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EDITORIAL

It is my proud privilege to welcome you all to the TheIRES International Conference at Zurich, Switzerland. I am happy to see the papers from all part of the world and some of the best paper published in this proceedings. This proceeding brings out the various Research papers from diverse areas of Science, Engineering, Technology and Management. This platform is intended to provide a platform for researchers, educators and professionals to present their discoveries and innovative practice and to explore future trends and applications in the field Science and Engineering. However, this conference will also provide a forum for dissemination of knowledge on both theoretical and applied research on the above said area with an ultimate aim to bridge the gap between these coherent disciplines of knowledge. Thus the forum accelerates the trend of development of technology for next generation. Our goal is to make the Conference proceedings useful and interesting to audiences involved in research in these areas, as well as to those involved in design, implementation and operation, to achieve the goal.

I once again give thanks to the Institute of Research and Journals, TheIIER, TheIRES for organizing this event in Zurich, Switzerland. I am sure the contributions by the authors shall add value to the research community. I also thank all the International Advisory members and Reviewers for making this event a Successful one.

Editor-In-Chief

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THE DEVELOPMENT OF A MOBILE MAP APPLICATION: A CASE STUDY OF SUAN SUNANDHARAJABHAT UNIVERSITY

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Abstract - This research aims to study (1) the development of a Suan Sunandha Rajabhat University mobile map application and (2) the usage results of the Suan Sunandha Rajabhat University mobile map application through Android Studio and Google Map, to determine the extent to which the website design conforms to the mobile experiences suitable for the use in modern times. The research sample consisted of thirty application users. The researcher assessed the data by estimating arithmetic mean and standard deviation values. The research instruments included a questionnaire for assessing the application’s efficiency, and a questionnaire for studying the result of the application usage. The research results show that:

1) The Suan Sunandha Rajabhat University mobile map application consisted of five major parts: (1) Homepage, (2) University Map, (3) Search Menu, (4) About Us Menu, and (5) Contact Us Menu. The overall assessment of the application’s appropriateness was rated at the very good level ($\bar{x} = 4.66; S.D. = 0.37$). This shows that the effectiveness of the developed application was rated as being at the very good level.

2) According to overall user perception, the average accuracy rate of the results of the Suan Sunandha Rajabhat University mobile map application was rated at the very good level ($\bar{x} = 4.54, S.D. = 0.55$).

Index Terms - Application, mobile application, navigator system, 3D map, Google Map

I. INTRODUCTION

Information technology plays a significant role in Thai society and in the daily lives of the Thai population, especially with regard to work, communications and transportation. Most daily activities are related to information technology in that many people use it to gather data when travelling, including the route and the map information which calculates the overall distance to the destination. Therefore, it currently affects the lives of many people.

Nowadays, communication using traditional maps mostly involves the use of 2D pictures which only specify the locations or location coordinates, and the relationship between the components at various locations. However, the main problem with 2D map communication is that the users cannot understand or see the overall image of the location, such as the height, structure, or size of buildings, requiring the 2D map users to use their imagination to picture what the location would look like. Hence, applying advanced technology to create 3D maps for digital content is an interesting idea for map communication, in that it allows users to recognize and understand the map structures more effectively [1] [2]. Traveling to unfamiliar places or on unfamiliar routes can result in anxiety, as people might not know how to reach their destination, and how long it will take [3].

Suan Sunandha Rajabhat University is one of the continuously developing higher educational institutions in Thailand. This development involves increasing the number of buildings; however, due to the differing sizes and numbers of buildings, there have been a lot of problems for visitors to the university, as well as for new students who need to travel around the campus. Recently, such individuals have been confronted with a number of challenges such as finding the route to their destinations due to the lack of information about the buildings and locations within the university campus; this usually results in lateness or wasting time. Moreover, the signposting or printed maps of the campus are mostly unclear. If the problem could be resolved through the use of modern traveling technologies such as 3D maps displayed on a screen, it would help visitors or new students to have a better learning experience at Suan Sunandha Rajabhat University [4]. Such a map must be able to link with widely-used Google Maps.

Due to the aforementioned problems, the researcher created the tools needed to offer directions by developing a mobile map application for Suan Sunandha Rajabhat University using the Android operating system. The application was designed for resolving routing problems throughout the Suan Sunandha Rajabhat University campus; it includes information about buildings, places, and contact numbers for facilitating visitors. The 3D map application involves the use of an effective developed mapping software that rapidly fulfills the needs of the users and facilitates their transportation. The application effectively reduces errors in terms of searching for the correct route and reducing the duration of travel. The users can access the information and services they require via the application in all circumstances.

II. RESEARCH OBJECTIVES

1) To develop the mobile map application for Suan Sunandha Rajabhat University.
2) To study the usage results of the mobile map.
The Development of a Mobile Map Application: A Case Study of SuanSunandhaRajabhat University.

III. RESEARCH METHODOLOGY

The research methodology is divided into two stages as follows:

Stage 1: The development of a mobile map application for SuanSunandhaRajabhat University is as follows:

1) The mobile map application for SuanSunandhaRajabhat University was developed by using the data collected from the study, through analysis and the synthesis of related documents and research as guidelines for designing the application. The researcher collected the data with regard to the buildings, places, and contact numbers in order to develop the application. This included physical and textural data such as the pictures of the actual locations, buildings, and exteriors of each building. The programs that the researcher used as the modeling tools for designing the mobile map application were Android Studio, Google Maps, and other tools for developing Android applications.

2) System Analysis and Design

When the users operate the mobile map application, the information and details of the buildings and places will be searched for and routed. The application would display the details of the building, contact numbers, and locations of the searched-for building from the database. A systems administrator can all of the information in the database. The application will be systematically function-based on the Use Case Diagram as illustrated in Figure 1.

![Use Case Diagram of the System Architecture](image)

The ‘Use Case Diagram’ shown in Figure 1 is a diagram showing the operational scope of the application, as well as the details of the use case applied in the application.

3) The mobile map application was developed by using PHP, Android Studio, Google Maps, and Mysql in order to design the website screen that suits the mobile experiences of the users in modern times.

4) The application was assessed and evaluated by five computer and information technology specialists. The assessment was divided into four parts: 1) Function Requirements, 2) Function Test, 3) Usability Test, and 4) Security Test.

Stage 2: The study of the usage results of the mobile map application usage involved the analysis of the evaluation results using arithmetic mean (x) and standard deviation (S.D.) in terms of a five-level rating scale based on the Likert scaling method.

IV. RESEARCH RESULTS

The researcher divided the results into two sections. These are as follows:

Section 1: The development of the SuanSunandhaRajabhat University mobile map application

A. The development results of the SuanSunandhaRajabhat University mobile map application is described as follows:

1) Application Users

- When operating the application, the start screen would appear as illustrated in Figure 2.

![The Screen Displaying the List of Buildings](image)
From Figure 3, the operation menu consists of Homepage, Map, Favorite, Contact Number, Contact Us, Website, and About the University.

- The screen displaying the area containing the building.

From Figure 4, the screen displays the area of the buildings. This is divided into five zones.

- The screen displaying the list of buildings as shown in Figure 5

From Figure 5, when users choose a specific area, the screen will display a list of buildings allowing the users to look up a building from the list.

- The screen displaying the list of buildings as shown in Figure 6

From Figure 6, when the user clicks on the name of the selected building, the screen will display details of that building. This will consist of its contact number, fax number, website, e-Mail, map, and directions to that building.
The Development of a Mobile Map Application: A Case Study of Suan Sunandha Rajabhat University

- The screen displaying the building location on the map as illustrated in Figure 7.

From Figure 7, when the user chooses the building on the map, the screen will display its location on the map, including details of the building.

- The screen displaying the direction on the map as shown in Figure 8.

From Figure 8, when the user chooses the building on the map, the screen will display directions to that building.

2) Systems Administrator

- The screen displaying the logging in of the systems administrator

Figure 9. The Screen Displaying the Logging In of the Systems Administrator

- The administrator screen; the login page of an administrator, requesting that person’s username and password in order for him/her to gain access to the system.

Figure 10. The Administrator Screen
The Development of a Mobile Map Application: A Case Study of Suan Sunandha Rajabhat University

- The Process of adding, deleting, and editing the type of buildings on the administrator screen which displays the saving building data and type of buildings menu.

Figure 11. The Screen Displaying Adding, Deleting, and Editing the Type of Buildings Data

B. The Evaluation Results with regard to the Application on the part of the Computer and Information Technology Specialists

The content evaluation was divided into four parts: 1) Function Requirement Test, 2) Function Test, 3) Usability Test, and 4) Security Test. The details are as illustrated in Table 1.

<table>
<thead>
<tr>
<th>Area of Evaluation</th>
<th>Appropriateness</th>
<th>( \bar{x} )</th>
<th>S.D.</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Function Requirement Test</td>
<td>4.73</td>
<td>0.41</td>
<td>Very good</td>
<td></td>
</tr>
<tr>
<td>2. Function Test</td>
<td>4.52</td>
<td>0.47</td>
<td>Very good</td>
<td></td>
</tr>
<tr>
<td>3. Usability Test</td>
<td>4.77</td>
<td>0.30</td>
<td>Very good</td>
<td></td>
</tr>
<tr>
<td>4. Security Test</td>
<td>4.65</td>
<td>0.32</td>
<td>Very good</td>
<td></td>
</tr>
<tr>
<td>Average Result</td>
<td>4.66</td>
<td>0.37</td>
<td>Very good</td>
<td></td>
</tr>
</tbody>
</table>

Table 1: The Evaluation Results with regard to the Application on the part of the Computer and Information Technology Specialists

Regarding the evaluation results with regard to the Suan Sunandha Rajabhat University mobile map application on the part of the computer and information technology specialists as shown in Table 1, the researcher found that the overall appropriateness was rated at the very good level \( \bar{x} = 4.66; \) S.D. = 0.37). The evaluation results represented the capability of the application which was developed with the use of Android Studio. Furthermore, the design was based on the Graphical User Interface (GUI), so the application is convenient and flexible for all users. In addition, the researcher used the Black-Box Testing method to investigate all the function operations of the application to identify any errors, as well as to resolve any problems in order to ensure that the application worked perfectly. As can be seen from Table 1, the appropriateness of the application evaluation was rated at the highest level; consequently, the developed application is expected to be able to support the user’s transportation planning.

Stage 2: The Results of the Study of the Suan Sunandha Rajabhat University Mobile Map Application Usage.

The results of Suan Sunandha Rajabhat University mobile map application usage are illustrated in Table 2.

<table>
<thead>
<tr>
<th>Areas of Evaluation</th>
<th>Appropriateness</th>
<th>( \bar{x} )</th>
<th>S.D.</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. The application is easy to use.</td>
<td>4.63</td>
<td>0.48</td>
<td>Very good</td>
<td></td>
</tr>
<tr>
<td>2. The component arrangement on the screen is appropriate.</td>
<td>4.50</td>
<td>0.56</td>
<td>Very good</td>
<td></td>
</tr>
<tr>
<td>3. The application is convenient in terms of data searching.</td>
<td>4.50</td>
<td>0.67</td>
<td>Very good</td>
<td></td>
</tr>
<tr>
<td>4. The design color is appropriate.</td>
<td>4.43</td>
<td>0.56</td>
<td>Good</td>
<td></td>
</tr>
<tr>
<td>5. The signs or pictures are appropriate.</td>
<td>4.50</td>
<td>0.62</td>
<td>Very good</td>
<td></td>
</tr>
<tr>
<td>6. The interaction between the application and the user is appropriate.</td>
<td>4.57</td>
<td>0.50</td>
<td>Very good</td>
<td></td>
</tr>
<tr>
<td>7. The overall view of the screen design is appropriate.</td>
<td>4.63</td>
<td>0.48</td>
<td>Very good</td>
<td></td>
</tr>
<tr>
<td>Evaluation Results</td>
<td>4.54</td>
<td>0.55</td>
<td>Very good</td>
<td></td>
</tr>
</tbody>
</table>

Table 2: The Results of the Suan Sunandha Rajabhat University Mobile Map Application Usage.

From Table 2, the results of the mobile map application usage as evaluated by thirty users, showed that the appropriateness of the application’s overall view was rated at the very good level \( \bar{x} = 4.54; \) S.D. = 0.55). This is due to the fact that the users were familiar with this kind of application, including a high degree of map information literacy, and were skillful in using digital information.

CONCLUSION

The application developed by the researcher was inspired by Google Maps technology [5] A mobile map application is very important for the future.
because it can collect and clearly display the data in a modern way, as well as reducing the chance of getting lost on the part of students, parents who come to visit the university or other visitors. This conforms with the research conducted by [6] in which using a mobile phone map application for investigating or providing guidance with regard to a route would prevent the chance of getting lost in the event of traveling to an unfamiliar destination.

The development of the Suan Sunandha Rajabhat University mobile map application was successfully achieved. According to the evaluation results of the application as derived from the users, the system can effectively be used to resolve location finding problems, as well as displaying clear details of the destination. This conforms to the research conducted by [3] in which the software used would help people obtain information about a particular place. Moreover, it can reduce the problems associated with getting lost and wasting time. This would benefit people who are not familiar with the campus routes and buildings. From the study results, the appropriateness of the Suan Sunandha Rajabhat University mobile map application in terms of usage was rated at the highest level due to the modern and beautiful design of the route and the building structures, which have become increasingly complex.

Therefore, the mobile map application can play a significant role in the future due to its convenient installation process and easy usage. At the present time, the mobile application is very convenient for users as a means of enhancing their digital information skills [7]. The trends in terms of mobile devices and mobile technology, including the development of the mobile map application, is one of the applications supporting users while traveling and is in line with the studies of [8] [9].

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