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# Design and Development of ‘Where am I?’: A System to Update the Location and Activities of UUM SOC Lecturers

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**Abstract:** “Where am I?” is a system used by lecturers to share with the public, especially students, about the location and activities the lecturer performs during working hours. Lecturers will not all the time be in their respective rooms. This system was developed to prevent students from waiting for the lecturer outside the lecturer’s room without knowing whether the lecturer was inside or not. Students cannot know when the lecturer will return if the lecturer is not in the room. A suitable platform for which lecturers keep updating their current location and activities has been developed with some enhancements. A study has been conducted using a system prototyping methodology consisting of four main phases: planning, analysis, design, and implementation to develop the system. The system is developed on two platforms, mobile and web-based. The public will use the system on the mobile platform, especially students, while lecturers will use the web-based platform. A usability evaluation was conducted involving 19 respondents and all the respondents from Universiti Utara Malaysia (UUM), which involved two lecturers and seventeen students in measuring the respondent’s opinions. The materials and tools used to complete this evaluation phase are a laptop & smartphones. A cloud-based video conferencing service, ZOOM has been used as a tool to demonstrate the system to the respondents. Next, respondents were asked to fill out a questionnaire prepared using Google Form by answering some questions and giving their opinion about the system. Findings from this study indicate that the respondents were satisfied with the system’s usefulness and ease of use. However, respondents suggested that the system should be more user-friendly, enhancing system usefulness.

**Keywords:** *UUM SOC lecturer, lecturer location, lecturer activity, location/activity system,*

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## 1. Introduction

Universiti Utara Malaysia (UUM) was formally incorporated on 16th February 1984, with the unique mission to provide academic excellence in business management education, IT, and quality management. Faced with this challenging task, the university has, since its inception, ensured that its academic niche areas are focused on such

disciplines as management, accountancy, economics, information technology, entrepreneurial development, tourism management, banking and finance, social development, human resources development and international affairs management [1]. A university lecturer is responsible for teaching, conducting research, writing for publications, supervision, being a consultant, providing community service and many other duties in addition to administrative duties. Lecturer’s duty and responsibility is to

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teach undergraduate and graduate level students in areas allocated by the Head of Department and reviewed from time to time by the Head of Department [2]. Lecturers may have significant course administration responsibilities, including curriculum design [3]. Lecturers have many duties where they must give a lecture for students at classes, attend meetings/programs and others. Lecturers will not all the time be in their respective rooms. During the teaching and learning process throughout the semester, students need to meet face-to-face with the lecturers who teach or supervise them regularly or immediately. Students who do not make appointments will come directly to the lecturer's room. If the lecturer is in the room but is performing a task that cannot be interrupted or is indeed not in the room, the student will usually wait outside the lecturer's room. In situations where the lecturer is not in the room, students usually do not know whether the lecturer will return to the room and when.

A System to Update the Location and Activities of UUM School of Computing (SOC) Lecturers was developed to prevent students from waiting for the lecturer outside the lecturer's room while the lecturer is not in the room. This study aims to develop a system that combines a mobile application and a web-based application that lecturers can use to share with the public, especially students, about the location and activities performed by the lecturer during working hours. The mobile application falls broadly into three categories which are native, web-based and hybrid [4]. Native applications ran on a device's operating system and were required to be adapted for different devices. Web-based applications require a web browser on a mobile device. Hybrid applications are 'native-wrapped' web apps. The system for access by public users (including students) was developed in a native application, while the system for access by lecturers was developed in a web-based application. Although access by lecturers is on a web-based application basis, lecturers have the option of either accessing it normally using a web browser on a personal computer or using a web browser on a mobile device such as a mobile phone or tablet.

## 2. Methodology

The methodology is a body of practices, procedures, methods and phases used by those who work in a discipline. A methodology for project management is about managing project activities. This project was conducted by adapting System Prototyping [5]. Software/system prototyping was creating prototypes of software applications, for example, incomplete versions of the software program being developed [6]. A prototype could be built very quickly using several shortcuts and developing inefficient, inaccurate or dummy functions [7]. It is an iterative process involving the developer and client to run trial and fix errors until the prototype obtains an acceptable result. [8]. Four basic processes in System Prototyping are shown in Figure 1 below.

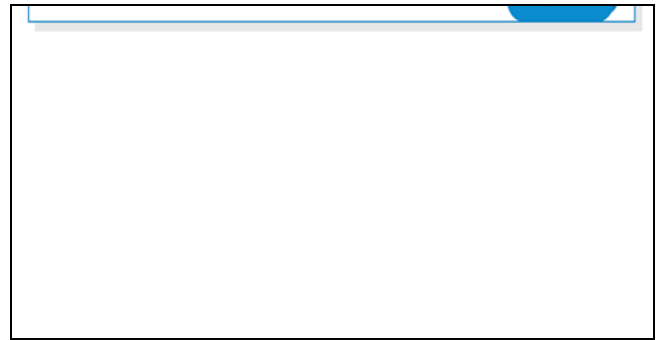


Figure 1. The System Prototyping Methodology

### Phase 1: Planning

A problem was identified where the students could not trace the lecturer's current location when they needed to go the lecturer room at SOC building every time to know whether the lecturer was inside the room or not. At this stage, a plan is proposed to develop a system that can assist the students in knowing the current location and activity of the lecturer. A project proposal was drafted explaining the problem in the UUM, the project's objective, the project's significance, the project's scope, and the project's schedule.

### Phase 2: Analysis

A System to update the location and activities of UUM SOC lecturers has been analyzed using a requirement analysis process. The activities involved in the phases identify the system's functional and non-functional requirements. A use case analysis, process modelling, and data modelling are the outputs from this stage. The design or the user interface's sketches were also produced at this stage.

### Phase 3: Design

In designing the system, Android Studio as an Integrated Development Environment (IDE) has been used to design the interface. Java is the programming language that has been used in Android studio. The database for the lecturer location/activity system is in web hosting. At this stage, a low-fidelity prototype has been developed to refine the functional and non-functional requirements. The prototype shows the selected users for a suggestion of improvement. The analysis and design phases will be repeated if a new requirement is identified. A usability or user acceptance study has been conducted to evaluate the functionality of the lecturer location/activity systems. Two lecturers and a group of seventeen students have been randomly selected to evaluate the system.

### Phase 4: Implementation

In this stage, a system that has been tested and evaluated is placed on a web server. The web server is subscribed from the web hosting service provider. Once the final system is developed based on the final prototype, it is thoroughly tested and deployed to production. Finally, the system undergoes routine maintenance to minimize downtime and prevent

large-scale failures.

### 3. Design and Development

This section describes the design and development of the system to update the location and activities of UUM SOC lecturers by following the four phases of System Prototyping. This section is divided into two sub-sections; (1) the requirements specification of the system and (2) the prototype development of the system, a mobile application developed for the public, including students and a web-based application for lecturers to demonstrate the gathered requirements.

#### A. List of Requirements

Table 1 lists three essential requirements (and their priority) produced from the requirements gathering process for the public users, and Table 2 shows the functional requirement of the system for lecturers. The requirements for the user include login into the system, View the details SOC Lecturer Location/Activity and Update Personal Information. While for admin, include login into the system and manage update Lecturer Location/Activity System.

Three priorities are specified for the Mandatory requirements (M), Optional (O) and Desirable (D). Listed below describe the functional requirements of the system:

- i. M – Mandatory requirements  
(The system must do)
- ii. D – Desirable requirements  
(The system preferably should do)
- iii. O – Optional requirements  
(The system may do)

Table 1. Functional requirement of the system for public users.

No.	Requirement Description	Priority
1.	<b>Login Into The System</b>	
1.1	Users can login with their id and password.	M
1.2	Users are allowed to resetting their password.	O
1.3	Users can log out.	M
1.4	Users can register a new account (Sign Up).	D
2.	<b>View the details of SOC Lecturer Location/Activity</b>	
2.1	Users must click one of the lecturer icons from the list of lecturer locations/activities.	M
2.2	Users can view the details SOC Lecturer’s current Location/Activity.	M
3.	<b>Update Personal Information</b>	
3.1	User can update their personal information. (Number phone, e-mail address).	D
	User can change their profile photo.	O

Table 2. Functional requirement of the system for lecturers

No.	Requirement Description	Priority
1.	<b>Login Into The System</b>	

1.2	Lecturers can login with an id and password.	M
1.3	Lecturers allow resetting their password	O
1.4	Lecturers can logout	M
2.	<b>Manage Update Lecturer Location/Activity System</b>	
2.1	Lecturers can update their current location.	M
2.2	Lecturers can update their current activity with time.	M

#### B. Prototype development of lecturer location/activity system

A system prototype to update the location and activities of UUM SOC lecturers was developed. It represents the requirements explained in the previous subsection. Software prototyping is a standard way of demonstrating the software requirements so that further comments and suggestions can be obtained from the users based on their experience in interacting with the prototype. The Android Studio was used as the primary integrated development environment (IDE) tool. Further, the 000webhost development platform was used to facilitate crucial functions like user authentication and database for data storage. Screenshots in Figure 2 show the selected interface of a mobile application that can be accessed by the public (including students) to get information on the location and activities of the UUM SOC lecturers.

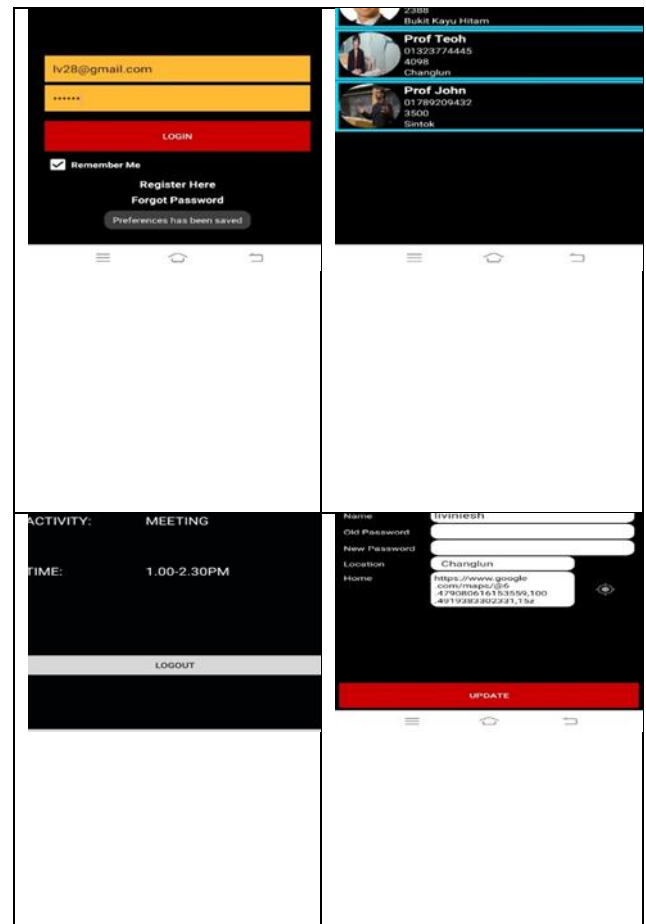


Figure 2. The interfaces for Mobile Application for Public

Users

Figure 3 shows the interface of a web-based application that can be accessed by the lecturers to share with the public, especially students, about the location and activities performed by the lecturer during working hours.

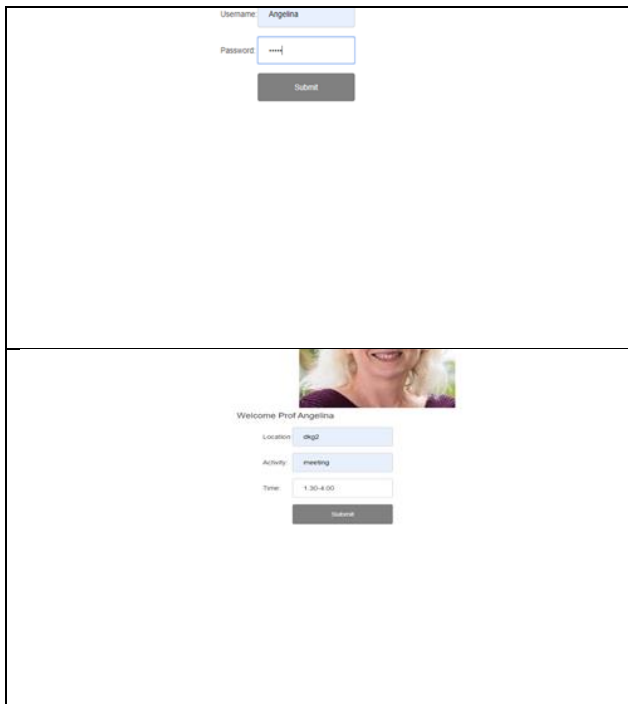


Figure 3. The interfaces of Web-based Applications for lecturers

4. Evaluation

A. The Evaluation Setting

A usability evaluation was conducted on 19 respondents, consisting of 2 lecturers and 17 students from UUM. Questionnaires were distributed to all respondents to collect their opinion of the system. There are two sections in the questionnaire to be answered. First, the respondents must answer Section A, which is the Demography and Background Information of respondents. In Section B, respondents need to rate the given statements on a scale of 1-5. Scale 1 represents STRONGLY DISAGREE, and scale 5 indicates that respondents STRONGLY AGREE. A complete representation of scales 1 to 5 are shown in Table 3. The respondents should answer all the questions that have been given. In evaluation, the respondents are given 10 to 15 minutes to perform all tasks. The materials and tools used to complete this evaluation phase are a laptop & smartphone. In addition, a cloud-based video conferencing service, ZOOM, has been used as a tool to demonstrate the system to the respondents. Next, respondents were asked to fill out a questionnaire prepared using Google Form by answering some questions and giving their opinion about the system.

Table 3. Statement based on the scale

Strongly disagree	Disagree	Neutral	Agree	Strongly Agree
1	2	3	4	5

B. The Respondents' Demographic Information

Analysis of the respondents' demographic information revealed that 17 (89%) are students, and 2 (11%) are lecturers. 68% of them were Male, and 32% were Female. Regarding respondent age, seven respondents (37%) are aged between 19-21 years old, ten respondents (53%) are aged between 22-25 years old, and two respondents (10%) are 36-45 years old. 84% of the respondents also said that they use the Internet daily, and 16% said they use it occasionally. Most respondents (84%) said that they think tracking the lecturers' activity is necessary while the rest said they are not sure.

C. The Usability of lecturer location/activity system

An analysis was conducted on the respondents' responses in Section B of the post-task questionnaire. Table 3 shows a scale of 1-5, from strongly disagree to agree strongly. While Figures 4, 5, 6, 7 and 8 measure the respondents' perception of the lecturer's location/activity system in terms of the overall task, usefulness, ease of use, satisfaction and ease of learning which the questions stated at Table 4.

Table 4. The post-task questionnaire items

ID	The post-task questionnaire items
	<b>Overall complete task</b>
O1	Overall, I am satisfied with the ease of completing this task.
O2	Overall, I am satisfied with the amount of time it took to complete this task.
	<b>The usefulness of Lecturer Location/Activity System</b>
U1	Lecturer Location/Activity System makes it easier to know the current lecturer's location/activity.
U2	Lecturer Location/Activity System gives me greater control over my work.
U3	Lecturer Location/Activity System enables me to accomplish tasks more quickly.
U4	Lecturer Location/Activity System saves me time when I use it.
U5	Lecturer Location/Activity System meets my needs.
U6	Lecturer Location/Activity System does everything that I would expect it to do.
U7	Lecturer Location/Activity System is useful overall.
	<b>Ease of Use of Lecturer Location/Activity System</b>
EU1	Lecturer Location/Activity System is easy to use.
EU2	Lecturer Location/Activity System is user-friendly.
EU3	Lecturer Location/Activity System is flexible.
EU4	Lecturer Location/Activity System to accomplish what I want to do with accessing app/website.
EU5	I can use Lecturer Location/Activity System without written instructions.
EU6	I don't notice any inconsistencies as I use it.
EU7	Both occasional and regular users would like Lecturer

	Location/Activity System.
EU8	I can recover from mistakes quickly and easily.
	<b>Satisfaction of Lecturer Location/Activity System</b>
S1	I am satisfied with Lecturer Location/Activity System.
S2	Lecturer Location/Activity System works the way I want it to work.
S3	Lecturer Location/Activity System is wonderful and pleasant to use.
	<b>Ease of Learning of Lecturer Location/Activity System</b>
E1	Lecturer Location/Activity System is easy to learn how to use it.
E2	I can easily remember how to use Lecturer Location/Activity System.
E3	I learned to use Lecturer Location/Activity System quickly.

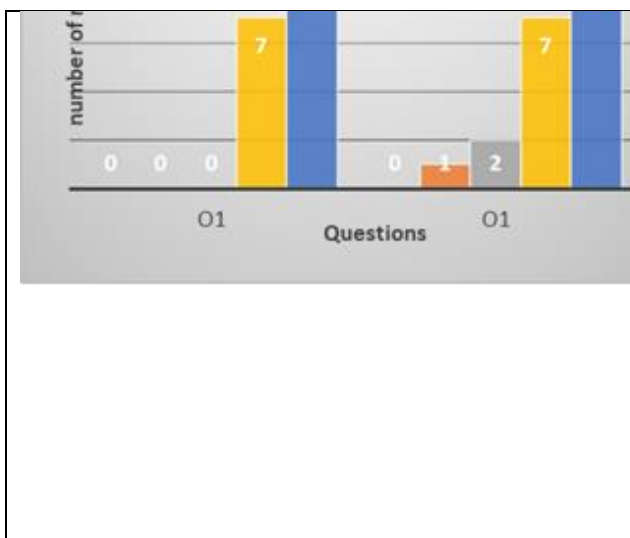


Figure 4. Overall complete task

For the overall complete task, there are two questions asked, O1 - ease of completing this task and O2 - the amount of time it took to complete it. Figure 4 above shows that all 19 respondents are satisfied with the ease of completing this task, while 84.2% of respondents were satisfied with the amount of time it took to complete this task.

When respondents were asked seven questions (U1 - U7) related to the system's usefulness, all of them gave an agreed answer as in Figure 5, except one respondent answered disagree with question U2 – The system gives me greater control over my work.

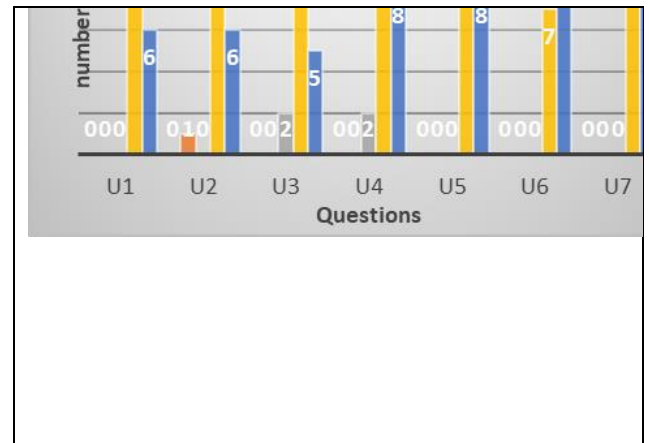


Figure 5. The usefulness of the system

Figure 6 shows the respondents' responses to questions related to Ease of Use on the developed system (EU1 -EU8). Again, the majority of respondents agreed with almost all of the statements related to Ease of Use.

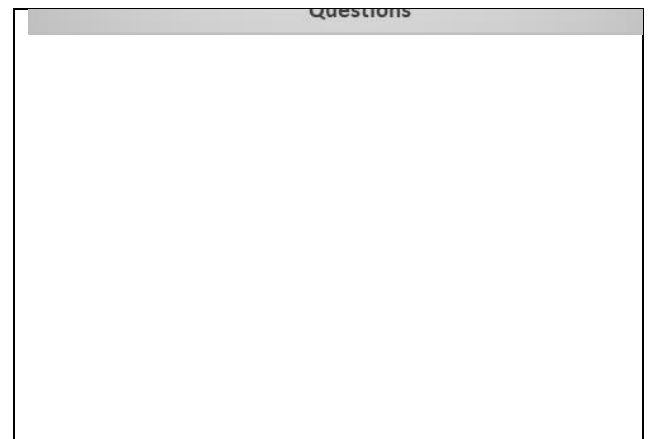


Figure 6. Ease of use of the system

For the questions related to Satisfaction of the system (S1 - S3) and Ease of Learning the system (E1 - E3), all respondents agreed with all relevant statements. Respondents' perceptions of the above can be seen in Figure 7 for Satisfaction of the system and Figure 8 for Ease of Learning the system.

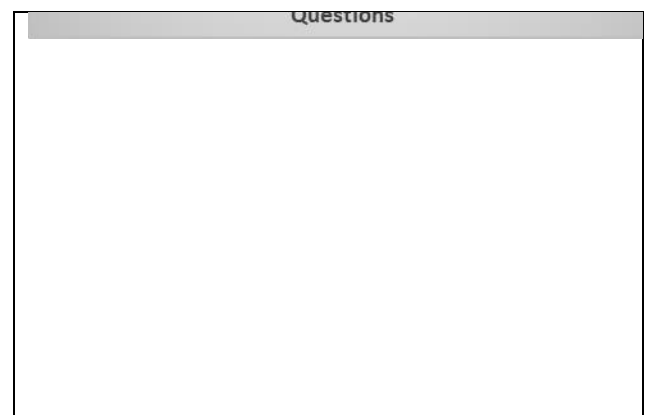


Figure 7. Satisfaction of the system

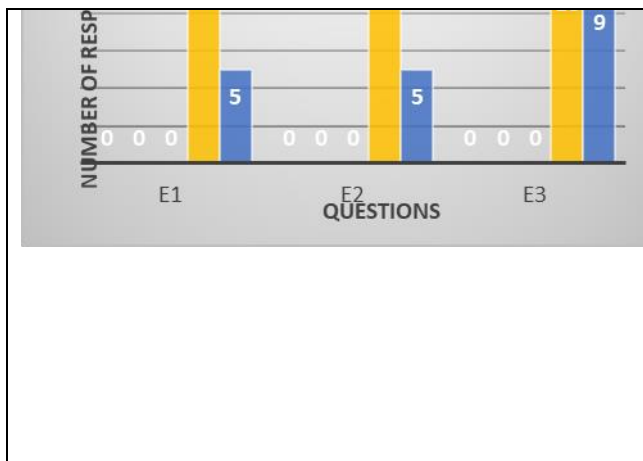


Figure 8. Ease of learning the system

The evaluation outcomes suggested that ‘Where am I?’: A system to update the location and activities of UUM SOC lecturers is useful and easy to use. Regarding the user interface, the respondents reported that the system is user-friendly and can be used without the need for written instruction. Further, the respondents reported they were satisfied with how they wanted the system to work. They also perceived that it is easy to learn how to use the system and easily remember how to use it. Analysis of the respondents’ feedback about the system’s usefulness shows that most respondents agree that the system meets their needs, saves time and enables them to accomplish tasks more quickly. Further, all the respondents were satisfied with the ease of completing this task.

## 5. Conclusion and Future Works

This paper described the design and development of ‘Where am I?’: A System to Update the Location and Activities of UUM SOC Lecturers. In conclusion, the system can help the students plan their time to visit the lecturers when they want to meet. In the future, this system can be improved with the use of the Global Positioning System (GPS), which will show the accurate, current location of the lecturer without being manually updated by the lecturers.

[11]

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