



Faculty of Computer Science and Information Technology

MACSys – Mobile Application Complaint System for Yayasan Sabah

Mohd Danniell Bin Ahmad

**Bachelor of Computer Science with Honours
(Software Engineering)
2019**

MACSYS – MOBILE APPLICATION COMPLAINT SYSTEM FOR YAYASAN SABAH

MOHD DANNIEL BIN AHMAD

This project is submitted in partial fulfillment of the
requirements for the degree of Bachelor of Computer
Science with Honours

Faculty of Computer Science and information Technology
UNIVERSITI MALAYSIA SARAWAK
2019

DECLARATION OF ORIGINALITY

I hereby declare that this research together with all of its content is none other than that of my own work, with consideration of the exception of research-based information and relative materials that were adapted and extracted from other resources, which have evidently been quoted or stated respectively.

Signed,

.....

Mohd Danniell bin Ahmad

Faculty of Computer Science and Information Technology
Universiti Malaysia Sarawak.

21 May 2019

UNIVERSITI MALAYSIA SARAWAK

THESIS STATUS ENDORSEMENT FORM

TITLE MACSys – Mobile Application Complaint System for Yayasan
Sabah

ACADEMIC SESSION: 2018/2019

MOHD DANNIEL BIN AHMAD

(CAPITAL LETTERS)

hereby agree that this Thesis* shall be kept at the Centre for Academic Information Services, Universiti Malaysia Sarawak, subject to the following terms and conditions:

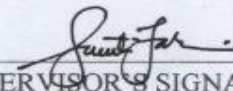
1. The Thesis is solely owned by Universiti Malaysia Sarawak
2. The Centre for Academic Information Services is given full rights to produce copies for educational purposes only
3. The Centre for Academic Information Services is given full rights to do digitization in order to develop local content database
4. The Centre for Academic Information Services is given full rights to produce copies of this Thesis as part of its exchange item program between Higher Learning Institutions [or for the purpose of interlibrary loan between HLI]
5. ** Please tick (✓)

- CONFIDENTIAL (Contains classified information bounded by the OFFICIAL SECRETS ACT 1972)
- RESTRICTED (Contains restricted information as dictated by the body or organization where the research was conducted)
- UNRESTRICTED



(AUTHOR'S SIGNATURE)

Validated by



(SUPERVISOR'S SIGNATURE)

Permanent Address

Kuarters Institut Perguruan

89000 Keningau

Sabah

Date: 16/5/2019

Date: 16/5/19

Note * Thesis refers to PhD, Master, and Bachelor Degree

** For Confidential or Restricted materials, please attach relevant documents from relevant organizations / authorities

ACKNOWLEDGEMENT

I would like to express my deep gratitude to my supervisor, Dr. Suriati Khartini Binti Jali, who have been giving me full support, advice and guidance throughout my Final Year Project. Next, I am thankful for my examiner, Associate Professor Madya Dr. Tan Chong Eng, who have been providing helpful and straightforward feedbacks and comments regarding my Final Year Project. I would also like to express my appreciation to Final Year Project coordinator, Professor Dr. Wang Yin Chai, who had provided useful guidelines throughout this Final Year Project.

Besides that, I would like to give my appreciation to my university, University Malaysia Sarawak (UNIMAS) as well as my faculty which is Faculty Computer Science and Information Technology (FCSIT) for giving me the opportunity to do this Final Year Project. Throughout this project, I have gained a lot of knowledge and able to enhance my skills in this field, therefore, I am truly appreciated the opportunity. Not to forget, Mr Jessel Kamijan, Senior Executive Information Technology of Yayasan Sabah for his cooperation and sharing in order for me to gather all information needed for this project.

Finally, I also wish to thank my family and friends who had helped and supported me in finishing my Final Year Project.

TABLE OF CONTENTS

Declaration.....	i
Thesis Status Endorsement Form.....	ii
Acknowledgment.....	iii
Table of Contents.....	iv
List of Figures.....	viii
List of Tables.....	x
Abstract.....	xi
Abstrak.....	xii
Chapter 1: Introduction.....	1
1.1 Introduction/Background.....	1
1.2 Problem Statement.....	2
1.3 Scope.....	2
1.4 Aim and Objectives.....	2
1.5 Procedure/Methodology.....	3
1.6 Significance of Project.....	4
1.7 Project Outline.....	5
1.7.1 Chapter 1: Introduction.....	5
1.7.2 Chapter 2: Literature Review.....	5
1.7.3 Chapter 3: Requirement Analysis and Design.....	5
1.7.4 Chapter 4: Implementation.....	5
1.7.5 Chapter 5: Testing.....	5
1.7.6 Chapter 6: Conclusion and Future Works.....	5
Chapter 2: Literature Review.....	6
2.1 Introduction.....	6
2.2 Review on Existing System.....	6
2.2.1 Sistem Aduan ICT - RTM.....	7
2.2.2 Sistem iJKMN.....	9
2.2.3 Sistem Meja Bantuan ICT.....	10

2.2.4 e-Damage.....	12
2.2.5 Yayasan Sabah Manual Method.....	13
2.2.6 Comparison on Existing System	13
2.3 Review on Tools and Technology.....	14
2.3.1 Android Operating System.....	14
2.3.2 Android Studio.....	15
2.3.3 Firebase.....	15
2.3 Summary	16
Chapter 3: Requirement Analysis and Design.....	17
3.1 Introduction	17
3.2 Mobile Application Development Life Cycle (MADLC).....	17
3.2.1 Planning.....	18
3.2.1.1 Survey	18
3.2.1.2 Analysis on Current Method.....	20
3.2.1.3 Analysis of Proposed System.....	20
3.2.1.4 Functional Requirement.....	21
3.2.1.5 Non-Functional Requirement.....	22
3.2.1.6 Software	22
3.2.1.7 Hardware.....	23
3.2.2 Design.....	24
3.2.2.1 Activity Diagram	26
3.2.2.2 Use-Case Diagram	26
3.2.2.2.1 Use-Case Diagram for All Roles	26
3.2.2.2.2 Use-Case Description for Administrator	27
3.2.2.2.3 Use-Case Diagram for Yayasan Sabah Staff User.....	28
3.2.2.3 Sequence Diagram	28
3.2.2.3.1 Sequence Diagram for Login into System.....	29
3.2.2.3.2 Sequence Diagram for Complaint Application Process.....	30
3.2.2.3.3 Sequence Diagram for Manage User	31
3.2.2.4 Class Diagram.....	32

3.2.2.5 Wireframe	33
3.2.3 Development.....	35
3.2.4 Testing	35
3.2.5 Release.....	36
3.2.5 Maintenance	36
3.3 Summary.....	36
Chapter 4: Implementation.....	37
4.1 Introduction	37
4.2 Installation and Configuration of the Software/Tools Used.....	37
4.2.1 Firebase.....	37
4.2.2 Android Studio	37
4.3 Implementation Pages	38
4.3.1 Login Page.....	39
4.3.2 Register Page	41
4.3.3 Home Page.....	42
4.3.4 Form Application Page.....	43
4.3.5 Complaint Ticket Page	44
4.3.6 Complaint History Page	45
4.3.7 Manage User Page	46
4.3.8 Manage Complaint Page.....	47
4.3.9 Generate Report Page.....	48
4.4 Summary	48
Chapter 5: Testing	49
5.1 Introduction	49
5.2 Functional Testing.....	49
5.2.1 Test Case	49
5.3 Non-Functional Testing.....	52
5.3.1 Usability Testing	53
5.3.1.1 User Interfaces	53
5.3.1.2 User Functionality.....	54
5.3.1.3 Overall Evaluation of the Proposed Mobile Application.....	55

5.4 Summary	55
Chapter 6: Conclusion and Future Work	56
6.1 Introduction	56
6.2 Objectives and Achievements	56
6.3 Limitations and Constraint	56
6.4 Future Work	57
6.5 Conclusion.....	57
References	58
Appendix A.....	60
Appendix B	62
Appendix C	68

LIST OF FIGURES

Figure 1.1 Mobile Application Development Life Cycle Phases	3
Figure 2.1 Sistem Aduan ICT – RTM Complaint form	7
Figure 2.2 Sistem Aduan ICT – RTM View Status of Complaint made	8
Figure 2.3 Sistem Aduan ICT – RTM Printable Summary of Complaint made	8
Figure 2.4 Sistem iJKNM - Modul Aduan Kerosakan ICT (eHelpdesk) Complaint form	9
Figure 2.5 Sistem iJKNM - Modul Aduan Kerosakan ICT (eHelpdesk) View Status of Complaint made	10
Figure 2.6 Sistem iJKNM - Modul Aduan Kerosakan ICT (eHelpdesk) Summary and List of History Complaint made	10
Figure 2.7 Sistem Meja Bantuan ICT Complaint form	11
Figure 2.8 Sistem Meja Bantuan ICT View Status of Complaint made	11
Figure 2.9 e-Damage Complaint Form	12
Figure 2.10 e-Damage View Status of Complaint Made	12
Figure 2.11 Mobile Operating System Market Share in Malaysia	14
Figure 3.1 Mobile Application Development Life Cycle Phases	17
Figure 3.2 Histogram of Benefit of the Proposed Mobile-based Application	19
Figure 3.3 Activity diagram for MACSys	25
Figure 3.4 Use case for all roles	26
Figure 3.5 Sequence diagram for login	29
Figure 3.6 Sequence diagram for complaint application process	30
Figure 3.7 Sequence diagram for manage user	31
Figure 3.8 Class Diagram of MACSys App	32
Figure 3.9 Sample Login Page	33
Figure 3.10 Sample Home Page	33
Figure 3.11 Sample Complaint Form	34
Figure 3.12 Sample Complaint Ticket	34
Figure 3.13 Sample Complaint Status	34
Figure 3.14 Sample Complaint History	34
Figure 4.1 Login Page of MACSys	39
Figure 4.2 Login Page of MACSys with Wrong Input	40

Figure 4.3 Register Page of MACSys.....	41
Figure 4.4 User Homepage.....	42
Figure 4.5 Admin Homepage.....	42
Figure 4.6 Complaint Application of MACSys	43
Figure 4.7 Complaint Ticket Page	44
Figure 4.8 History Page of MACSys	45
Figure 4.9 Manage User Page.....	46
Figure 4.10 Manage Complaint Page of MACSys	47
Figure 4.11 Report Page of MACSys	48
Figure 5.1 Result for the User Interface of MACSys	53
Figure 5.2 Result for Functionality of MACSys.....	54
Figure 5.3 Result for Overall Experience Using MACSys.....	55

LIST OF TABLES

Table 2.1 Comparison on the Similar Existing System	13
Table 3.1 Software Requirement	23
Table 3.2 Hardware Requirement	23
Table 3.3 Use Case Description for Administrator	27
Table 3.4 Use Case Description for Yayasan Sabah Staff User	28
Table 5.1 Test Case of Login Functionality.....	49
Table 5.2 Test Case of Home Page Functionality.....	50
Table 5.3 Test Case of File Complaint Functionality.....	50
Table 5.4 Test Case of Manage User Functionality.....	51
Table 5.5 Test Case of Manage Complaint Functionality	51
Table 5.6 Test Case of Notification Functionality	52
Table 5.7 Test Case of Generate Report Functionality.....	52
Table 6.1 Objectives and Achievements.....	56

ABSTRACT

Mobile Application Complaint System (MACSys) is aimed at developing an online complaint system which is important to the Information and Communication Technology Department (ICT) as it is a complaint platform for the hardware and software. This application able to maximize the productivity of the ICT process in the organization since it can be used to automate the workflow of the complaint made by staff. The complaint system application has features such as filling in complaint form, check status of the complaint made, view history and summary of the complaint made. Users can log in to the MACSys by entering their user ID and password. With the help of this application, staffs can make complaint at anytime and anywhere using their smartphones. The advantage of this application is there is no necessity for the staffs manually filling the complaint form and waiting for the status of the complaint made.

ABSTRAK

Tujuan Aplikasi Mudah Alih Sistem Aduan (MACSys) adalah untuk memudahkan pengurusan aduan secara dalam talian yang penting untuk Jabatan Teknologi Maklumat dan Komunikasi (ICT). Aplikasi ini dapat memaksimumkan produktiviti proses ICT dalam organisasi kerana ia boleh digunakan untuk mengautomasi proses aduan yang dibuat oleh kakitangan Yayasan Sabah. Sistem aduan ini mempunyai ciri-ciri seperti mengisi borang aduan, semakan status permohonan bagi aduan yang dibuat, lihat sejarah dan ringkasan aduan yang dibuat. Pengguna boleh log masuk ke dalam MACSys dengan memasukkan ID pengguna dan kata laluan mereka. Dengan bantuan aplikasi ini, Kakitangan boleh membuat aduan pada bila-bila masa dan di mana sahaja menggunakan telefon pintar mereka. Kelebihan aplikasi ini adalah ianya tidak memerlukan kakitangan mengisi borang aduan dan menunggu status aduan yang dibuat secara manual.

CHAPTER 1: INTRODUCTION

1.1 Introduction/Background

Yayasan Sabah (YS) is one of the largest groups in Sabah as it has many divisions and branches. YS is involved in various development programs such as educations, socio-economic, health and social culture as well as charitable programs. With that, it is imaginable how many employees in their building. Every employee is given hardware and software to ease them to work. Hardware and software tend to wear out and sometimes cause a problem if not been set right, when it happens, the staffs fill in a paper form stating the problem along with the location and send it to the admin in the Information and Communication Technology (ICT) department.

The problem with the current system is the complaints are done and maintained manually. Thus, the complaints need to be automated and centralized. Currently, the staff must hand over the filled paper form to the ICT department and the staffs only have limited time to send the filled form due to their own work needed to be done. The only free time they have is during the lunch break which the staff in ICT department may not be in as well. Hence, the process of handing over the filled form is time consuming. Since the complaint is in the form of a paper, it tends to be misplaced and eventually be neglected. Therefore, the reason of this project is to eliminate the problem as stated. The staffs will be able to use mobile-based application of the complaint system at any time and place given which will be convenient and faster in term of the process.

It is because every staff have their own mobile in which they can use the mobile application whenever there is a problem occur. Moreover, the staff will be able to see the status of the complaint that have been filed.

1.2 Problem Statement

The ICT department in YS receives complain both in software and hardware problem from all the staff in YS almost every day. The current method of issue a complaint is by filling in a physical form and sending the form to the ICT department. This method will cause a problem when the staff does not have time to go back and forth for the process. Furthermore, this method is only available during office hour which is inconvenient to the staff that does not keep track on things thus, technical problem may be neglected. Therefore, this idea is to overcome the stated situation.

1.3 Scope

The application will be designed for Android mobile platform and to be use by all the staff at Yayasan Sabah. It acts as a platform for the staffs to file a complaint regarding their hardware and software problems, check the status of the complaint made and generate complain report. There will be two main users in the application which is admins and the YS staff. The admin will be able to use the system to store, add and retrieve staff information and manage their data, including updating or deleting status of complaint. This mobile-based application will only be built for Android users.

1.4 Aim and Objectives

The aim for this project is to develop a mobile application complaint system for YS. The objectives of this project are highlighted based on the problem statements, which are:

- To design a mobile-based application of complaint system for YS that is friendly user and able to manage complaints

- To develop a functional mobile-based application of complaint system that can be used at any time and from any where
- To convert the paper-based system to an online system for a better environment and management

1.5 Procedure/Methodology

In order to achieve the objectives of the project and build a successful mobile-application, the Mobile Application Development Life Cycle (MADLC) is chosen as the methodology for this project.

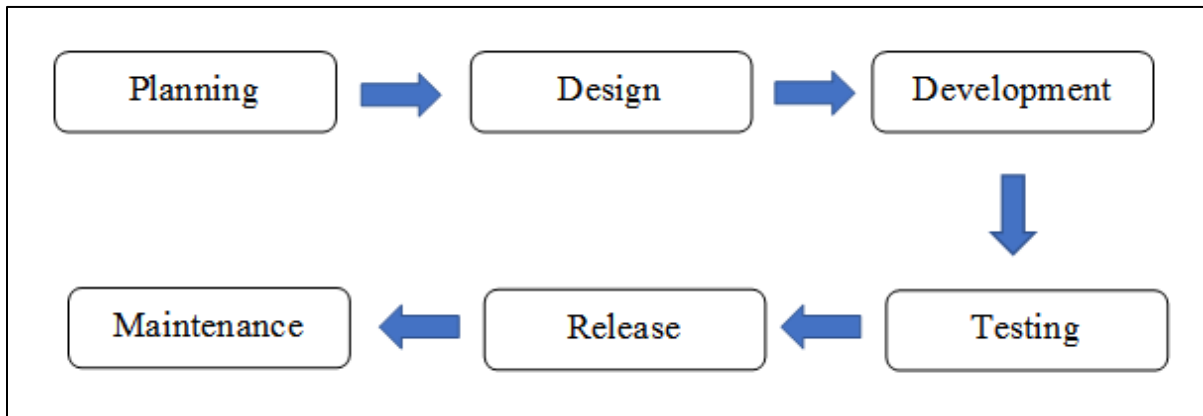


Figure 1.1: MADLC Phases (Kaur & Kaur, 2015)

Figure 1.1 shows the phases of MADLC. MADLC is the representation of the conventional System Development Life Cycle (SDLC) from the perspective of mobile (Kaur & Kaur, 2015). First, planning phase is where developers are required to define the goal of the project. List of requirements is needed to confirm whether the requirement can be transformed into features of an application. Gathering requirements can be done by distributing questionnaire.

Next is designing phase. At this phase, prototyping and refinements of the project are needed. This phase plays an important role where developers decide on how to portray the

features to the user. After designing, it is the development phase where activities of building the application are included. Besides that, the user interface of the application will be built based on the design at the prototyping phase and database will be created.

Testing phase needs to be done where the mobile-based application is tested before releasing it. This phase is to find out problems or errors that were made during and after the development phase. After making sure the mobile-based application is error-free and have obtained feedbacks from clients/users, the mobile-based application is ready to be release. Lastly, maintenance phase where the mobile-based application is maintained by receiving feedbacks from clients such as suggestion, comments and ratings.

1.6 Significance of Project

The Mobile-based Application of Complaint System for YS has the potential to solve the current problem that occurs by improving the current filing complaint process and provide a better complaints management. In the presence of this proposed mobile-based application, the staff in the ICT department of YS that acts as the administrator does not need to ask other staff to manually fill a paper form to file a complaint and send it to the ICT department anymore. All the YS staff can file a complaint and check the status of the complaint made at any time given. In general, this project aims to enhance efficiency and at the same time maintain information accurateness

1.7 Project Outline

1.7.1 Chapter 1: Introduction

Describe about the proposed mobile-based application to able to give the readers a clearer picture. This chapter consists of an introduction, problem statements, objectives of the project, the methodology used, significance of project and the project outcome.

1.7.2 Chapter 2: Literature Review

Chapter 2 consists of the research on the current system and comparing the mobile-based application which can be referred on journals, articles or any other resources. This chapter also discussed the limitations and scope including the suggestions to improve the current system to the mobile-based application.

1.7.3 Chapter 3: Requirement Analysis and Design

Chapter 3 will explain the details of the methodology used to develop the mobile-based application. The requirement analysis and database design also will be discussed in this chapter.

1.7.4 Chapter 4: Implementation

Chapter 4 focuses on the implementation of the mobile-based application and testing.

1.7.5 Chapter 5: Testing

Chapter 5 focuses on the functional and usability for the proposed mobile application.

1.7.6 Chapter 6: Conclusion and Future Works

Chapter 6 concludes the development of the proposed mobile-based application and discusses the future work.

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

The purpose of this chapter to review and make a comparison of the selected existing systems that are similar to the proposed system.

Today, most of the complaint systems are often found in the form of web-based application. However, as the uses of technology is increasing, where everything can be done at any time given by using mobiles. It encourages to develop a mobile-based application of complaint system to reach out to more necessary users. It is essential for them to be able to access, store and retrieve the data in the complaint system. Currently, YS is using a manual approach to manage their complaint data by storing their data using papers.

The disadvantage of following the manual approach compared to the mobile-based application is the cost of it is higher due to the excessive use of paper. Moreover, since all data manually written and kept-on in paper, organising the collection of data would be something difficult. Another problem of self-organising the papers is to find the needed data, the staffs need to slowly check the content to get what they need. On the other hand, the mobile-based application is more efficient and systematic as it uses database to store the data and the use of papers will be reduced.

2.2 Review on existing systems

In this section, four existing system had been chosen to be reviewed and compared. In order to identify the similarities, advantages, and disadvantages of the chosen system. The features of the existing and proposed systems will also be discussed.

2.2.1 Sistem Aduan ICT - RTM

Sistem Aduan ICT is an online website that is made specifically for RTM staffs. It is fully owned by RTM. This website allows RTM staffs to:

- Fill a complaint form regarding hardware and software (refer Fig 2.1)
- Check the status of the complaint made whether it is fixed or still pending (refer Fig 2.2)
- View summary of the complaint made (refer Fig 2.3)

The screenshot shows the RTM Complaint Form (BORANG ADUAN) interface. The header includes the RTM logo and navigation links: KATEGORI, BORANG ADUAN (highlighted), SEMAKAN, BANTUAN, FAQ, MANUAL PENGGUNA, and LOG MASUK. The main heading is "BORANG ADUAN" with a sub-heading: "Lengkapkan borang aduan berikut mengikut kategori masalah. Klik ⓘ untuk panduan menulis aduan." The form fields are:

- Nama Pelapor: Text input field with placeholder "Nama Pelapor".
- Bahagian: Dropdown menu with "Pilih Bahagian".
- No Tel Pejabat/Bimbit: Text input field with placeholder "contoh : 0389118098".
- Email: Text input field with placeholder "contoh: said@rtm.gov.my".
- Kategori Kerosakan: Dropdown menu with "Pilih Kategori Kerosakan".
- Keterangan Aduan: Large text area for the complaint details.

Below the text area, there is a note: "Beri keterangan mengenai kerosakan yang di alami. Sekiranya melibatkan aduan bagi reset kata laluan sila nyatakan no kad pengenalan pengguna." At the bottom, there are two buttons: "Hantar" (orange) and "Set Semula" (black).

Figure 2.1: Sistem Aduan ICT – RTM Complaint form

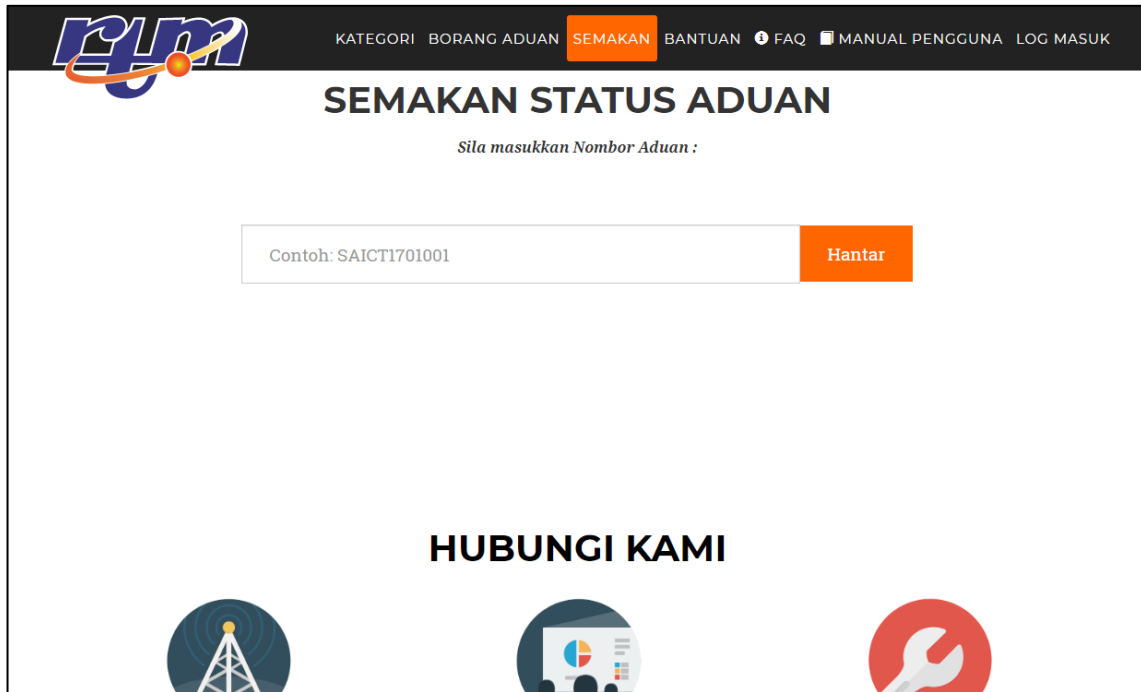


Figure 2.2: Sistem Aduan ICT – RTM View Status of Complaint made

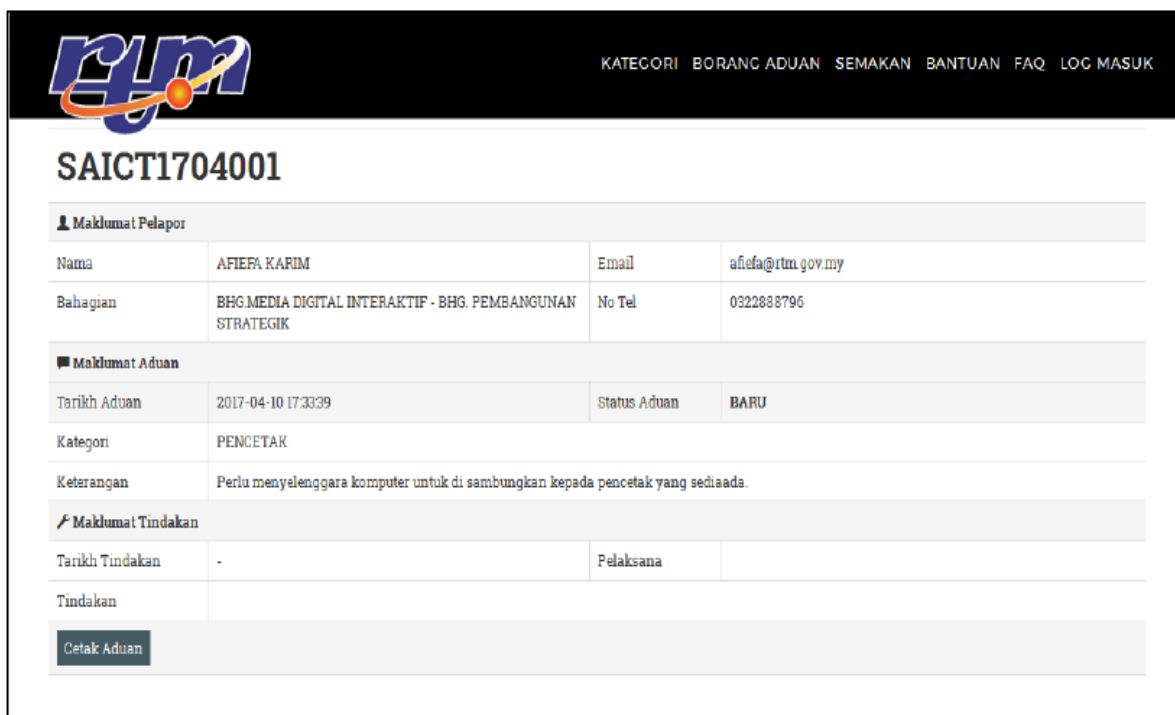


Figure 2.3: Sistem Aduan ICT – RTM Printable Summary of Complaint made

Sistem Aduan ICT has all the basic feature required to work as a complaint management system. However, it does not provide the history of the complaint made by the users.

2.2.2 Sistem iJKMN

The iJKMN system has been developed with the aim to centralizing the work management process of Melaka State Health Department (Sistem iJKMN, 2010). By using only one system, users can access various work modules without having to access to another system. One of the system's complaint system. The complaint system provides;

- A complaint form to fill regarding hardware and software
- Check the status of the complaint made whether it is fixed or still pending
- A list of history complaint made
- View summary of the complaint made

Sistem iJKMN almost has all the required feature as a complaint system. However, there is no notification provided regarding their complaint. Thus, the user would not been alert if there is a response to their complaint.

: Butir-Butir Aduan Kerosakan Komputer	
Jenis Kerosakan	Pilih Jenis Kerosakan <input style="border: none;" type="button" value="+"/>
Item/Jenis Sistem	Item/Jenis Sistem
Model Item/Modul Sistem	Model Item/Modul Sistem
Catatan	<div style="border: 1px solid gray; height: 50px;"></div>
No Siri Peralatan	<input type="text"/>
Kontrak Penyelenggaraan Berpusat	<input checked="" type="radio"/> Tiada <input type="radio"/> Ada
<input type="button" value="Hantar"/> <input type="button" value="« Kembali"/>	

Figure 2.4: Sistem iJKMN - Modul Aduan Kerosakan ICT (eHelpdesk) Complaint form

Langkah Penyelesaian / Maklumbalas					
No	Tindakan Oleh	Maklumbalas	Tindakan Seterusnya	Tarikh	Status
1	HANINA (Pengguna)	Daftar Aduan	PT Helpdesk	25 Nov 2010 - 05:17:06 AM	Menunggu Tindakan

Figure 2.5: Sistem iJKNM - Modul Aduan Kerosakan ICT (eHelpdesk) View Status of Complaint made

								Rekod 1 - 1 / 1		
No	No Laporan	Jenis Kerosakan	Item/Jenis Sistem	Modul Sistem	Tarikh	Tempoh Aduan	Status	Tindakan		
1	19/2010	Perkakasan	LCD PROJECTOR	TOSHIBA	25 Nov 2010 05:17:06 AM	0 hari	Menunggu Tindakan	Lihat	Padam	Cetak

Tambah Aduan
« Kembali
①
②
③

*Nota : No Laporan yang bertanda * tidak boleh dipadam dan dikemaskini kerana sudah mempunyai tindakan.*

Figure 2.6: Sistem iJKNM - Modul Aduan Kerosakan ICT (eHelpdesk) Summary and List of History Complaint made

2.2.3 Sistem Meja Bantuan ICT

Sistem Meja Bantuan ICT is developed to help BTM and other departments to manage information and actions regarding complaints of ICT. This is a web-based system and is accessible to all departments throughout Pahang state (Sistem Meja Bantuan ICT, n.d.). All complaint information will be maintained by ICT Help Desk Groups at BTM and then forwarded to the staff of Meja Bantuan ICT.

The complaint system provides;

- A complaint form to fill regarding hardware and software
- Check the status of the complaint made whether it is fixed or still pending