

Parking ‘didacticiel’: A Game-Based Learning Application of Vehicle Parking

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Abstract : Parking lot area can be so difficult to a certain people who tried to park exactly in the parking lot. Parking ‘didacticiel’, a game-based learning application, develop to teach users about road rules and how to be parking properly in a very attractive way by 3D modelling. ADDIE model has been used to develop the application including the standard from Road Transport Department Malaysia (JPJ). The application educates driver especially to the candidates from driving school center by recognize the right signs on the road. In future, the improvement of the application will be discovered by the development of virtual reality game-based learning using a goggle.

Keywords: Parking, ADDIE Model, Game-Based Learning, Application

1. Introduction

There are almost all people own a vehicle especially a car in Malaysia. Usually they used it for their daily purpose for instance to go for work, sending their children to schools, and a symbol of self-glory. However, not all of them are skilled in park their own vehicles. This needs to be emphasized by us as Malaysians because this matter can affect the traffic of other road users. In addition, road users who do not care about some of these road rules can result in various probabilities for their accidents, being fined by the authorities and causing chaos on the road.

Malaysian’s government has gazette legislation that Malaysians need to have a driving license. Therefore, Malaysians should sit for the driving test. But how many of people are obey with the rules? Research from [1] had shown that almost 1.2 million of people in Malaysia didn’t have any driving

license. This statement could be worried to another legal driver. In fact, it might be influencing the attitude and behavior during drive. Because of this, candidates should show their earnestness and confidence during driving lesson.

Candidates are unable to try and experience driving conditions during driving lesson in a longer period. They stick to the time period which only have an hour daily or by a week. Experiencing driving lesson might be dropped. Furthermore, they are unable to understand the signs and rules on the road. To increase the attitude and behavior during drive, an application has been developed. Parking 'didacticiel' teach users about road rules and how to be parking properly in a very attractive way by 3D modelling. Besides, it educates driver especially to the candidates by recognize the right signs on the road.

1.1 Parking issues and traffic fault

Difficulties of parking is a hardly issues in Malaysia. People park their cars incorrectly, including parking on the yellow line causing traffic congestion. Parking in the wrong place and the wrong way of parking causes traffic to slow down, especially parks on the shoulder of the road also threatens the safety of other road users [2, 3, 4]. Director of Traffic Investigation and Enforcement Department Bukit Aman, Senior Assistant Commissioner Sharul Othman Mansor says, there are six major offenses of road users; driving over speed limits, driving in emergency lanes, cutting in double lines, cutting lines, disobeying traffic lights and using telecommunication devices while driving [5].

According to the Theory of Planned Behavior (TPB) [6], most of people reacts with their behaviors and attitudes at a specific time and place. As shown in figure 1, the prior predictor of behavior in the TPB model is intention which is determined by three factors that are attitude, subjective norm and perceived behavior control. Theoretically, an intention that leads to behaviour happens only when perceived behavioral control is strong. In practice, normally intentions and perceived behavioral control are the main effects on behavior, but there is no significant interaction. People seems to be anger with the limited of parking lots, feels regrets and tend to be frustrated. Various strategies and approaches need to be done to address the issue of safety of road users, particularly in educate the driving license candidate to change their behavior on road. The authorities, agencies and organizations need to cooperate in giving emphasis to the safety of the road users [7].

Local studies should be conducted to understand the problems of the issue. Survey should be carryout on adolescent because it is very important that from the beginning, we must understand their behavior. Adolescents are very important in the development of a country near future. **Figure 1** shows the TPB model.

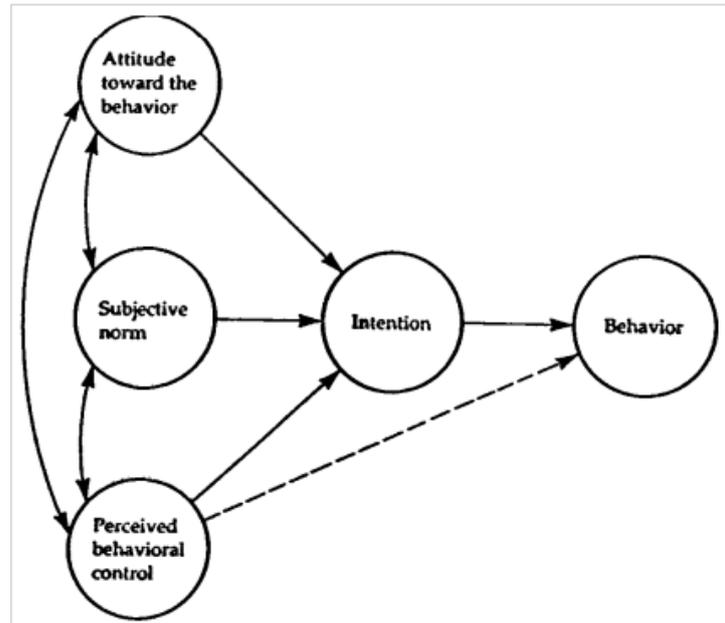


Figure 1: Theory of Planned Behaviour Model

1.2 Application of game-based learning

Nowadays, a game-based learning is a trend for teaching and learning method during learning process in school and institution. Teacher and instructor found that this medium can increase the understanding for students [8]. This medium is helpful especially in education that involve technical and social aspects [9].

Research shows that the impact of flow (operationalized as heightened challenge and skill), engagement, and immersion on learning in game-based learning environments increase positively. [10] Application using games-based learning meets the basic needs of the learning environment and can provide an exciting learning experience. [11, 12]

An application called Parking '*didacticiel*' has been developed for user especially to the candidate during driving lesson. This application was developed as a user-friendly which user can handle like a real-life driving. This application hope to increase the understanding and potential drive with a legal driving license in future.

2. Methodology

The application use ADDIE model [13] for methodology development. Each phase goes through several interrelated processes starting from the pre-production, production until the post-production process of a quality products. ADDIE model includes analysis, design, development, implementation and evaluation [14, 15]. **Figure 2** shows ADDIE model.

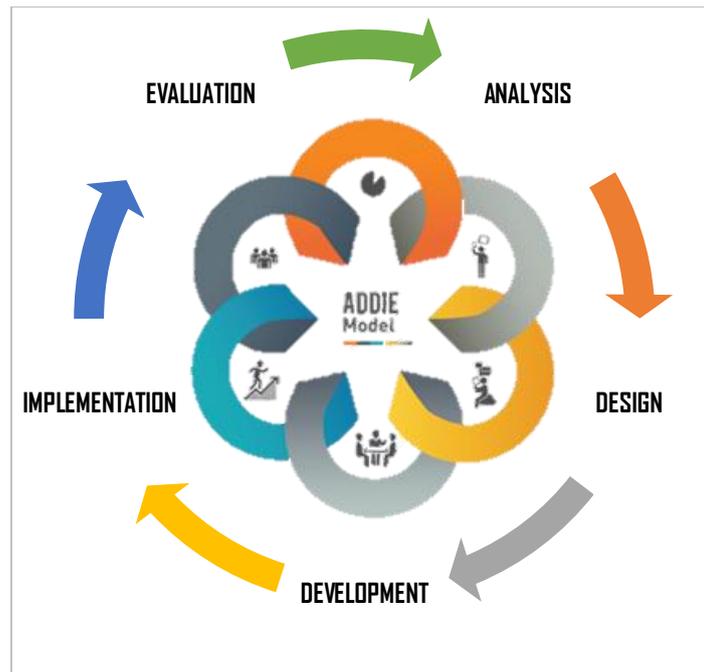


Figure 2: ADDIE Model

2.1 Analysis

In this phase, several things need to be identified before starting a project. All available data and problems will be collected and analyzed. The relevant data and problem have been classified below:

- the difficulties of parking and understanding to the signage
- the medium that can help to be professional in driving

The analysis was conducted using a questionnaire. The questionnaire was conducted with the aim of identifying how to develop this application and the understanding among user with parking and signage.

2.2 Development

In the development phase, the application has been incorporated with pre-designed content into the design phase. In this phase, identification has been made to the design model for this game application. As a result, the processes have been done by producing a storyboard, conceptual models, architectural models, multimedia application design specification documents and identification to the appropriate program code for the application interface.

2.3 Design

For design phase, there are some important things the app was designed for. In this phase, storyboards and graphics has been created. All multimedia elements that have been formed are developed according to each module. Vehicle models for each 3D animation are built using Unity software while graphics are developed using Adobe Photoshop CC 2019. Meanwhile, for audio elements, Audacity software has been used. The game environment was developed using Unity software and C # programming language. Before moving on to the next phase, the content that has been merged needs to go through the implementation and evaluation phase. **Figure 3, 4, 5** and **6** shows the development and prototype of the application.



Figure 3: Main Page



Figure 4: GUI for Player



Figure 5: The Scoreboard Shows The Score for the Stage



Figure 6: Option Menu When User Pause From Playing

2.4 Implementation

Before test the application, the implementation must be run by make a risk analysis on how to use the steering wheel properly and how to park properly according to the standards [16] by Road Transport Department Malaysia (JPJ). Then, the application has been planned, measured, designed and prioritized testing sessions based on predetermined risks. Prior to the next phase, all these processes must go through the evaluation phase to be evaluated.

2.5 Evaluation

The evaluation phase includes the analysis of Malaysians people from aged 17 to 60 years. The findings of the study obtained from the questionnaire that has been distributed to the public [17, 18]. The testing approach was used a needs-based strategy approach.

3. Results and Discussion

The survey was conducted at Pusat Latihan Memandu Bandar Maharani, Muar, Johor. 30 respondents among students has filled out the survey form. The result represents to the table and figure below.

Figure 7 shows there are 18 respondents from male and 12 respondents from female at Pusat Latihan Memandu Bandar Maharani. From this chart, we know that most people especially male, alert to learn and get their own driving license.

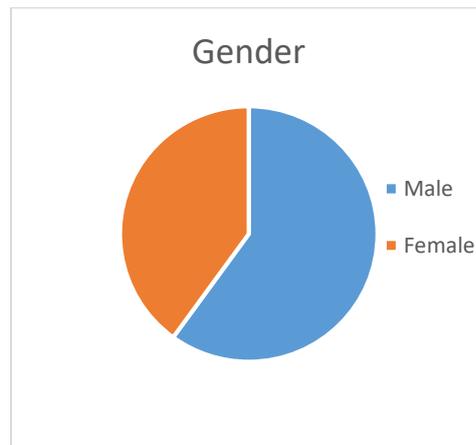


Figure 7: Respondent By Gender

Figure 8 shows there are 11 respondents from 17 to 29 years old, 7 respondents from 30 to 49 years old and 2 respondents from 50 to 60 years old. This study reinforces that adolescence are the most who alert to get their own driving license.

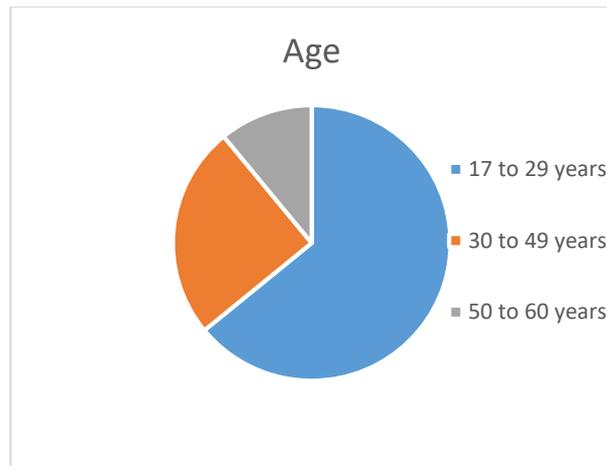


Figure 8: Respondent By Age

Table 1: Questionnaires With The Responds

Item	Description	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
1	Apps theme.	8	22	0	0	0
2	Game arrangement.	7	9	14	0	0
3	Motive of apps.	7	14	9	0	0
4	Interface of apps.	11	8	11	0	0
5	Tutorial presentation.	6	9	15	0	0
6	Suitable.	6	9	15	0	0
7	Error in apps.	14	6	10	0	0
8	Parking and driving information.	3	12	15	0	0
9	Auto gear vs. manual gear.	17	5	8	0	0
10	Can influence user.	18	12	0	0	0

Table 1 shows the results from the respondent. Mostly they are strongly agree to the overall development of application. They find enjoyable and satisfaction to the application. All usability approach meets the requirement and need. The implementation of game-based learning applications has fulfilled the needs and requirement to the targeted user.

4. Conclusion

Based on the research, this study find that the game-based learning application is very useful for candidates at driving school center. They can train themselves to park a car properly. Furthermore, it will make it easier for each driving school center to teach new candidates in driving a car for parking. In future, the improvement of the application will be discovered by the development of virtual reality game-based learning using a goggle.

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