The Design and Development of Driving Game as an Evaluation Instrument for Driving License Test

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Abstract—The focus of this paper is to highlight the design and development of an educational game prototype as an evaluation instrument for the Malaysia driving license static test. This educational game brings gaming technology into the conventional objective static test to make it more effective, real and interesting. From the feeling of realistic, the future driver can learn something, memorized and use it in the real life. The current online objective static test only make the user memorized the answer without knowing and understand the true purpose of the question. Therefore, in real life, they will not behave as expected due to behavior and moral lacking. This prototype has been developed inform of multiple-choice questions integrated with 3D gaming environment to make it simulate the real environment and scenarios. Based on the testing conducted, the respondent agrees with the use of this game prototype it can increase understanding and promote obligation towards traffic rules.

Keywords—Educational game, evaluation instrument, game, game prototype.

I. INTRODUCTION

COMPUTER games have become one of the fastest growing and most economically successful kinds of software. One of the examples is an educational game. An educational game, one designed for learning, is a subset of both play and fun. It is a melding of educational content, learning principles, and computer games [1]. Even though the development of these games did not contemplate a potential educational use, sometimes their contents and models are so rich and detailed that they can have an educational value if handled properly, as several (although isolated) initiatives show [2]. [1] also indicate that an effective educational game design must achieve a balance between fun and educational value.

A game is a system in which players engage in an artificial conflict, defined by rules, those results in a quantifiable outcome [3]. [4] also indicate that a game is a rule-based system with variable and quantifiable outcome, where different outcomes are assigned different values, the player exerts effort in order to influence the outcome, the player feels emotionally attached to the outcome, and the consequences of the activity are negotiable.

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Therefore, in the real life, when they drive they can adapt the knowledge and moral gathered through a game to choose whether it's right or wrong based on their decision on complying the road sign and laws. We have developed a game prototype of Malaysia Road Transportation Department (JPJ) driving license static test game that bring an alternative way to test instrument on testing the knowledge, ethics and moral for road sign and laws. This game creates the feels in driving on road to non-expert driver while doing their driving test.

II. DESIGN AND DEVELOPMENT

A simple interview and observation was performed with the helps of 15 staffs and 6 instructors from driving school institutions to gather complete understanding toward the driving test processes, issues and scenarios. Questions like the current technology for the driving test, behavior of new drivers, road condition, road signpost and laws, drivers moral and attitude have been asked to them. Through the early processes, the information's gathered have been written down to be used as good references during this study. We also have conducted an interview with the people who has taken the JPJ Static Driving Test and also with the people who has registered to take the test in order to get the user perception toward the current test. Next, for the observation process, we have observed driver behavior on the road to identify elements like morale and attitude and it are the good information to understand what the driver was lack off. It's important to identify the problems to ensure the validity.

A. Problems Definition

In this problem definition, the data that has been collected has been analyzed to identify the problems in the conventional testing method. We discovered the main problem is related to the moral and behavior of the driver itself. During the interview with staff and instructor at driving school institutions, all of them have agreed that the new driver nowadays was lack of moral and their behavior on the road is not appropriate. These opinions are based from the instructors experience in conducting driving training.

Next, the problems are derived from the JPJ static driving tests that the candidate need to take in order to get the preliminary license to learn driving. The current JPJ static driving test is in form of an online multiple-choice question. A new driver needs to attend education driver courses for 5 hours and study the example questions provided by the driving school institution. So, in order those to pass the test they just

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need to memorize the answer provided. They just memorized without knowing the true meaning or purposes of all road sign and laws available that are tested in the test. Besides that, the current JPJ static driving test is just boring and it could not capture the attention of the tester and doesn't provide a new thing to learn because of the static test. With the introduction of 3D technology, we can simulate the effect happen if the new driver doesn't comply with the road sign and rules.

B. Genre, Character and Perspective

After the problems have been identified, now come to the genre and character determination. The purpose for the game that we have constructed is to educate the new driver about complying with road signs and rules, so we have chosen the educational genre. This genre was been chosen because it similar to teaching method. In the character part, user or a new driver is the character that will use the prototype. It's also known as the target audience. To fulfill the game environment a first person perspective (FPP) view has been selected on how the prototype will be seen. Therefore, the user will see the game environment as a driver perspective driving behind a car steering.

C. Location and Interface

In order to make the user experience the feeling like in a real situation, the location of game must be well created. For the JPJ static driving test, the location was drawn based on story plot of the game. This purpose of the prototype is to test the new driver, so the location is driving on the road. The prototype JPJ Malaysia static driving test educational game uses a simple layout in order to make it easy to understand and follow. Other than that, the graphics of the prototype use shadow effect to make they look lively. It will make the user feel comfortable when doing some interaction with the prototype.

III. THE PROTOTYPE

This prototype as shown in Fig. 1, 2, 3, and 4 highlight the educational game developed as the evaluation instrument for driving test in Malaysia. Based on the game developed, the user will experience the feeling like in a real driving situation during the test, where they will roaming the road while answering all the question asked. They will be evaluated based on their action in answering the answer given. At the end of the game, the mark will be displayed and the user will know whether they pass the driving test or not.

Fig. 1 Snapshots of the main menu

Fig. 2 Snapshots of the starting test

Fig. 3 Snapshots of the test question

Fig. 4 Snapshots of the result page

IV. TESTING

In order to test the prototype, the scenario based testing has been used to ensure the prototype runs and performs accordingly. Scenario based testing begin with one group of tester by giving a simple briefing about the research and prototype developed. Then, researchers gave the "Scenario Testing Form" to the tester that include all about the scenarios happens in the prototype. The actions asked in the "Scenario Testing Form as displayed in Table I.

TABLE I
SCENARIO TESTING FORM

Event	Action	Comment
Click the program	After click the program, user can see the welcome screen. After that menu screen will be appeared.	
Enter to start	From the menu screen user can enter to start the program. This screen includes text and image.	
In starting point	At this screen, user can hear the engine sound. This screen includes the image and	

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	3D environment.
Begin the explore	Starts to explore with first person perspective view. User can see 3D environment world.
Question 1	At the signpost, question will be appeared. User can choose the answer by press the enter button.
Question 2	At the signpost, question will be appeared. User can choose the answer by press the enter button.
Question 3	At the signpost, question will be appeared. User can choose the answer by press the enter button.
Question 4	At the signpost, question will be appeared. User can choose the answer by press the enter button.
Question 5	At the signpost, question will be appeared. User can choose the answer by press the enter button.
Question 6	At the signpost, question will be appeared. User can choose the answer by press the enter button.
Question 7	At the signpost, question will be appeared. User can choose the answer by press the enter button.
Question 8	At the signpost, question will be appeared. User can choose the answer by press the enter button.
Question 9	At the signpost, question will be appeared. User can choose the answer by press the enter button.
Question 10	At the signpost, question will be appeared. User can choose the answer by press the enter button.
Mark system	The mark system will display total mark. The questions also appear. From mark system screen, user can save the mark by press "space bar" button. User also can go to main menu by press "escape" button.

The testing has been conducted in three phases as Alpha, Beta and Pilot testing. The group of tester consists people from multimedia, international affair and business department. Testing Alpha has been performed on 27 September 2010 with three people that have experience with current JPJ driving static test. The test result will put into consideration to fix all the bugs and design error for Beta testing. From Alpha testing, we have concluded the problems as below:

1) Must create a instruction for the user
2) Adding some grass textures
3) Create cloud texture in the top of prototype
4) Full control for user on question section
5) Question 10 have same signpost with other signpost

6) Didn't display the question at result section

Beta testing has been performed on 2 October 2010 also with three people that have experience with current JPJ driving static test. The test result will put into consideration to fix all the bugs and design error for Pilot testing. From Beta testing, we have concluded the problems as below:

1) Main menu without an image
2) The car view not move smoothly
3) Doesn't have additional objects
4) Sound of car engine didn't stop when it reach at signpost
5) No function button or action to save of print the result

Pilot testing has been performed on 5 October 2010 also with three people that have experience with current JPJ driving static test. As gathered in Alpha and Beta testing, all the problems have been fixed and Pilot testing turns out with no comment from the tester.

V. CONCLUSION

The development of this prototype brings new adaptation of game technology in a conventional evaluation method. The use of 3D game environment encourages understanding and obligation towards road rules. Based on the design and development discussed it shows the benefit of using game technology can create more interesting and fun on static driving test. The prototype developed shows the interactive interaction between the user and the new evaluation test. Result from the testing conducted also shows the benefit of using this new concept in doing evaluation. Furthermore, with the use of game in evaluation it can produce new kind of evaluation method that suited with the advancement of current technology.

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