



Faculty of Computer Science and Information Technology

***INTERACTIVE UNIVERSITY GUIDEBOOK FOR FRESHIES
UNIMAS PREP***

Audrey Grace Paul

Bachelor of Computer Science with Honours

(Multimedia Computing)

2019

**INTERACTIVE UNIVERSITY GUIDEBOOK FOR FRESHIES
UNIMAS PREP**

AUDREY GRACE PAUL

This project is submitted in partially fulfilment of the
requirements for the degree of
Bachelor of Computer Science with Honours

Faculty of Computer Science and Information Technology
UNIVERSITI MALAYSIA SARAWAK

2019

UNIVERSITI MALAYSIA SARAWAK

THESIS STATUS ENDORSEMENT FORM

TITLE INTERACTIVE UNIVERSITY GUIDEBOOK FOR FRESHIES - UNIMAS PREP

ACADEMIC SESSION: SEMESTER 2, 2019/2020

(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

NO.98, LORONG GRACELAND 2,
TAMAN GRACELAND, 88300
KOTA KINABALU, SABAH

Date: 24/7/2020

Date: 17/07/2020

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

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

DECLARATION

I hereby declare that this project is my original work. I have not copied from any other student's work or from any other sources except where due reference or acknowledgement is not made explicitly in the text, nor has any part had been written for me by another person.

A handwritten signature in black ink, appearing to read 'Audrey', written over a horizontal dotted line.

(AUDREY GRACE PAUL)
Matric No: 58491

19th JULY 2020

ACKNOWLEDGEMENT

First and foremost, I would like to deliver my greatest gratitude to my supervisor, Dr Suriati Khartini Binti Jali, and my co-supervisor, Sir Adrus Mohd Tazuddin, for their continuous support and dedicated involvement in every possible way to help me overcome the challenges faced throughout my Final Year Project. Furthermore, I would also like to thank my examiner, Madam Amelia Jati Anak Robert Jupit for her constructive comments and critiques regarding my Final Year Project. Likewise, I would like to give my appreciation to the Final Year Project coordinator, Professor Dr Wang Yin Chai, who had provided useful guidelines and clear insights throughout this Final Year Project.

Aside from that, I would like to express my appreciation to my university, University Malaysia Sarawak (UNIMAS) as well as my faculty, Faculty of Computer Science and Information Technology (FCSIT) for providing me with a platform to do my Final Year Project. Along with this project, I was exposed to a lot of experiences and gain invaluable knowledge that has develops the skills I have today.

Most importantly, none of this could have happened without the endless encouragement from my family and friends that have also been supporting me through the ups and downs in completing this Final Year Project. I am also grateful to those who helped me with the data collection by distributing and participating in the survey in my FYP 1 and to those participated in my usability testing and interview session in FYP 2. Their co-operation is highly appreciated, and the outcome of this project stands as a testament that their honest feedback and support has got me through till the end.

Table of Contents

DECLARATION	iii
ACKNOWLEDGEMENT	iv
LIST OF FIGURES	viii
LIST OF TABLES	x
LIST OF ABBREVIATIONS	xii
ABSTRAK	xiii
ABSTRACT	xiv
CHAPTER 1: INTRODUCTION	1
1.1 Introduction	1
1.2 Problem Statements	2
1.3 Aim and Project Objectives.....	3
1.4 Brief Methodology	3
1.4.1 Phase 1: Identification	4
1.4.2 Phase 2: Design	4
1.4.3 Phase 3: Development.....	5
1.4.4 Phase 4: Prototyping.....	5
1.4.5 Phase 5: Testing	5
1.4.6 Phase 6: Deployment.....	6
1.5 Scope	6
1.6 Significance of Project	7
1.7 Project Schedule	7
1.8 Expected Outcomes	8
1.9 Project Outline.....	9
CHAPTER 2: LITERATURE REVIEW	11
2.1 Introduction	11
2.2 Review on Existing Systems and Applications.....	12
2.2.1 Fordham Orientation	13
2.2.2 Mesra@UKM.....	15
2.2.3 Sunway MyCampus	17
2.2.4 Sydney Uni Welcome Week	19

2.3	Comparison of Existing Mobile Application	21
2.4	Brief Overview of Proposed System	22
2.5	Summary	23
CHAPTER 3: REQUIREMENT ANALYSIS AND DESIGN		24
3.1	Introduction	24
3.2	Methodology (MADLC)	24
3.2.1	Phase 1 – Identification phase	25
A.	Survey.....	26
B.	Functional Requirement	31
C.	Non-Functional Requirement	32
D.	Software Requirements Specification	33
E.	Hardware Requirements Specification.....	34
3.2.2	Phase 2 – Design phase	35
A.	Activity Diagram.....	35
B.	Use Case Diagram.....	37
i.	Use-Case description.....	38
C.	Sequence Diagram.....	42
i.	Login	42
ii.	Create a profile/sign in	43
iii.	Manage account and view profile	44
D.	Class Diagram	46
E.	Wireframe.....	47
3.2.3	Phase 3 – Development phase	51
3.2.4	Phase 4 – Prototyping phase.....	51
3.2.5	Phase 5 – Testing phase	51
3.2.6	Phase 6 – Deployment phase.....	52
3.3	Summary	52
CHAPTER 4: IMPLEMENTATION.....		53
4.1	Introduction	53
4.2	Required Components	53
4.2.1	Ionic Framework	53
4.2.2	Firebase	55
4.2.3	Articulate 360.....	56
4.3	UNIMAS Prep Walkthroughs	57
4.4	Summary	68
CHAPTER 5: TESTING		69

5.1	Introduction	69
5.2	Functional Testing.....	69
5.2.1	Test Cases.....	69
5.3	Non-functional Testing	80
5.3.1	Usability Testing	80
A.	User Interface	81
B.	User Experience	82
C.	Overall Evaluation.....	85
5.4	Summary	85
CHAPTER 6: CONCLUSION AND FUTURE WORK.....		86
6.1	Introduction	86
6.2	Project Achievement	86
6.3	Limitations and Constraints	87
6.4	Future Works.....	88
6.5	Conclusion.....	88
REFERENCES		89
APPENDICES		92
APPENDIX A – Session 2019/2020 UNIMAS guidebook		92
APPENDIX B – Gantt Chart for FYP 1		93
APPENDIX C – Gantt Chart for FYP 2.....		93
APPENDIX D – Official Letter for Data Collection		94
APPENDIX E – FYP 1 Questionnaire (Google Forms)		95
APPENDIX F – FYP 1 Questionnaire (Summary of the Responses).....		98
APPENDIX G – Screenshots of preparation page content		100
APPENDIX H – Gamification questions and answers		101
APPENDIX I – FYP 2 Questionnaire (Google Form).....		103
APPENDIX J – FYP 2 Questionnaire (Summary of the responses).....		108
APPENDIX K – Interview script		113
APPENDIX L – Paper for assessment		115

LIST OF FIGURES

Figure 1.1 Mobile Application Development Lifecycle -----	4
Figure 2.1 Interfaces for Fordham Rose Hill Orientation App -----	11
Figure 2.2 Interfaces for Mesra@UKM app -----	13
Figure 2.3 Interfaces for Sunway MyCampus app -----	15
Figure 2.4 Interfaces for Sydney Uni Welcome Week App -----	17
Figure 3.1 Mobile Application Development Lifecycle -----	23
Figure 3.2 Respondents' year of study at UNIMAS -----	24
Figure 3.3 The existence of guidebook at the respondents' previous schools -----	25
Figure 3.4 Guidebook information that needed more details based on first-year students ---	26
Figure 3.5 UNIMAS Guidebook language preference -----	27
Figure 3.6 Respondents' preference on how they get information regarding UNIMAS -----	27
Figure 3.7 Activity diagram for UNIMAS Prep -----	34
Figure 3.8 Use case diagram for UNIMAS Prep -----	35
Figure 3.9 Sequence diagram for login -----	39
Figure 3.10 Sequence diagram for creating new account -----	40
Figure 3.11 Sequence diagram for manage account -----	41
Figure 3.12 Sequence diagram for manage checklist -----	42
Figure 3.13 Class diagram for UNIMAS Prep -----	43
Figure 3.14 Sign-up and Login pages -----	44
Figure 3.15 Manage account page -----	45
Figure 3.16 UNIMAS campus map -----	45
Figure 3.17 Resources and guidelines page -----	46
Figure 3.18 FAQ page -----	46

Figure 3.19 Checklist page -----	47
Figure 4.1 Versions used for environment setup -----	54
Figure 4.2 Interface for Firebase authentication service -----	55
Figure 4.3 UNIMAS Prep gamification feature in Articulate Storyline 360 -----	56
Figure 4.4 Login and Sign Up page -----	57
Figure 4.5 Forgot password page -----	58
Figure 4.6 Email verification for new user -----	59
Figure 4.7 Home page (Registered user) -----	59
Figure 4.8 Home page (Guest user) -----	60
Figure 4.9 Preparation page -----	60
Figure 4.10 FAQ page -----	61
Figure 4.11 Schedule page -----	62
Figure 4.12 Checklist page -----	63
Figure 4.13 Explore page (gamification) -----	64
Figure 4.14 Maps page -----	65
Figure 4.15 Contact page -----	66
Figure 4.16 Manage account page -----	67
Figure 4.17 Developer’s info page -----	68
Figure 5.1 Respondents’ feedback regarding the user interface of UNIMAS Prep -----	80
Figure 5.2 Respondents’ feedback regarding the aesthetics of UNIMAS Prep -----	80
Figure 5.3 Respondents’ feedback regarding the gamification feature of UNIMAS Prep --	81
Figure 5.4 Respondents’ feedback regarding the efficiency of the UNIMAS Prep -----	82
Figure 5.5 Respondents’ feedback on technical support -----	82
Figure 5.6 Respondents’ feedback on the information or resources provided in the app ----	83

Figure 5.7 Respondents' feedback on the overall experience -----	84
--	----

LIST OF TABLES

Table 2.1 Comparison of existing mobile applications and proposed application -----	19
Table 3.1 Software requirements used and its description for developer -----	31
Table 3. 2 Software requirements used and its description for users -----	31
Table 3.3 Hardware requirements used and its description for developer -----	32
Table 3. 4 Hardware requirements used and its description for users -----	32
Table 3.5 Use case description for create profile -----	36
Table 3.6 Use case description for login account -----	36
Table 3.7 Use case description for login: Invalid login credentials -----	36
Table 3.8 Use case description for manage account -----	37
Table 3.9 Use case description for select gamification -----	37
Table 3.10 Use case description for answer quiz -----	37
Table 3.11 Use case description for view campus map -----	38
Table 3.12 Use case description for view resources and guidelines -----	38
Table 3.13 Use case description for view FAQ -----	38
Table 3.14 Use case description for send enquiry -----	41
Table 3.15 Use case description for manage checklist -----	41
Table 3.16 Use case description for call contacts -----	41
Table 5.1 Test case for user registration -----	69
Table 5.2 Test case for registered user's login -----	70
Table 5.3 Test case for guest user's login -----	71
Table 5.4 Test case for guest user's home page -----	71

Table 5.5 Test case for forgot password -----	72
Table 5.6 Test case for user account -----	73
Table 5.7 Test case for registered user's home page -----	74
Table 5.8 Test case for explore page -----	74
Table 5.9 Test case for view maps -----	75
Table 5.10 Test case for checklist page -----	76
Table 5.11 Test case for schedule page -----	77
Table 5.12 Test case for preparation page -----	77
Table 5.13 Test case for contact page -----	78
Table 5.14 Test case for FAQ page -----	78
Table 6.1 UNIMAS Prep's Objectives and Achievements -----	85

LIST OF ABBREVIATIONS

APA	RSView Development Project Archive
API	Application Programming Interface
CLI	Command-line Interface
CSS	Cascading Style Sheets
eLEAP	e-Learning Enrichment and Advanced Platform
FACA	Faculty of Applied and Creative Arts
FCSHD	Faculty of Cognitive Science and Human Development
FENG	Faculty of Engineering
FLC	Faculty of Language and Communication
FSS	Faculty of Social Sciences and Humanities
FRST	Faculty of Resource Science and Technology
HTML	Hypertext Markup Language
LTS	Long-term Support
PPPU	Pusat Pengajian Pra-Universiti
SDK	Software Development Kit

ABSTRAK

Setiap tahun, terdapat lebih daripada seribu pelajar yang bakal mendaftar di Universiti Malaysia Sarawak (UNIMAS) untuk melanjutkan pelajaran mereka sebagai mahasiswa atau mahasiswi sarjana muda. Pada masa yang sama, UNIMAS akan menganjurkan sesi aluan pelajar baharu untuk memastikan setiap pelajar tahun pertama mampu menyesuaikan diri sebelum hari kuliah pertama berlangsung. Sehingga pada hari ini, pelajar baharu hanya boleh akses versi buku panduan universiti dalam bentuk salinan lembut yang mengandungi lebih daripada 60 halaman muka surat. Oleh itu, buku panduan universiti berpotensi untuk dijadikan dalam bentuk aplikasi mudah alih yang interaktif dan bermanfaat kepada pelajar generasi moden ini. Sedemikian juga, cadangan tersebut juga membantu untuk mengurangkan jumlah pembaziran kertas dan memanfaatkan teknologi yang sedia ada seperti telefon pintar. Dengan kegunaan *UNIMAS Prep*, pelajar baharu boleh mempunyai akses mudah kepada maklumat yang diperlukan dan juga mampu meningkat efisiensi dalam pengurusan dokumen mereka. Selain itu, pelaksanaan konsep permainan dalam aplikasi mudah alih yang berkonteks informatif ini akan menggalakkan pelajar menggunakan *UNIMAS Prep* untuk meneroka UNIMAS dengan kesesuaian jadual mereka dan mampu memberi kesan yang positif dalam pengalaman universiti tahun pertama mereka.

ABSTRACT

Each year, there are more than a thousand students enrolled in the University Malaysia Sarawak (UNIMAS) for undergraduate studies. Like most universities, UNIMAS will organise a week filled with activities and talks to ensure that every first-year student gets to be familiarised with their new academic home. Currently, new students can gain access to a softcopy version of the university guidebook which contains every necessary information that is densely packed into more than 60 pages. Thus, to lessen the amount of paper waste and take advantage of the modern technology such as smartphone, turning the university guidebook into a mobile yet interactive application could bring great benefits for new students of this modern generation. With the use of UNIMAS Prep, new students can have easy access to information required and manage their document efficiently. Furthermore, the implementation of gaming concept in an informative context mobile application will further encourage students to use UNIMAS Prep to explore UNIMAS in their term and in hope to enhance their first-year university experience.

CHAPTER 1: INTRODUCTION

1.1 Introduction

University can be an exciting yet daunting experience for new students as it opens up to more prospects in life. The transition into university is a known issue and most students are aware of the changing environment but being ready for it is another concerning matter (Briggs, Clark, & Hall, 2012). With the growth in demand and usage of modern technology such as mobile devices, university students are deemed to be more tech-savvy as owning a smartphone is no longer far-fetched in this generation. The implementation of a modern solution is needed to counter the gap between new students' prior expectations and the reality of university life.

For many first-year students who graduated from pre-university, matriculation, Sijil Tinggi Persekolahan Malaysia (in English, Malaysian Higher School Certificate or commonly known as STPM) or diploma, the university is a new phase in life which they have varying expectations and ambitions. Before starting their first year at the university, they would need to do tons of preparations in a limited amount of time. Hence, being organised and prompt are crucial qualities they need to acquire before entering university. Regardless, new students would still have to deal with basic issues such as navigating around their faculty or campus, thus making them harder to adjust to the new study environment (Soiferman, 2017). As for non-local new students, they might not get the same support in terms of physically and emotionally. As stated by Hart and Swenty (2016), no matter what level of support the student has while going through college transition, the associated student will have the likeliness to be linked with some level of anxiety. This proves that it is vital for the university to focus on assisting and guiding the new students in their transitions into tertiary education. Ongoing support is also

needed to help new students with their concerns especially during their first semester (Beaumont, Moscrop, & Canning, 2016).

1.2 Problem Statements

Currently, new students are required to download a portable document file (PDF) version of the university guidebook to get all the information before they arrived at University Malaysia Sarawak (UNIMAS) (refer to Appendix A or [here](#)). This method is tedious and inconvenient because students need to manually extract information from the guidebook to ensure that they have the right documents prepared for university. Furthermore, the guidebook is not user-friendly as students need to scroll to the required page just to get certain information.

Likewise, some students even opt to print out the university guidebook as scrolling through more than 60 pages of the softcopy version is very troublesome and time-consuming. The process to extract the information is also inefficient as students would need to read every detail to ensure no documents needed are left out. Additionally, the guidebook is only available in the Malay language without any consideration to those students that might not be familiar with reading instructions in the Malay language. Besides, some of the flow charts included in the guidebook are not visually pleasing since the flow charts need to be fitted with the size of the compiled guidebook. Aside from that, there is no general frequently asked questions included in the guidebook to assist new students with their questions and concerns. Moreover, navigating around the university is also an issue as new students are unable to find their way around the campus without proper maps being provided in the guidebook.

This current PDF version of the guidebook is clearly lacking interactivity, efficiency, functionality and aesthetics to be used by new students of this generation. Needless to say, a mobile application is a suitable choice as it is portable and new students can refer to it anytime and anywhere.

1.3 Aim and Project Objectives

The mobile-based application system, also known as *UNIMAS Prep* is specifically designed to make university guidebook a hassle-free system for new intake students. Based on the problem statements specified previously, the objectives can be listed as follows:

- I. To design an interactive university guidebook for new students.
- II. To develop a mobile application system for the new intake students that can provide easier access to necessary guides and resources.
- III. To evaluate the usability of the mobile application on new intake students using User Acceptance Testing (UAT).

1.4 Brief Methodology

The suggested methodology for this proposed project is Mobile Application Development Life Cycle (MADLC). MADLC is suitable for this project as it helps to provide an initial indicator to plan task well ahead and it focuses on the development of a mobile-based application. This dedicated framework lifecycle process includes six (6) phases namely, identification, design, development, prototyping, testing, and deployment (Vithani & Kumar, 2014).

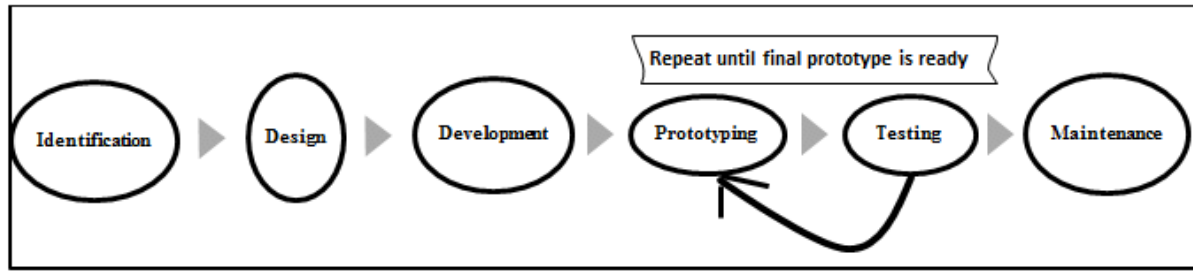


Figure 1.1 Mobile Application Development Lifecycle (Vithani & Kumar, 2014)

1.4.1 Phase 1: Identification

The first phase for the Mobile Application Development Lifecycle (MADLC) is the identification phase. In this phase, the proposed idea is further detailed and analysed by making a comparison between similar existing application and its functionalities, any differences with the existing application will be documented. Project scope, objectives, constraints and system requirement will also be determined in this phase. Questionnaires and interview sessions will then be conducted to gather requirement needed for this proposed project. The documentation is then progressed to the next phase which is the design phase.

1.4.2 Phase 2: Design

Next, an initial design of the mobile application will take place. Project developer needs to determine the feasibility of developing the proposed application on the mobile platform. Then, the functionalities of the application are broken down into modules before proceeding into prototyping. Part of the design phase is to create wireframes, use-case diagram, activity diagram, sequence diagram and class diagram for user interface interaction to explain the flow of the application. The documentation is then forwarded to the development phase.

1.4.3 Phase 3: Development

After identifying the requirements and design for the application, the phase proceeds with actual application coding. There are two stages in the development phase which includes coding for functional requirement and coding for User Interface (UI) requirement. The core functionalities for the application is the focus before continuing with the user interface design to ensure that the mobile application can be supported on multiple system platforms. The documentation is then forwarded to the prototyping phase.

1.4.4 Phase 4: Prototyping

Functional requirements of the prototypes are analysed by getting tested and receiving feedback from the end-users. Any required changes are implemented through the previous phase which is the development phase. The phases for development, prototyping and testing are repeated until the final prototype is ready and approved. The documentation of the work done is then forwarded to the testing phase.

1.4.5 Phase 5: Testing

This is the most crucial phase of the development lifecycle model. The prototype is being tested on an emulator or simulator before testing it on real devices. The testing on real devices must take different operating system versions and the variable screen sizes into consideration. The test cases are documented and forwarded for feedback.

1.4.6 Phase 6: Deployment

This is the last phase in MADLC. The objectives will be reviewed, and potential enhancement is documented for future reference. The mobile application is ready for deployment after all the testing is completed and final feedback is obtained.

1.5 Scope

This proposed project is aimed to be used by new intake students from the incoming intake. This mobile application is an alternative way for the students to view their guidebook in a more organised manner instead of needing the students to download the PDF version and extract the information manually. Also, the language that will be used for this project is in English. The key function is to provide an easily accessible mobile application system for new students to organize and prepare them before arriving at UNIMAS. This, in turn, could also facilitate the registration process for new students, making the process more efficient and effective.

There is a limitation to this project as the university guidebook being referred to here is only available for undergraduate Malaysian students in UNIMAS. This is also because the proposed project will be tested in small scale to increase accuracy and reliability in presenting the information. Hence, pre-university, international students and postgraduate students are not able to utilise the same information provided, albeit they could still use other features included in the proposed project.

1.6 Significance of Project

UNIMAS Prep has the potential to solve the current guidebook problem by providing an interactive mobile application for new students to use on the go. The use of the softcopy version of the university guidebook is inconvenient yet tedious to handle as new students have limited time constraint to settle all the necessary documentation before registration day. The university guidebook itself contains more than 60 pages hence new students have difficulty identifying which information is relevant to them. Thus, students always need to keep track to ensure they have gotten every document needed. The new students can have easy access to the information required and manage their document efficiently with the use of *UNIMAS Prep*. Another added advantage is it allows the students to explore *UNIMAS* through the implementation of gaming concept.

1.7 Project Schedule

This final year project is comprised of first and second semester worth of mobile application development for the academic year of 2019/2020. The project schedule can be referred to in Appendix B.

1.8 Expected Outcomes

The expected project outcome would be a functioning mobile application that allows new students to use it as a guide before entering UNIMAS and through the beginning of their university life. The obvious advantage for new students is they can get instant access to the university information right at their fingertip. Besides, students can personalise (i.e. add, delete and edit) their checklist with a pre-assigned document checklist feature included ensuring they have everything ready before the semester starts. The proposed app also has a gamification feature to help new students to explore university life independently, thus enhancing their experience as first-year undergraduate students. Also, the mobile application would be hassle-free and convenient to use as information are being organised by sections so students can have clear and thorough guidelines on the preparations needed in an orderly manner. Hence, students can resolve their questions or concern with the inclusion of the FAQ section in one easily accessible spot. Aside from that, students can easily navigate within the university campus with the use of an interactive map to get themselves familiar around campus. UNIMAS Prep would be a holistic university guide that can access information anytime and anywhere for the incoming new students.

1.9 Project Outline

Chapter 1: Introduction

Chapter 1 covers the introduction of the proposed mobile application system, *UNIMAS Prep*. This chapter provides an overview of the whole project which includes introduction of new students experience in their first-year of university, problems that has been identified that triggers the development of this proposed system, the aims and objectives to be achieved upon this project's completion, methodology that has been chosen to assist in the development processes, scope and the significance of the project to its end user.

Chapter 2: Literature Review

Chapter 2 outlines the literature review done on similar existing systems by reviewing related articles, journals and additional research papers. Furthermore, at least three existing systems are chosen to be reviewed and analysed. Discussion about the systems limitations and functionalities would also be included. Some features are also adopted and used in the implementation of *UNIMAS Prep*.

Chapter 3: Requirement Analysis and Design

Chapter 3 includes the discussion about requirement analysis and design during the development of the proposed system. Requirement analysis such as questionnaire, use case diagram, sequence diagram, class diagram, activity diagram, wireframe and others are also reviewed.