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# UTHM Scheduled Waste Management System

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**Abstract:** UTHM Scheduled Waste Management System is a web-based system that increases UTHM OSHE's accessibility to all scheduled waste's information in Universiti Tun Hussien Onn Malaysia (UTHM). The purpose of developing this prototype is to solve the problem of UTHM Occupational Safety, Health, and Environment (OSHE) in recording and managing the scheduled waste and disposal application manually using documented system. The users of this system are Science Officer, Laboratory Manager, Assistant Engineer, UTHM OSHE Environment Unit, and UTHM OSHE Administration. This system also has four modules which are user registration and login module, scheduled waste registration module, disposal application module and report generation module. Furthermore, this system will be developed through a structural approach by using Incremental Model. The software used in developing this system are Visual Studio Code, MySQL database and programming language Hypertext PreProcessor (PHP). The conclusion is the development of this system will improve the accessibility and manageability of all scheduled waste information in UTHM.

**Keywords:** Management System, scheduled waste, prototype, structural, development

## 1. Introduction

The purpose of the report is to developed UTHM Scheduled Waste Management System. UTHM Scheduled Waste Management System is a web-based system that replaces the existing manual system. Currently, all UTHM scheduled waste information and disposal application are recorded and managed manually using a manual form (using a filing system). The system integrated into Occupational Safety, Health and Environment (OSHE) UTHM. UTHM Scheduled Waste Management System is a web-based system under CMC (Chemical Management Centre) that increased UTHM OSHE's accessibility to all scheduled waste information in UTHM. This project involves five users which are Science Officer, Laboratory Manager, Assistant Engineer, UTHM OSHE Environment Unit, and UTHM OSHE Administration. The developed system improved scheduled waste management efficiency. Therefore, the server is used as the database platform for UTHM OSHE. UTHM Scheduled Waste Management

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System managed the scheduled waste in UTHM and standardize the UTHM Staff disposal application. The information inserted by the UTHM Staff will be saved in the database. The problem of data loss and destroyed by disaster can be avoided. The system also help the UTHM OSHE categorized the types of scheduled waste proposed by UTHM Staff. With the scheduled waste registration module in UTHM Scheduled Waste Management System, UTHM Staff can register the scheduled waste before proceeding to disposal application. Once the scheduled waste is approved by UTHM OSHE Administration, the user can apply for disposal application. There will be an issue where UTHM Staff need to postponed their application and request for a waste card from UTHM OSHE if they do not have one. However, these problems can be solved by uploading the waste flowchart through the system.

## 2. Related Work

### 2.1 Introduction

A research literature review is a process for discovering, analysing, and summarising the current body of accomplished and archived work [1]. A literature review examines literature, academic papers, and other resources relevant to a certain subject, research topic, or concept, and provides an overview, synopsis, and research context in connection to the research actual topic. Apart from that, the literature review is also important to help the system developer's understanding of the appropriate new technology so that can be applied in the development of new systems. The UTHM Scheduled Waste Management System can be developed more easily in the presence of information from this literature review. It is expected with the results obtained through the study this literature will assist the implementation of this proposed system as well as be able to meet the needs of the target users at the same time. The equivalent system must be studied in order to develop a better system. It is intended to serve as a reference and guide for working on new systems. Based on in-depth study, the modules and functionalities found in similar systems are identified.

### 2.2 Comparison with Existing System

There will be a comparison of three existing systems and one proposed system. Table 1 will contain all of the features that were compared. During the comparison, the capabilities of each system will be discussed. Based on the comparison tabulated in Table 1, there were better features for the UTHM Scheduled Waste Management System compared to the existing system.

**Table 1: Comparison between existing systems**

<b>Modules and features</b>	<b>User</b>			
	Environment, Health, and Safety Management System (EHS-MS) (MIT EHS, 2021)[2]	Electronic Scheduled Waste Information System (eSWIS) (DOE, 2021)[3]	UTMLab (UTMLab, 2021)	UTHM Scheduled Waste Management System
<b>System type</b>	Web-based system	Web-based system	Web-based system	Web-based system
<b>Login</b>	By using email and password	By using email and password	By using UTMID and password	By using email and password

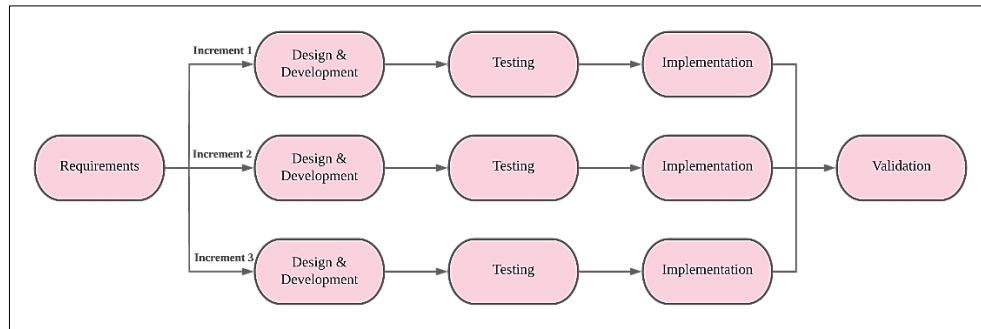
**Table 1: (continued)**

Modules and features	User			
Environment, Health, and Safety Management System (EHS-MS) (MIT EHS, 2021)[2]	Electronic Scheduled Waste Information System (eSWIS) (DOE, 2021)[3]	UTMLab (UTMLab, 2021)	UTHM Scheduled Waste Management System	
<b>Register</b>	Using personal detail follow by type of user	Using personal detail follow by type of user	Using personal detail follow by type of user	Using name, email, mobile number, and password
<b>Folder submission</b>	Authors can easily keep track of the user activity and form submission from the system.	Authors can view the inventory in storage and monitor the due date submission.	Authors can easily keep track of the user activity and monitor statistics of chemical application and scheduled waste disposal.	Authors can view waste added and disposal application submissions. Authors can also accept or reject those waste registration and application.
<b>Programming language</b>	Not stated	Not stated	Not stated	PHP, CSS, HTML
<b>Notification</b>	Not stated	In the website	Not stated	In the system
<b>Status of submitted work</b>	Track at any given point in time	Track at any given point in time	Track at any given point in time	Track at any given point in time

### 3. Methodology

#### 3.1 Incremental Model

Incremental Model was used in developing the UTHM Scheduled Waste Management System. The Incremental Model, is a process of software development where requirements are broken down into multiple standalone modules of software development cycle. Requirements, design and development, testing, implementation and validation are all steps in incremental development. To manage the project as a whole, incremental processes begin with a broad definition of the project's requirements. This requirement definition serves as the foundation for a project plan that describes all increments. The incremental development model divides the whole project into increments with each increment give some of the needed capability. Each subsequent release until all of the specified functionality has been implemented [4], the system adds functionality to the preceding release. Figure 1 shows the phases of the Incremental Model.



**Figure 1 : The phases of the Incremental Model**

As shown in Table 2, each phase has its own assignment and output that need to produce during the entire project development.

**Table 2: Software development activities and it’s task**

Phases	Activities	Output
<b>Requirement Analysis</b>	<ul style="list-style-type: none"> <li>Data gathering and analyze information on UTHM Scheduled Waste Management System.</li> <li>Collect requirements on the components of the system.</li> </ul>	<ul style="list-style-type: none"> <li>A documented report about the system requirements.</li> </ul>
Increment 1		
<b>Design and Development</b>	<ul style="list-style-type: none"> <li>the collected requirements are translated into flowchart.</li> <li>Design context diagram, data flow diagram, entity relationship diagram and flowchart diagram.</li> </ul>	<ul style="list-style-type: none"> <li>Context diagram.</li> <li>Data flow diagram.</li> <li>Entity relationship diagram.</li> <li>Flowchart diagram.</li> </ul>
<b>Testing</b>	<ul style="list-style-type: none"> <li>the functional testing of user registration and login module will be performed</li> <li>The requirement specification will identify the input data by testing the user registration and login module</li> </ul>	<ul style="list-style-type: none"> <li>Prototype of the system which contains any error that need debug.</li> </ul>
<b>Implementation</b>	<ul style="list-style-type: none"> <li>the source code will be written according to the requirement</li> <li>Develop the user registration and login module.</li> </ul>	<ul style="list-style-type: none"> <li>User registration and login module developed.</li> </ul>
Increment 2		
<b>Design and Development</b>	Develop the design of the system	Design of the system developed.
<b>Testing</b>	functional testing for scheduled waste registration will be conducted.	Tested the developed prototype.
<b>Implementation</b>	the code for scheduled waste registration module will be constructed.	Scheduled waste registration module developed.

**Table 2: (continued)**

Phases	Activities	Output
Increment 3		
<b>Design and Development</b>	<ul style="list-style-type: none"> <li>• final version of prototype is developed during this phase</li> <li>• Prepare explanation on how the system works.</li> <li>• the latest user interface design is finalized</li> </ul>	Finalized how the system works.
<b>Testing</b>	functional testing for disposal application and report generation module will be conducted	Finalized and tested system.
<b>Implementation</b>	A disposal application module and report generation module is developed.	<ul style="list-style-type: none"> <li>• Disposal application and report generation module will be developed.</li> <li>• Fixed errors</li> </ul>
<b>Validation</b>	<ul style="list-style-type: none"> <li>• Validate the functionality of the entire system.</li> <li>• Evaluate the performance of the system by releasing it to the user.</li> </ul>	The completed UTHM Scheduled Waste Management System.

#### 4. Analysis and Design

The purpose of the system requirement analysis is to structure the system independent of any implementation environment. The system requirements analysis activity represents the second major development phase of the overall process. System requirements are all the activities the new system must perform or support and the constraints that the new system must meet. The process of system requirement analysis is divided into four which are data flow diagram (DFD), process specification, requirement traceability matrix and entity relationship diagram (ERD). In this section, the system requirement analysis is described based on the functional and non-functional requirement analysis.

##### 4.1 Functional Requirement Analysis

Functional requirements are the activities that the system must perform. Functional requirements defined products features or functions that developers must implement in order for users to complete their duties. Table 3 shows the functional requirement of the proposed system.

**Table 3 : Functional Requirement of The Proposed System**

No.	Modules	Functionalities
1.	User Profile Management Module	<ul style="list-style-type: none"> <li>• The system should allow the UTHM Staff to register and login into the system using the existing email and password.</li> <li>• The system should allow the admin to login into the system using the existing email and password.</li> <li>• The system should allow the UTHM Staff and admin to input the valid username and password to logged in as user.</li> <li>• The system should redirect the UTHM Staff and admin to respective dashboard once successful login.</li> <li>• The system should allow the UTHM Staff and admin to manage their profile.</li> </ul>

**Table 3 : Functional Requirement of The Proposed System (continued)**

No.	Modules	Functionalities
2.	Scheduled Waste Registration Module	<ul style="list-style-type: none"> <li>The system should display scheduled waste registration details interface.</li> <li>The system should allow UTHM Staff and admin to register a scheduled waste online.</li> <li>The system should allow UTHM Staff and admin to create, edit, delete and view scheduled waste details.</li> <li>The system should allow UTHM OSHE administration and UTHM OSHE Environment Unit to manage waste and authorized the scheduled waste.</li> </ul>
3.	Disposal Application Module	<ul style="list-style-type: none"> <li>The system should allow a disposal application by Science Officer, Laboratory Manager, Assistant Engineer.</li> <li>The system should allow Science Officer, Laboratory Manager, Assistant Engineer to insert disposal application, view the application details and cancel disposal application if the status is not updated yet.</li> <li>The system should allow Science Officer, Laboratory Manager, Assistant Engineer to upload a waste card and flowchart information in JPG, JPEG, PNG or PDF format.</li> <li>The system should allow UTHM OSHE administration and UTHM OSHE Environment Unit to view application information, download the waste card and flowchart, approve or reject the application and add some remark at the application details.</li> <li>The system should allow UTHM OSHE administration and UTHM OSHE Environment Unit to view the details of cancelled application by user.</li> </ul>
4.	Report Generation Module	<ul style="list-style-type: none"> <li>The system should allow Science Officer, Laboratory Manager, Assistant Engineer to monitor and generate the monthly scheduled waste record (based on apply date) and disposal application report (based on disposal date) to PDF format.</li> <li>The system should allow UTHM OSHE administration and UTHM OSHE Environment Unit to monitor and generate the monthly scheduled waste record (based on apply date) and disposal application report (based on disposal date) to PDF format.</li> <li>The system should allow UTHM OSHE administration and UTHM OSHE Environment Unit to monitor and generate the approved scheduled waste and disposal application record to PDF format.</li> </ul>

#### 4.2 Non-Functional Requirement Analysis

Non-functional requirements, rather than specific behaviours, defined the criteria that can be used to evaluate a system's operation. Besides that, non-functional requirements are often distinguished from functional requirements by focusing on how the system should perform rather than what it should accomplish [5]. Table 4 shows the non-functional requirement of the proposed system.

**Table 4 : The Non-Functional Requirement Of The Proposed System**

No.	Requirements	Description
1.	Performance	<ul style="list-style-type: none"> <li>The interaction between the user and the system should not be more than 10 minutes.</li> <li>The system should be able to use anytime.</li> </ul>

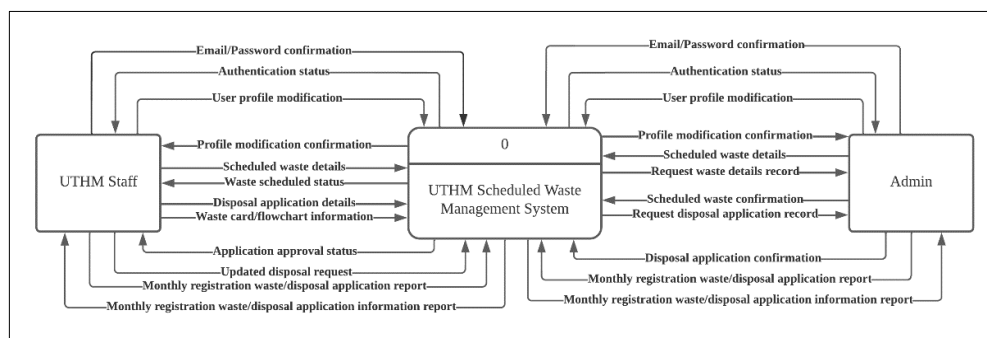
**Table 4 : (continued)**

No.	Requirements	Description
2.	Operational	<ul style="list-style-type: none"> <li>The system should be user friendly.</li> <li>The system should be easily maintained and updated.</li> <li>The system should be able to work on any web browser.</li> </ul>
3.	Security	<ul style="list-style-type: none"> <li>Only administrator can generate the report details.</li> <li>Users can only access their own account with user email and password.</li> <li>Users can only view their own waste registration and disposal application details.</li> <li>Users can change their password anytime.</li> </ul>

## 4.2 System Analysis

### 4.2.1 Data Flow Diagram

A basic overview of the complete system is called Context Diagram. The first diagram in the hierarchy is the context diagram, which is also referred to as the Level 0 DFD. It is designed to be an at-a-glance view, showing the system as a single high-level process, with its relationship to external entities. Context diagram should be easily understood by a wide audience. Figure 2 shows the context diagram of UTHM Scheduled Waste Management System is being developed.



**Figure 2(a) : Context diagram of SWMS**

### 4.2.2 Data Flow Diagram Level 1

The DFD level 1 of UTHM Scheduled Waste Management System has to show all the major and elaborate high level processes of UTHM Scheduled Waste System and how they are interrelated. It has been a basic overview of the whole UTHM Scheduled Waste Management System or process being analyzed. The Level 1 diagram shows all the processes at the first level the numbering, the data stores, external entities, and data flows among them. It is design to be a view of User registration and login module, Scheduled waste registration, Disposal application and Report generation show the system as a single high-level process, with its relationship to external entities of the applicant who represent of Science Officer, Laboratory Manager, Assistant Engineer while the administrator in the DFD figure represent the UTHM OSHE administration and UTHM OSHE Environment Unit. It must be easily understood by a wide user, including the applicant in DFD level 1 of UTHM Scheduled Waste Management System. Figure 3 shows Data Flow Diagram Level 1 of UTHM Scheduled Waste Management System.

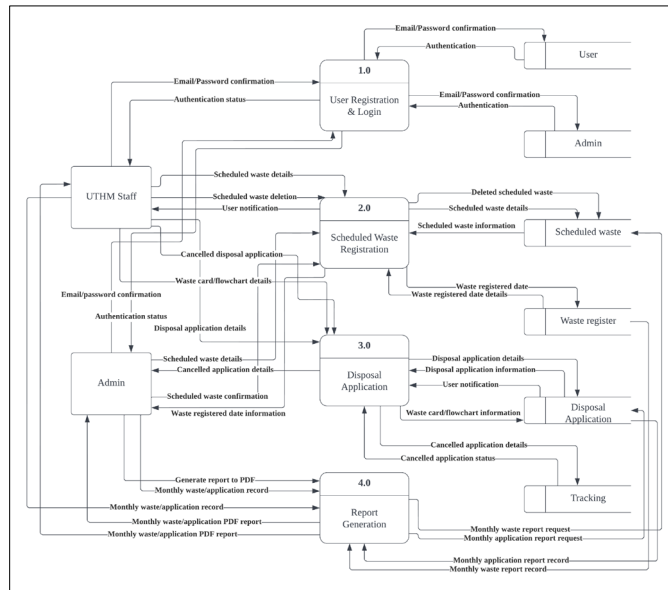


Figure 2(b) : Data Flow Diagram Level 1

### 4.3 Entity Relationship Diagram

An Entity Relationship Diagram (ERD) is a diagram which shows the information that is created, stored, and used by a business system [7]. ERD is used to describe and explain the components or processes that can be linked to the other for the design of a database. ERD aims at facilitating the development of a system for managing information systems entities. Shown in Figure 4 Entity Relationship Diagram for UTHM Scheduled Waste Management System.

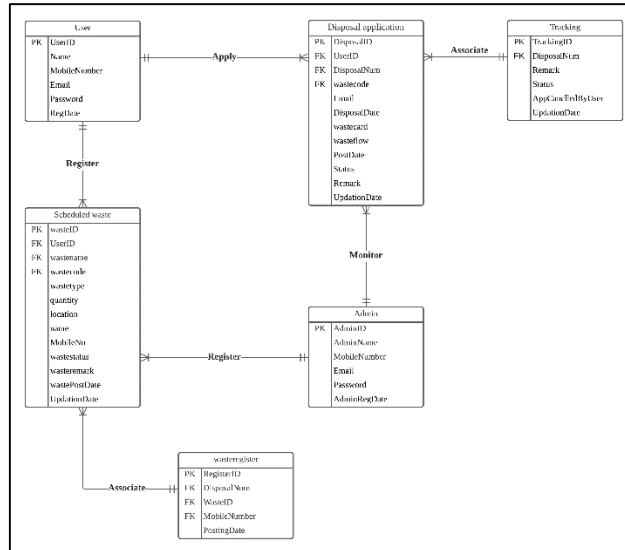


Figure 2(c) : Entity Relationship Diagram

As shown in Figure 4, there are 6 tables in the database. The following describes the relational scheme of the database :

- i. tbladmin (adminID, AdminName, MobileNumber, Email, Password, AdminRegDate)
- ii. tbluser (userID, name, MobileNumber, Email, MobileNumber, Password)



- iii. tbl DISPOSALAPP (DisposalID), DisposalNum, disposalmethod, MobileNumber, Location, Email, DisposalDate, wastecard, wasteflow, PostDate, Status, Remark)
- iv. tbl WASTE (wasteID, wastename, wastecode, wastetype, quantity, location, name, MobileNo, wastestatus, wasteremark, wastePostDate, UpdationDate)
- v. tbl TRACKING (trackingID, DisposalNum, Remark, Status, AppCancelledByUser, UpdationDate)
- vi. tbl WASTEREGISTER (regID, DisposalNum, wasteID, MobileNumber, PostingDate)

#### 4.4 User Flowchart

A flowchart is constructed to show the progress of the developed system which is the UTHM Scheduled Waste Management System. Flowchart helps in showing procedures of the flow or steps taken on the system journey. Figures 5 and 6 shows the flowchart for each user which is UTHM Staff and admin that has developed in this system.

##### a) UTHM Staff

Figure 5 shows the flowchart for UTHM Staff. The UTHM Staff will enter information such as email and password to login the system. After that, the user will view the homepage of the system, insert the scheduled waste and apply a disposal application.

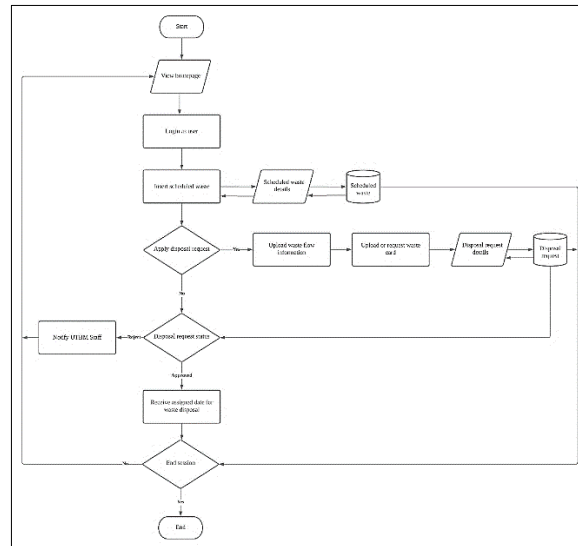


Figure 3(a) : The flowchart for UTHM Staff

##### b) Admin

Figure 6 shows the flowchart for Admin. The admin will enter information such as username and password to login the system. After that, the admin will view the homepage of the system, insert the scheduled waste, view disposal request application, approve or reject the disposal request, view monthly disposal report and scheduled waste record and generate the report to PDF format.

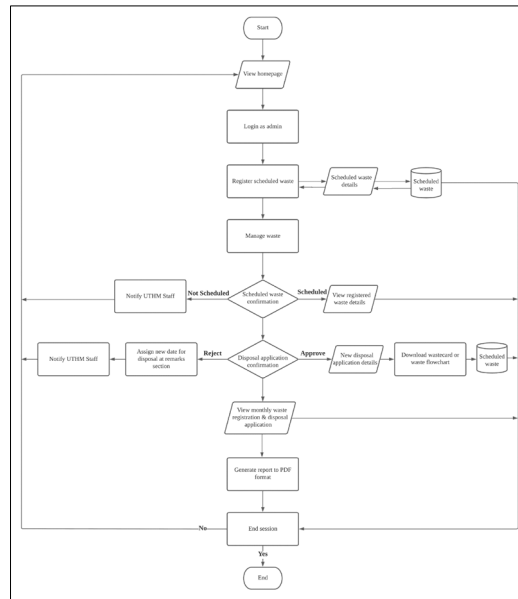


Figure 3(b) : The flowchart for Admin

### 5. Implementation And Testing

There are two types of testing in system testing which are functional testing and user acceptance testing.

#### 5.1 Functional Testing

Functional testing involves testing all of the system’s modules and functionalities to guarantee that they perform exactly as they did in the previous phase. The testing process is carried out in order to identify any faults that may occur while the system is in use. Table 5 shows Test Plan Results for User’s interface of the system Table 6 shows the Test Plan Results for Admin’s interface of the system.

Table 5 : Test Plan Results for User’s interface of the system

No	Test Cases	Expected Output	Actual Output
<b>User Registration and Login Module</b>			
1	Enter invalid email and password	Display error message “Invalid details”	Display error message and email/password incorrect.
2	Press login button without input email or password	Appear a pop up Window with message “ Please fill in this field”.	As expected
3	Enter valid and correct email and password.	Login successfully and redirect to user dashboard.	As expected
4	Update profile details such as phone number.	Display message of updated successfully.	As expected
<b>Scheduled Waste Registration Module</b>			
5	Insert all required scheduled waste details.	Appear a pop up Window with message “Waste detail has been added.”	As expected
6	Update scheduled waste details	Appear a pop up Window with message ”Waste detail has been updated.”	As expected
7	Delete scheduled waste details	Appear a pop up Window with message “Waste Data has been deleted successfully.”	As expected

**Table 5 : (continued)**

No	Test Cases	Expected Output	Actual Output
<b>Scheduled Waste Registration Module</b>			
8	Display admin's remark on scheduled waste detail	Admin's remark on waste details showed.	As expected
9	Check application status	Display the status of each disposal application including the remark given by OSHE UTHM.	As expected
<b>Disposal Application Module</b>			
10	Submit the application form without fill in all the details needed in the form.	Display alert message "please fill out this field."	As expected
11	Submit the application form completely with valid input.	Display message with "Your disposal has been taken successfully application successfully."	As expected
12	Upload the waste card or waste flowchart with invalid format.	Display message "Waste Card has Invalid format. Only jpg / jpeg/ png /gif format allowed".	As expected
13	Download file uploaded by user at scheduled waste details.	File able to download at scheduled waste details.	As expected
14	Display admin's remark on scheduled waste detail	Admin's remark on waste details showed.	As expected
15	Check application status	Display the status of each disposal application including the remark given by OSHE UTHM.	As expected
<b>Report Generation Module</b>			
16	Submit the form without fill in the date details needed in the form.	Display alert message "please fill out this field."	As expected
17	Generate the report to PDF format.	Save the PDF file successfully.	As expected

**Table 6 : Test Plan Results for Admin's interface of the system**

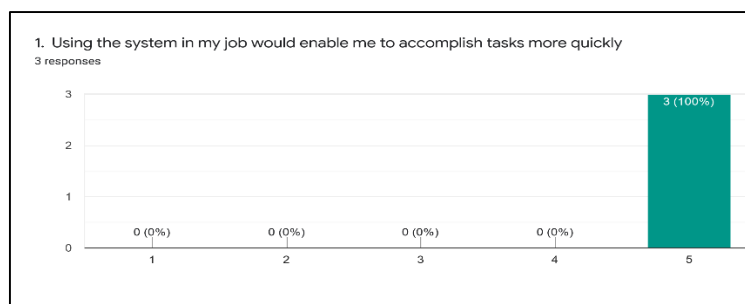
No	Test Cases	Expected Output	Actual Output
<b>User Registration and Login Module</b>			
1	Enter invalid email and password	Display error message "Invalid details"	Display error message and email/password incorrect.
2	Press login button without input email or password	Appear a pop up Window with message " Please fill in this field".	As expected
3	Enter valid and correct email and password.	Login successfully and redirect to user dashboard.	As expected
4	Update profile details such as phone number.	Display message of updated successfully.	As expected
<b>Scheduled Waste Registration Module</b>			
5	Insert all required scheduled waste details.	Appear a pop up Window with message "Waste detail has been added."	As expected

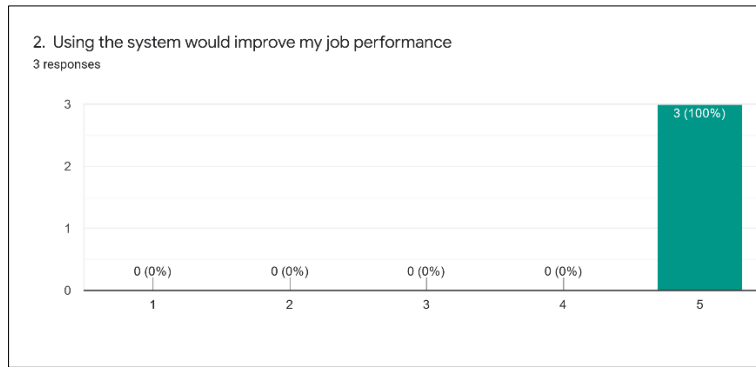
**Table 6 : (continued)**

No	Test Cases	Expected Output	Actual Output
<b>Scheduled Waste Registration Module</b>			
6	Update scheduled waste details	Appear a pop up Window with message "Waste detail has been updated."	As expected
7	Delete scheduled waste details	Appear a pop up Window with message "Waste Data has been deleted successfully."	As expected
8	Approved waste scheduled confirmation status.	Update the status of waste from "Not Updated Yet" to "Scheduled".	As expected
9	Add remark on scheduled waste detail.	Remark on waste details showed.	As expected
<b>Disposal Application Module</b>			
10	Approved disposal application confirmation status.	Update the status of application from "Not Updated Yet" to "Approved".	As expected
11	Submit the application form without fill in all the details needed in the form.	Display alert message "please fill out this field."	As expected
12	Download the waste card or waste flowchart uploaded by user.	Display waste card or flowchart details.	As expected
13	Receive notification for new waste registration and new disposal application from user.	Display the notifications with date and time that user applied.	As expected
<b>Report Generation Module</b>			
14	Submit the form without fill in the date details needed in the form.	Display alert message "please fill out this field."	As expected
15	Generate the report to PDF format.	Save the PDF file successfully.	As expected

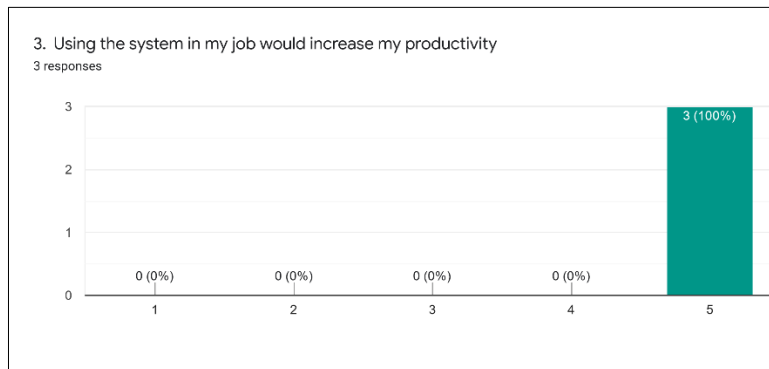
## 5.2 User Acceptance Testing

User Acceptance Testing (UAT) is a sort of end-user evaluation and validation of the developed software system during system testing. The user acceptance test is the last phase of testing in the development of a system. End-user testing, also known as application testing, is a stage in the software development process where the product is put to the test by people who are supposed to be using it [6]. User acceptance testing was carried out through questionnaire distribution by using Google Form. The user acceptance testing had been successfully conducted to collect the feedback from OSHE UTHM. Three UTHM OSHE staff from different PTj had been involved in this testing. The feedback collected from the UTHM OSHE staff is then presented in graph which Rank 1 is strongly disagree to Rank 5 which are strongly agree. Figure 7(a) to Figure shows the questionnaire for the user acceptance testing.

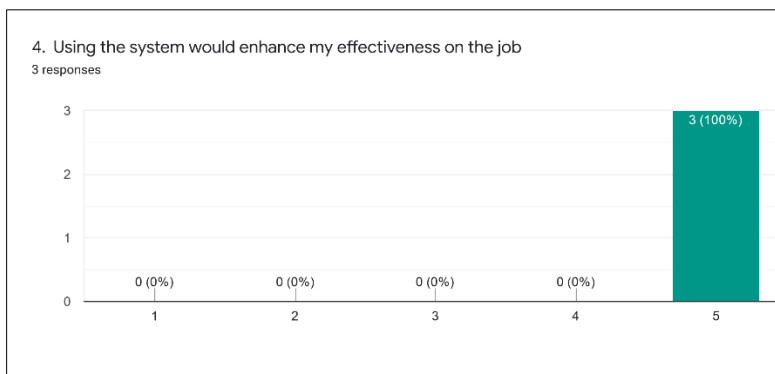
**Figure 7(a) : The user acceptance result for Question 1**



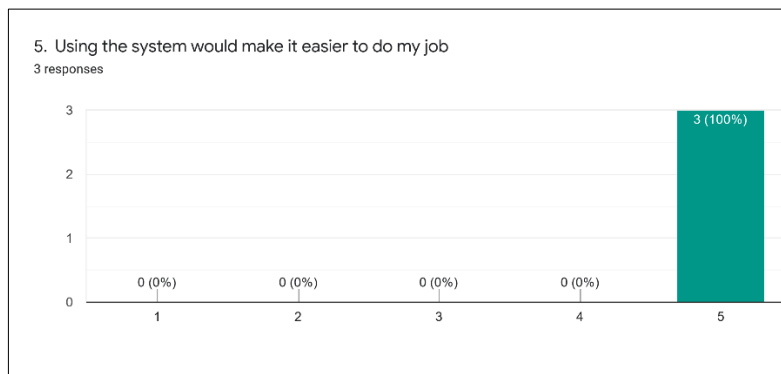
**Figure 7(b): The user acceptance testing result for Question 2**



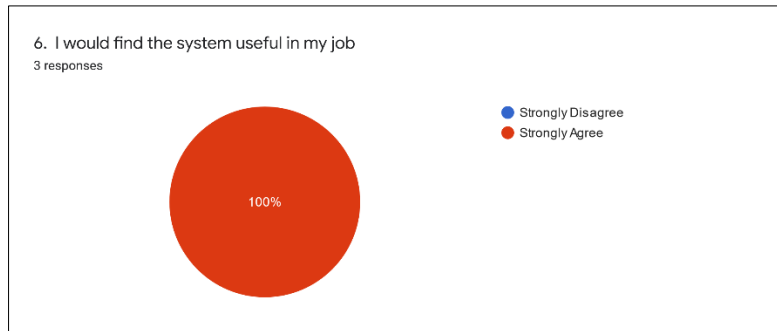
**Figure 7(c): The user acceptance testing result for Question 3**



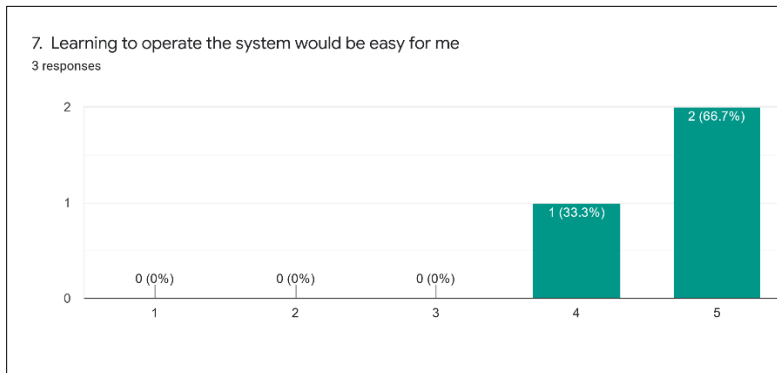
**Figure 7(d) : The user acceptance testing result for Question 4**



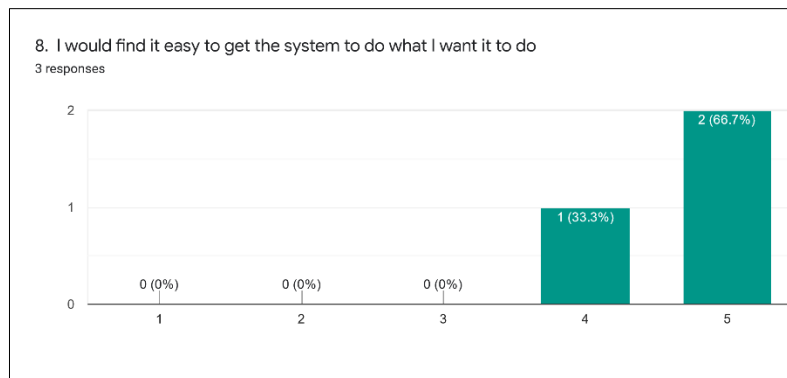
**Figure 7(e): The user acceptance testing result for Question 5**



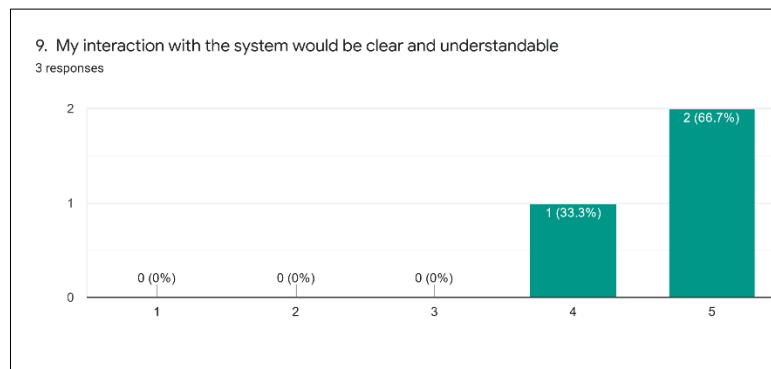
**Figure 7(f): The user acceptance testing result for Question 6**



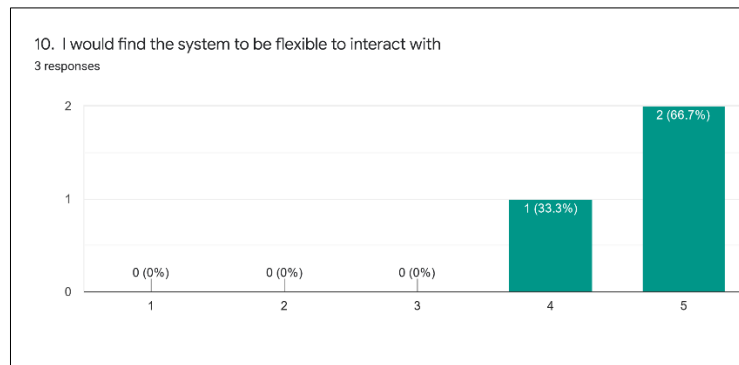
**Figure 7(g): The user acceptance testing result for Question 7**



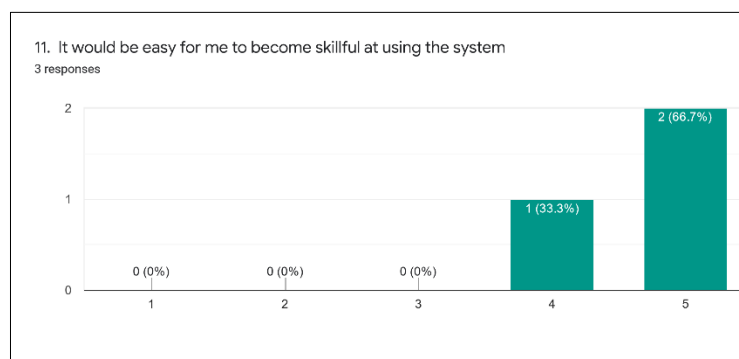
**Figure 7(h): The user acceptance testing result for Question 8**



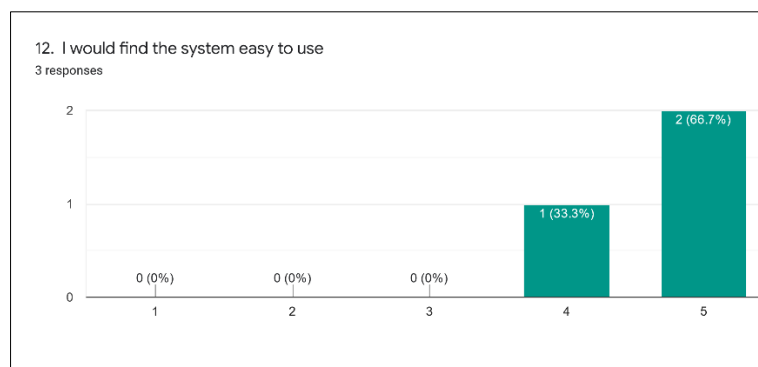
**Figure 7(i) : The user acceptance testing result Question 9**



**Figure 7(j): The user acceptance testing result for Question 10**



**Figure 7(k): The user acceptance testing result for Question 11**



**Figure 7(l): The user acceptance testing result for Question 12**

## 6. Conclusion

UTHM Scheduled Waste Management System has provided a platform for interaction between users which include UTHM Staff and UTHM OSHE. With the system developed, managing the scheduled waste, collecting application and storing data problem had been overcome. UTHM Scheduled Waste Management System has been successfully developed which aims to help to increase UTHM OSHE's accessibility and manageability to all scheduled waste's information in UTHM. Using the system, managing scheduled waste and disposal application process become more organized where UTHM OSHE can see all the waste and application record and know about the details of the application. This software has been proved to give the experience in managing their disposal application in an efficient way. During the process of analysis and development, there are some limitations identified. However, these constraints do not adversely affect the development of the system and the lack can be improved. Improvements can be applied to UTHM Scheduled Management System to improve its performance and functionalities. This system has met its goals based on the system requirements, scope, and user

requirements. It is also possible for UTHM managers to reduce the amount of paper they use to keep track of the scheduled waste and disposal application schedule. Hence, by having this system, the process of recording waste registration and disposal application data can be made with regular application. In a nutshell, the system will efficiently and systematically handle all scheduled waste in UTHM.

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### References

- [1] Fink, A. (2019). *Conducting research literature reviews: From the internet to paper*. Sage publications.
- [2] *EHS Management System* – Massachusetts Institute of Technology Environment, Health, and Safety, MIT EHS, (2021). Retrieved 14 November 2021, from <https://ehs.mit.edu/about/ehs-management-system/>
- [3] *eSWIS QUICK GUIDE - INNATECH WASTE MANAGEMENT (LABUAN) SDN BHD*. (2021). Retrieved 14 November 2021, from <http://www.innawaste.innatech.com.my/index.php?page=eswis-quick-guide>
- [4] Guhe, M. (2020). *Incremental conceptualization for language production* (1st ed., pp. 98-99). Vanderbilt Avenue, New York, NY: Routledge.
- [5] Eckhardt, J., Vogelsang, A., & Fernández, D. (2016). Are "non-functional" requirements really non-functional?. *Proceedings Of The 38th International Conference On Software Engineering*. doi: 10.1145/2884781.2884788
- [6] Gillis, A. (2022). *What is User Acceptance Testing (UAT)? - SearchSoftwareQuality*. SearchSoftwareQuality. Retrieved 13 June 2022, from <https://www.techtarget.com/searchsoftwarequality/definition/user-acceptance-testing-UAT>.
- [7] Dennis, A., Wixom, B., & Roth, R. (2013). *System analysis and design* (5th ed., p. 224). Hoboken, N.J.: Wiley.