Developing A Traffic-Sign Knowledge Application On Android System

Satien Janpla, Phattara Bumrugrad, Kunyanuth Kularbphettong*

* 1 U-Thong nok, Dusit Bangkok 10300 Thailand

Abstract

In this paper, we present a traffic-sign knowledge application on Android system. The objective of this system is to support and advice user to learn and test traffic signs and driving rules in Thailand based on mobile application. It makes benefits for users to learn and know the means of traffic signs and how to drive correctly in Thailand. After learning the specific lessons of application, users will take a specific test and know their result immediately. In this project, it was divided the result by the research purposes into 2 parts: developing the Mobile application for traffic-sign knowledge and testing and evaluating the system. Questionnaires were used to measure user satisfaction with system usability by specialists and users. The results were satisfactory as followed: Means for specialists and users were 4.15 and 4.37, and standard deviation for specialists and users were 0.583 and 0.644 respectively. Further analysis showed that the quality of a traffic-sign knowledge system was also at a good level as well.

Keywords: traffic-sign knowledge, Android system, and Mobile application

1. Introduction

Currently, a traffic collision, also known as a traffic accident, is an important public problem in Thailand. It affects to lose a large amount of life and property. Although there are many agencies and organizations cooperate with promoting the campaign to protect car accident, the problem is still increasing. According to the report of

* Kunyanuth Kularbphettong. Tel.:+4-432-432-432.
E-mail address: kunyanuth.ku@gmail.com
Bureau of Non Communicable Disease, Ministry of Public Health, Thailand, from 2010 to 2012, road accident killed 41,858 people (Poluta and Nunziata, 2006). Moreover, the WHO’s 2013 country report on Thailand regarding death toll from road accidents ranked third worldwide, Thailand ranks first in South East Asian region on an average 2 people die and or injured each hour and Director of the World Health Organization Collaborating Centre for the Prevention of Accidents reveals the Road Safety Report (Global Status Report on Road Safety, 2013), prepared by the WHO’s. Deaths rate is found (Corchado, Bajo, Paz and Tapia, 2008). A driver is one of the significant causes of this problem. Therefore, the better way to reduce the cost of accident problem is to educate and improve the skills and attitudes of drivers. In recent years, initiatives have been taken from Thai Government to provide and promote the knowledge of safety driving by taking use of Information and communication technologies. With recent advances in Information Technology of smart mobile devices, it is possible to take advantage of these devices to design an application to educate standards for testing driver’s abilities in safety. In addition, mobile devices become more widely used as an opportunity to seed knowledge of safety driving and suggest drivers to learn and test traffic signs and driving rules automatically. This research aims to develop a traffic-sign knowledge application on Android system which will be benefits for users. Besides, it is also useful to provide knowledge of safety driving and traffic signs and driving rules in Thailand also. The remainder of this paper is organized as follows. Section 2 presents related works and research methodologies used in this work. Section 3 presents the system architecture and section 4 shows the results of this experiment. Finally, in section 5 conclude the paper with future research.

2. Related works

This section explains reviews of relevant literature for exploration and adaptation information to develop this project. To reach the objectives of this research, mobile technology has also applied to implement and enhance adaptive system.  Android operating system was used to develop the mobile application to provide management of patient health records and medical images (Doukas, Pliakas and Maglogiannis, 2010). There is much of research that indicated how to provide requirements for design of a mobile learning (Sharples, 2000). (Sharples, Taylor & Vavoula, 2007). (Lally, Sharples, Bertram, Masters, Norton and Tracy, 2012). Also, Mobile technology has been developed to support processes and enhance the reliability of mobile applications so as to eliminate human error (Bin and Lun, 2001).

3. System framework

The traffic-sign knowledge application on Android system is designed to provide knowledge in how to driving safety and advice user to learn and test traffic signs and driving rules in Thailand. The system contains three following components as shown in Fig.1.
To implement the project, questionnaires and user’s requirements were applied in the design and development of this mobile application. The information was used as a source of information for management mobile application and database management and internet network technology were applied in order to make the system fast and easily work. The system can be divided to be 4 parts as following: a user profile part, a searching part, a learning part, and a testing part. Fig 2 was presented the components of the system.

In the user profile module, user can register his/her profile such as personnel information, email address, username and password, and etc and also this module allows user to edit his/her information and user can search for traffic sign knowledge and driving rules in Thailand by using a search module. Moreover, they can learn the means of traffic signs and how to drive correctly in Thailand and they can take driving exams and know results from the testing module of this application.

Also, testing and evaluation of this mobile application were divided into two parts: Black box Testing and Questionnaires by specialists and users. Black box testing was used to test the performances of the system and the errors of the system. The satisfaction of this system was evaluated by questionnaires. To evaluate the quality assessment system, Mean (x) and standard deviation (SD) were used to evaluate the abilities of the project.
4. The results of this system

The results of this research are separated by the research objectives into 2 parts: developing the traffic sign knowledge application on Android system and testing and evaluating the system.

4.1. Developing the traffic sign knowledge application

The experiment of this research was conducted and designed to explore the effectiveness of the traffic-sign knowledge application through mobile phones. Fig 3. Fig 4. and Fig 5. were shown the results of traffic sign knowledge application on Android system.

![Fig. 3.A-B the first page of mobile application](image)

![Fig. 4. A B The example learning pages of this application](image)
4.2 Testing and evaluating the qualities of the system

To test and evaluate the qualities of the system, Black box Testing and Questionnaires by specialists and users were used to test this project. Black Box testing was used to determine the error of the project as following: functional requirement test, Function test, Usability test, Performance test and Security test. The ability of the system was evaluated by Functional Requirement test in requirements of the users and Functional test was used to assess the accuracy of this application. The suitability of the system was determined by usability test. Performance test was used the processing speed of the system. Finally, Security test was evaluated the security of the system Table 1. was shown the results of Black box testing.

Table 1. The results of Black box testing

<table>
<thead>
<tr>
<th></th>
<th>Specialists</th>
<th>Users</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Function Requirement Test</td>
<td>4.17</td>
<td>4.51</td>
</tr>
<tr>
<td>2. Functional Test</td>
<td>4.15</td>
<td>4.28</td>
</tr>
<tr>
<td>3. Usability Test</td>
<td>4.23</td>
<td>4.45</td>
</tr>
<tr>
<td>4. Performance Test</td>
<td>4.03</td>
<td>4.31</td>
</tr>
<tr>
<td>5. Security Test</td>
<td>4.23</td>
<td>4.33</td>
</tr>
</tbody>
</table>
Data collected from a questionnaire which was analyzed statistically. Mean score and standard deviation were the major analytical techniques to address the proposed research questions. The results were satisfactory as followed: Means for specialists and users were 4.15 and 4.37, and standard deviation for specialists and users were 0.583 and 0.644 respectively. Further analysis showed that the quality of a traffic-sign knowledge system was also at a good level as well.

5. Conclusion and future works

In conclusion, the significant objective of this study was to present the preliminary result for the ongoing improvement project of the traffic-sign knowledge application on Android system and also this project can be beneficial to support and suggest user for driving safety information. Nevertheless, the future experiments will be required other new media techniques to enhance this project.

Acknowledgements

The authors gratefully acknowledge the financial subsidy provided by Suan Sunandha Rajabhat University.

References