

Development of the Android Application I-Findplace at Universiti Tun Hussein Onn Malaysia (UTHM)

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Abstract: This study was conducted to develop the I-Findplace Android Application at Universiti Tun Hussein Onn Malaysia (UTHM). This application was developed to guide users, especially in understanding the various locations around the campus and simultaneously performing location searches. The increasing number of students at UTHM has led to the development of the surrounding campus area, making it difficult for visitors or users to obtain information about each location within the UTHM campus. Therefore, the purpose of this study is to design, develop, and test the functionality of the I-Findplace Android Application. In this study, the developers utilized the constructivism learning theory and employed the waterfall model as a guide for the entire development process, which includes analysis, design, implementation, testing, and maintenance phases. After the Android application was developed, its functionality was evaluated using a questionnaire as an assessment tool, which was distributed to four (4) expert evaluators. Two evaluators assessed the content of the application, while the other two evaluated the user interface and multimedia elements. The research findings were analyzed, and positive feedback was obtained, indicating that the I-Findplace Android application at UTHM facilitates users in gaining a deeper understanding of specific locations and enables them to search for places around UTHM. Overall, the development of this application has achieved the predetermined objectives.

Keywords: Android Application, Find Place, Obtain Information

1. Introduction

In the context of the postmodern era, the use of information and communication technology (ICT) is rapidly expanding worldwide, regardless of age. According to Munohsamy (2014), the use of ICT is one of the technologies used to disseminate information involving computer technology as well as the transfer and sharing of information. The use of computers and software to transform, store, protect, process, transfer, view, and access information regardless of place and time is crucial in today's world.

Therefore, the use of ICT is highly important, as people almost always utilize technology, and according to Abdul Razak (2011), technology enables us to access everything at our fingertips.

Hence, in line with the growing use of technology today, the development of applications is necessary to replace conventional methods, such as manual approaches that rely on location maps and plans for searching places around the UTHM campus. These conventional methods are still widely used today, as stated by Muchamad Oktaviandri (2019). Therefore, the goal of this project is to create the i-findplace Android application to address the challenges faced by students at Universiti Tun Hussein Onn Malaysia (UTHM). This application is developed to overcome issues such as searching for areas around the campus due to scattered lab locations and a lack of information. Additionally, students also encounter difficulties when they do not have direct access to university websites like the Student Academic Information System (SMAP).

1.1 Research Background

According to the official website of Universiti Tun Hussein Onn Malaysia (2016), Universiti Tun Hussein Onn Malaysia (UTHM) has two main campuses, namely the Parit Raja Campus and the Pagoh Campus. The Parit Raja Campus is the main campus of Universiti Tun Hussein Onn Malaysia (UTHM), which covers a relatively large area. Furthermore, UTHM is a rapidly developing university, with ongoing construction of buildings and improved infrastructure. Through interviews conducted by the researcher with UTHM security personnel in 2022, it was found that new UTHM students face difficulties in searching for locations around the campus. This is because buildings with multiple floors make it challenging for users, particularly new students, to locate specific places on campus, especially during the early semesters. It also leads to delays in students' arrival at laboratories or lectures due to unclear information about the locations on the provided maps or plans for new students, resulting in a significant waste of time searching for the exact building for classes.

Additionally, according to Sendow (2012), a map is a visual representation of specific areas typically found on a flat surface. Maps are used to provide information to users in a particular area. The function of a map is to provide a detailed representation of a specific area with geographic features. Google Maps, developed by Google in 2005, offers various features such as satellite images, street maps, 360° street view, real-time traffic conditions, and route planning for walking, driving, cycling, or public transportation. Due to the advancement of computing systems that can be built in smaller sizes compared to before, mobile devices like smartphones have become very popular among the public, along with internet connectivity, as they are easily accessible anytime.

Therefore, with the development of Android applications, which involve creating new applications for the Android operating system, using the Java programming language, and developed through Android Studio, individuals now have the technology to develop their software to solve the problems they face. This technology can easily be deployed on mobile devices, such as smartphones, as highlighted by Yuen (2022). Furthermore, according to Sulaiman (2022), smartphones have become a necessity, along with food, clothing, and shelter, as they are essential tools for connecting with other individuals.

In this study, the researcher has developed an application called i-findplace using Android Studio. i-findplace is an essential application that provides convenience for students to find locations easily and quickly such as laboratories, lecture rooms, blocks, and more within the campus. The application allows students to search for areas around the campus using the provided map in the i-findplace app. It also provides step-by-step directions to each location, particularly for buildings with multiple floors, such as Blocks A, B, C, and D. The application also includes buttons that directly link to relevant websites

such as the SMAP (Student Academic Information System) Portal and the Official UTHM Website. Moreover, the use of this application is more effective than relying on conventional paper maps or plans.

1.2 Problem Statement

Based on the problem stated above, all students on campus face difficulties in finding laboratory rooms during the early weeks of the semester. UTHM students themselves encounter the same problem every semester in locating lecture halls, laboratories, and workshops within UTHM due to the scattered locations throughout the campus. For example, the Faculty of Technical and Vocational Education has multiple laboratories and workshops in several blocks such as A, B, C, and D.

Therefore, a lack of location information is one of the factors that make laboratories difficult to find. Although UTHM's location map is available on the official website, it only shows the names of locations and restricts the information to names without specifying the laboratories and current locations for users. Additionally, students also face difficulties when they do not have direct links to official websites such as the Student Academic Information System (SMAP) Portal and the Faculty's Official Website.

In response to these challenges, the i-findplace application was developed. Google Maps and step-by-step directions are the methods used to create this application because they are highly useful in providing detailed maps and navigation to UTHM students. Previously, students had to spend more time searching and building directories with specific directions, such as how many steps are required to reach a particular location. The existence of the i-findplace application facilitates students to search for places easily and automatically around the campus, thereby solving the issue of time savings. The application also provides several buttons that directly link to relevant web pages such as the Student Academic Information System (SMAP) Portal.

1.3 Purpose

The purpose of this study is to develop an Android application among UTHM students and staff to facilitate the application development process. Additionally, the study aims to assist UTHM students and staff in searching for areas and buildings within the UTHM campus using Android, as well as to test the effectiveness of the i-findplace application development.

1.4 Objectives

There are several research objectives to be achieved at the end of this study. The research objectives include:

- I. To design the development of the i-findplace Android application at UTHM.
- II. To develop the i-findplace Android application at UTHM.
- III. To test the functionality of the developed i-findplace Android application at UTHM.

1.5 Research Questions

There are several research questions discussed at the end of this study. The research questions discussed include:

- I. What is the suitable design for developing the i-findplace Android application?
- II. How is the development of the i-findplace Android application conducted?
- III. What are the experts' views on the functionality of the i-findplace Android application?

1.6 Important of Android Application

The development of the i-findplace Android application has several importance. Among these important is the importance to students, visitors, and security personnel.

2. Methodology

The selection of the waterfall model as the methodology for developing the i-findplace Android application at UTHM is due to its suitability. The waterfall model is highly suitable for application development as it involves progressing through phases one after another until completion. This model follows a systematic and sequential approach, consisting of five phases: analysis phase, design phase, implementation phase, testing phase, and the final phase, which is maintenance phase.

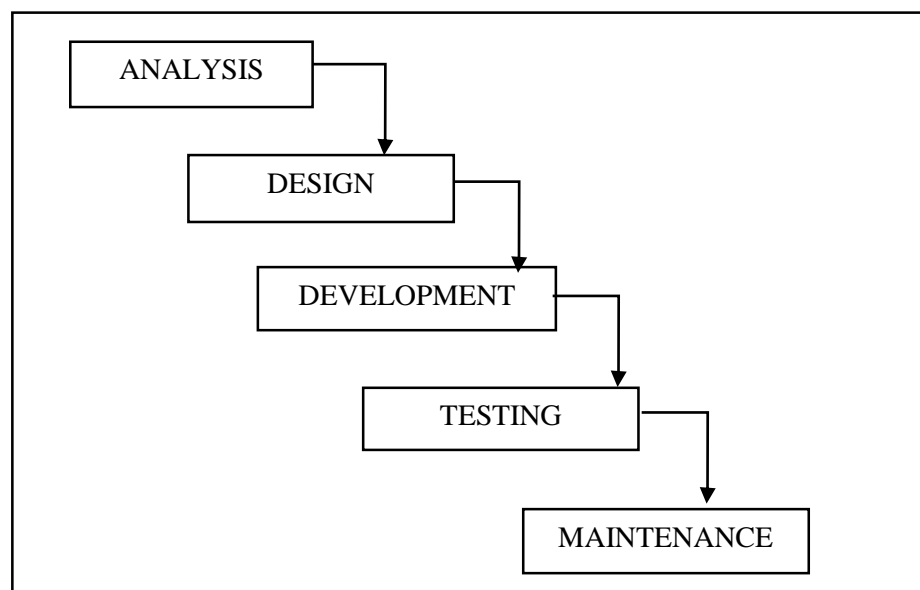


Figure 1: Waterfall Model
(Pascapraharastyan, Supriyanto & Sudarmaningtyas, 2014)

The chosen Waterfall Model is suitable for developing the i-findplace Android application at UTHM. This is because the model provides a structured and systematic approach that can serve as a guide during the application development process. By utilizing the Waterfall Model, developers can address problems in a phased manner, minimizing the occurrence of errors and ensuring that the resulting application meets user requirements (Pascapraharastyan, Supriyanto & Sudarmaningtyas, 2014).

2.1 Analysis Phase

The analysis phase serves as the foundation for all subsequent stages in designing a material, aiming to identify objectives, content, suitability to targets, and the achievement of learning and teaching models. In the analysis phase, the main problem faced, especially by UTHM students, is the difficulty in searching for places around UTHM. Through the development of this application, it can help address the students' problems, particularly. The target users for the i-findplace Android application are new students who have recently enrolled and visitors who need to search for specific locations such as buildings, lecture rooms, halls, and others.

2.2 Design Phase

In the design phase, the researcher creates rough sketches to design the graphical user interface (GUI). The GUI, also known as the Graphic User Interface, serves as a reference and initial guide for the developers before they start building the application. The purpose of developing rough sketches is to visualize ideas in the interface design that will be developed. Within the graphical user interface, there are descriptions of the multimedia elements to be used to facilitate the development process. Furthermore, the design phase focuses on aspects such as content, interface layout, and user interaction (Harun & Ibrahim, 2007).

2.3 Implementation Phase

In the implementation phase, before developing the application, a filling model is developed. The filling model combines abstract prototyping and navigation. Prototyping involves the process of quickly and easily developing a trial application that can be evaluated by end users (Dennis et al., 2005). This phase discusses the role of utilizing the elements and components outlined in the previous phase. Various considerations and attention need to be given during this process, and it may take a considerable amount of time.

2.4 Testing Phase

The testing phase will be conducted after the completion of the application development. Testing will be carried out to ensure the proper functioning of the application. This testing is necessary to identify any issues in the application that require improvements to be made during the maintenance phase. This phase will involve experts conducting testing on the developed i-findplace Android application. This step is taken to determine whether the relevant elements and components can function properly and to obtain feedback in case any issues arise during the testing of the Android application. Based on this feedback, the prototype application can be improved and modified to ensure that it ultimately achieves the intended objectives.

2.5 Maintenance Phase

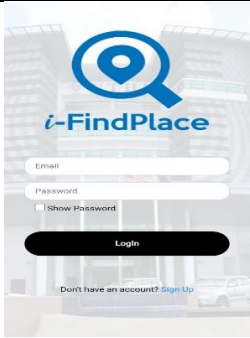
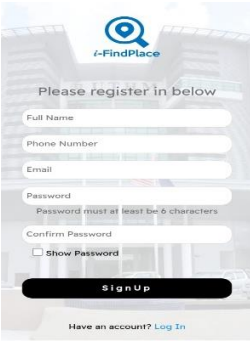
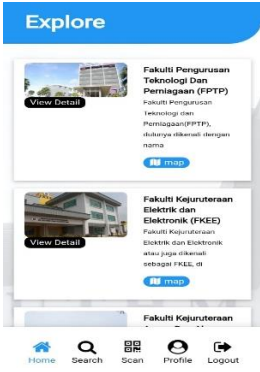

This phase is the final phase of the project, which is the maintenance phase, where the application issues are identified, and improvements are made. In this phase, the developed Android application needs to be evaluated by specialized experts who possess expertise in their respective fields, including content presentation. Expert consultations are conducted to ensure the validity of evidence in terms of feasibility and acceptance by the users involved in this research area.



2.6 The Development of Android Application I-Findplace at UTHM Interface

In the interface design, the developer sketches the interface for several important components to facilitate the development of the Android application i-findplace at UTHM. Some of the interface components involved are administrator login, user history, user history information, user records, location list, administrator profile, user login, user registration, place search, code scanning, and user profile. Table 1 shows the interface that was developed.

Table 1: Description of Interface Application

Application Interface	Descriptions
Log in User	The login user shows the use of text and graphics. Text – List details and button name Graphic – Design of background interface, logo of apps, and interaction buttons.

	
<p>Register User</p> 	<p>The registered user shows the use of text and graphics. Text – List details for register and button name for ‘sign up’ Graphic – Design of background interface, logo of apps and interaction buttons</p>
<p>Home User</p> 	<p>The home user shows the use of text and graphics. Text – Details about explore and button name Graphic – Design of background interface, picture for place, and interaction buttons.</p>
<p>Search Location</p> 	<p>The search location shows the use of text and graphic. Text – Title and button Graphic – Design of background interface, picture for place and interaction buttons.</p>
<p>Scan Qr Code</p>	<p>The scan QR code shows the use of text and graphics. Text – Title and button for every check-in place Graphic – Design of background interface and interaction buttons.</p>

	
<p>Profile Update</p> 	<p>The updated profile shows the use of text and graphics. Text – Title and button for ‘save changes’ Graphic – Design of background interface and interaction buttons.</p>

3. Results and Discussion

The expert evaluation conducted involves four experts who assess the functionality of the product. Among the experts involved are two lecturers from the Faculty of Technical and Vocational Education (FPTV) who evaluate the interface design, multimedia element presentation, user-friendliness, interactivity, and overall interface of the application. The other two experts are from the Security Division, Registrar's Office at UTHM, who assess the content, specifically whether the information about the locations contained in the Android application i-findplace is relevant and accurate according to UTHM's information. Table 2 shows the demographic for the four experts.

Table 2: Demographic for four experts

Details	Expert 1	Expert 2	Expert 3	Expert 4
Gender	Male	Female	Male	Female
Education Level	Degree	Degree	Degree	PHD
Field of Specialization	Security	Security	Multimedia	Education Technology
Working Period	< 5 years	10 to 15 years	>15 years	5 to 10 years
Position	Officer	Admin Security	Lecturer	Lecturer

3.1 Interface Expert Assessment Analysis

In the interface design and multimedia elements section, the focus is on the display of the application interface in terms of layout, colors, typography, size, links, and multimedia elements implemented by the developer in developing the Android application i-findplace. For interactive design, a search button is provided that allows users to search for places related to UTHM, enabling user

interaction with the provided search button. Therefore, both experts were selected to analyse the interface design and multimedia elements to assess their suitability for this application.

The expert checklist form consists of 30 items developed for the interface design and multimedia elements section. The purpose of all these items is to determine whether the interface structure in the Android application is suitable or not. This checklist form consists of several components such as multimedia elements, user-friendliness, interactivity, and overall application. The findings of the interface design and multimedia component analysis are presented. Based on the expert analysis of the interface design and multimedia elements, feedback notes are also provided, as shown in Table 3.

Table 3: Expert analysis of the interface design and multimedia elements

No	Item	Yes (%)	No (%)
1.	The graphic arrangement used is appropriate.	100	-
2.	The graphic colors used are suitable for the application background	100	-
3.	The provided application helps enhance user interest	50	50
4.	The provided application helps facilitate users.	50	50
5.	The graphics used can attract user attention.	100	-
6.	The provided navigation buttons in this application function well.	100	-
7.	The background in the application interface is consistent from one page to another.	100	-
8.	The navigation buttons used are in inconsistent positions.	100	-
9.	The use of text size and colors is appropriate.	100	-
10.	The text positioning is consistent.	100	-
11.	The graphic positioning is consistent and clear.	100	-
12.	Users can control the navigation buttons available in this application	100	-
13.	Users can explore this Android application more clearly	100	-
14.	Users find it easy to use this application	100	-
15.	Users find it easy to access the required information	100	-
16.	The use of fonts in this application is easily understood by users	100	-
17.	The menu link on each page of this application functions well	100	-
18.	The positioning of navigation buttons in this application is consistent	100	-
19.	The available options facilitate user navigation	100	-
20.	The display in this application allows users to view content clearly	100	-
21.	The button in this application functions well	100	-
22.	The elements in this application are highly interactive	100	-
23.	The options in the search button function well	100	-
24.	The links to the provided search locations function well	100	-
25.	The language used can be understood by users	100	-
26.	The application is easy to use	100	-
27.	This application provides relevant and useful links	100	-
28.	This application is user-friendly	100	-
29.	This application makes it easy for users to search for places within the UTHM campus	100	-
30.	The design of this developed application is attractive	100	-

Based on the obtained evaluation results in Table 3, all the experts agree that the graphical layout used is appropriate, along with the implemented graphic colors in this application. Both experts also agree that the text size and text positioning are consistent. Additionally, all experts concur that the provided navigation buttons in the application are functioning well and are consistently positioned. The consistent provision of buttons indirectly increases user interest in using the application as it avoids confusion regarding the available buttons. However, one expert believes that the provided application

does not enhance user interest, suggesting that improvements should be made by the developers in the future. On the other hand, another expert agrees that the application can attract user interest.

Furthermore, the evaluation results of the user-friendly aspect from multimedia experts indicate a high level of assessment. Almost all multimedia experts agree that the Android application i-findplace has fulfilled user-friendly aspects, including easy access to required information and the use of easily understandable text. Moreover, the provided options in the application facilitate user navigation, and the consistent positioning of navigation buttons eases user interaction. In conclusion, the Android application has achieved user-friendly aspects. Regarding interactivity elements, two experts agree that the evaluation of interactivity aspects has reached a high level. All experts concur that the Android application has fulfilled interactivity aspects such as button components, search links, and options within the search button, which are in good condition and functioning as expected. Therefore, no improvement actions are necessary for the interactivity aspect of this Android application.

Finally, the overall evaluation of the Android application shows positive feedback from both experts, considering the developed application's design as attractive and user-friendly. Furthermore, the application facilitates users in conducting place searches and provides clear information about specific locations within the UTHM campus. Consequently, it can be concluded that the overall developed application is appropriate and does not require improvement actions, particularly in terms of application design.

3.2 Content Expert Assessment Analysis

This section focuses on the analysis of the content design, evaluating whether the developed Android application meets the needs of users when visiting UTHM. Section B consists of sixteen items that have been constructed to test the functionality of the i-findplace Android application, specifically related to the content design elements. Based on Table 4, presents the data obtained and analyzed from the expert assessment of the content design elements.

Table 4: Expert analysis of the content design

No	Item	Yes	No
1.	The content of this application is easy to understand.	100%	-
2.	Is the required information relevant to this application?	100%	-
3.	Is the displayed content suitable for the users?	50%	50%
4.	Does this application have comprehensive location search information?	50%	50%
5.	Does this application have a clear process flow?	100%	-
6.	Can this Android application help users explore UTHM?	100%	-
7.	Does this Android application attract users' interest?	100%	-
8.	Is the content of this application well organized?	100%	-
9.	Is the provided information accurate?	100%	-
10.	IS the rate of content delivery suitable for user abilities?	100%	-
11.	Does the QR code button function properly?	100%	-
12.	Is the QR code button appropriate?	100%	-
13.	Do the links or search buttons function properly?	100%	-
14.	Is this application suitable for use by new students during the orientation week?	100%	-
15.	Is this application suitable for development among students during the orientation week?	100%	-
16.	Is this application suitable for future patients?	100%	-

Based on the findings of the assessment, all content experts agree that the content of this Android application is easy to understand for users. All experts also agree that the displayed content is suitable, and the provided information is relevant to the developed application. Additionally, both selected experts believe that the rate of content delivery aligns with users' comprehension abilities, indicating that the i-findplace Android application provides accurate information according to users' needs. Furthermore, both experts agree that this application is suitable for use by new students during the orientation week to help them explore UTHM.

Moreover, both experts believe that this application has a clear process flow and is easily understandable by users, even new users, indirectly implementing user-friendly concepts. For item thirteen, both experts agree that the provided links and search buttons in the application function properly, enabling users to search for places around UTHM solely through the provided search button. Finally, all experts agree that this application is suitable for future patenting for further research purposes and improvements that can be utilized by the university.

4. Conclusion

In summary, the development of the android application i-findplace at UTHM has been well-developed and successful concerning the learning model, namely used Waterfall Model. The phases found in this Waterfall Model have helped developers to produce quality products and develop promptly. In this product development, several things need to be emphasized, namely the objectives of the study, the scope, and the research questions. The developer develops this product concerning these three things so that it can achieve the stated objectives. Therefore, hopefully, this android application i-find place can be used for students, visitors, and staff of UTHM.

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