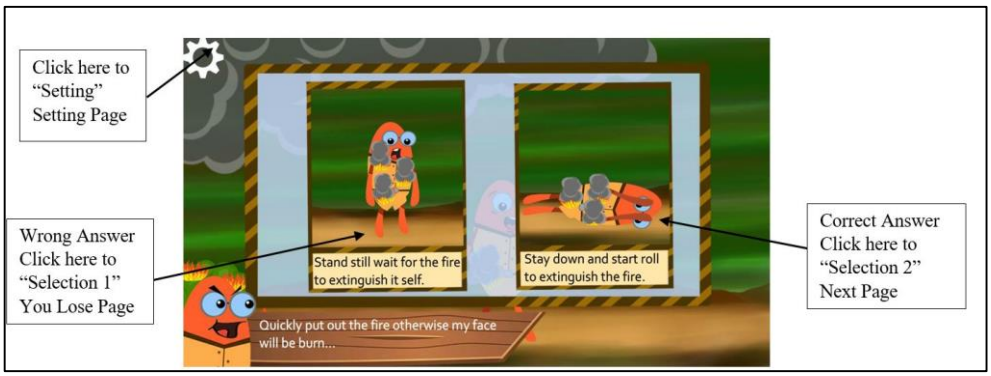

Figure 3.4 Adventure Content Designs for Outdoor Topic

Figure 3.5 showing the message prompted if user tapped on an incorrect result. User can decide to go back to the previous page by tapping on the 'Restart' button; Tap on the 'Home' button to go back to the Home screen or tap on 'Exit' button to exit the application.

Figure 3.5 Message prompted as a result of Choosing Incorrect Answer

Figure 3.6 showing an encouraging message prompted when user successfully going through all the stages in adventure module. At this screen, user have two options to choose, user can either tap on 'Restart' to play on the topic all over again, or tap on 'Home' button to go back to the Home screen.

Figure 3.6 Message Prompted as a Result of Successfully Gone through all the scenarios in the adventure module

Figure 3.7 showing one of the samples of Mini Game Question. The narrator in the game will explain a scenario and prompt user to choose the correct answer. If user has chosen the correct answer, then he will be redirected to the next question.

Figure 3.7 Sample of one of the Mini Game questions

Figure 3.8 as shown below will be prompted if user has chosen the incorrect answer. The prompted message includes the correct answer to remind user the correct action to be taken for the particular scenario. User has to tap on the button 'Continue' to proceed to the next page.

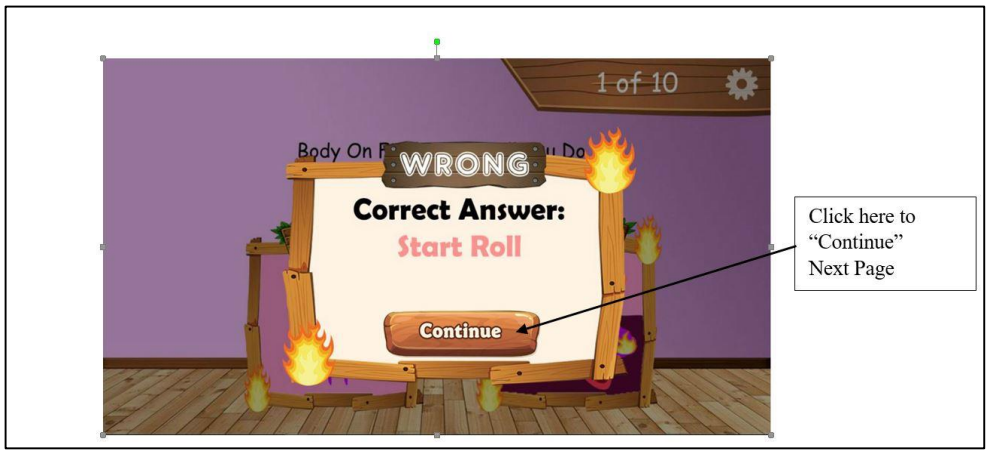

Figure 3.8 Message Prompted when the Answer Chosen is Incorrect

4.0 DISCUSSION

This game application contains different scenarios in the adventure module which are categorized into three main domains, indoor fire awareness, outdoor fire awareness and building fire awareness. After user played this game application they will have a more rational idea on how to react when there is fire incident.

As for 'Mini Game' module, it has adopted the quiz concept. Users have to answer questions, and at the end of the game, the application will inform user the points that user earned. The Mini Game module's motivation is to provide revisions for the user after they have already gone through all the three topics in the Adventure module.

According to Muntean (2011), gamification is the use of game play elements for non-game applications, particularly consumer-oriented web and mobile sites in order to encourage people to adopt the applications. Other than act as an entertainment elements in daily life, at the same time modelling behaviour. Subsequently, the motivation of this game is to raise fire safety awareness for the user who plays the game. Other than entertainment, this application also can be applied as teaching and learning tool, particularly in fire safety related subjects.

This application simulates the fire incidents or scenarios, and allows user to choose the most rational action to be taken and at the same time gives suggestion on the action to be taken if user does not know what to do. This can give a brief idea on what should be done when there is fire incident happens.

5.0 CONCLUSION

By creating a mobile application for the fire safety awareness, user can gain knowledge and raise their awareness through the scenarios inside the application. They do not need to go into the real fire incident to learn what action to be taken when there is fire incident occur. This is the new era where everybody has a smartphone in their hands, thus, it is very convenient for user to install this application in their mobile phone and launch the applications whenever they need time for entertainment. This application is developed using Macromedia Flash, where the animation is also very interactive. It is very suitable for all range of user from the olden people to the younger people.

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