FACULTY of COMPUTER SCIENCE
&
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UNIVERSITI of MALAYA
KUALA LUMPUR

THESIS MANAGEMENT SYSTEM
(Sistem Latihan Ilmiah)

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ABSTRACT

The proposed system, Sistem Latihan Ilmiah (SLI) is a web-based system. The objective of Sistem Latihan Ilmiah is to implement a computerized and efficient environment for all the undergraduates who are doing their final year thesis.

The V model is chosen as the development methodology for the proposed system. This is because the model allows iteration process, where requirements changes in the middle of the development period, can be taken into consideration to allow the system to evolve for better use. Besides, the V model suits the project most due to its ease of use and simplicity, besides being a powerful development model. The main tools used in the system development are ASP, Windows 2000 Professional, Microsoft Internet Explorer 5.5, Internet Information Server 5.0, Macromedia Dreamveawer MX, Microsoft Front Page, Adobe Photoshop 6.0, VBScript, JavaScript, HTML and Microsoft Access 2000.

Few methodology techniques were utilized in the information gathering process. Reviews on existing system on the Internet and survey were conducted in order to gain more information regarding this system. Internet surfing has helped a lot in the information gathering process, besides books and journal references. The system analysis and design processes are conducted to deliver diagrammatic outcomes such as data flow diagrams, context diagram and user interface design which will assist in the system implementation in the later part of the development process.

ACKNOWLEGMENT

Many good people have contributed their precious time, gave freely of their invaluable advice and in one manner or another, helped towards the completion of this proposal. Therefore, I would like to take this opportunity to express my heartfelt gratitude to the following persons without whom this proposal would never have been completed.

First and foremost, I would like to express my gratitude and appreciation to my respected supervisor, Miss Sri Devi Ravana for devoting her precious time in guiding me throughout the semester with patience and dedication. Her guidance, support and suggestions have helped me a lot to understand the project requirements and

Next, I would like to address my thankfulness to my moderator, En. Noor Zaily for evaluating the project, and at the same time, forwarding useful suggestions and comments in order for me to come up with a better and dated system.

Besides that, I would like to express my gratitude to my family members for their support and understandings. Last but not least, special thanks to my other course mates for their support and help.

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INTRODUCTION

1.1 Project Overview

All undergraduates of the university are required to carry out a final year project according to their own majoring. The project is a compulsory subject for all undergraduates in order to complete their degree studies during their 3 years in the university. The thesis project is divided into 2 parts. They are Phase 1 of Final Thesis Project and Phase II of Final Thesis Project. Students are given duration of one semester to complete each of this phase.

The current thesis management system in most of the universities and colleges are done manually where by there is no database to record the details about the thesis. Due to this some of the information regarding the thesis might be lost without proper paper handling and documentation. Due to the problem above, I have decided to build an online thesis management system called "Sistem Latihan Ilmiah" (SLI).

The main purpose of Sistem Latihan Ilmiah (SLI) is to implement an online system for students and lecturers who are involved in the final year project. All the students and lecturer who have registered for final year project can use this system. Through this system, students can either choose thesis titles which are being offered by the lecturers or propose their own title if they are not interested with the lecturers' title.

With this system, lecturers' can view students who have chosen the titles that are offered by them. Besides that lecturer can read and evaluate titles, which have been proposed by the students. Lecturer can also decide whether they want to accept or reject the students' title by using the voting poll. By having this system implemented in FSKTM, students can check the status of their title straight online.

Administrators job is to register all the students and lecturer who are involved in final year project. Besides that administrator will be in charge in updating the system. The main purpose of this Sistem Latihan Ilmiah (SLI) is to create an effective communication among lecturers and students.

1.2 Problem Definition

The current thesis title management system is not efficient. It is very trouble some and not handy for all the lectures, students and administrators. The current thesis title management problems can be categories into 3 sections, which are the students' section, lecturers' section and administrators' section.

1.2.1. Students Section

i. Some students do not get a lecturer to supervise them.

ii. Students need to rush to meet the lecturers to register or ask information regarding the thesis titles.

iii. Students find it difficult to meet the lecturers to discuss about their thesis because most of the time lecturer's are not in the room.

iv. Students do not get a lecturer to supervise them for the titles, which students choose themselves.

v. Students did not get the titles, which was offered by the lecturers because it was taken by a different student.

vi. Other students have already taken all the titles for thesis.

vii. Students do not know the status of each title. (either available or not)

viii. Students have to queue up to get the thesis registration form.

ix. Some student's drop the paper because they do not know what to do when all the titles are taken and lectures does not want to accept more students.

1.2.2 Lectures Section

i. Lectures do not have enough title for all the students who propose them.

ii. Too many students comes hunting for them.

iii. Many students look for them to propose their own title.

iv. Lectures are not in the room when students come looking for them.

v. Difficult to avoid students from making more that one registration.

1.2.3 Administrators Section

i. Lecturers miss out certain students name when submitting the final name list of students who are under their supervision.

ii. Some students register to more that one lecturer.

iii. Some lecturers don't submit the students name list on time.

1.3 Project Objective

Objectives of the proposed system are as said below:

a. Provide better information to meet the student's need.

Students can get the full detailed information about the thesis title offered for a particular session. For every title, information such as descriptions, suggested development tools, the students can view lectures in charge and status of the title before they make their choice.

b. To enhance the quality of the relationship between advisors and students.

The next objective of this Sistem Latihan Ilmiah (SLI) can be considered as the extra feature or criteria of the system. It enhances the quality of the relationship among the students and lecturers by providing the chatting and message board function.

c. Flexible to be customized to any other similar environment.

Sistem Latihan Ilmiah (SLI) can easily adapt to changes for any other faculty with the similar need.

d. Save time

Students will no longer need to meet the individual lecturer to know whether a specific title is still available or not. They can always check the status of the titles through the system at anytime. Besides that students also can save their time in order to get their marks. This is because they can check their result straight online using this Sistem Latihan Ilmiah (SLI).

1.4 Project Scope

Scope of the proposed system are as said below:

i. The target users of this system are students, lecturers and administrators who have registered for final year project.

ii. This system is build for higher-level education use, especially for university use.

iii. This Sistem Latihan Ilmiah (SLI) is a web-based system.

iv. Sistem Latihan Ilmiah (SLI) will be offered only in one language and that is Malay language.

1.5 Project Schedule

Project schedule is a particular demanding task for software managers. Managers estimate the time and resources required to complete all the activities and organize them in a coherent sequence. Project scheduling involves separating activities and judging the time required to complete these activities. Usually, some of these activities are carried out in parallel to shorten the total project duration.

In estimating schedule, it should not assume that every state of the project would be problem free. I f the project is new and technically advance, certain part of it may turn out to be more difficult and take longer than originally anticipated.

This project schedule is usually represented as a set of charts showing the work breakdown, activity and dependencies and staff allocations. Bar charts and activity

networks are graphical notations, which is used to illustrate the project schedule. Sistem Latihan Ilmiah(SLI) project schedule is show in the next page.

1.6 Conclusion

As a conclusion, the Sistem Latihan Ilmiah (SLI) is developed to replace the manually thesis management system which is currently being used in most faculties and colleges. Hopefully with the implementation of this system, it will get to overcome all the problems faced by the current manual system.

Table 1.5: Project Development Schedule

ID	TASKS	2003							2004	
		JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB
1	Project Definition									
2	Literature Review.									
3	Methodology									
4	System Analysis and System Design									
5	Construction									
6	System Implementation									
7	System Testing									
8	System Delivery									
9	Documentation									

CHAPTER 2
LITERATURE REVIEW

CHAPTER 2

LITERATURE REVIEW

2.1 What is literature review?

A literature review is an account if what has been published on a topic by accredited scholars and researches. Occasionally it is required to write one as a separate assignment (sometimes in the form of an annotated bibliography) but more often it is written as part of the introduction to an essay, research paper or thesis.

The main purpose of literature review is to guide the students or researches to use the best way to access and analysis information regarding their research topic. It also helps the students to develop their information seeking and critical appraisal skill. Students can also recognize relevant information, synthesize and evaluate it according to the guiding concepts. Besides, writing the literature review is also to convey the reader on what knowledge and ideas have been established on the particular topic and what are the strength and weakness of this particular topic.

2.2 Current existing system on the Internet.

The literature review has also been carried out to study and review the current existing system on the Internet. A few example of current existing thesis system on the Internet is being discussed in the following pages.

2.2.1 Faculty of Computer Science and Information Technology, University Malaya

URL: http://www.fsktm.um.edu.my/ilmiah2003/

The current thesis management system in FCSIT is done online but there is a part where by student's thesis title choosing part is done manually. Let us look at the processes concerning the current Thesis Management System in FCSIT. Firstly all the lecturers must come up with their own title. Once they have come up with their own titles, they will submit those titles to their Head Of Department in order for the Head of Department to approve those titles. Once the titles are being approved, the lecturers will upload the titles into the FCSIT web site. The titles in the website will be uploaded according to departments. For example all the titles regarding networking will be uploaded in the Networking Department.

Once the titles are being uploaded into the FCSIT website students can browse the titles according to their department. Students can browse the titles suggested by a particular lecturer by clicking on the link provided (the link is the lecturer's name.)

Figure 2.2.1:Page displaying the thesis titles offered by lecturers of FCSIT.

If the students are interested in the particular title, they have to rush and meet the lecturer involved on that title in order for the students to book that particular title before some other students takes that title. Besides that if students are not interested with the titles that are offered by the lecturer, they can propose their own title. To propose their own title, the students have to go and meet the particular lecturer they want and ask them approvals. But most off the times students find it difficult to meet the lecturer because they won't be in the room and the students won't know what time the lecturer will be back to the room. Due to this a lot of time is wasted in the process of choosing title for thesis.

Before the students go and meet the lecturer, the need to get a form from the office which is "Borang Pemilihan Tajuk Project WXES/T 3181". This form contains details such as the students name, matrix number department, thesis title, lecturers name, lecturer's signature and student's signature. All the students are required to fill in the form before they approach the lecturer. If a lecturer agreed to put a particular student under his or her supervision, then the lecturers must sign on the form as approval.

There will be a deadline to submit the " Borang Pemilihan Tajuk Projek WXES/T 3181" back to the office. After all the forms have been collected from the students, it will be passed to the office clerks for filling purpose.

Once all the thesis title choosing session is over, all the lecturers will update the list of students under their supervision and send the list to the administrator in order for the administrator to assign moderator for the students.

The literature review has also been carried out to study and review the current existing system on the Internet. Below this are a few example of current existing thesis system on the Internet.

2.2.2 MIT Library.

URL: http://library.mit.edu

There are two types of search facilities in this site that can be chosen to search the database. There are basic search and search by multiple terms. For basic search, visitors can choose to search by keyword, thesis supervisor keyword, title keyword and authors name. Meanwhile for search by multiple terms, we can search by keyword anywhere, author keyword; title keyword, thesis supervisor keyword, thesis department keywords and notes with the Boolean expressions (AND or OR or NOT)

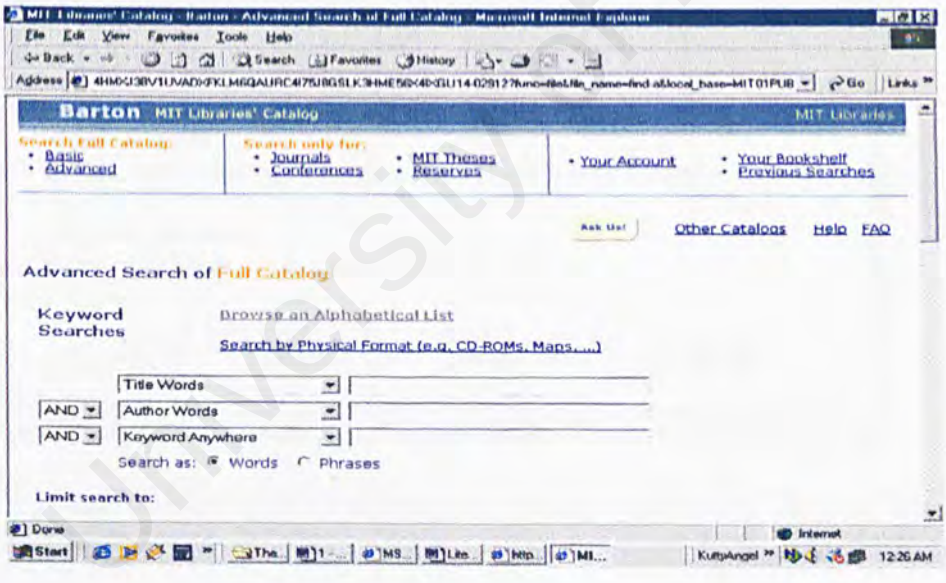

Figure 2.2.2: Page displaying advanced search function, which is offered by MIT Library

As for the search result, if there is too many matches found a message will pop up asking us to refine the search expression. The search will return information on the author, title, format and availability.

2.2.3 Virginia Tech University.

URL: http://scholar.lib.vt.edu/theses/

The university library has developed online access to theses, dissertations, technical and special reports in cooperation with the Virginia Tech Graduate School and the Computer Science Department. It has provided unrestricted access to anyone with Internet access and a WWW browser. One should be able to read, print and download these materials without any problems.

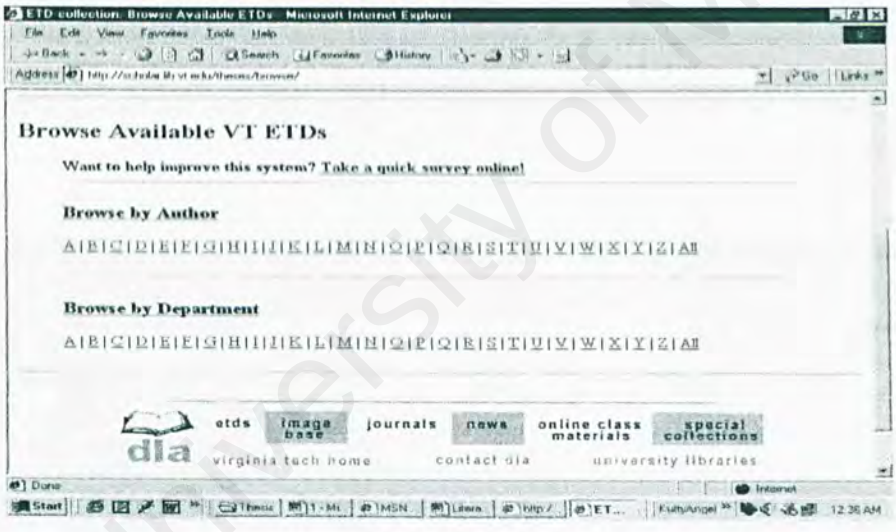

Figure 2.2.3:Page displaying browse function, which is offered by Virginia University

Visitors of the site can select either to browse the list of current available thesis or they can initiate a search by entering one or more words. Current available thesis divided into 2 parts. One is browsing by author and the other one is browsing by department. By using

both of this function, related thesis and dissertations can be found from the web site to be used as reference in future research.

2.2.4 University of Waterloo.

URL: http://etheses.uwaterloo.ca/

This web site search facilities can be used to search information on thesis done by the students of the university by keyword, author, title, academic department or year of acceptance. The results of the search are simple. Only the authors name and the title of the thesis are displayed. How ever, if the users don't want to see in detail what the thesis is about, he or she can click on the hyperlink and it will come to the abstract page of the thesis.

After viewing the abstract page, user can choose to view the whole thesis project in a PDF format. If user are not interested in that title, user cam choose to search the database again.

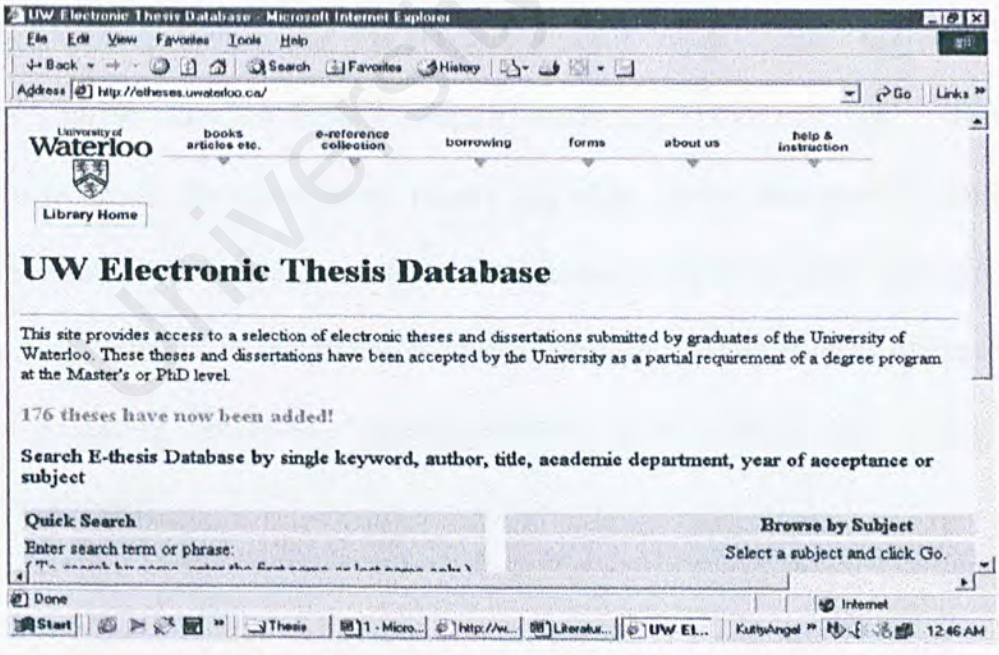

Figure 2.2.4: Page displaying University of Waterloo thesis front page.

2.3 The World Wide Web and Higher Education: The promise of Virtual Universities and online libraries.

In this 20th century higher education is facing a paradigm shift of historic proportions. The extensive development of the world's telecommunications infrastructure which as supported remarkable growth of the Internet, has placed powerful tools in the hands of educators to access incredibly diverse global sources of textual, visual and audio based information on virtually every subject and thesis title. Perhaps more importantly, the world wide web is beginning to provide a medium for faculties to offer their own expertise and create web based courses which includes the titles for assignments and thesis for students any where in the world. Computer mediated communications in general and the Internet in particular, offer the opportunity to interact on a global basis regarding about any topic in which human beings are interested [2].

Recently UCLA Extension and the Home Education Network have begun to deliver continuing higher education through computer mediated distance learning. Students have access to lecturers, class discussion, papers and other course materials 24 hours a day from any location that has a computer and a internet connection. Cable television could become major players in the future of online education. Many courses offered via the distance education, technology would combine video deliver with Internet based communications [2].

Many universities and colleges are placing an emphasis on on-line education not only as a way to reach working adults but also as a method of reining in the costs associated with

expanding and maintaining an increasingly expensive campus infrastructure. Also with more working adults seeking to continue their education for career advancement in a constantly shifting job market. Higher education is seeking innovative ways to provide flexible course offering through new media. The convergence of these forces had led to the beginning of virtual universities. Thanks to wide spread access to the Internet. Due to widespread access to the Internet, universities are beginning to provide more and more of their resources through the World Wide Web. Examples of the resources provided by the universities are thesis titles, assignment titles, class schedules and many more [2].

Online communication can produce for more student instructor interaction in a large class then would other wise place take place. Example, Jon Storslee, who teaches a graduate education course at Arizona State of university uses a web based resources and constant e-mail communication to interact with his students. He often spends between four and five hours per day reading and responding to the e-mail from the 50 students in the class [2].

Many professors are also creating their own web pages for the courses that are conducted by them. They include syllabus, assignment titles, thesis tiles, reading materials and links to appropriate resources. Current developments in media technology and communication infrastructure are beginning to make it possible to develop courses for use "on demand". By developing such a course it will produce a more comprehensive packaging of class and library whereby students can access through the web to get their study materials. Due to this it is not necessary for the students to come to the physical campus because they can get all their materials from the Internet [2].

2.4 Online Education: How Does It Benefits Students.

In this 20th century many universities and colleges are placing an emphasis on online education. Due to this thousands of lecturers are creating web pages for the courses that are conducted by them. They include syllabus, assignment reading materials, thesis titles and links to appropriate resources into their web sites. One can gain a lot of benefits from online systems.

Probably the greatest benefit of online education is the incredible convenience that it offers. Unlike traditional class, online courses usually don't have regular meetings (though there are still due dates for assignments and exams and you may have scheduled meetings or "chats" occasionally). As a result, you can do your schoolwork and studying based around your schedule. No more 8am classes, no more hunting for lecturer to fix appointment and no more 4-hours or lecture. You only need a computer and Internet connection in order for you to study on your own preferred time.

Secondly when it comes to local schools and colleges, a student who is studying in college has far more programs to choose from the students that are studying in a local school. But when you're taking classes online, geography doesn't matter anymore. If a course or program isn't offered in your school, you can almost always find an online school that offers a comparable distance-learning program. You no longer have to bet at a disadvantage because you live in a remote or less-populated area.

Thirdly an online technology provides numerous interfaces to facilitate communication. A number of adaptive computer tools, including both hardware and software, have been developed for use by persons with limited vision, hearing and mobility. In addition you will often have more opportunities for more direct communication with your teachers and classmates in an n online classroom. Instead of being limited to asking questions during class hours or appointment hours due to time constrains, you'll have direct access to your instructors via email or message boards. This can be especially helpful for lecturer who are always difficult to be found in the room. By having this online system it can save a lot of time for students and lecturers.

Fourthly, online courses facilitate student's collaboration and make students aware of a larger audience for their work. Instead of simply doing final year project papers for their lecturer, student work can be easily shared with the entire class, and students can make presentations to a large audience. Students can work in supportive pairs or having to be in the same place at the same time. As a result of this, students don't have to waste their time by fixing appointments to meet up with the rest of the group members.

2.5 Student's Questionnaire Analysis.

2.5.1 Questionnaire for students.

To determine the problems faced by the students, a survey has been conducted among students of FCSIT, University Malaya. The details of the survey are as follows.

i. **Description:** A survey has been conducted in a form of questionnaire.

ii. **Time Frame:** 3 weeks.

iii. **Place:** Faculty of Computer Science and Information Technology.

iv. **Number of questions:** 9

v. **Number of questionnaires handed out:** 70

vi. **Number of questionnaires returned:** 70

2.5.2 Students Feed Back Analysis.

2.5.2.1: Statistical results on students who are taking final year thesis

Table 2.5.2.1 (a): Statistical Results On Students who are taking final year thesis

Are you doing your final year thesis this semester?	Number (x/70)	Percentage (%)
YES	60	86
NO	10	14

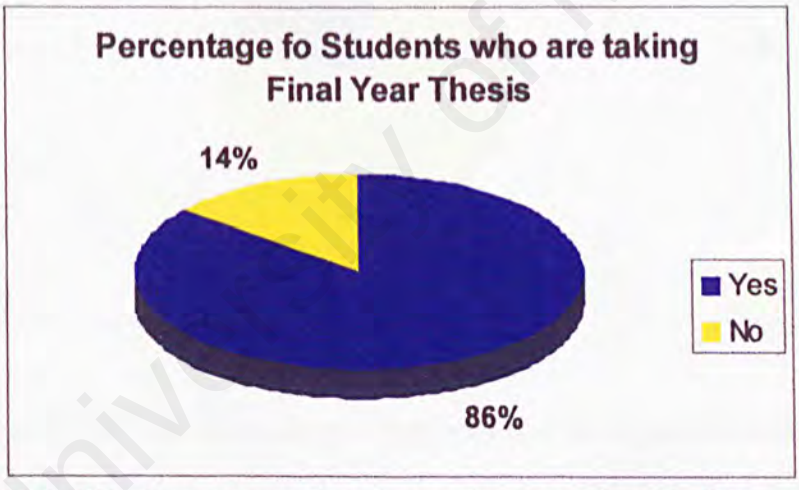

Figure 2.5.2.1(b): Percentage of students who are taking Final Year Thesis.

From the above graph we can see clearly that out of 70 students, 60 students (86%) are doing their final year thesis this semester whereas 10 students (14%) are not doing their final year thesis this semester. This is possibly because some of them would have taken their thesis last semester or planning to take it next semester.

2.5.2.2: Statistical results on students who have got their thesis title

Table 2.5.2.2 (a): Statistical Results On Students who have got their thesis title.

Have you got your title for your thesis?	Number (x/70)	Percentage (%)
YES	54	77.14
NO	16	22.86

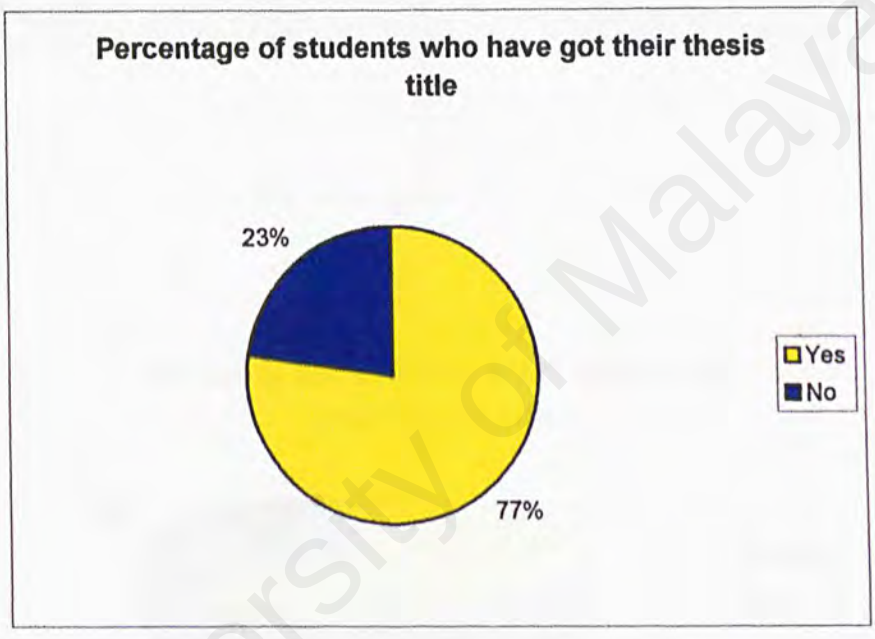

Figure 2.5.2.2 (b): Percentage of students who have got their thesis title

The above graph describes percentage of students who have got their thesis title. From the above graph we can see clearly that out of 70 students, 54 students (77.14%) students have got their thesis title whereas 16 students (22.86%) have not got their thesis title. This is possibly because some of them are still waiting for the lecturer's approval regarding their thesis title. Besides it may be also because of the thesis titles have

finished, or the students didn't manage to meet the lecturer to get further information regarding the titles that are being offered.

2.5.2.3: Statistical results on students' satisfactory level regarding their thesis title

Table 2.5.2.3(a): Statistical results on students' satisfactory level regarding their thesis title.

Are you happy with your title?	Number (x/70)	Percentage (%)
YES	39	55.71
NO	21	30

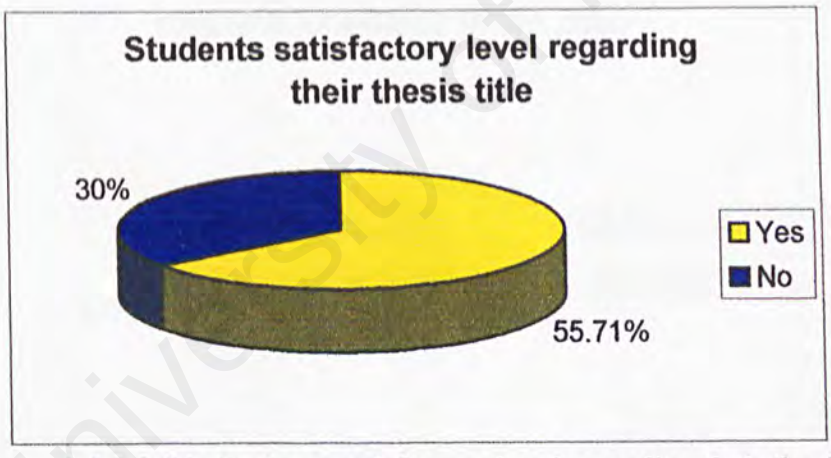

Figure 2.5.2.3 (b): Students satisfactory level regarding their thesis title

The above graph shows the students satisfactory level regarding their thesis title. From the graph we can conclude that 55.71% of the students are happy with their thesis title compare to 30% of the students who are not happy with the thesis title. If we look at the number of students, 30% will contribute to 29 students, which is not a small number. The

possible reason why students are not satisfy with the thesis title are may be because they didn't get the title which they wanted or they didn't get the title which was offered because a different student took it.

2.5.2.4: Statistical results on students' choice of thesis title

Table 2.5.2.4(a): Statistical results on students' choice of thesis title.

Is this your own title or lecturer's title?	Number (x/70)	Percentage (%)
Own Title	23	32.86
Lecturer's Title	47	67.14

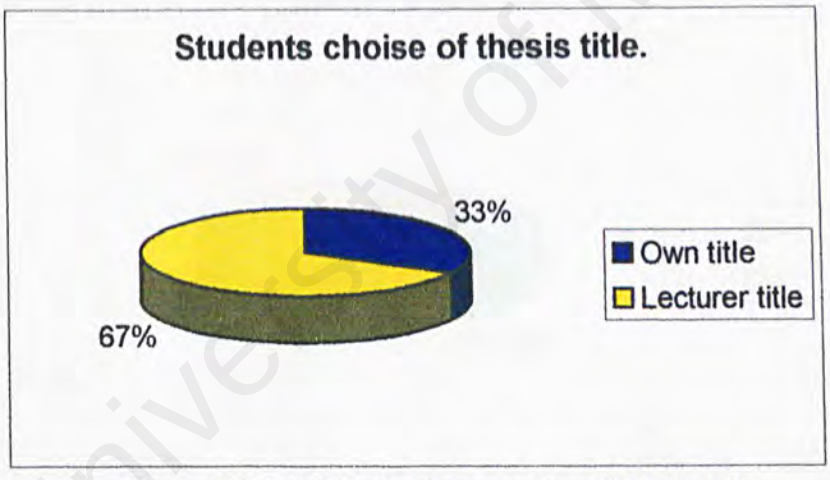

Figure 2.5.2.4 (b): Students choice of thesis title.

The above graph shows the students choice of thesis title. From the graph we can conclude that 67% of the students thesis title are lecturers title, mean while balance 33% are students own title. This is probably because most of the lecturer would like the students to take the titles that are offered before they can accept students' own proposed title. This is possibly to avoid students from going out of scope.

2.5.2.5: Statistical results on percentage of students who faced problem during the selection of thesis title.

Table 2.5.2.5(a): Statistical results on percentage of students who faced problem during the selection of thesis title.

Did you face any problem during the selection of thesis title?	Number (x/70)	Percentage (%)
Yes	58	82.86
No	12	17.14

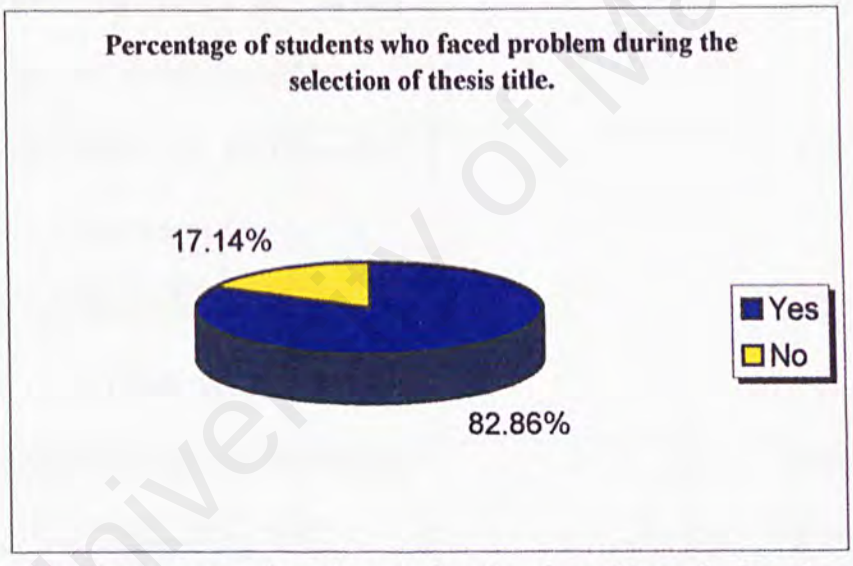

Figure 2.5.2.5(b): Percentage of students who faced problem during the selection of thesis title

The above graph shows the percentage of students who faced problem during the selection of thesis title. We can see very clearly from the graph that 82.86% students, which will be 58 students who faced problem during thesis title choosing period. Balance 17.14% of students didn't face any problem during thesis title choosing period. The

possible reason why many students face problem during the thesis title selection period is because they do not have enough facilities to get information regarding the thesis.

2.5.2.6: Statistical results on types of problem faced by students.

Table 2.5.2.6(a): Statistical results types of problem faced by students.

What type of problems did you face?	Number (x/130)	Percentage (%)
Did not get a lecturer to supervise you	12	9.23
Title for thesis have finished	22	16.92
Did not get the lecturer you wanted	18	13.85
Did not get a lecturer to supervise you on the title which you chose	15	11.54
A different student took the title which you wanted	20	15.38
You did not know what to do when all the thesis title have finished	15	11.54
You find it difficult to meet the lecturer	23	17.69
Others	5	3.85

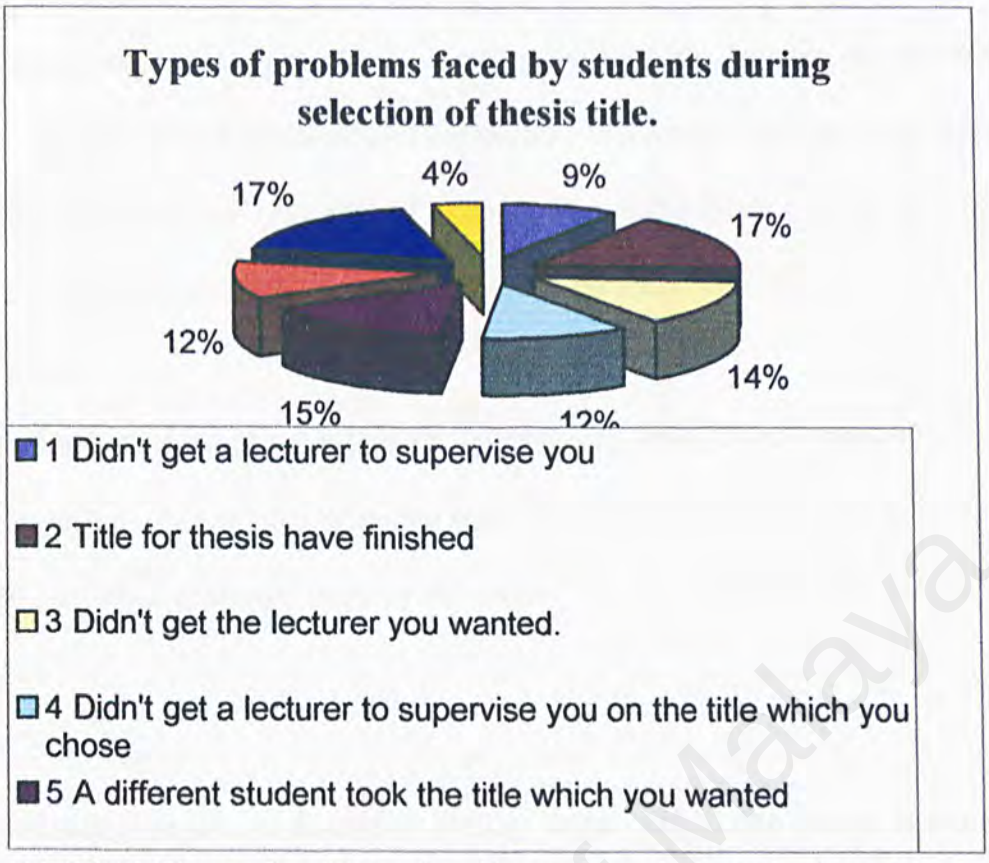

Figure 2.5.2.6(b): Types of problems faced by students during selection of thesis title

From the above pie chart we can see that, generally students face 8 types of problems. There are two main problems faced by students are students find it difficult to meet lecturers and titles for thesis have finished. Each of the problems, which are said above, contributes 17% respectively. The main reason why students find it difficult to meet the lecturers is because they do not know the lecturers timetable. Due to this whenever students go looking for the lecturer, they will not be around.

The next problem was 15% of the students did not get the title that was offered by the lecturers because a different student took it. 14% of the students did not get the lecturer they wanted. This is probably because that particular lecturer already has a quiet a number of student under their supervision and they cannot take any more students.

12% of the students did not get a lecturer to supervise them on the titles that students proposed themselves. This is probably because most of the lecturer would like the students to take the titles that are offered before they can accept students' own proposed title. Besides that, there are also 12% of students who didn't know what to do when all the titles are taken and lecturers does not want to accept more students.

9% of the students did not get a lecturer to supervise them. This is probably because some other students took all the titles that were offered by the lecturer. Lastly 4% of the students faced other problems such as the name was not registered for the final year project paper.

2.5.2.7: Statistical results on students' opinion regarding online system for choosing thesis title.

Table 2.5.2.7(a): Statistical results on students' opinion regarding online system for choosing thesis title.

Do you think that there should be an online system for choosing your thesis title?	Number (x/70)	Percentage (%)
Yes	63	90
No	7	10

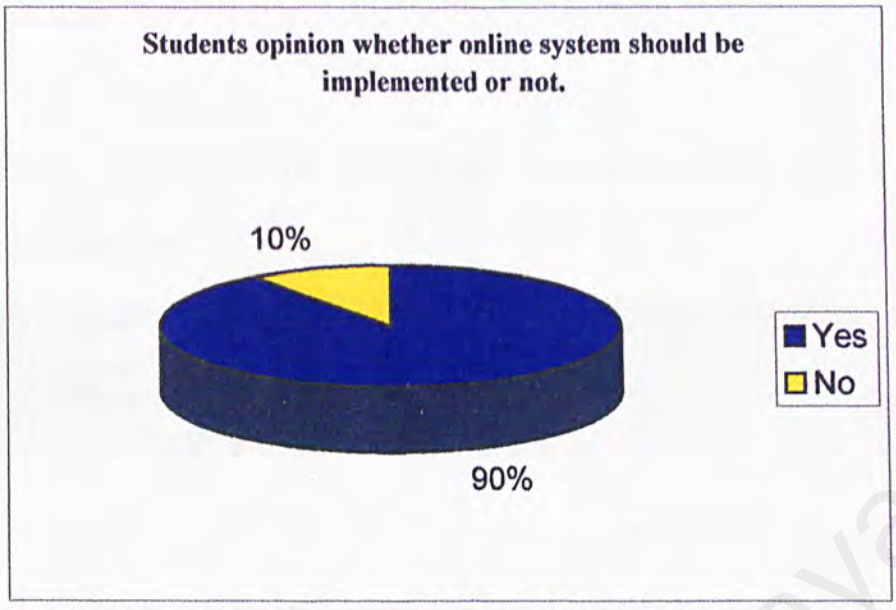

Figure 2.5.2.7(b): Students opinion whether Thesis Title Management System should be implemented or not.

The above graph shows us, student's opinion whether online system should be implemented or not. From the survey that was carried out we can see that 90% of the students agree to implement an online system in order for them to choose their thesis title compare to 10% of students who thinks this system should not be implemented. One of the possible reasons why 10% of the student's think this system should not be implemented is because some of them have already took their final year project paper last semester.

2.5.2.8: Statistical results on students' opinion regarding sending proposal through the online system.

Table 2.5.2.8(a): Statistical results on students' opinion regarding sending proposal through the online system.

Would you prefer if you could send your proposal (students own title) through the system, without meeting the lecturer?	Number (x/70)	Percentage (%)
Yes	50	71.43
No	20	28.57

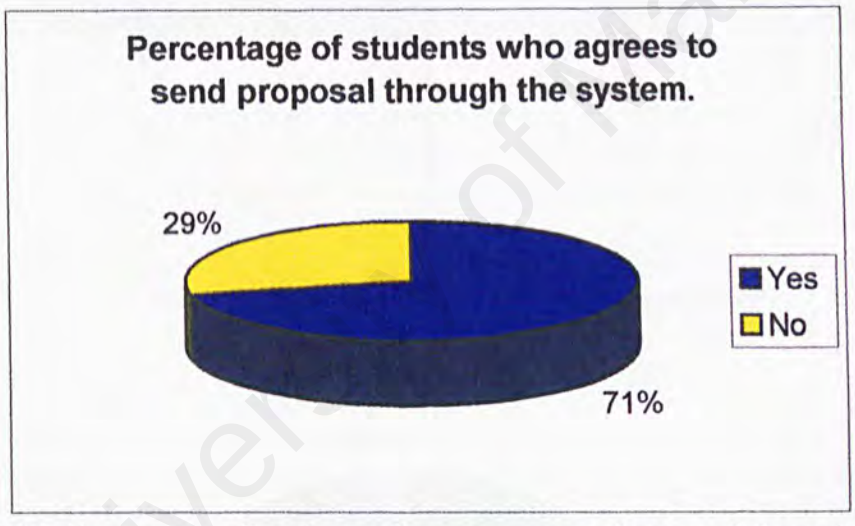

Figure 2.5.2.8(b): Percentage of students who agrees to send proposal through the system.

The above graph shows, student's opinion on sending their proposal (students own title) through the system. From the survey that was carried out we can conclude that 71.43% of the students have agreed to send their proposal using the proposal function in the system compare to 28.57% of the student's who don't agree to implement this function into the system. The possible reason why majority of the students prefer to send their proposal using this system is because they can save a lot of time. For instance students do not need

to rush to meet the lecturers, students can see the status of the titles which is offered and students can also discuss regarding their thesis titles by using the chat and message board function.

2.5.2.9: Statistical results on students' opinion on implementing "Sistem Latihan Ilmiah"

Table 2.5.2.9(a): Statistical results on students' opinion on implementing Sistem Latihan Ilmiah.

In your opinion do you think this kind of system should be implemented?	Number (x/70)	Percentage (%)
Yes	67	95.71
No	3	4.26

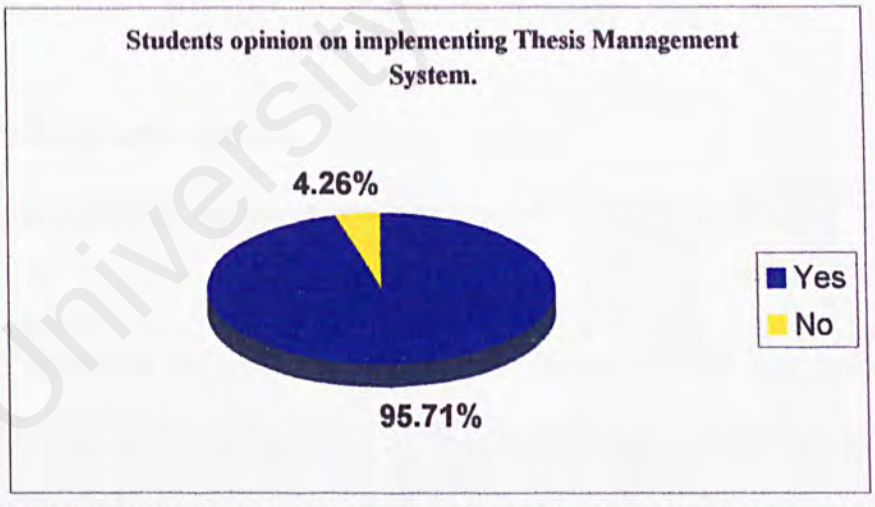

Figure 2.5.2.9(b): Students opinion on implementing Thesis Management System

The above graph shows students opinion on implementing Thesis Management System. From the above graph we can see that 95.71% of the students wants Thesis Title

Management System to be implemented. This is because by implementing this system, it will get to reduce problems that are faced by students during thesis title choosing session.

2.6 Lecturer's Questionnaire Analysis.

2.6.1 Questionnaire for lecturer's.

To determine the problems faced by the lecturer's, a survey has been conducted. The details of the survey are as follows.

i. **Description:** A survey has been conducted in a form of questionnaire.
ii. **Time Frame:** 3 weeks.
iii. **Place:** Faculty of Computer Science and Information Technology.
iv. **Number of questions:** 7
v. **Number of questionnaires handed out:** 15
vi. **Number of questionnaires returned:** 15

2.6.2 Lecturer's Feed Back Analysis.

2.6.2.1: Statistical results on lecturers who are involve in final year project.

Table 2.6.2.1(a): Statistical results on lecturers who are involve in final year project.

Are you involved in the final year project?	Number (x/15)	Percentage (%)
Yes	14	93.33
No	1	6.67

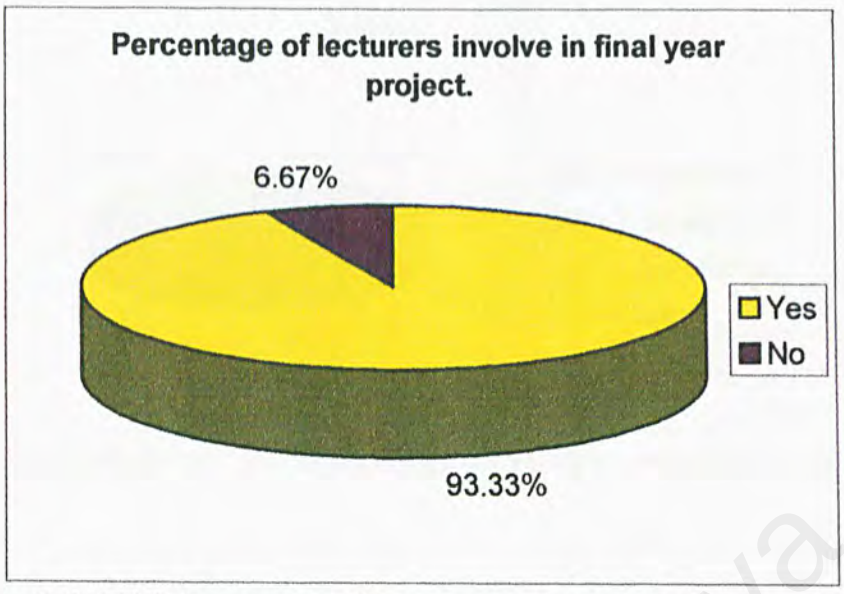

Figure 2.6.2.1(b): Percentage of lecturers involved in final year project.

From the above graph we can see clearly that 93.33% lecturer's are involved in final year project compare to 6.67% lecturer's who are not involve final year project.

2.6.2.2: Statistical results on number of students who are doing thesis under certain lecturer.

Table 2.6.2.2(a): Statistical results on number of students who are doing thesis under certain lecturer.

How many students are doing thesis under your supervision?	Number (x/15)	Percentage (%)
1-3 students	1	7
4-7 students	1	6.67
8-12 students	10	66.67
Others	3	20

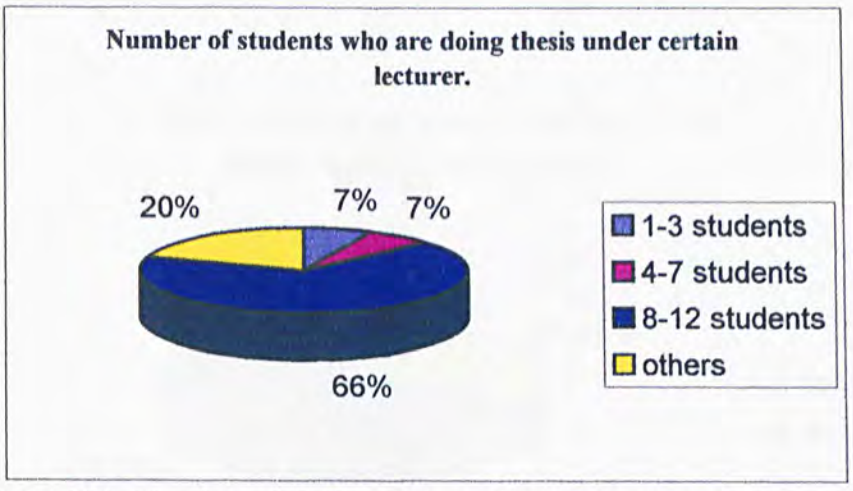

Figure 2.6.2.2(b): Number of students who are doing thesis under certain lecturer

The above pie chart shows us number of students who are doing thesis under certain lecturer. From the pie chart we can see clearly that 66% of the lecturer have 8-12 students under their supervision. This is probably due to large number of students who are taking their thesis this semester, so each one of them need a lecturer to supervise them. 7% of the lecturer's have 1-3 students under their supervision. 20% of the lecturer's have more than 13 students under their supervision. Balance 7% of the lecturer has 4-7 students under their supervision.

2.6.2.3: Statistical results on lecturers' satisfactory level regarding current Thesis Management System.

Table 2.6.2.3(a): Statistical results on lecturers' satisfactory level regarding current Thesis Management System.

Are you happy with the current Thesis Management System?	Number (x/15)	Percentage (%)
Yes	5	33.33
No	10	66.67

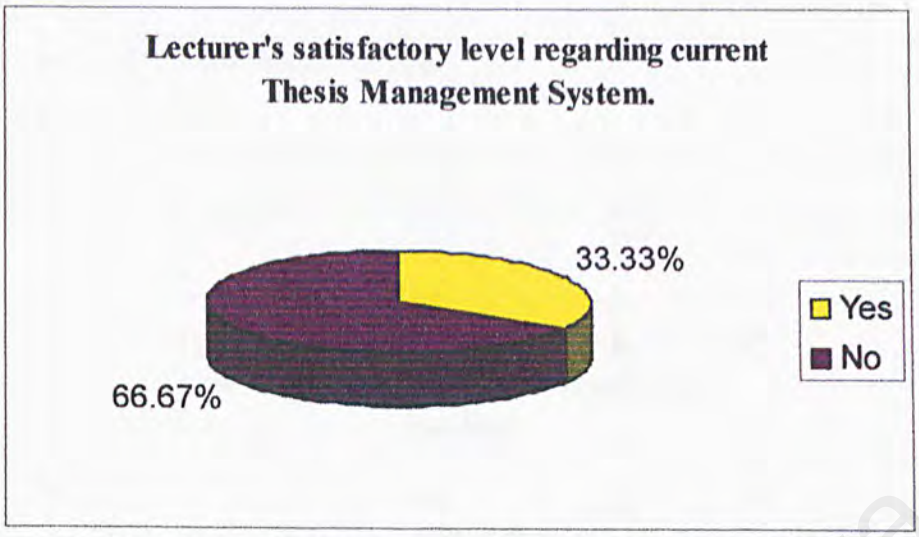

Figure 2.6.2.3(a): Lecturer's satisfactory level regarding current Thesis Management System

The above graph shows lecturer's satisfactory level regarding current Thesis Management System. From the graph we can see that 33.33% of the lecturer are satisfied with the current existing system but 66.67% of the lecturer are not satisfied with the current existing system. The possible reason why 66.67% of the lecturer's are not happy with the currents existing system is because the face quiet a number of problems such as too many students come looking for them, when they are not in the room.

2.6.2.4: Statistical results on types of problem faced by lecturers.

Table 2.6.2.4(a): Statistical results types of problem faced by lecturers

Why are you not happy with the current system?	Number (x/25)	Percentage (%)
You do not have enough title for all the students	4	16
Too many students come looking for you	5	20

Many students propose you for their own title	7	28
You are not in the room when students look for you	8	32
Others	1	4

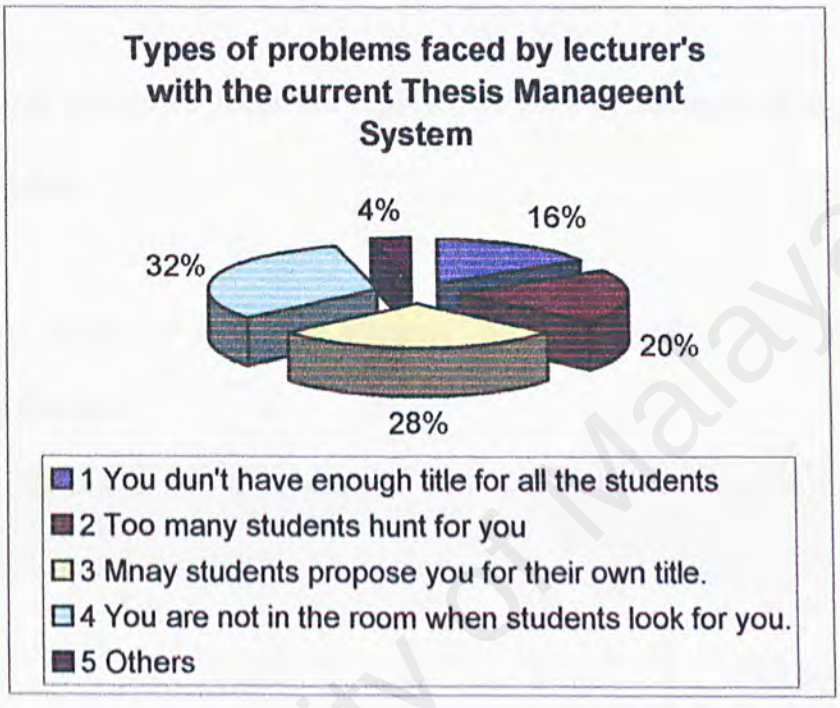

Figure 2.6.2.4(b): Types of problems faced by lecturers with the current Thesis Management System

The graph in the previous page shows types of problems faced by lecturers with the current Thesis Management System. The most frequent problem faced by lecturers with the current system are lecturer's are not in the room when the students look for them. This is because it contributes 32%. The second highest problem faced by lecturer's are many students propose their own title.28% of the students propose their own title to the lecturer. This is probably due to students who are not interested with the titles offered by the lecturers. 20% of the lecturers say that too many students come hunting for them. Due

to that the lecturers don't have enough title to offer the students. 16% of the lecturer doesn't have enough title for all the students who come and propose them. This is possibly due to all the titles, which are offered by the lecturer, have been taken by other students. Balance 4% of the lecturer face some other problems such as some students who have registered to do their thesis have also registered under some other lecturer.

2.6.2.5: Statistical results on lecturers' opinion regarding students choosing thesis titles straight online.

Table 2.6.2.5(a): Statistical results on lecturers' opinion regarding students choosing thesis titles straight online.

Would you prefer if a system were build so students can choose thesis title straight online?	Number (x/15)	Percentage (%)
Yes	11	73.33
No	4	26.67

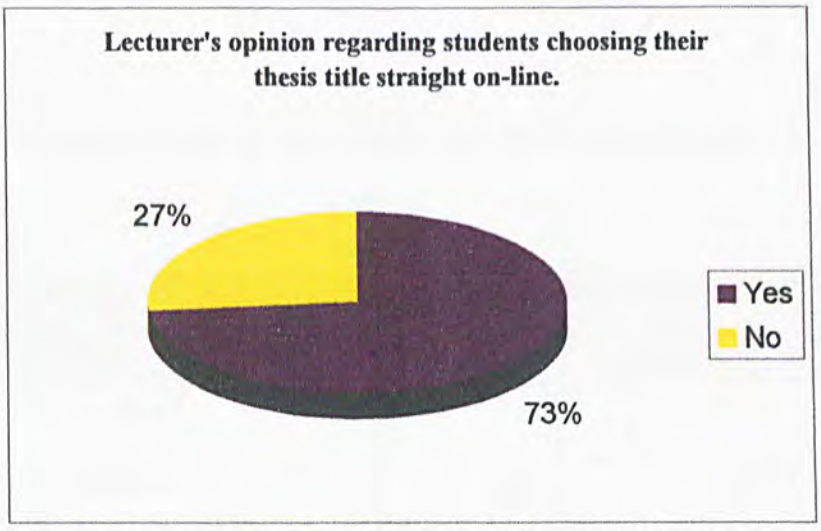

Figure 2.6.2.5(b): Lecturer's opinion regarding students choosing thesis title straight online .

The above pie chart tells us lecturer's opinion regarding students choosing the proposed title or sending their own thesis title straight on-line. From the pie chart we can see that 73% of the lecturer's agrees if the students send their thesis title straight on-line. The probable reason why lecturers agree for students to send in their thesis title through on-line is because the lecturers can over come the problem faced by them. 27% of the lectures don't agree if the students send in the thesis title on-line. This is possibly because the lecturers are scared that student's own proposed title might be out of scope.

2.6.2.6: Statistical results on how many students should a lecturer have under their supervision.

Table 2.6.2.6(a): Statistical results on how many students should a lecturer have under their supervision.

In your opinion how many students should a lecturer have under their supervision?	Number (x/15)	Percentage (%)
1-3 students	1	7
4-7 students	10	66.67
8-12 students	3	20
Others	1	6.67

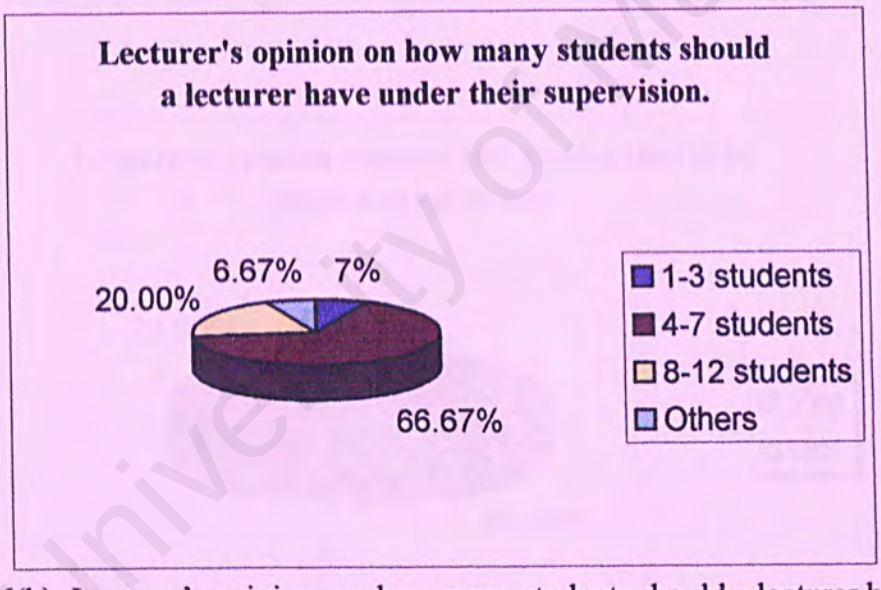

Figure 2.6.2.6(b): Lecturer's opinions on how many students should a lecturer have under their supervision.

The above graph shows lecturer's opinions on how many students should a lecturer have under their supervision. 66.67% of the lecturer's think that one lecturer should have 4-7 students under their supervision. This is because with the current existing system lecturers have almost 8-12 students under them. Due to that, the lecturer can pay full attention on al the students. 20% of the lecturers think that each lecturer should have 8-12

students under their supervision. 7% of the lecturer thinks that each lecturer should have 1-3 students under their supervision.

2.6.2.7: Statistical results on lecturers' opinion on implementing Thesis Management System.

Table 2.6.2.7(a): Statistical results on students' opinion on implementing Thesis Management.

In your opinion do you think this kind of system should be implemented?	Number (x/15)	Percentage (%)
Yes	12	80
No	3	20

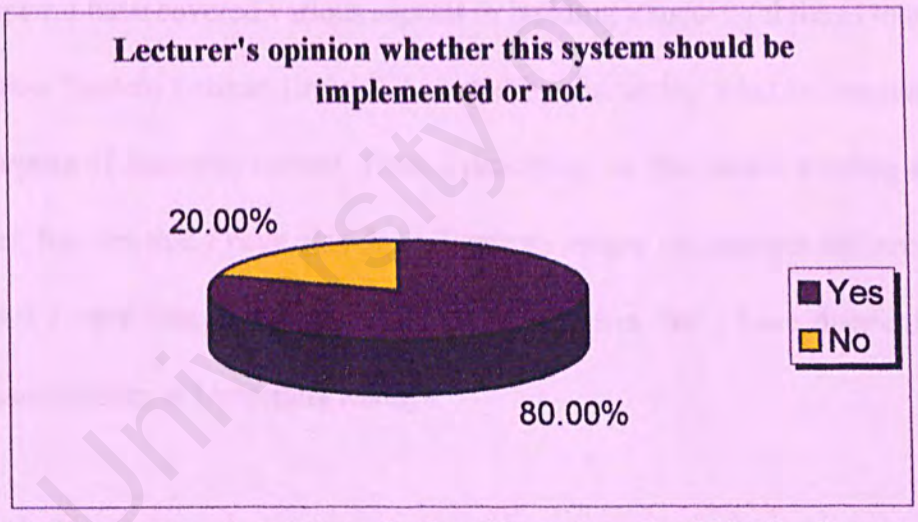

Figure 2.6.2.7(b): Lecturer's opinion whether this system should be implemented or not.

The above graph shows the lecturer's opinion whether this system should be implemented or not. From the above graph we can see that 80.00% of the lecturers wants Thesis Management System to be implemented. This is because by implementing this system, it

will get to reduce problems that are being faced by the lecturers during thesis title choosing session. Besides reducing problems this system will get to create an effective communication between students and lecturers. Balance 20.00% of the lecturers thinks that this system should not be implemented.

2.7 Conclusion

Literature review is very important in developing a system. By doing literature review, one would know the problems faced by other systems and how they have implemented their systems to meet customers' needs. Thus, the developer would be prepared to face the problems and this would give a chance to develop a system that has overcome all the problems as discussed above.

In this chapter, I have covered various aspects in building a successful thesis management system called "Sistem Latihan Ilmiah". I started by discussing what is literature review and the purpose of literature review. Then, I proceeded to the current existing system on the Internet. Besides that I have also done literature review on journals and articles. Last but not least I have also done analysis on questionnaires that I have distributed to the lecturers and students of University Malaya.

CHAPTER 3
METHODOLOGY

CHAPTER 3

METHODOLOGY

3.1 Software Process Model.

There are many models in software engineering literature, which can be categorized as follows [4]:

1. Prescriptions
    - The way the software development should progress
2. Descriptions
    - The way the software development is done in activity.

3.1.1 Types of Development Methodology

Every process models include system requirements as input and delivers product as an output. Many process models have been proposed over the years by the software developers worldwide. Among the most popular process models are as follows [4].

i. Waterfall model
ii. V model
iii. Prototyping model
iv. Operational specification
v. Transformational model
vi. Phased development model
vii. Spiral model

3.2 Models considered for this system

Among all the existing models, only 3 models are considered suitable to describe and represent this system. The models are:

3.2.1 Waterfall model

3.2.2 V model

3.2.3 Prototyping

3.2.1 Waterfall model

The waterfall model is one of the first process models to be introduced to software developers worldwide. As seen in figure 3.1, the stages in the model are depicted as cascading from one to another. The main features of this model are that one development stage should be completed before the next stage begins. The waterfall model presents a very high level view of what goes on during development [4].

The waterfall model has the following advantages:

(i) The model has well defined phases with well-defined inputs.

(ii) It recognizes the sequences of software engineering activities that shall result in a software product.

The main disadvantages of this model are:

(i) Real projects rarely follow the sequential flow that the model proposes.

(ii) The model assumes that requirements are clearly specified at the beginning of the project. The model has no mechanism to handle changes to the

requirements that are identified because of design and construction activities or user feedback.

(iii) The model reduces the users' involvement between design and testing phase of the project. This creates a gap and reduces users' felling of 'ownership' as the model provides no forum for active participation from the users during the intermediate phase of the life cycle.

(iv) For large projects, the users have to wait a long time for the delivery of the system. A working version of the program(s) will not be available until late in the project time span. Requirements may change and system may even become redundant by the time they are delivered.

(v) The assumption that all requirements have to be known at the beginning in sufficient details lead to premature decisions. Because it is difficult to estimate resources accurately when only limited information is available. It is often difficult for the user/customer to state all the requirements explicitly. This model requires this and difficult to accommodate the natural uncertainty that exist at the beginning of any project.

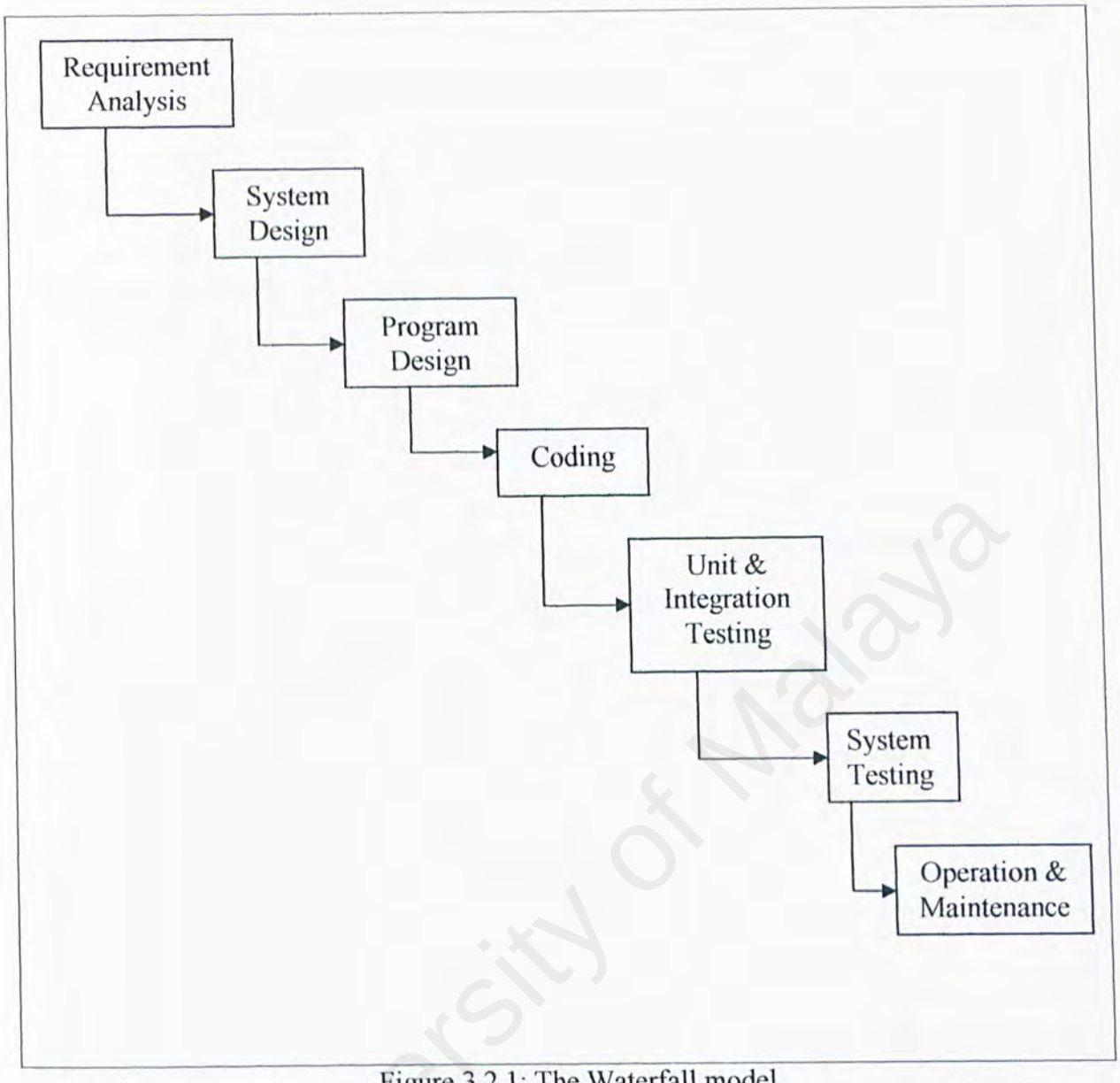

Figure 3.2.1: The Waterfall model.

3.2.2 V-model

The waterfall model tends to view testing as a single phase in its life cycle. The V-model attempts to give increased importance to testing related activities by dividing the life cycle into 'development' and 'testing' phases. The model relates each development phase to its associated testing phase. Then in this model, work on testing phase is carried out in parallel. For example, acceptance test planning activities of the acceptance-testing phase

may be carried out along with the requirement phase. Similarly, system test planning activities of the system-testing phase need not wait for unit testing to be completed.

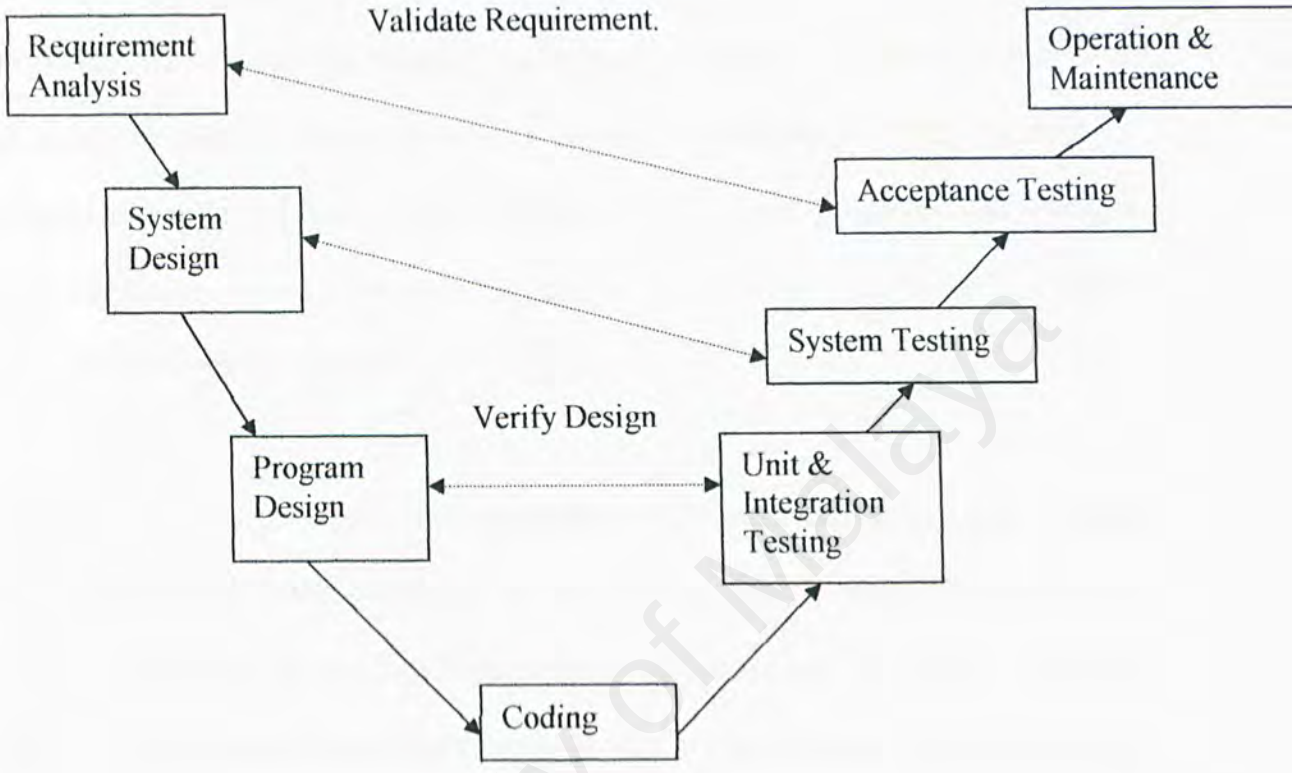

Figure 3.2.2: The V model.

The V-model has the following advantages:

i. In v-model the testing activities are explicitly emphasized.

ii. The V-model also links the testing activities with the corresponding specification activities and encourages the preparation of test plans early in the life cycle.

The V-model has the following disadvantages:

i. Extensive testing may not always be cost-effective

3.2.3 Prototyping Model

It is recognized that defining requirements in many situations is particularly tricky. In such situations, detection of the missing or incorrect requirements at the later stage is extremely expensive in terms of delays in delivery. It is also recognized that software project often takes a long time and that requests change over time. In such situation prototype model is more suitable.

The prototype paradigm begins with requirements gathering. Developers and customer meet and define the overall objectives for the software, identify whatever requirements are known and outline areas where further definition is mandatory. A 'quick design' then occurs. The quick design focuses on a representation of those aspects of the software that will be visible to the customer/user (example: input approach and output format). The quick design leads to the construction of a prototype. The prototype is evaluated by the customer / user and used to refine requirements for the software to be developed. Iteration occurs as the prototype is tuned to satisfy the needs of the customer, while at the same time enabling the developer to better understand what needs to be done.

The prototype model has certain advantages and particularly use where:

i. Users are unable to specify their requests or have no previous knowledge or experience of computers and therefore are unable to envisage the feature they need.

ii. The proposed system is expected to have considerable user interface.

iii. The development environment supports the quick creation of prototype.

iv. The proposed system has a complex algorithm or outputs that need to be redefined.

v. Improved communication between the developers and the end users.

The prototype model however has some disadvantages:

i. Users, on seeing a working prototype, often start expecting the actual system to be ready very soon after.

ii. Where prototype is not representative enough, users can get disappointed with the prototype and lose interest in the system being developed.

iii. Prototypes are made in a hurry, often without evaluating all options or understanding the full implication of the technical choices made.

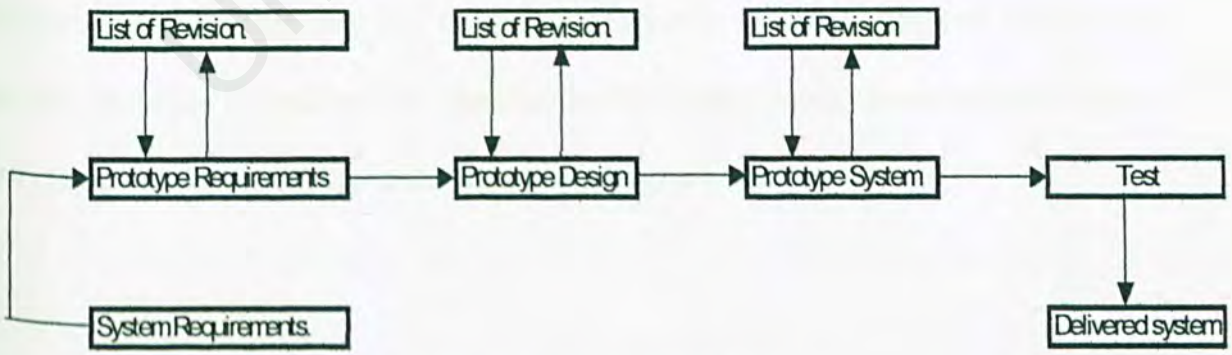

Figure 3.2.3: Prototyping model

3.3 Model chosen for this system.

3.3.1 V model.

The V model was chosen for this system because the model has the following benefits.

i. Testing activities are related to analysis and design, which will smoother the development process.

ii. The model is separated into 2 sections. The first section is the analysis and design section, which is situated on the left side of the model. The second section is the testing and maintenance section, which is situated on the right side of the model. This two section will be helpful to keep track on the system's development.

iii. Re-executed capabilities, if problems encountered during verification and validation helps to solve problems very efficiently.

iv. Acceptance testing and validating the requirement, which is conducted by the customer, leads to a better user-friendly system.

3.3.2. Validation and verification.

Validation ensures that the system has implemented all of the requirements so that each systems function can be traced back to a particular requirement in the specification. Verification ensures that each functions works correctly. In short validation makes sure that the developer is building the right product according to the specification whereas verification checks the quality of the implementation [6].

3.4 Method used to find information

There are many type of methods can be used to find information. The methods are:

i. Internet

ii. Journals

iii. Books

iv. Questionnaire

v. Observation

vi. Interview

vii. Other project paper

3.4.1 Method of finding information used for this system.

Although they have many methods to get information, but only few options which response to the need of the system. They are as said below:

3.4.1.1 Internet Surfing

3.4.1.2 Questionnaires

3.4.1.3 Interviews

3.4.1.4 Journals.

3.4.1.1 Internet Surfing.

Internet surfing is considered as a good method and choice of fast finding for desired information. A lot of information can be obtained from the Internet to fulfill the need in this project. Analyzing the existing online system has made a big help in giving ideas on the features, functionalities as well as the design of the web based Thesis Management System.

3.4.1.2 Questionnaires

This is a technique whereby information is collected from individuals through questionnaires. To get feedback from the students and lecturers regarding the problems they are facing related to thesis, questionnaires were given to students and lecturers in Faculty Of Computer Science and Information Technology, University Malaya.

3.4.1.3 Interview

This is a fact-finding technique whereby information is collected from individuals through face-to-face interaction. In order for me to get more information regarding this system, I have interviewed a few of my friends from other university and college.

3.4.1.4 Journals

Besides gathering information using the Internet, I have used the journals to gather information related to this system. The journals, which were used in order to gather information for this system, are listed in the reference.

3.5 Software And Technologies

3.5.1 Operating System

3.5.1.1 Microsoft Windows 98

Microsoft Windows 98 is one of the Microsoft products. It was considered as a cheap alternative to serve as the developments platform for the proposed Thesis Title Management System. It is perfectly capable of administering a small site but

unfortunately it is unable to handle high loads due to the unavailability of certain features like load balancing which is available in Windows NT [13].

It is able to serve web pages due to the inclusion of Personal Web Server on the Windows 98 CD. Installation of this utility would enable Windows 98 to function as a web server for small networks thus no need to pay for the higher fee that is required to run a copy of Windows NT Server on a machine. Windows 98 has a better File Allocation Table format called FAT32.

Windows 98 also supports a wide range of hardware and peripherals. In this case this features is not a useful one as Windows 98 sacrifices its stability by supporting all kinds of peripherals in the market.

3.5.1.2 Microsoft Windows 2000 Professional

Microsoft Windows 2000 Professional is built on Windows NT technology and easy to use, familiar with Windows 98 user interface. Windows 2000 Professional makes business users more productive.

Its integrated web capabilities and broad support for mobile computer and hardware devices makes it the easy way for business users to connect to the Internet anywhere and anytime.

The combined features of Windows 200 Professional create the mainstream operating system for desktop and notebook computing in all organization. It has the best business features of Windows 98 Plug and Play, easy-to-use interface and power management. Besides that Windows 2000 Professional inherit the strengths of Windows NT standards –based security, manageability and reliability whether deploy Windows 2000 Professional on a single computer or via a worldwide network. Windows 2000 Professional increases the computing power while lowering the total cost of desktop ownership.

The advantages of Windows 2000 Professional are:

i. **Windows file protection**

Protects core system files from being overwritten by application installs. In the event a file is overwritten. Windows File Protection will replace that file with the correct version.

ii. **Driver Certification.**

Provides safeguards to assure that device drivers have not been tampered with and reducing the risk of installing non- certified drivers.

iii. **Full 32-bit Operating System.**

Minimizes the chance of application failures ad unplanned reboots.

iv. Microsoft Installer

Works with the windows Installer service, helping users install, configure track, upgrade and remove software programs correctly, minimizing the risk of user error and possible loss of productivity.

v. Windows Logo Program

Provides assurance that applications have met a comprehensive set of standards developed by Microsoft in cooperation with customers and third party developers.

vi. Dramatically reduced reboot scenarios.

Eliminates most scenarios that forced you to reboot in Windows NT 4.0 and Windows 9x. Many software installations also will not require reboots.

3.5.1.3 Windows NT Server 4.0

Windows NT Server 4.0 is a Microsoft Windows personal computer operating system designed for users and businesses needing advanced capability. NT's technology is the base for the Microsoft successor operating system, Windows 2000. The Windows NT Server 4.0 is designed for business machines that need to provide services for network - attached computers. It is required, together with an Internet server such as Microsoft's Internet Information Server (IIS), for a Windows system that plans to serve web pages.

3.5.1.4 LINUX

LINUX is a free; UNIX work- alike designed for Intel processors on PC architecture machines. LINUX is not UNIX, as UNIX is a copyrighted piece of software that demands license fees when any part of its source code is used. LINUX was written from scratch to avoid license fees entirely, although the operation of the LINUX operating system is based entirely on UNIX and it shares UNIX's command set.

LINUX supports a wide range of software from TEX (a text formatting language) to X (a graphical user interface) to the GNU C/C ++ compilers to TCP/IP networking. It is well suited to function as a development environment for web applications. Its superior stability is a feature that cannot be beaten even by Windows. LINUX is capable of running 24 hours 7 days a week without system failures and crashes. Memory management is dynamics and used memory is released after particular applications ends unlike Windows.

In addition LINUX has the following features:

i. It is capable of multitasking

ii. Has support for network clients and servers

iii. Includes a LAN manager /windows Native (SMB) client and server.

iv. It is multi-platform - it can run on any processor.

v. It supports many networking protocols.

LINUX only weakness is a lack of support for hardware that makes it a little difficult to setup a machine with LINUX. Fortunately support for LINUX is growing every single day and more peripherals are being added to LINUX's list of supported hardware.

3.5.2 Web Server

3.5.2.1 Microsoft Internet Information Server (IIS)

As the Internet becomes more woven into mainstream businesses, so grows the need to have web services interwoven with mainstream business computing. Internet Information Server 5.0 (IIS 5.0) runs as an enterprise service within Windows 2000. This version improves the web server's reliability, performance, management, security and application services. With Internet Information Server 4.0 (IIS 4.0), Microsoft focused on security, administration, programmability and support for Internet Standards. Internet Information Server 5.0 (IIS 5.0) builds on the features and capabilities needed to deliver web sites required in an increasingly Internet-centric business environment and it makes it even easier to use the technologies given in earlier versions. In particular Internet Information Server 5.0 (IIS 5.0) features improvements in the following four major areas :-

i. Reliability and Performance

A number of features make Internet Information Server (IIS) more reliable and better performing. To make it faster and easier to restart, Internet Information Server 5.0 (IIS 5.0) allows the administrator to restart web services without rebooting the computer. To improve reliability, Application Protection provides the ability to run applications in a pool, separate from the web services. The new CPU Trotting and Socket Pooling features

in Internet Information Server 5.0 (IIS 5.0) can also improve reliability. For application developers, web site performance can be improved through new features such as script less Microsoft Active Server Pages (ASP) processing, ASP self-tuning and performance enhanced ASP objects.

ii. Management

Internet Information Server 5.0 (IIS 5.0) is easier to install and maintain. A number of features support this increased ease-of-maintenance, including a simplified installation process, new security task wizards, the ability to account for time used by process, more flexible remote administration and the ability to create custom error message.

iii. Security

Internet Information Server (IIS 5.0) adds support for important industry-standard security protocols, including Digest Authentication, Server Gated Cryptography, Karberos V5 authentication protocol, Transport Layer Security and Fortezza. In addition, three new task wizards make it easier for administrator to manage a site's security setting.

iv. Application Environment

Developers will find that Internet Information Server 5.0 (IIS 5.0) expands the web server's application development environment by building on new technologies included in Windows 2000.These include Active Directory and the expanded Component Object Model (COM+). In addition, enhancements to Internet Information Server (IIS) Active

Server Pages such as script less ASP processing, as well as improved flow control and error handling, let developers write more efficient web-centric applications.

3.5.2.2 Apache.

Apache is UNIX web server and available free of charge. It also can run in Windows NT. Apache can be obtained from the Internet. All the core and module source code can be obtained and modified to suit developer's needs. Hosting multiple IP addresses on an Apache server is done with little configuration [18].

There are many good features in Apache. Apache supports.

i. **Dynamic Shared Object (DSO) support.**

Apache modules may now be loaded at runtime, this means that modules can be loaded into the server process space only when necessary, thus overall memory usage by Apache will be significantly reduced.

ii. **Support for Net ware 5.X**

Apache now experimentally supports the Netware 5.X operating systems.

iii. **Supports for Windows NT/95.**

Apache supports the Windows 95, 98, ME, Windows NT, Windows 2000 operating systems.

iv. **Reliable Piped Logs.**

3.5.2.3 Netscape Enterprise Server (NES)

Netscape Web Server produces it. It supports Oracle, Informix and Java. Netscape Enterprise Server is also used to convert .pdf File to HTML. Netscape Enterprise Server can run either in UNIX or Windows NT Server. It has a direct link to a DBMS and automatically directory tree.

This server allows users to serve several different web sites using the same server on the same machine. It uses the standard NCSA log format and has a built in image maps (NCSA) and supports the Windows CGI interface.

This web server has full –text search features such as automatic index updates, allowing immediate search access to newly changed data and searched by content or by document attributes such as author, title and modification date.

Besides Enterprise Server also supports stored procedures, multiple database connection and persistent transactions. This commercial server is one of the most expensive server available today.

The following are the comparison features of IIS vs. Netscape Enterprise Server vs. Apache.

Table 3.6.2.3: Comparison between IIS 50, Netscape Enterprise Server 3.01 and Apache.

Features	IIS 5.0	Netscape Enterprise Server 3.01	Apache
Platform available on	Windows NT	Digital UNIX, AIX, HPUX, Windows NT and IRIX.	Net BSD, Digital UNIX, BSDI, AIX, Windows NT, 95, LINUX, IRIX, Free BSD.
Setup and Administration	Simple setup procedures and integrated management tools.	Setup more difficult, has strengths in terms on administration of the server.	Setup more difficult and has a poor administration tools.
Authentification and security	Very strong authentification and strong security features	No certification support	No certification support.
Logging	Extended logging facilities. Able to logging into my ODBC database.	Have a number of logging facilities. Unable to logging into my ODBC database.	Have a number of same facilities with Netscape Enterprise Sever 3.01. Able to logging into my ODBC database
Content Management	Content management can be doe graphically with Windows NT file management systems	Have some strong features	Poor features.
Internet services support	Http 1.1 Compliant able to access HTTP Host Header sites	HTTP 1.1Compliant. Require add on for	HTTP 1.1 Compliant.

	using any browser. Integrated SMTP support, Integrated NNTP support.	SMTP AND nntp support	

3.5.3 Web Browser.

There are a large number of browsers available to the general public. Some are free and some are not free. However these web browsers can be downloaded for free from dozens of sites on the Internet. The most common browsers used by the general public are Internet Explorer and Netscape Navigator.

The similarities between Internet Explorer and Netscape Navigator are, both of them are flexible tool bars, has complete history and management list. Furthermore they have control over security, HTML –aware e-mail clients, web page editors support Dynamic HTML (DHTML), automatic URL completion and updates.

3.5.3.1 Microsoft Internet Explorer

Microsoft Internet Explorer 5.5 (or commonly known as IE 5.5) has been called the Cadillac of Browsers and is now capturing over 70 percent of the market. The Outlook Express comes with Microsoft's instant messaging tool, MSN Messenger that enables communications with friends anywhere and anytime via the Internet, while a click on the toolbar opens up FrontPage Express. FrontPage Express makes creating web sites a breeze with its WYSIWYG feature. The additional support of dynamic HTML and cascading style sheet allows developers to add in more animation and interactive

creations. Web designers are also able to apply style sheets to the whole site with just a few lines of codes.

3.5.3.2 Netscape Navigator

Netscape Navigator is the other web browser that is considered as the most popular browser. Netscape Navigator is a product by Netscape Communications, now owned by America Online. Currently, almost all Internet users use either Netscape's browser or Microsoft's Internet Explorer browser and many users use both. Although Netscape Navigator was the first initial predominant product in terms of usability and number of users, Microsoft's browser quickly gained its momentum and is now considered the more superior product in terms of usability and number of users. Hence, its now taking a shift lead in usage.

Netscape's browser is called Navigator and is packaged in suite of software called Communicator. Netscape was developed in 1995 by a team led by Mare Andreessen who created graphical user interface, at the University of Illinois's National Center for Supercomputing Applications (NCSA) in 1993.

With consideration to scripting languages, it is important to take note that Netscape Navigator supports JavaScript but it does not support VBScript, which is the scripting language developed by its main browser rival, Microsoft Corporation.

3.5.3.3 Comparison Between Microsoft Internet Explorer and Netscape Navigator.

The following are the comparison between Internet Explorer and Netscape Navigator:

Internet Explorer.

i. Completely integrated into desktop.

ii. Internet related tasks are meshed into the short menu and Microsoft applications.

iii. Preferences are aplenty, but not as customizable as Navigator.

iv. Desktop wallpapers have turned into "active desktop" that can host miniature web pages.

v. HTML authoring is done via separate software package (Front Page) so necessary to buy and learn another interface.

vi. Ability to choose which e-mail and news editor /reader to use.

vii. Relatively stable.

Netscape Navigator.

i. Java based terminal emulator.

ii. Transformed from a simple viewing tool to the client side of an enterprise –wide, cross- platform architecture for exchanging into both within a company and outside.

iii. Communicator pro includes a group – calendar application

iv. HTML authoring is done via a integrated tool in communicator (composer) so no need to buy and learn another interface.

v. Preferences for customization are much more advance from choosing font size and type to cache size.

vi. Uninstall features is simple and thorough.

vii. Very stable.

They are both very good browser. The major differences are, Internet Explorer has many compatibility issues with Java, Java Script and HTML, while Netscape Navigator tries to stay current with the industry standards in most cases.

3.5.4 Database Management System.

3.5.4.1 Microsoft SQL Server 7.0

Microsoft SQL Server (MS SQL) is a database management system developed by Microsoft Corporation. It is a client server relationship system (RDBMS) that is highly integrated with the NT operating system. By using MS SQL Server, modern applications can be developed by separating the client application and the database services. SQL Server Transact-SQL, supports the ANSI SQL-92 Standard and provide extension to the SQL language.

Microsoft SQL Server supports a set of features that result in the following benefits: -

- Ease of installation or deployment and use.
- MS SQL Server includes a set of administrative and development tools that improve the ability to install manage and use the MS SQL Server across several sites.

- Scalability.
- The same database engine can be used across platform ranging from laptop computer to large, multiprocessor servers running MS Windows NT Edition and Windows 2000.
- Data warehousing
- MS SQL Server includes tools for extracting and analyzing summary data for online analytical processing (OLAP). MS SQL also includes tools for visually designing databases and analyzing data using English based questions.
- System integrations with other server software.
- SQL Server integrates with e-mail, the Internet and Windows.

MS SQL Server 7.0 runs on the NT 4.0 or Windows 2000. SQL Server 7.0. Enterprise Edition builds on the established strengths and broad functionality of SQL Server, extending its already extensive scalability, interpretability, availability and manageability. Enterprise Edition provides the means for building and deploying large scale distributed applications, making it the best platform for the largest and most mission-crucial support and can expand to use to 3GB of memory. SQL Server 7.0 Enterprise Edition runs on Windows NT 4.0 Enterprise or Windows 2000 Advance Server.

With the vest of breed data warehousing solutions, SQL Server includes OLAP Services, Data Transmission Services and English Query and works with over 45 independent software vendors (ISV) that form the Data Warehousing Alliances. MS SQL Server is

also the first database to scale from the laptop to the enterprise using the same code base, offering code compatibility.

3.5.4.2 Microsoft Access 2000

Microsoft Access 2000 is a database platform, which makes it possible to develop database-integrated ASP web sites. Because all the information in an Access database is contained in a single file, it is easy to upload or download the entire database over FTP or the web [5].

Access allows the user to link together data stored in more than one file. It stores information in an easily retrievable form. It can store information such as text, numbers, dates, currency, pictures, and sounds. As well as being able to store data, it allows information to be selected easily and quickly. The summaries of the information selected can also be printed.

These are the important things that should be considered when setting up a database:

i. Type of information that needs to be stored
ii. Type of information that needs to be retrieved
iii. Who the data is intended for and how other users will use it
iv. Whether certain parts of the data is restricted to certain users only
v. Who is allowed to change or add data
vi. If the data refers to actual people, it may need to be registered under the Data Protection Act

Advantages of Microsoft Access are:

i. **Integration with other software.**

Microsoft Access is closely integrated with the other members of the office suite of business software. As far as accounting software is concerned, the link with the suite's spreadsheet program, Excel is useful.

ii. **Microsoft Access is fully networkable.**

Microsoft Access is designed for both stand-alone and multi- user application. The program is fully networkable.

iii. **Microsoft Access is Y2K compliant.**

As might be expected, both Microsoft Access 97 and Microsoft Access 2000 are fully year 2000 compliant.

The following are the Microsoft Access 2000 characteristics:

Table 3.6.4.2: Microsoft Access 2000 characteristics.

Object	Maximum sizes/ numbers
Database size	1Gb
Number of characters in an object name	64
Number of characters in a user name or group name	20
Number of characters in a password	14
Number of concurrent users	255
Number of characters in a table name	64
Number of characters in field name	64
Number of fields in a table	255
Number of characters in a text field	255
Number of characters in a memo field	65,535 /1Gb

Though the maximum database is 1Gb, the database can include linked tables in other fields and its total size is limited by available storage capacity. Number of characters in a memo field can be up to 65,535 characters when entering data through he user interface or can be up to 1Gb when entering data programmatically. Access 2000 can lock on the row level in comparison with Access 97 page level's lock [7].

3.5.5 Web Application Programming Technology (Client Side)

3.5.5.1 Hypertext Markup Language (HTML)

Hyper Text Mark-up Language or HTML in short is the language used to specify the construction of Web pages. Web pages are a form of hypertext that includes text, graphics and links to other HTML documents.

Web pages are stored as standard ASCII (American Standard Code for Information Interchange) files. Web pages may be viewed by a variety of different web browsing tools, each of which may have different abilities. However, since web pages are text files, each web browser can read it and format the document in accordance with its abilities.

HTML is a standard, which enables you to request a web browser to format and display your web page in a particular way. HTML allows you to mark areas of your document that would become titles, new paragraphs, italic text and much more. Since the web page is specified as an ASCII file, the codes or elements, as they are known, have also got to be in ASCII format.

The elements can broadly be divided into two main categories, that is those that describe the format of the web document, for example, what it looks like, and those that define information about the document, for example, its title.

3.5.5.2 VBScript

When the World Wide Web first became popular, HTML was the only language programmers could use to create Web pages. They soon learned that HTML was quite limited in what it could do. It presented the user with a "page" of information, but the web page and the user had a limited amount of interaction; it was like reading the front page of a newspaper on a computer monitor. Now most computer users, whether they use Windows, Macintosh, UNIX, or a combination of the three, are accustomed to graphical applications that provide interaction. They are used to clicking buttons, entering values into text boxes, and choosing from menus. The only way to get useful work done with a computer is to interact with it. The first generation of web pages provided information to the users, but the users could not interact with the web the way they could with their word processors. The interaction available to them required that they send the data to the server, where all the "smarts" were provided. The results were then sent back to the web page. This interaction required a great deal of extra time, effort, and overhead, and the interface presented to the user was very constrained compared to the applications they were accustomed to using.

Fortunately, the builders of the Internet and the World Wide Web could see these limitations. They soon realized that if the user were denied the capability to interact with

the web page, it would become little more than a collection of information, much like a library of books. Although that collection is very useful, users demand more from their computers than what they could get elsewhere.

These demands have resulted in a continued improvement of HTML, the emergence of browsers such as Internet Explorer that tap into the power of HTML, and the advent of scripting languages such as VBScript. VBScript lets the user interact with a web page rather than simply view it. There are many possible scenarios for this interaction. For instance, this capability to interact makes it possible for web pages to ask questions and respond to how the user answers them. VBScript can then take input from the user and check the data to make sure it is valid or meets certain criteria. Then, it can put an Internet server to work either by actually storing the data or causing some action to take place on the server based on the information given.

VBScript can also perform calculations on data, such as computing the cost of an item after taking into account the sales tax. Often, calculations on a web page are useful in providing the user a way of figuring out what he or she wants to do, or perhaps giving the user some sort of result he or she is seeking. In this way, the web page enables the user to walk away with more than a mere presentation of fixed information.

By utilizing other technologies such as CGI, VBScript code can even initiate order placement for an item in the computer of a company that is selling the item. If the script

determines all criteria for a valid order are met, it can place the order. Otherwise, it can generate an error message.

3.5.5.3 JavaScript

JavaScript is a general-purpose programming language designed to let programmers of all skill levels control the behavior of software objects. The language is used most widely today in web browsers whose software objects tend to represent a variety of HTML elements in a document and the document itself. But the language can be and is used with other kinds of objects in other environments. For example, Adobe Acrobat Forms uses JavaScript as its underlying scripting language to glue together objects that are unique to the forms generated by Adobe Acrobat. Therefore, it is important to distinguish JavaScript, the language, from the objects it can communicate with in any particular environment. When used for web documents, the scripts go directly inside the HTML documents and are downloaded to the browser with the rest of the HTML tags and content.

3.5.5.3.1 How is JavaScript different from Java?

JavaScript was developed by Brendan Eich of Netscape where else Java was developed at Sun Microsystems. While the two languages share some common syntax, they were developed independently of each other and for different audiences. Java is a full-fledged programming language tailored for network computing. It includes hundreds of its own objects, including objects for creating user interfaces that appear in Java applets in web browsers or standalone Java applications. In contrast, JavaScript relies on whatever

environment it is operating in for the user interface, such as a web document's form elements.

JavaScript was initially called Live Script at Netscape while it was under development. A licensing deal between Netscape and Sun at the last minute let Netscape plug the "Java" name into the name of its scripting language. Programmers use entirely different tools for Java and JavaScript. It is also not uncommon for a programmer of one language to be ignorant of the other. The two languages don't rely on each other and are intended for different purposes. In some ways, the "Java" name on JavaScript has confused the world's understanding of the differences between the two. On the other hand, JavaScript is much easier to learn than Java and can offer a gentle introduction for newcomers who want to graduate to Java and the kinds of applications you can develop with it.

3.5.6 Web Application Programming Technology (Server Side)

3.5.6.1 Personal Home Page (PHP)

PHP is a script language and interpreted in web programming, which is similar to JavaScript and Microsoft's VBScript. PHP got its initials from the earliest version of the program that is called Personal Home Page. It is actually a cross platform alternative of Microsoft's ASP technology. Just like ASP, the former is also embedded within a web page along with its HTML. That is how it basically works. Beginning with the user's request, the server will call PHP to interpret and perform operations called for by the PHP script, before the page is finally sent to the user. Since content will vary based on the results of interpreting the script, PHP can be thought as "dynamic" HTML pages.

3.5.6.2 Common Gateway Interface (CGI)

Common Gateway Interface (CGI) is a standard way for sending and receiving a user's request between application programs. Whenever there is a request for a web page, the server will be responsible for sending back the requested page. However, in cases where fill-in-forms are used, a small application program will be needed to process the data and then send back a confirmation message if needed. This convention of passing data to and fro between the server and the application is none other than the Common Gateway Interface (CGI).

CGI is the answer to a consistent way of passing the user's request between the application program and the user. Thus, the person writing the application program can be ensured that his or her program gets used no matter which operating system the server uses. And because the interface is consistent, a programmer can have the choice of writing CGI applications in different languages. However, the more popular languages chosen are C, C++, Java and PERL.

3.5.6.3 Active Server Pages (ASP)

Microsoft Active Server Pages (ASP) is the server-side execution environment in Microsoft Internet Information Server (IIS) 3.0 that enables you to run ActiveX scripts and ActiveX server components on the server. By combining the scripts and components, developers can create dynamic content and powerful web-based applications easily [14].

Web pages that are customized for each user on the fly, based upon their actions or requests. For example, new visitors to your site can be shown a different welcome page than returning users see, or pages in an online catalog can be queries to a database so customers always see the most current information and availability.

Organizations will use the Active Server Pages technology to put a web front end on existing business solutions, or to create entirely new web-based applications. Since ASP provides a very open development environment, with support for Microsoft Visual Basic, Scripting Edition (VBScript) and Jscript, organizations can leverage the investments they already have in these scripting languages [14].

3.5.6.3 Java Server Pages (JSP)

Java Server Pages is a technology that allows us to combine markup such as HTML or XML with java code to dynamically generate web pages. The Java Server Pages specifications are implemented by several web servers as opposed to Active Server Page that is only supported under IIS. One of the main advantages of Java Server Pages is the portability of code between different servers. Java Server Pages is also very powerful, faster that ASP and instantly familiar to Java programming.

3.5.7 Web Application Development Tools.

3.5.7.1 Microsoft Front Page 2000.

Microsoft Front Page 2000 looks a lot like a full- fledged Microsoft Office application. The programs menus, navigation and customizable tool bar all look and works like the rest of Microsoft Office premium. Microsoft Front Page 2000 is easy to learn and use.

Microsoft Front Page 2000 provides a comprehensive solution for publishing and managing work groups web sites. Microsoft Front Page 2000 helps users create the sites they want whether in creating a personal web page or a corporate Internet or Intranet site. Besides it makes updating sites easy and works well with office [19].

In addition, office 2000 users can now save HTML documents directly to Front Page based sites, while features such as shared office menus and toolbars make office users feel immediately comfortable with Microsoft Front Page 2000. This product enhancements guide assists in the evaluation of Front Page 2000 by describing new and improved features that allows teams to create and manage intranet sites. It is in the combined Editor and explorer mode, which makes findings and launching pages faster. Another striking difference is the ability to create pixel –precise layouts using Cascading Style sheets. The benefits of pixel precision are some what tempered by the requirement of a 4.0 version of a popular browser to view the finished pages.

The Microsoft Front Page 2000 web site creation and management tools gives users everything they need to create and manage exactly the site they want.

3.5.7.2 Adobe Photoshop 6.0

Adobe Photoshop is the most popular program for creating and modifying images for the web. Photoshop is available on a wide array of platforms has the most intuitive user interface, the most complete set of tools and the largest number of reference books around.

Photoshop is software that allows designers and photographers to create original artwork, correct color, retouch and composite scanned images and prepare professional quality separations and output with more flexibility than ever before. With a wealth of powerful painting and selection tools, plus multiple layers, special effects filters and lighting effects, Adobe Photoshop is a camera for your mind [17].

3.5.7.3 Macromedia Dreamweaver MX.

With Macromedia Dreamweaver MX one can maintain total control over source code with Roundtrip HTML and Roundtrip Server Markup; quickly connect Web sites to databases; and preview, test, and edit live data in the workspace.

Macromedia Dreamweaver MX lets you easily add server side logic, navigation, and interactivity; use templates; import and export your data; insert GIF, JPG, and PNG images; and manipulate layers, forms, frames, objects, and tables.

The program also includes the ability to insert various media types (ActiveX, Flash, Shockwave, and others), spell checking, searching capabilities, the ability to create photo albums, and an HTML optimizing function.

3.6 Conclusion

In this chapter, a study has been carried out on the proposed Sistem Latihan Ilmiah (SLI) to find out the suitable methodology to be used and the "V model" has been chosen. Besides that, methods used to find information regarding this system is also discussed in this chapter. Lastly review on software and technologies are also carried out in this chapter.

CHAPTER 4
SYSTEM ANALYSIS

CHAPTER 4

SYSTEM ANALYSIS

4.1 Requirement Analysis

A requirement is a feature of the system or a description of something the system is capable of doing in order to fulfill the system's purpose. The figure below illustrates the process of determining the requirements for a software –based system [4].

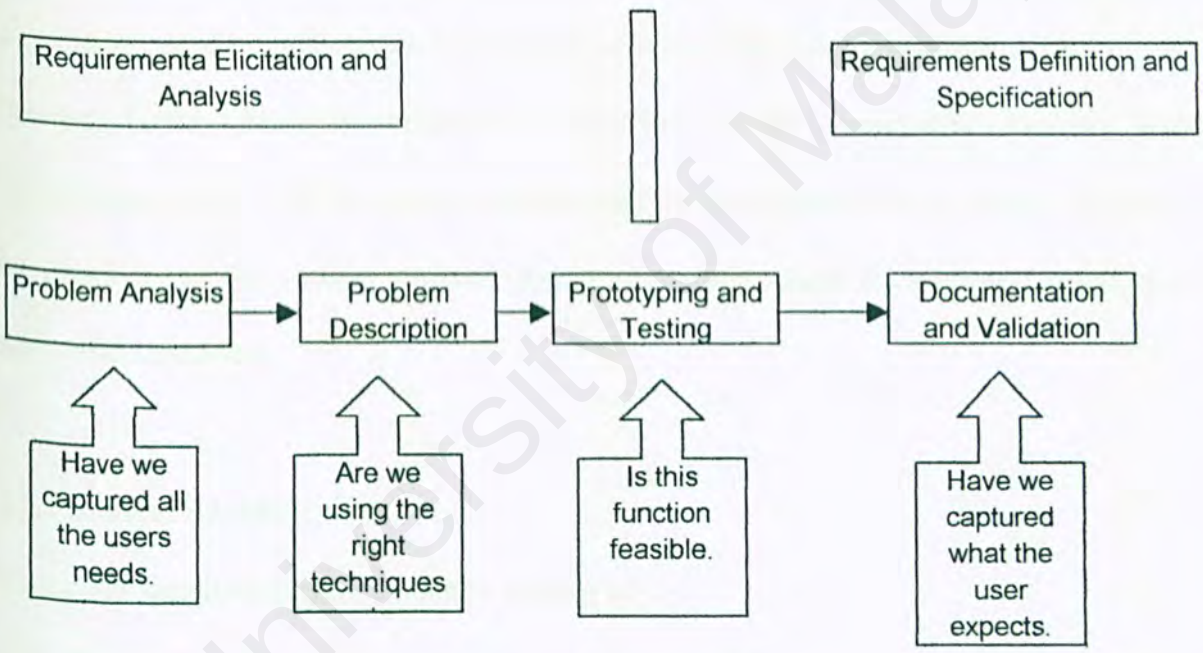

Figure 4.1: The process of determining requirements.

In the requirements elicitation process, the developers will ask the same question in many ways so that they are sure of what the users and customers need. There are 3 categories of requirements and they are [4]:

i. Requirements that absolutely must be met.

ii. Requirements that is highly desirable but not necessary.

iii. Requirements that are possible but could not be eliminated.

Requirements describe a systems behavior as the system acts on data or instruction. The requirements express the system and object states and the transition from one state to another state. Requirements can be further divided into 2 types. They are:

i. Functional requirement

ii. Non-functional requirement.

4.2 Functional requirement

Functional requirements are the functions or activities that the system must perform. It is derived directly from the capabilities identified in the requirement analysis and specification phase. The functional requirements for the Sistem Latihan Ilmiah (SLI) can be divided into three main modules that is the student module, lecturer module and administrator module.

4.2.1 Student's module.

Functional requirements for student's module are:

i. Students can have their own login and password.

ii. Students can choose thesis titles that are being offered or propose their own title. Each student is given two choices in choosing their thesis title.

iii. Students can check the status of each title, which is offered by the lecturer.

iv. Students can check whether their suggested title is being accepted or rejected by the lecturer.

v. Students can update their profile.

4.2.2 Lecturers' module

Functional requirements for lecturer's module are:

i. Lectures can have their own login and password.

ii. Lectures can add, modify and delete thesis title.

iii. Lectures can view students who have responded to their title

iv. Lectures can view students who have proposed the own title.

v. Lectures can evaluate the students proposed title by using the voting poll.

vi. Lectures can assign new student

vii. Lectures can modify student's thesis details.

viii. Lecturer can update his or her own profile.

4.2.3 Administrators' module.

Functional requirements for administrator's module are:

i. Register all the students and lecturer who are involve in final year project.

ii. Update the system.

iii. Assign a password for all the new user of the system.

4.3 Non- functional requirements.

Non- functional requirements are a description of other features characteristic and constrains that define a satisfactory system. They include timing constrains, constraints

on the development process and constrains on standards. Although the non-functional requirements are quite subjective, they are as important as the functional requirements. The non-functional requirements are:

i. User Friendly Interface

It is important to make sure that users are comfortable and do not encounter difficulties while using a system. The Sistem Latihan Ilmiah (SLI) will have a very user-friendly interface in order to enable the users to interact with the system comfortably and easily. With its graphical user interface, users can point-and-click their way around easily. Meaningful caption and menu options will simplify user interaction with the system.

ii. Efficiency

The system will be efficient in processing the data requested. The system would have a fast response time and a high throughput rate. Server scripting language such as ASP will be used instead of CG1 in order to increase the file processing speed.

iii. Modularity

The Sistem Latihan Ilmiah (SLI) will be developed in a modular approach to ease maintenance and scalability of any modules in the system. The system would be divided into three modules, which are the student module, administrator module and the lecturer module.

iv. Accuracy

The system will be able to produce the data and information in an accurate manner. The system would not make any mistakes in retrieving the right data.

v. Maintainability

The system will be able to perform maintenance on the data stored in the Sistem Latihan Ilmiah (SLI) database. The maintenance of the data will include inserting, updating and deleting data stored in the database.

vi. Reliability And Availability

The system would be reliable at every second. It would perform file processing without any flaw. The data requested will always be available.

vii. Response Time

The response time to retrieve information such as product information can be considered within a reasonable interval time. This means that all desirable information will be available to the users at any point of time. The requirement for up-to-date information is also a necessity.

4.4 Consideration Of Software

4.4.1 Consideration of Operating System.

4.4.1.1 Microsoft Windows 2000 Professional

Microsoft Windows 2000 Professional was chosen over others such as Microsoft Windows 98, NT Server 4.0 and LINUX.

This is because Microsoft Windows 2000 Professional doesn't have a complicated installation procedure. For example UNIX, LINUX and Windows 2000 Sever are difficult to install and configure. UNIX or LINUX is not an end –user oriented operating system. In a production environment this is not very desirable because valuable time will be wasted on learning details of various applications. Microsoft Windows 2000 Professional is built on Windows NT technology and easy to use, familiar with Windows 98 interface and it makes business users more productive.

Among the entire platform, the pricing of Windows Professional 2000 is not so expensive. Besides the cost for setting up this server are also not as expensive as UNIX, which have cryptic user interface are hard to manage and give way to high administration costs.

4.4.2 Consideration of Web Server

4.4.2.1 Internet Information Server 5.0

Several web servers from different vendors were available at the time of analysis. However, after analyzing all of them, the Internet Information Server 5.0 was chosen as the web server that would be used for the Sistem Latihan Ilmiah (SLI). The Internet Information Server (IIS) is the larger of the two web servers available from Microsoft and

it is the only World Wide Web server that is tightly integrated with Microsoft Windows NT Server operating system.

The Internet Information Server (IIS) provides the ability to provide web services not only for web pages, but also for ftp sites (ability to transfer whole files from one site to another), nntp services (newsgroup services) and video and audio services.

4.4.3 Consideration of Database Management System

4.4.3.1 Microsoft Access 2000

Microsoft Access 2000 is a relational database that was developed by Microsoft. It currently has 10 million users worldwide and is considered one of the best-selling relational database packages for Windows in the market. Microsoft Access 2000 provides relational database powers to give the information users need in order to make better decisions. Together with the ODBC driver, data can be retrieved from the database in a client server based system. Microsoft Access 2000 is suitable for information processing. The reasons why I chose Microsoft Access 2000 as the database management system that would be used in the Sistem Latihan Ilmiah (SLI) are :-

vii. It integrates data from spreadsheets and other databases, and is the easy way to find answers and share information over intranets and the Internet.

viii. Microsoft Access 2000 allows generating, analyzing and creating reports fast. It integrates ease of use from the data entry point to printing in HTML.

ix. This relational database tool can be integrated easily with Macromedia Dreamveawer UltraDev.

x. Many simple and user-friendly features in building tables, queries, forms and reports that can be customized to suit project needs.

xi. It is very compatible to the technology that would be used in developing the Thesis Title Management System (TTMS) that is, Active Server Pages (ASP).

xii. Provides concurrent help by assisting users in answering their questions.

One of the most important areas of focus for the Internet Information Server (IIS) is providing powerful access control functionality for web access to files and application on the server. It includes a built-in search engine, streaming multimedia capabilities, and rich log file and analysis tools.

The Internet Information Server (IIS) includes security features and promises that are easy to install. It works closely with the Microsoft Transaction Server to access database and provide control at transaction level. It also works with Microsoft's NetShow in the delivery of streaming audio and video, delayed or alive.

4.4.4 Consideration of Web Browser.

4.4.4.1 Microsoft Internet Explorer 5.5.

Microsoft Internet Explorer 5.5 is chosen as the preferred web browser because it is the current favourite web browser among Internet users. Besides that Internet Explorer has

many compatibility issues with Java, Java Script and HTML, while Netscape Navigator tries to stay current with the industry standards in most cases.

4.4.5 Consideration Of Web Application Programming Technology (Client Side).

4.4.5.1 Hyper Text Markup Language (HTML)

Without HTML, THE World Wide Web would not exist. HTML allows the individual elements on the web to be brought together and presented as a collection. HTML is not the only way to present information on the web, but it is the glue that holds everything together. In addition to being a mark-up language for displaying text, images and multimedia, HTML provides instructions to web browsers in order to control how documents are viewed and how they relate to each other.

The users can add many functions inside HTML. They can add their own VBScript and also JavaScript inside HTML in order to make it become a dynamic HTML. Besides displaying information, the HTML can also show database records in the Internet and get response from other users.

However, HTML is a static web page where the content will never change. This is because the author of the page determines the exact content of the page unless if any content updating is done. Why bother? Normally, HTML files are interpreted on the client side (in a user's web browser).

4.4.5.2 VBScript

Visual Basic Script or VBScript enables us to embed commands into a HTML document and it has been designed to make it easier to develop client side web applications that run on a web browser. When an Internet Explorer user downloads a page, the VBScript commands are loaded by the web browser along with the rest of the document and are run in response to any of a series of events. VBScript is an interpreted language just like JavaScript. Internet Explorer interprets the VBScript command when they are loaded and run. They do not need to be compiled into executable form by the web author who uses them. Following are the reasons why I chose VBScript as the client side scripting language that would be used in developing the Sistem Latihan Ilmiah (SLI):-

i. VBScript is powerful and can be used to develop highly interactive web pages that respond to the user input in an intelligent manner. In the case of a server side application, VBScript can be used to process data submitted by user with the aid of ActiveX controls specially designed for Microsoft Active Server Pages (ASP).

ii. VBScript codes are lightweight, fast and have been optimized to transmit via the Internet.

iii. VBScript is easier to use because it is based on the easy-to-learn BASIC (Beginner's All Purpose Symbolic Instruction Code) language.

iv. VBScript is very compatible to the technology that would used in this system, that is, Active Server Pages (ASP).

4.4.5.3 JavaScript

JavaScript's greatest potential gift to a web site is that scripts can make the page more immediately interactive, that is, interactive without having to submit every little thing to the server for a server program to re-render the page and send it back to the client. For example, consider a top-level navigation panel that has, say, six primary image map links into subsections of the Web site. With only a little bit of scripting, each map area can be instructed to pop up a more detailed list of links to the contents within a subsection whenever the user rolls the cursor atop a map area. With the help of that popup list of links, the user with a scriptable browser can bypass one intermediate menu page. The user without a scriptable browser (or who has disabled JavaScript) will have to drill down through a more traditional and time-consuming path to the desired content.

On their own, web pages tend to be lifeless and flat unless animated images are added or more bandwidth-intensive content such as Java applets or other content requiring plug-ins are operated. Embedding JavaScript into an HTML page can bring the page to life in any number of ways. Perhaps the most visible features built into pages recently with the help of JavaScript are the so-called image rollovers. An example to that would be rolling the cursor atop a graphic image which would change the image into a highlighted version as a feedback mechanism to let users know precisely what they are about to click on. But there are less visible yet more powerful enhancements to pages that JavaScript offers.

Interactive forms validation is an extremely useful application of JavaScript. While a user is entering data into form fields, scripts can examine the validity of the data. Without

scripting, the user has to submit the form and let a server program check the field entry and then report back to the user. This is usually done in a batch mode and the extra transactions take a lot of time and server processing power. Interactive validation scripts can check each form field immediately after the user has entered the data, while the information is fresh in the mind.

JavaScript allows a web page to perform "if-then" kinds of decisions based on browser version, operating system, user input, and, in more recent browsers, details about the screen size in which the browser is running. While a server CGI program can make some of those same kinds of decisions, not everyone has access to or the expertise to create CGI programs. For example, an experienced CGI programmer can examine information about the browser whenever a request for a page is made, thus a server so equipped might serve up one page for Navigator users and a different page for Internet Explorer users. Beyond browser and operating system version, a CGI program cannot know more about the environment. But a JavaScript-enhanced page can instruct the browser to render only certain content based on the browser, operating system, and even the screen size.

Scripting can even go further if the page author desires. For example, the author may include a preference screen that lets the user determine the desired background and text color combination. A script can save this information on the client in a well-regulated local file called a cookie. The next time the user comes to the site, scripts in its pages look to the cookie info and render the page in the color combination selected previously. The server is none the wiser, nor does it have to store any visitor-specific information.

4.4.6 Consideration Of Web Application Programming Technology (Server Side).

4.4.6.1 Active Server Pages (ASP)

Active Server Pages (ASP) is a programming environment that provides the ability to combine HTML, scripting languages and other components to create powerful Internet applications that run on servers. If a user creates a web site that combines HTML, scripting languages and other components, Active Server Pages (ASP) can be used to glue these items together. Users can create a HTML interface for an application by adding script commands to the HTML page and encapsulate it for business logic into reusable components. These components can be called from the scripts or other components [14].

An Active Server Pages application can integrate with any ODBC-compliant databases including Microsoft SQL Server, Oracle, Sybase, Informix, and DB2 databases. Any OLE 2 application, such as Lotus Notes or Microsoft Excel, can also be scripted to access or process information. You can also write components to access online data feeds and legacy mainframes.

Following are the reasons why I chose Active Server Pages (ASP) as the web technology that would be used in developing the Sistem Latihan Ilmiah:-

i. ASP combines HTML with other scripts in the same file for better application flow.

ii. The user does not need to worry about the browser's script capabilities as the scripts are processed on the server.

iii. ASP supports VBScript and JavaScript.

iv. Creating ASP requires only standard knowledge of HTML, or in other words, a person who knows HTML will find ASP easy to learn.

v. ASP development is compile free.

vi. ASP protects proprietary business algorithm and information.

vii. ASP supplies client server programming, which can be used to build client server applications.

viii. It is suitable for building multi-tier Internet and intranet applications.

4.4.7 Consideration of Web Application Development Tools.

4.4.7.1 Macromedi Dreamweawer MX

I have decided to use Macromedia Deamweaver MX because it is a great tool for creating ASP pages. It is also a great tool for HTML codes who want to spread their wigs and begin creating ASP pages. It allows creating simple ASP pages without any knowledge of VB or SQL and only a basic grasp of databases.

Macromedia Dreamweaver MX provides the tool to take advantage of the new Web-based model of computing. Some development tools focus on supporting a single Internet technology. Others support several technologies for Web-based development but don't provide visual tools to accomplish these tasks. Macromedia Dreamweaver MX exceeds existing development tools by providing a way to integrate multiple technologies and supplies visual tools to greatly enhance a developer's productivity.

4.4.7.2 Microsoft Front Page 2000

Microsoft Front Page 2000 was chosen for Sistem Latihan Ilmiah (SLI) because it is a comprehensive solution for publishing and managing workgroup web sites. It also helps users to create the web sites and pages.

4.4.7.3 Adobe Photoshop 6.0.

Adobe Photoshop 6.0 was chosen for this system because it is the most popular program for creating and modifying images for the web.

4.5 System Requirements

System requirements consist of two components, which are software and hardware requirements.

4.5.3 System Development Environment.

4.5.3.1 Hardware Requirement

Hardware requirement for Sistem Latihan Ilmiah (SLI) are:

i. Pentium III 500 MHz

ii. 128 MB of RAM

iii. 4.3 GB of Hard Disk

iv. 48X CD-ROM DRIVE.

v. Others standard computer peripherals.

4.5.3.2 Software Requirements.

Software Requirements for this system are:

i. Operating System

- Microsoft Windows 2000 Professional

ii. Web Server

- Microsoft Internet Information Server (IIS) 5.0

iii. Web Browser

- Microsoft Internet Explorer 5.5

iv. Database Management System

- Microsoft Access 2000.

v. Web Application Programming Technology (Client Side):

- Hypertext Markup Language (HTML).
- VBScript
- JavaScript.

vi. Web Application Programming Technology (Server Side)

- Active Server Page (ASP)

vii. Web Application Development Tools.

- Microsoft Front Page 2000
- Adobe Photoshop 6.0
- Macromedia Dreamweaver MX

4.6 Conclusion

In this chapter, a study has been carried out on the proposed Sistem Latihan Ilmiah (SLI) to find out the system requirements such as functional and non-functional requirements.

The tools and techniques to be used have been rectified as well. As a result, Microsoft Windows 2000 Professional has been chosen as the system platform, Active Server Pages (ASP) as the web technology, Internet Information Server 5.0 as the web server, Microsoft Internet Explorer 5.5 as the web browser, Macromedia Dreamveawer MX, Microsoft Front Page 2000 and Adobe Photoshop 6.0 as the web-authoring tool, HTML as the web application language, VBScript and JavaScript as the scripting languages and Microsoft Access 2000 as the database management system.

CHAPTER 5
SYSTEM DESIGN

CHAPTER 5

SYSTEM DESIGN

5.1 Introduction

After capturing the requirements analysis and definitions, the system design phase is implemented. The information collected earlier is used to accomplish the design of the system. Design is essential in the development of a system. It is the interaction between users and the system. The system design phase includes the design of the program, the user interface and the database.

The program design involves designing the modules that exist in the Sistem Latihan Ilmiah (SLI). Every module is designed in detail. The data flow for a module is presented in the designing phase. Related diagrams are used in presenting the data flow.

The database design is the most important component in any information system. A well-organized database can enhance the management of the system. The database schema is used to present the organization of the database.

Finally, the user interface design is the most essential part in attracting users to visit the system. The site layout design is presented in this phase.

5.2 Application Processing

The Sistem Latihan Ilmiah (SLI) will be delivered with the ASP Server. When a browser requests a page in an ASP application, the server processes the active server pages, interacts with backend systems, and dynamically generates a web page that is returned to the browser.

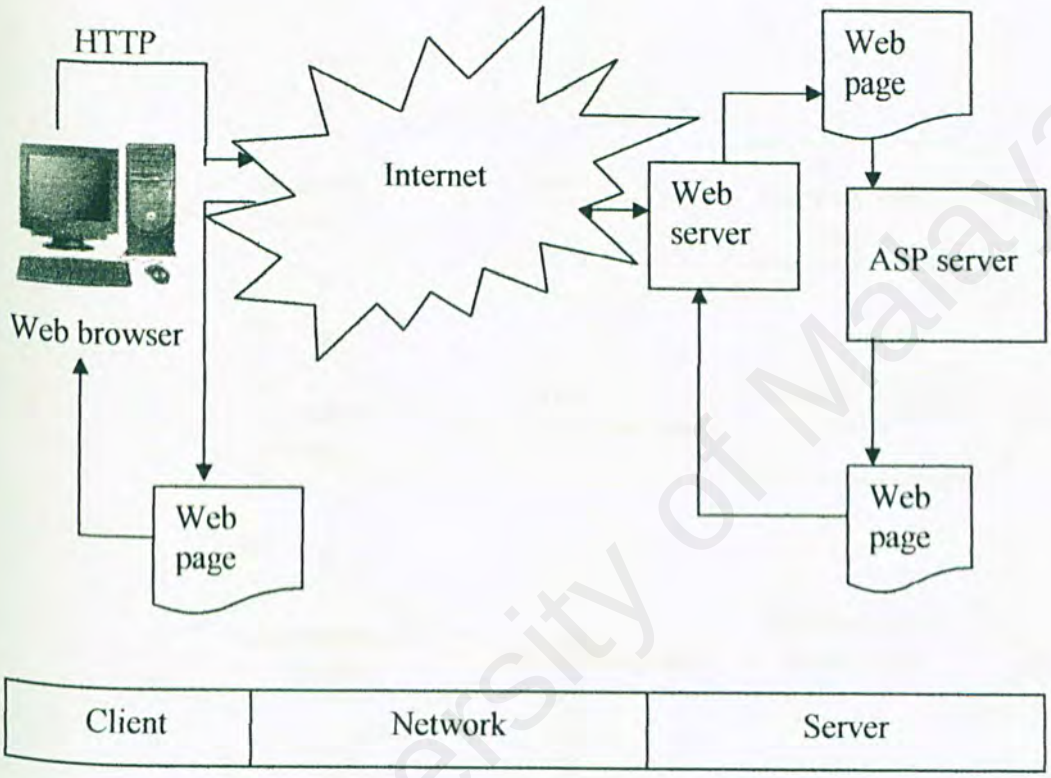

Figure 5.2: The Sistem Latihan Ilmiah (SLI) Application Processing

5.3 Flow Chart Diagram For System Modules

The system is divided into three modules that would perform all the store's functions. The three modules are the students' module, lecturers' module and the administrator module.

Sistem Latihan Ilmiah (SLI) flow chart diagram is shown in the figure below.

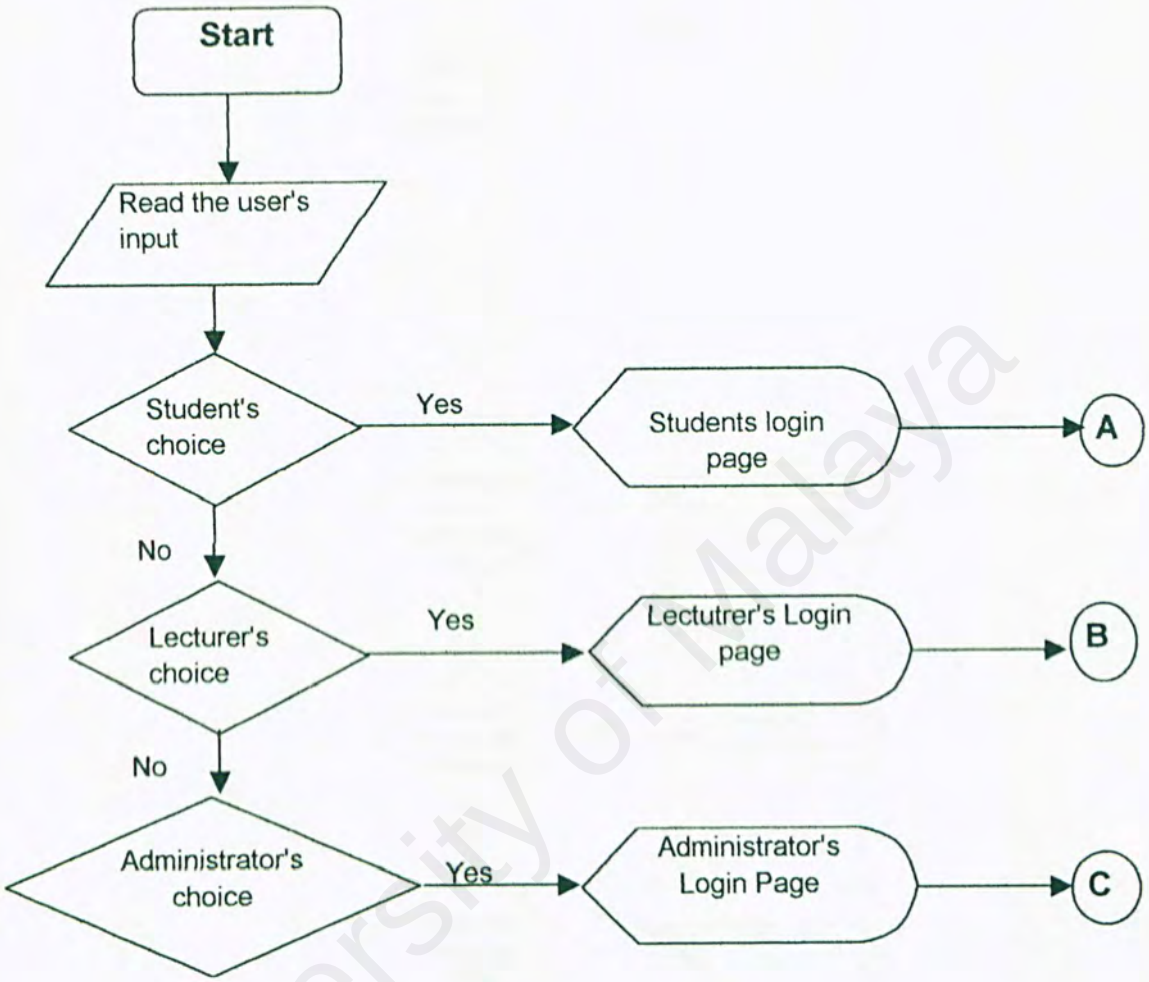

Figure 5.3 (a): Flow Chart Diagram for Sistem Latihan Ilmiah

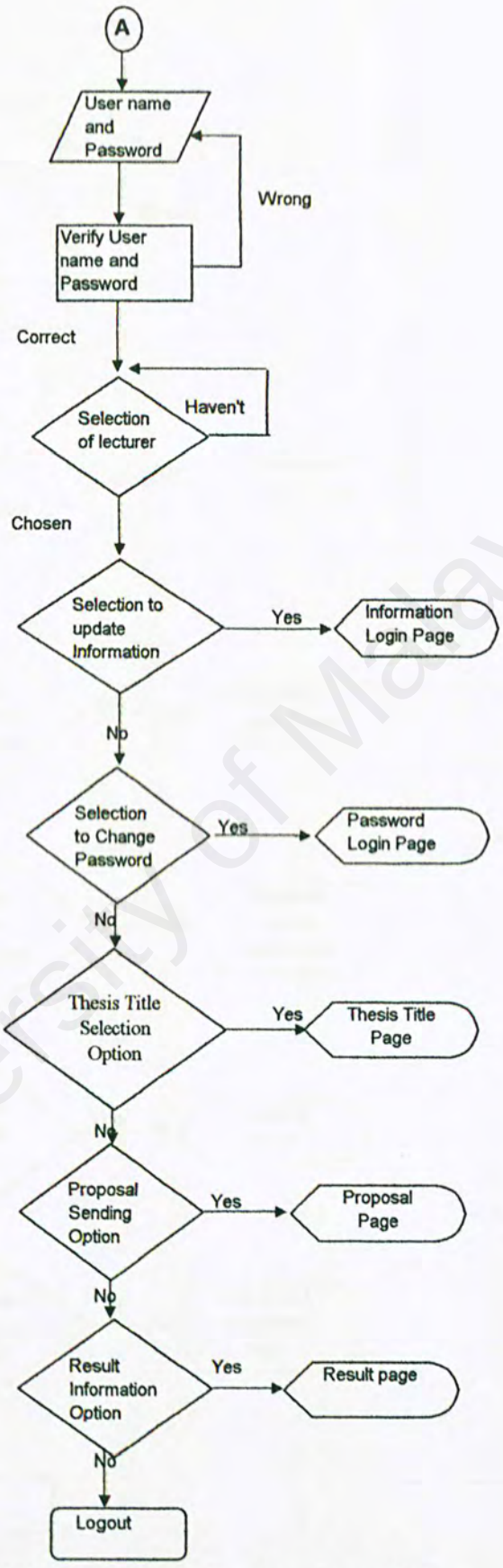

Figure 5.3 (b): Flow Chart Diagram for Student module.

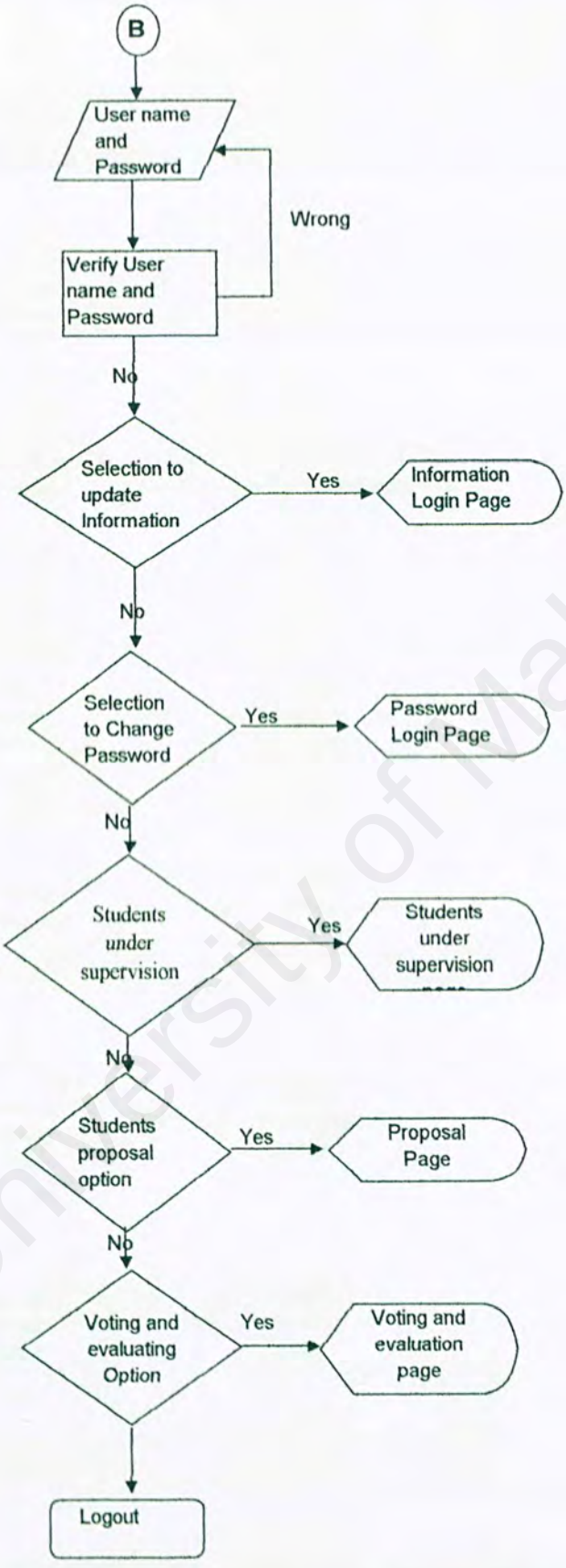

Figure 5.3 (c): Flow Chart Diagram for Lecturer module.

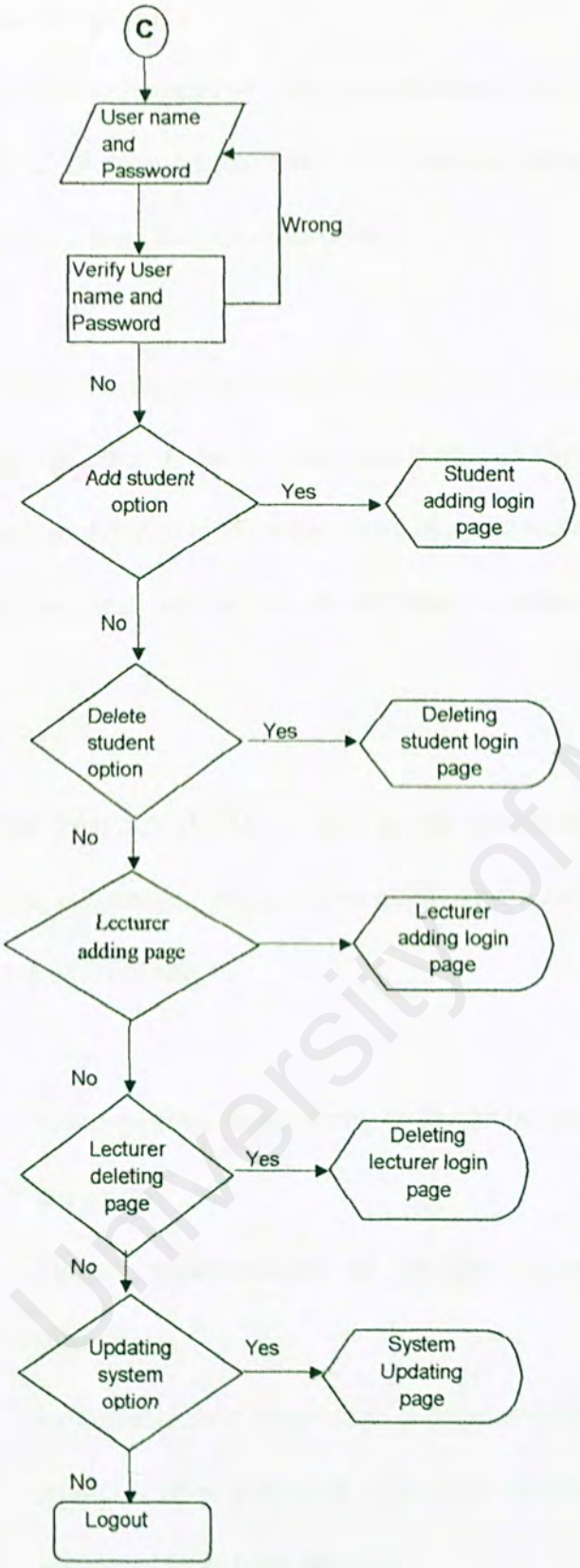

Figure 5.3 (d): Flow Chart Diagram for Administrator module

5.4 Data Flow Diagram

A DFD graphically characterize data process and flow in a system. This graphical representation is of utmost importance as it enables better understanding of the inter-relatedness of the system and its subsystems.

The context diagram is an overview of the system that consists of only the general system, which includes its basic input and output. Diagram 0 is the explosion of the context diagram and may include many more processes compared to the context diagram. Each of these processes may in turn be exploded to create a more detailed child diagram [8].

The Data Flow Diagram (DFD) is used as the graphical representation of the system design due to its advantage over narrative explanations on how data moves in the system. The advantages of DFD are: -

i. Freedom from committing to the technical implementation of the system too early.
ii. Further understanding of the interrelatedness of the system and its subsystems.
iii. Communicating knowledge of current systems to users through DFDs.
iv. Analysis of a proposed system to determine if the necessary data and processes have been defines.

Table 5.4: Data Flow Diagram Model Symbols

SYMBOLS	NAME	DESCRIPTION
	Entity	An external entity that can send data to or receive data from the system. Interacts with the system but considered as outside of the boundaries of the system.
	Data Flow	Used to show the movement of data from an origin to a destination with the head of arrow pointing towards the destination.
	Process	It represents the transformation or processing of information within a system.
	Data Store	Shows a depository for data that allows addition or retrieval of data.

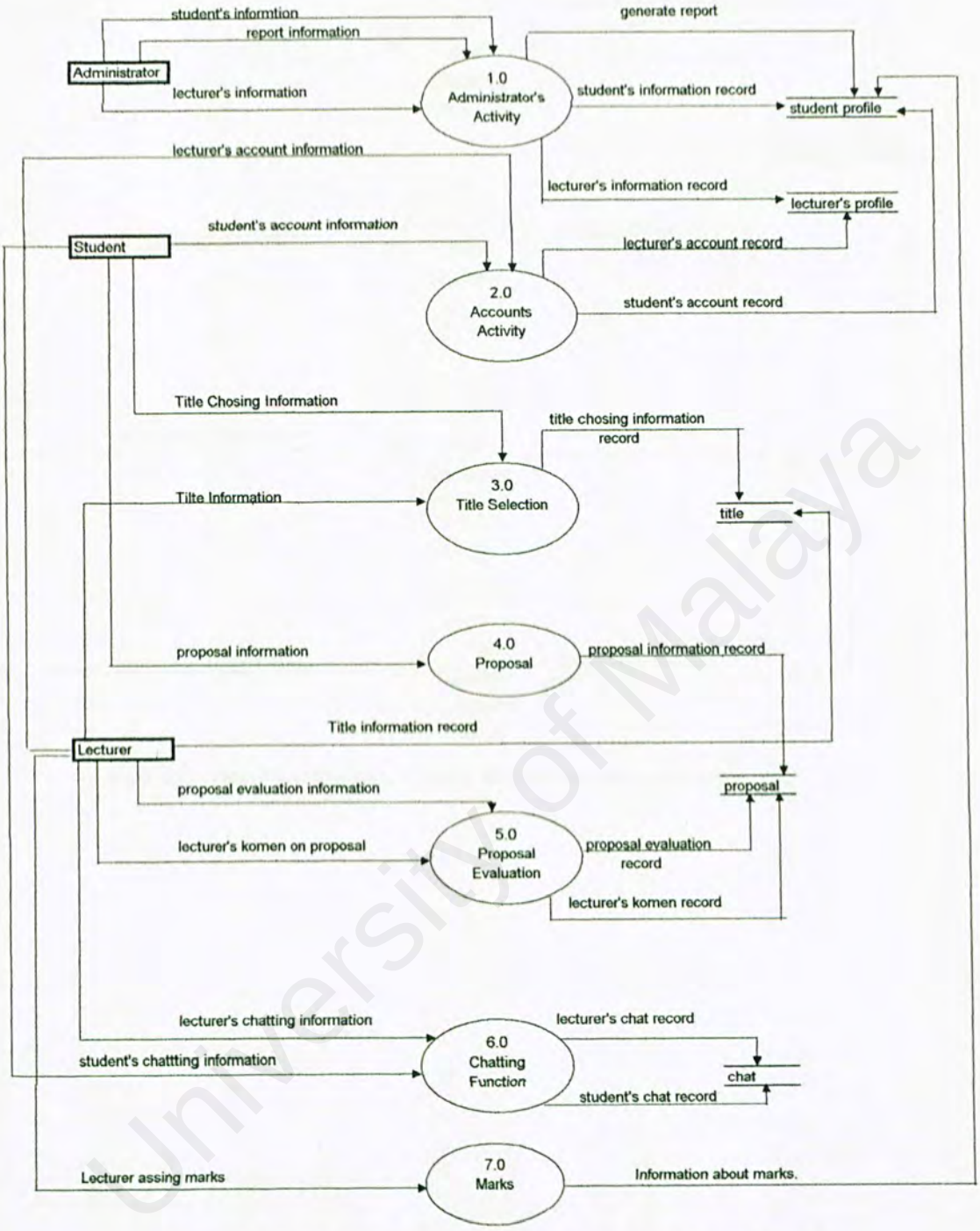

Figure 5.4(a): Data Flow Diagram Level 0 for Sistem Latihan Ilmiah

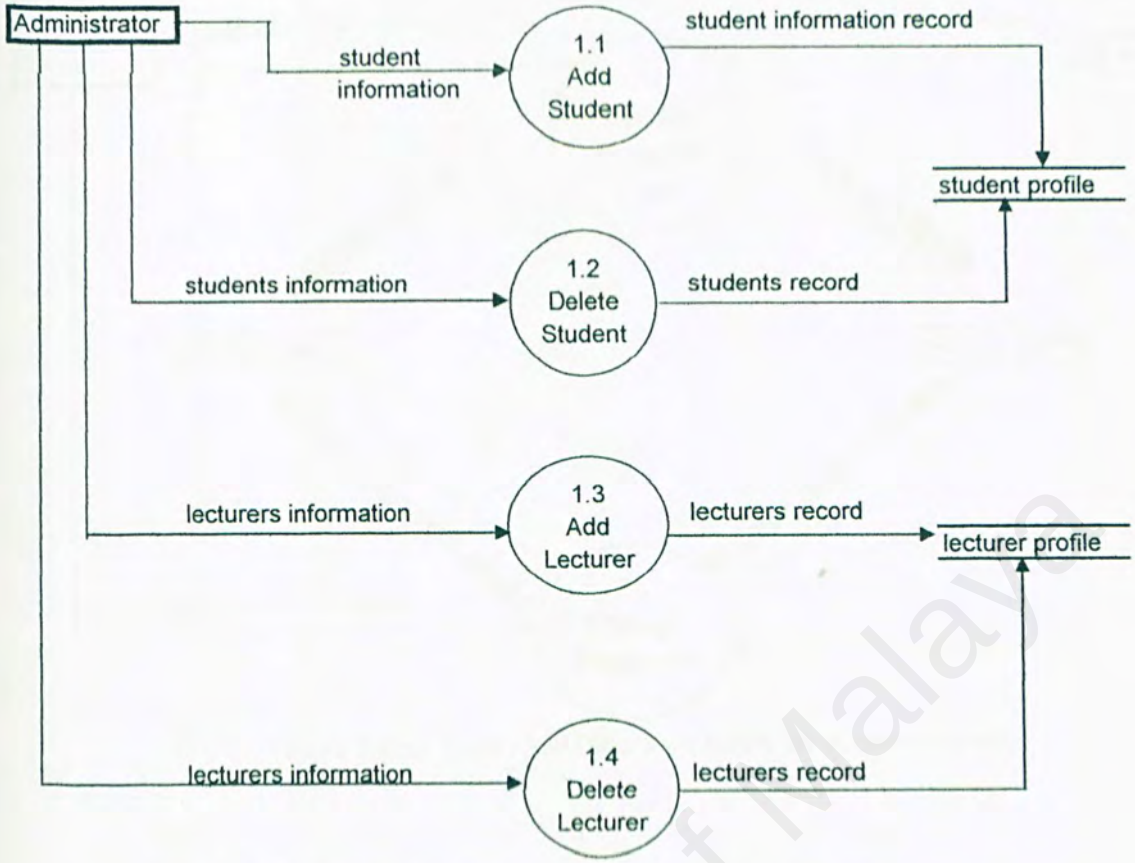

Figure 5.4(b): Data Flow Diagram Level 1 for Administrators Activity

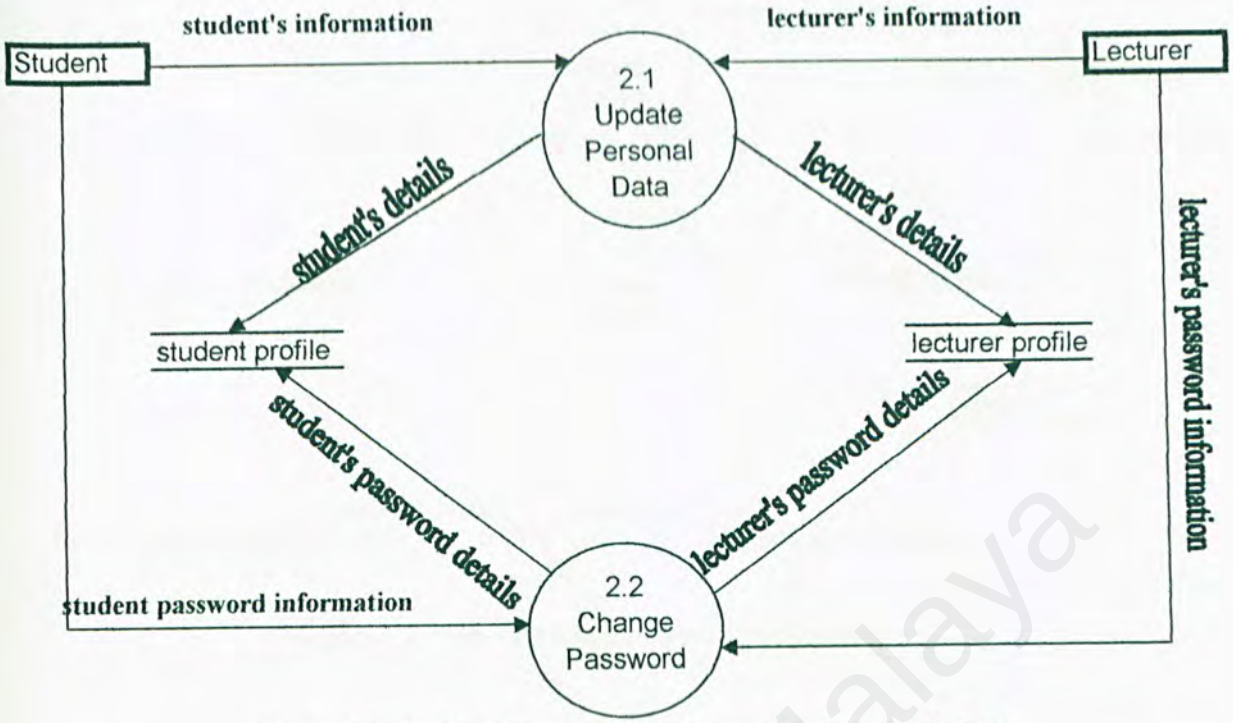

Figure 5.4(c): Data Flow Diagram Level 1 for Account Activity

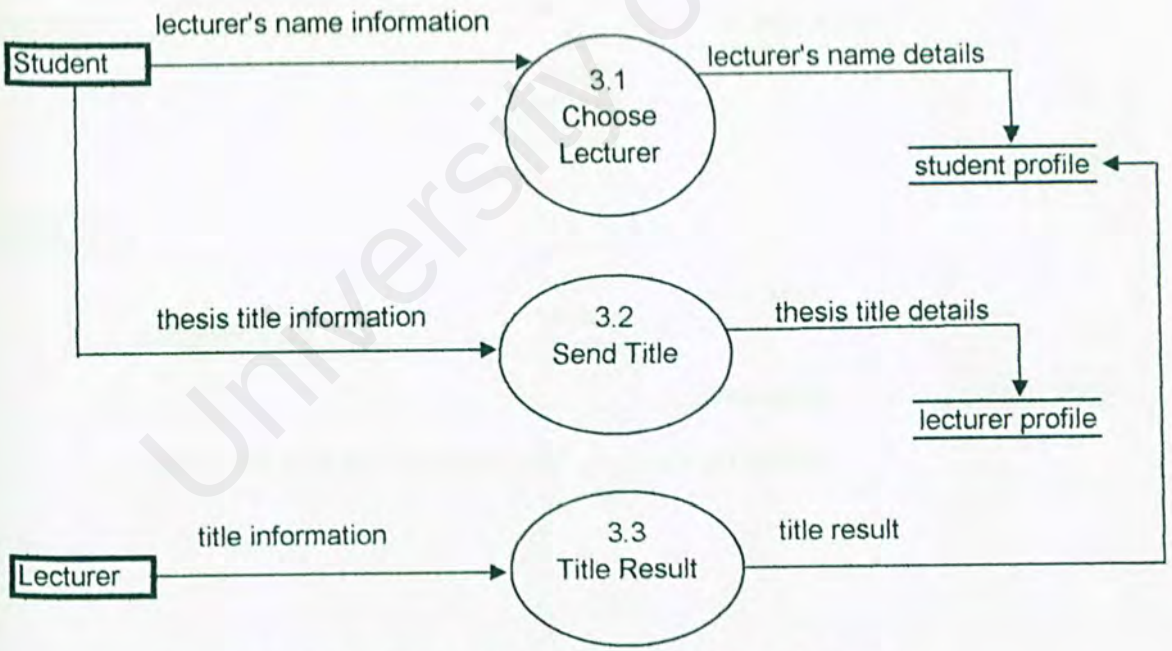

Figure 5.4(d): Data Flow Diagram Level 1 for Title Selection

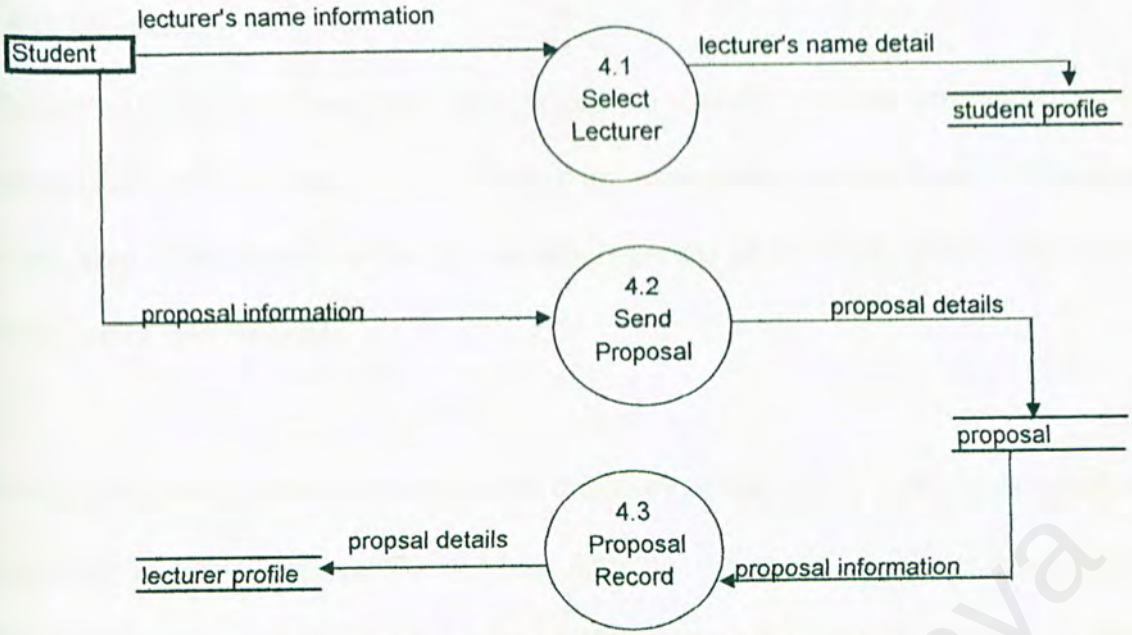

Figure 5.4(e): Data Flow Diagram Level 1 for Proposal

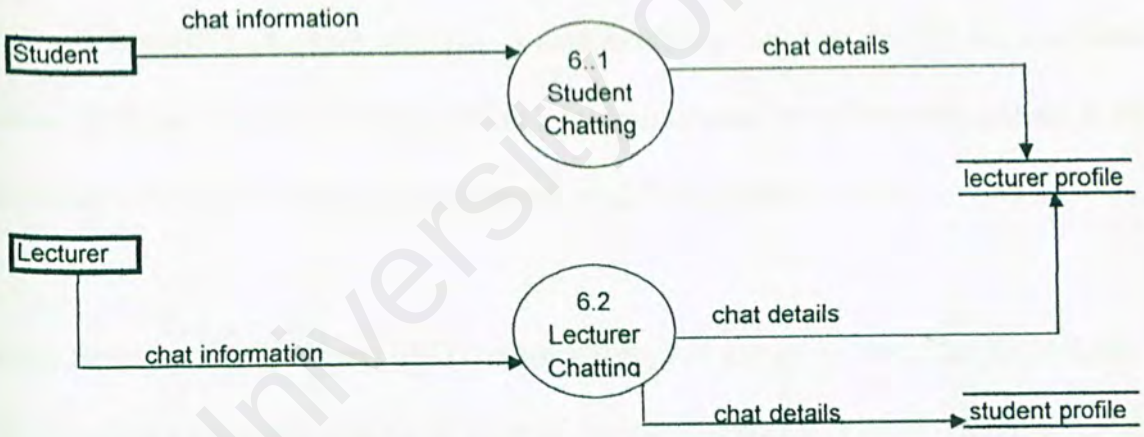

Figure 5.4(f): Data Flow Diagram Level 1 for Chatting Function

5.5 Context Diagram

The context diagram shows the entire system as a single process surrounded by the external entities. The major input and output are representing as data flows. The purpose of this kind of diagrams is to furnish an easy overview of the whole system that will be developed or implemented.

Context diagram also help to focus on the boundary of the system to be investigated and assistance in achieving agreement while defining the scope of Thesis Management project. Please refer to Figure 5.5 at page 105 to view the context diagram of Thesis Management System.

5.6 Entity Relationship Diagram (ERD)

Entity Relationship Diagram (ERD) is a data-modeling tool that depicts the association among different categories of data within a business model or information system. It does not imply how data is created, implemented, modified, deleted or used.

Entity Relationship Diagram (ERD) represents logical groups of data that are entities. It also provides a clear and systematic view of the system process. Please refer to Figure 5.6 at page 106 to view the Entity Relationship Diagram (ERD) of Thesis Management System.

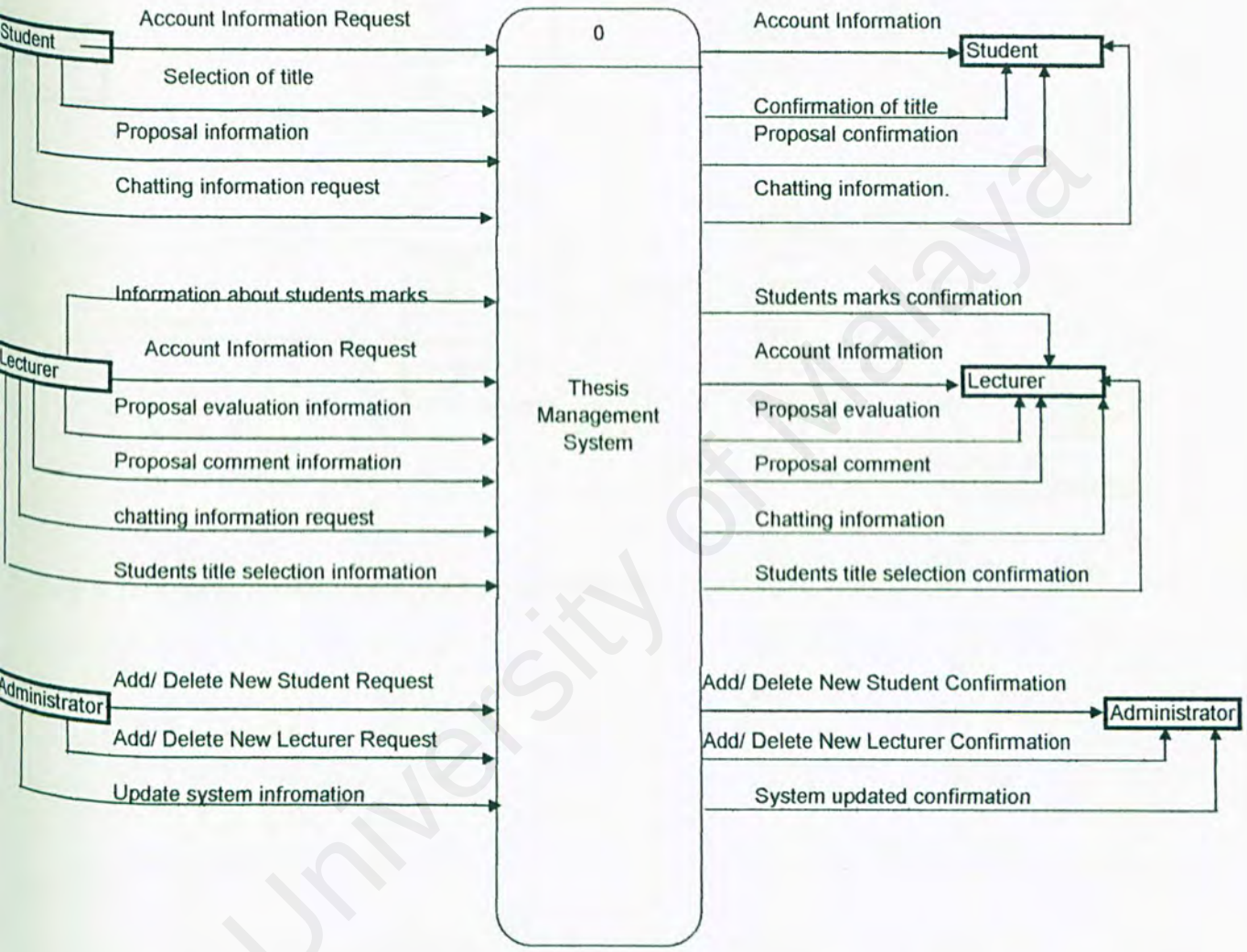

Figure 5.5: Context Diagram for Sistem Latihan Ilmiah (SLI)

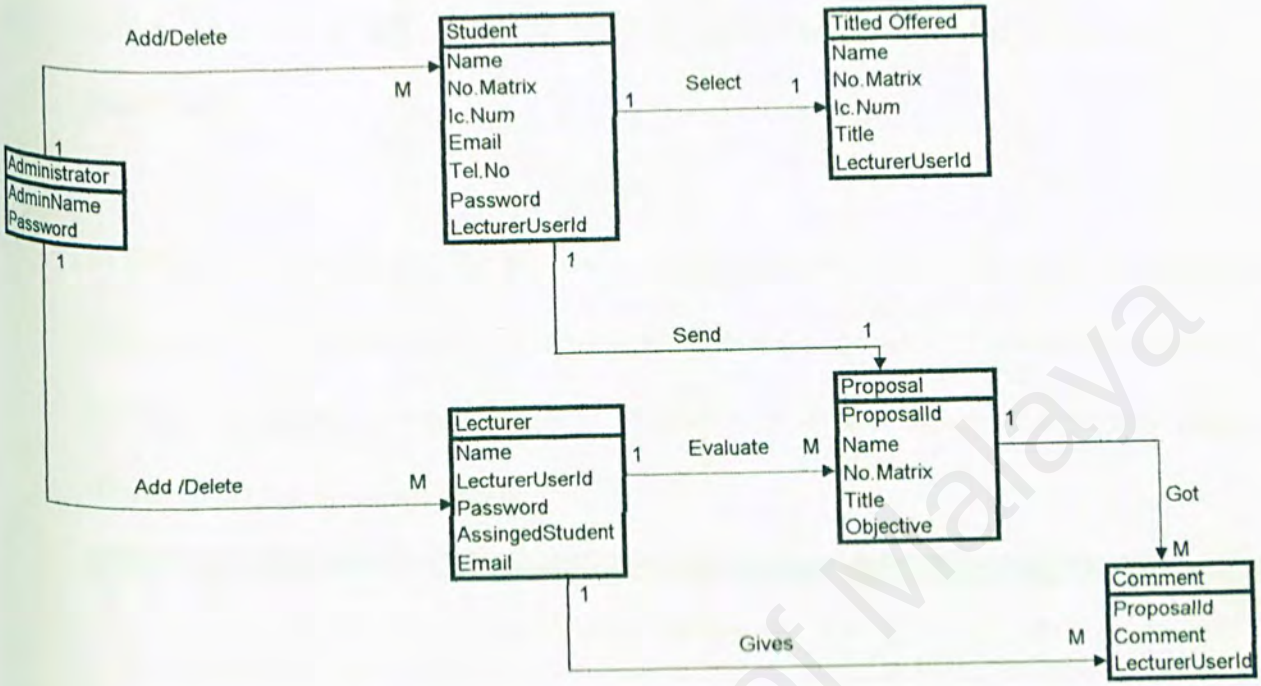

Figure 5.6: Entity Realationship Diagram(ERD) For Sistem Latihan Ilmiah (SLI)

5.7 User Interface

The user interface design of a system is often the yardstick by which that system is judged. An interface, which is difficult to use will at best, result in a high level of user errors. At worst, it will cause the software system to be discarded, irrespective of its functionality.

In Sistem Latihan Ilmiah, the goal of user interface design is to provide an easier and faster way for the user to interact with the computer, or what is commonly known as human – computer interaction (HCI). Example of user interfaces for Sistem Latihan Ilmiah (SLI) are as shown below.

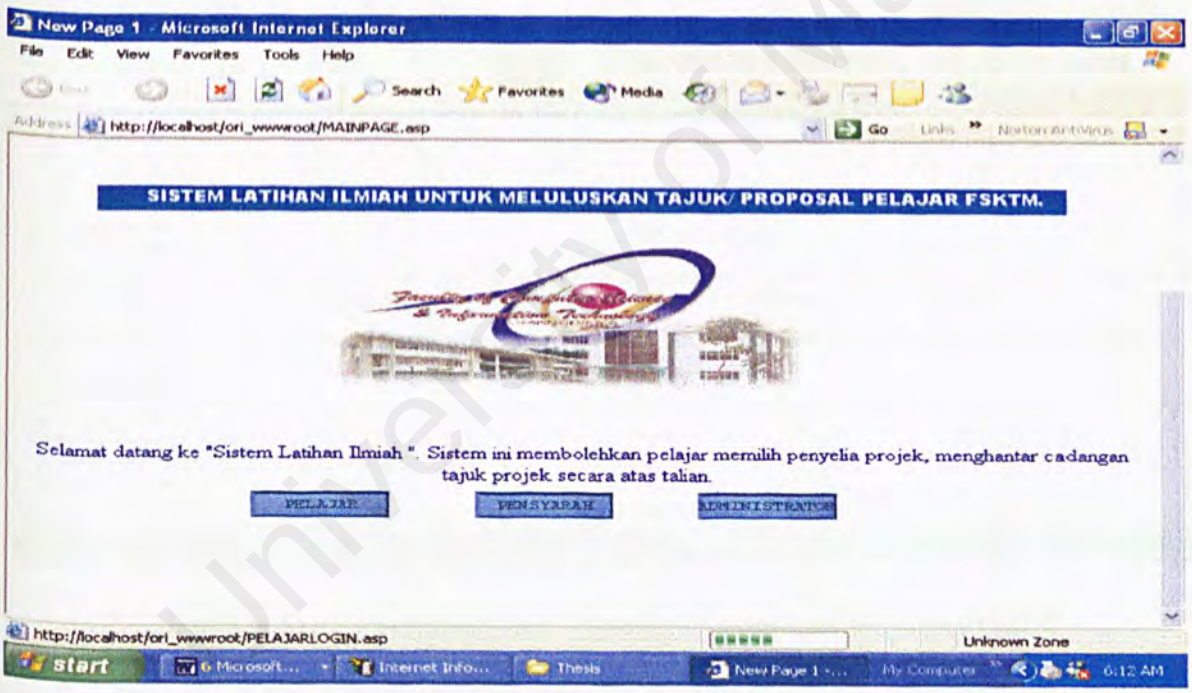

Figure 5.7 (a): The main page of Sistem Latihan Ilmiah (SPI)

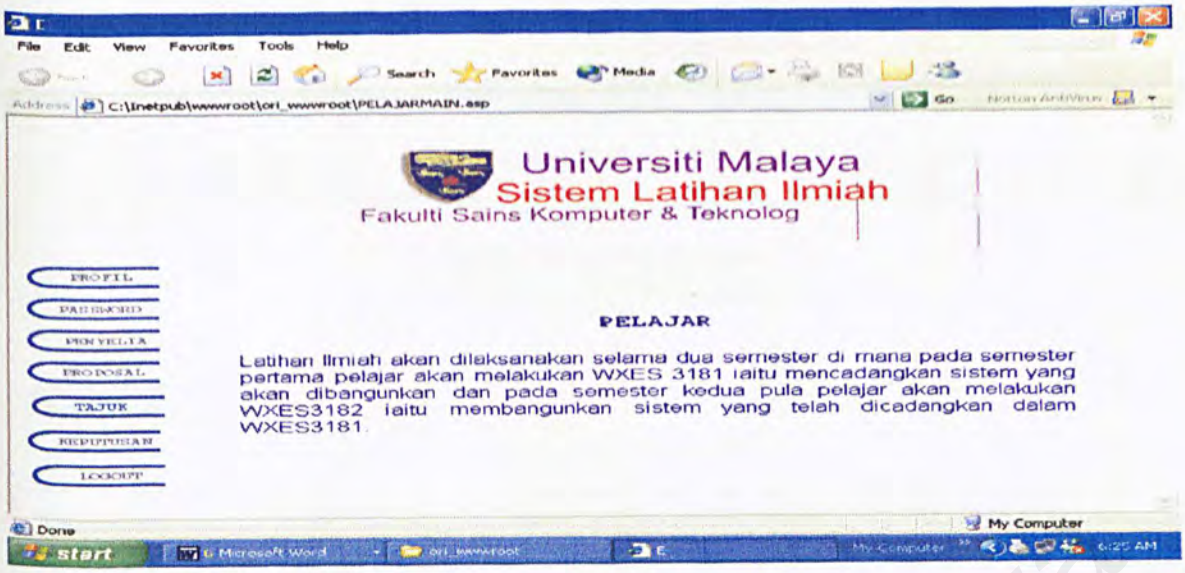

Figure 5.7 (b): Students Main Page for Sistem Latihan Ilmiah (TMS)

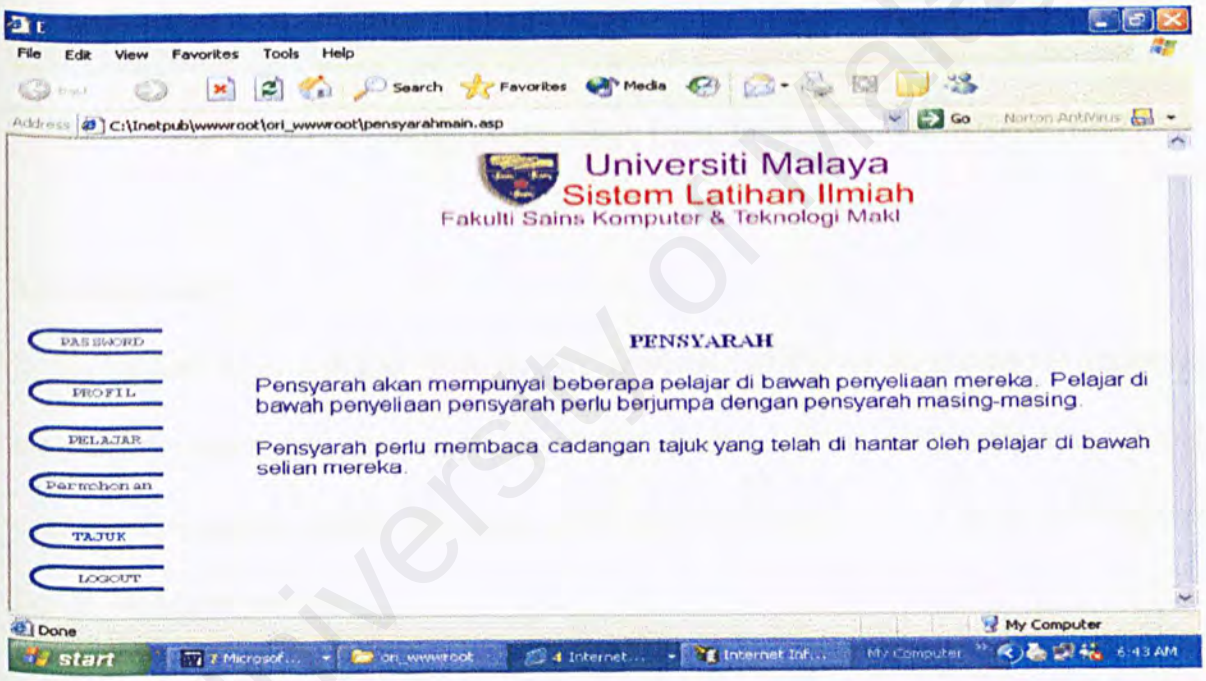

Figure 5.7 (c): Lecturers Main Page for Sistem Latihan Ilmiah (SLI)

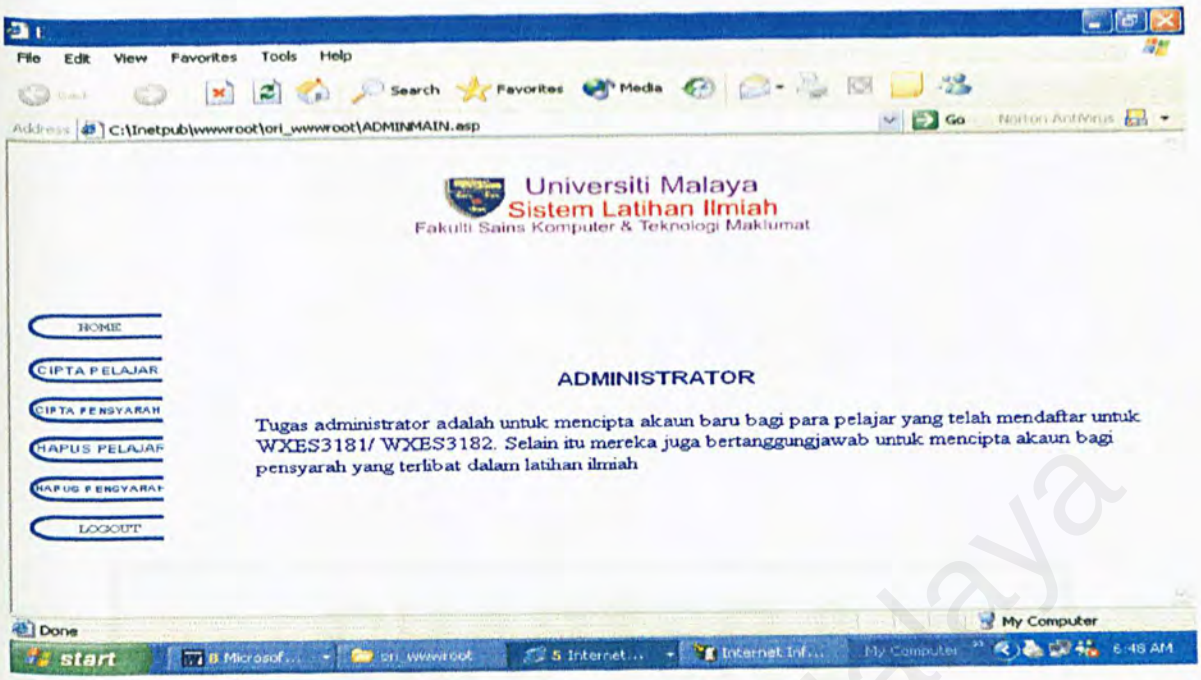

Figure 5.7 (d): Administrators Main Page for Sistem Latihan Ilmiah (SLI)

5.8 Conclusion

In this chapter, system design processes are conducted to deliver diagrammatic outcomes such as flow chart, data flow diagrams, context diagram, entity relationship diagram and user interface design which will assist in the system implementation in the later part of the development process.

CHAPTER 6
SYSTEM IMPLEMENTATION

CHAPTER 6

SYSTEM IMPLEMENTATION

6.1 Introduction

System implementation is a process that takes place after system design phase. It is a process to convert the system requirements into program codes. This phase describes how the initial and revised design was put into the real work.

Under this stage, we transformed the design model of the Sistem Latihan Ilmiah (SLI) into workable software. The system implementation of SLI will be divided into two components, which are platform implementation and modules implementation.

6.2 Platform Implementation

The platform implementation includes setting up the operating system which is Windows XP Professional. It is very important to have suitable hardware and software in speeding up the system development and make a success to this project.

6.2.1 Other Software Tools Needed

Many software tools are also used to develop Sistem Latihan Ilmiah (SLI), Table 6.2.1 shows a list of most of the software.

Table 6.2.1: Other Software Tools Needed

Software	Usage	Description
Microsoft Windows XP	System requirements	Operating system
Internet Information Services	System requirement	Web Server
Microsoft Access 2000	System requirement	Database

Internet Explorer 5.5	System requirement	Web Browser
Adobe Photoshop 7.0	System development	Graphic editing
Macromedia Dreamweaver MX	System Development	Coding the Web pages
Microsoft Word 2000	System development	Documentation
Microsoft FrontPage 2000	System development	Interface graphical design and HTML editor.

6.3 MODULE IMPLIMENTATION.

Sistem Latihan Ilmiah (SLI) consists of 3 modules. The modules are:

i. Administrator module

ii. Lecturer module

iii. Student module.

6.3.1 Administrator module

The administrator module consists of 4 sub modules which are add student, delete student, add lecturer and delete lecturer. The job of the administrator is to get the list of students and lecturers who are involved in WXES3181 from the office. A new account is created for each student and lecturer who have registered for WXES 3181. The purpose of creating a new account for each of the student and lecturer is to avoid unauthorized people from using this system. Students and lecturer are required to get the password from the administrator. User Id for the students is their matric number, mean while for

the lecturers are the Id card number. Besides that, administrator can delete the student and lecturer account by keying in the user Id number.

Each time the administrator keys in a data in order to create a new account, verification is being done to the data which is being keyed in. Below this is the example of the verification coding.

```
<script Language="JavaScript"><!--
function FrontPage_Form1_Validator(theForm)
{
 if (theForm.Name.value == "")
 {
  alert("Sila masukkan Nama Pelajar.");
  theForm.Name.focus();
  return (false);
 }
if (theForm.MetricNo.value == "")
 {
  alert("Sila masukkan Nombor Matrik pelajar.");
  theForm.MetricNo.focus();
  return (false);
 }

if (theForm.IC.value == "")
 {
  alert("Sila masukkan Nombor Kad Pengenalan pelajar.");
  theForm.IC.focus();
  return (false);
 }
if (theForm.Passwd.value == "")
 {
```

```
    alert("Sila masukkan Password pelajar.");
    theForm.Passwd.focus();
    return (false);
  }
if (theForm.CourseYear.value == "")
  {
    alert("Sila masukkan Tahun Kursus pelajar.");
    theForm.CourseYear.focus();
    return (false);
  }
  return (true);
}
```

Figure 6.3.1 (a): Sample code to check the inputs which are being keyed into the form.

```
<%

'Connect to Database

Dim Conn

Set Conn = Server.CreateObject("ADODB.Connection")

Conn.ConnectionString = "DRIVER={Microsoft Access Driver (*.mdb)};" & _

                "DBQ=" & Server.MapPath("Data/data.mdb")

Conn.Open


Dim RS, bolFound, strUsername


strUsername = Request.Form("MetricNo")
```

```
Set RS = Server.CreateObject("ADODB.Recordset")
RS.Open "studentProfil", Conn, , 3, 2

        Do Until RS.EOF OR bolFound
            IF (StrComp(RS("NoMatrik"), strUsername, _
                    vbTextCompare) = 0) Then
                bolFound = True
            Else
                RS.MoveNext
            End If
        LOOP

If bolFound then
RS.Delete
RS.Close
Set RS=Nothing
Conn.Close
Set Conn=Nothing
End If

If Not bolFound then
response.redirect "nostac.asp"
```

```
RS.Close
Set RS=Nothing
Conn.Close
Set Conn=Nothing
End If
%>
```

Figure 6.3.1 (b): Sample code to delete student data from the database.

6.3.2 Student module.

The student module consists of 6 sub-modules. The sub modules are:

i. Profile

ii. Password

iii. Lecturer

iv. Proposal

v. Title

vi. Result

In SLI, students are required to get the password and user Id from the administrator. Student who login to the system for the first time will be brought to a page which contain all the lecturers' name. Students are required to select which lecturer they want according to the space available for that particular lecturer. Student will not be brought to the main page until they select a lecturer.

```
Set RS = Server.CreateObject("ADODB.Recordset")
        RS.Open "Statistik", Conn, , , 2
```

```
PSMTotal = (RS("BilPelWXES3181") + RS("BilPelWXES3182")) / RS("BilPensyarah")
Max = CInt(PSMTotal)
RS.Close
Set RS=Nothing
Dim SQL
        SQL = "SELECT AssignedStudent FROM pensyarah WHERE
LecturerUserId='"&strSupID&"'"
        Set RS = Server.CreateObject("ADODB.Recordset")
        RS.Open SQL, Conn, 1, 3
Number = RS("AssignedStudent") + 1
strAS = RS("AssignedStudent")

if strAS >= Max then
RS.Close
Set RS=Nothing
response.redirect "full.asp"
else
RS("AssignedStudent") = Number
RS.Update
RS.Close
Set RS=Nothing
end if
```

Figure 6.3.2 (a): Sample code assigning student to a particular lecturer.

Besides that, student module contains a sub module called proposal. In this module student can send the own proposed title to the lecturer. Once they have sent their proposal, the system will generate a unique number as a reference for the proposal which they have sent. Student can use this unique number in order for them to check the result of their proposal.

```
<%
Dim Conn, RS, strUsername, bolFound, strRand, id, strRound, StudID

Randomize
id = CLng((60000000 - 10000000 + 1) * Rnd + 10000000)

strRand = TRIM(id)

strRound = Int(strRand)

strUsername = Request.Cookies ( "StudentID" )

Set Conn = Server.CreateObject("ADODB.Connection")
Conn.ConnectionString = "DRIVER={Microsoft Access Driver (*.mdb)};" & _
                "DBQ=" & Server.MapPath("Data/data.mdb")
Conn.Open

        Set RS = Server.CreateObject("ADODB.Recordset")
        RS.Open "studentProfil", Conn, , , 2
```

Figure 6.3.2 (b): Sample code to generate unique number for the proposal.

6.3.3 Lecturer module.

The lecturer module consists of 5 sub-modules. The sub modules are:

i. Profile

ii. Password

iii. Student

iv. Application

v. Title

In this module, lecturer can view student who are under their supervision. Besides that lecturer can evaluate students' proposal by using the unique proposal Id number. Apart from that, lecturer can add their own title into the system.

```
<%
Dim PropoID, Conn, RS, Comment, strResult, strLecturer

PropoID = TRIM(Request.Cookies("ProposalID"))
Comment = Request.Form("KOMEN")
strResult = Request.Form("result")
'strResult = CInt(Request.Form("result"))
strLecturer = TRIM(Request.Cookies("LecturerID"))

Set Conn = Server.CreateObject("ADODB.Connection")
Conn.ConnectionString = "DRIVER={Microsoft Access Driver (*.mdb)};" & _
                "DBQ=" & Server.MapPath("Data/data.mdb")
Conn.Open

        Set RS = Server.CreateObject("ADODB.Recordset")
        RS.Open "komen", Conn, , 3, 2

        RS.AddNew
        RS("ProId") = PropoID
        RS("LecturerUserID") = strLecturer
        RS("Komen") = Comment
        RS.Update
        RS.Close
        Set RS=NOthing
```

```
Dim bolFound, Marks

        Set RS = Server.CreateObject("ADODB.Recordset")
        RS.Open "Proposal", Conn, , 3, 2
        bolFound = False

        Do While Not (RS.EOF OR bolFound)
                If (StrComp(RS("ProID"), PropoID, vbTextCompare) = 0) Then
                        bolFound = True
                Else
                        RS.MoveNext
                End If
        Loop
```

Figure 6.3.3 (a): Sample code to evaluate student's proposal.

```
<%
Dim Conn, RS, strUsername, bolFound, strPwd, strOldPass

strUsername = Request.Cookies ( "LecturerID" )
strPwd = TRIM(Request.form("Newpwd"))
strOldPass = TRIM(Request.form("Oldpwd"))

Set Conn = Server.CreateObject("ADODB.Connection")
Conn.ConnectionString = "DRIVER={Microsoft Access Driver (*.mdb)};" & _
                "DBQ=" & Server.MapPath("Data/data.mdb")
Conn.Open

        Set RS = Server.CreateObject("ADODB.Recordset")
        RS.Open "pensyarah", Conn, , 3, 2

'try to find user entry in table
```

```
        Do Until RS.EOF OR bolFound
                IF (StrComp(RS("LecturerUserId"), strUsername, _
                        vbTextCompare) = 0) Then
                    'found it
                    BolFound = True
                Else
                    RS.MoveNext
                End If
        LOOP

'if passwords do not match, display message
If Not (StrComp(RS("Password"), strOldPass, _
                    vbBinaryCompare) = 0) Then
                RS.Close
                Set RS = Nothing
                Conn.Close
                Set Conn = Nothing
                Response.Redirect "lecturererror.asp"
Else
        RS("Password") = strPwd
        RS.Update
        RS.Close
        Set RS = Nothing
        Conn.Close
        Set Conn = Nothing
        Response.Redirect "lecrightpass.asp"
        End If
%>
```

Figure 6.3.3 (b): Sample code lecturer changing password.

6.4 Conclusion

In this chapter I have discussed the function of each module. This system consists of 3 main modules which is student module, administrator module and lecturer module. Each module is implemented using Active Server Pages (ASP) with the help of Macromedia Dreamweaver MX and Microsoft Front Page 2000. Some example of the sample codes are enclosed in this chapter.

CHAPTER 7
SYSTEM TESTING

CHAPTER 7
SYSTEM TESTING

7.1 Introduction

System testing is the analysis and validation of the product as a whole. System testing encompasses all product components, including both hardware and software. Its purpose is to verify that all essential functions and features are present and working properly.

System testing often includes testing the system's performance, stability and response time, besides validating that all system components working as intended. System testing can also include a wide range of industry standard tests. These may be performed separately on each system component, jointly on multiple system components, or both. Standard tests commonly use to validate a system may include, but are not limited to:

i. Functionality testing to determine how well your product functions based on its stated design specifications.

ii. Performance testing to identify whether your product functions within the expected performance parameters, and to allow you to compare your product's performance against its competitors.

iii. Stress/load testing to verify your system's ability to successfully handle excessive amounts or challenging types of input data.

iv. Compatibility testing to validate your system's ability to functions smoothly with each of the various hardware devices and software programs for which you designed and built it.

The goal of testing is to find out the errors and faults in the coding. Therefore, a systematically test procedure is needed to make sure that the system is tested thoroughly and completely. There are several stages of testing conducted in this project, it is shown in Figure 7.1 and each stage will be discussed in the sub chapters as following.

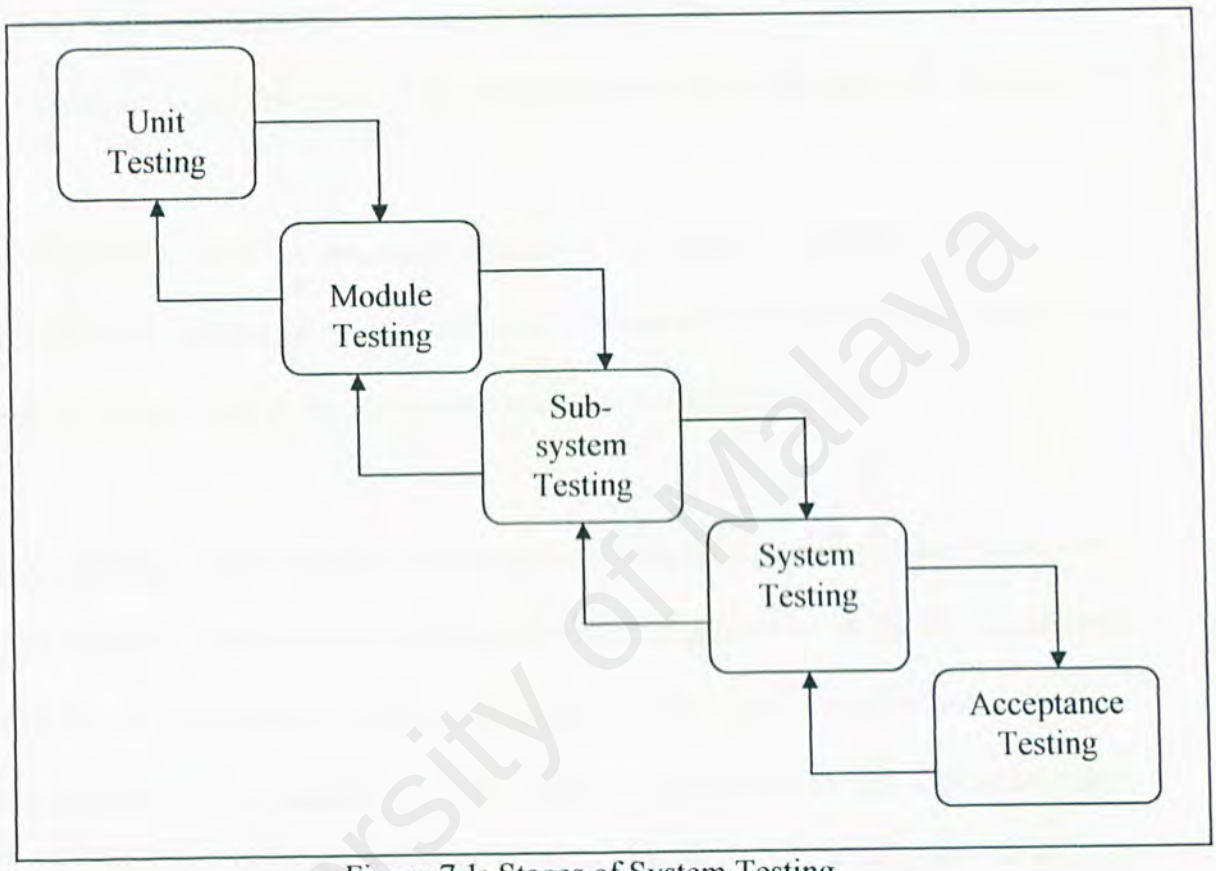

Figure 7.1: Stages of System Testing

7.2 Definition of Unit, Component and Integration Testing

Unit is the smallest compliable component. A unit typically is the work of one programmer (at least in principle). As defined, it does not include any sub-components (for procedural languages) or communicating components in general.

In unit testing, called components or communicating components are replaced with stubs, simulators or trusted components. Calling components are replaced with drivers or trusted super-components. The unit is tested in isolation.

Component is the integration of one or more units. The reason for "one or more" as contrasted to "two or more" is to allow for components that call themselves recursively. Component testing is the same as unit testing except that all stubs and simulators are replaced with the real thing. Two components (actually one or more) are integrated when:

a) They have been compiled, linked and loaded together.

b) They have successfully passed the integration tests at the interface between them.

Thus, component A and B are integrated to create a new, larger component (A,B). Note that this does not conflict with the idea of incremental integration-it just means that A is a big component and B, the component added, is a small one.

Integration testing means carrying out integration tests. Integration test for procedural languages is easily generalized for Object Oriented languages by using the equivalent constructs for message passing. In the following, the word "call" is to be understood in the most general sense of a data flow and is not restricted to just formal subroutine calls and returns – for example, passage of data through global data structures and/or the use of pointers.

As to be difference between integration and system testing, system testing specifically goes after behaviors and bugs that are properties of the entire system as distinct from properties attributable to components (unless, of course, the component in question is the entire system). Example of system testing issues includes resource loss bugs, throughput

bugs, performance, security, recovery, transaction synchronization bugs (often misnamed "timing bugs") and many others.

7.3 Unit Test

Unit test is the test of the software elements at the lowest level of development. Units may be aggregates of software elements. Planning for unit test should occur concurrently with the software design activity. Reused software will probably not undergo unit test, unless changes were made to these unit. Then, appropriate testing is performed as in regression testing.

In general, the steps for unit test are:

1. Test planning – Establish the objectives of the unit test, the strategies to be employed, the coverage requirements, reporting and analysis, and closeout of anomalies.
2. Generate, monitor and update the unit test plan to accomplish objectives.
3. Trace test design, cases, procedures and execution results to the unit designs.
4. Confirm that anomalies during test are software anomalies and not problems detected for other reasons.
5. Generate test cases and procedures – Develop test cases and procedures for unit test and continue tracing as required by software test plans.
6. Perform unit test – Check individual software units for typographical, syntactic and logic errors to ensure that each correctly implements the software design and satisfies the software requirements; execute the test cases; analyze results to verify anomalies; recommend changes to software design or code; and conduct retesting as necessary.

7. Document test activities and result.

Before a user can access certain sites of Sistem Latihan Ilmiah, he/she must have a valid User ID. Only then, he/she can login to the system. The following table shows the testing procedures to check the User ID.

Table 7.3.1(a): Test Case for Sistem Latihan Ilmiah Login Function

No	**Test Procedure**	**Output**	**Analysis of Test Result and Solution**
1	Insert a valid User ID and password into the login page.	Able to login to the system successfully.	Successfully login to the system. Objective is to be able to login to the system.
2	Insert a valid User ID and invalid password.	Login is denied	Login is denied. User is redirected back to the login page to try again. Objective is to prevent any unregistered user from login to the system.
3	Insert an invalid User ID.	Login is denied.	Login is denied. User is redirected back to the login page to try again. Objective is to prevent any unregistered user from login to the system.
4	Case 2 or 3 is repeated more than once.	Login is denied.	Login is denied until the correct User ID and password is provided. Objective is to prevent any unregistered user from login to the system.

Table 7.3.1(b) (part1): Valid inputs for the lecturer user ID function

Specification	**Valid class**	**Invalid class**
4 digit integer	0001-9999	< 4digit >4 digit not integer

Table 7.3.1 (b) (part2): Values that are being use to test the lecturer user ID function

Class	**Testing value**	**Output**
Valid	5845	Correct input
Invalid class	-1	Prompt error message

Invalid class	378	Prompt error message
Invalid class	Mega	Prompt error message

Table 7.3.1 (c)(part1): Valid inputs for the student password function

Specification	Valid class	Invalid class
Characters (minimum 6 characters and maximum 12 characters)	>6 characters <12 characters	<6 characters >12 characters

Table 7.3.1 (c) (part2): Values that are being use to test the student password function

Class	Testing value	Output
Valid input	123456	Correct input
Invalid input	-123	Prompt error message
Invalid input	Mega	Prompt error message
Valid input	Megala	Correct input

7.4 System Test

System test, in the context of software V&V, involves the conduct of tests to execute the complete integrated system. Software system test is the validation that the software meets its requirements. Validation of the complete system may involve many tests involving all system components. The software system tests exercise those system functions that invoke software to determine whether the software behaves as intended relative to complete system performance. These tests must be conducted in such a manner as to stress the system based on software responses to system inputs (e.g., from sensors, operators, databases). Tests and data collected from the tests are

designed to provide an operational profile of the system, which support a statistical analysis of the system reliability. This section of the report addresses only the tests that validate that the software implements the system requirements; other tests for other components and perspectives are necessary for complete system validation.

In Sistem Latihan Ilmiah (SLI), **white box testing** was used to test the system. White box testing basiclly involves looking at two structure of the code. It focuses on the idea of coverage. The main objective of white box testing would be to check for missing function. In Sistem Latihan Ilmiah(SLI) the white box testing was applied in the field of whether student under particular lecturer are being displayed correctly or not. Besides that white box testing was also used in order to check wether student proposal are being displayed correctly into the lecturer's account or not. Besides white box testing, interface test was also being carried out. In interface test, all the interface was tested in order for it to follow the correct flow.

7.5 Acceptance Test

This is the final stage in the testing process before the system is accepted for operational use. This usability testing is done and performed by the users. The choice of tests to be used was made by the users.

A user manual should be the source of the test. All of the errors found in the testing were reported to the developer of Sistem Latihan Ilmiah. Then, modifications can be carried out until the final release of the system.

7.6 Software Installation Test

The software installation test activity is the final step before launching full customer acceptance testing. The purpose of installation test is to demonstrate that the correct software has been delivered and that the software interfaces are correct relative to any interfaces at the installation site. Acceptance testing, which involves the user/customer, is outside the scope of this document.

7.7 Conclusion

In this chapter, I have discussed about the types of test which was carried out on Sistem Latihan Ilmiah in order for the system to work perfectly. Types of test which was carried out are unit test, white box test, acceptance test and software installation test.

CHAPTER 8
SYSTEM EVALUATION

CHAPTER 8
SYSTEM EVALUATION

8.1 Introduction

After system testing for the Sistem Latihan Ilmiah, the end product was brought up for system evaluation. After the system had been completed for the first time, it had been sent to several end-users to test it. There are many evaluation techniques that use to evaluate the final system. The purpose of the system evaluation is to highlight the strengths, limitations, constraints and possible future enhancement of the developed and completed system. The results gathered from the user testing stage are of a very good means of system evaluation. The following section will explain in detail about the system strengths and its limitations.

8.2 System Strengths

Sistem Latihan Ilmiah has got a few strengths. The strengths are as said below:

i. Students can choose the lecturer which they want according to the space available for the particular lecturer.

ii. Students can view the titles uploaded by the lecturer. If they are interested in that particular title, they can send in their application. Once the application is being sent, a unique number will be generated for the reference of the student.

iii. Students can check for the status of their application form using the unique number which was generated earlier.

iv. Besides selecting lecturer's title, student can send in their own proposal through this Sistem Latihan Ilmiah.

v. Lecturers can evaluate students application through this system and send in the result to the particular students account. This will save a lot of time.

vi. Lecturer's can also add their own title and edit them through this system.

vii. All the transaction in this system has relatively fast response time.

viii. The system will return error message if it detect inconsistencies.

ix. Sistem Latihan Ilmiah provides error messages when a user attempts to perform illegal actions, forget to insert or select the combo box. Notification will also provided after the completion of certain functions.

8.3 System Limitations

Sistem Latihan Ilmiah has got some limitation. The limitation are as said below:

i. Sistem Latihan Ilmiah is only meant for undergraduate students.

ii. Sistem Latihan Ilmiah can only be modified by authorized people.

iii. In Sistem Latihan Ilmiah (SLI), there isn't any function to retrive your password if the user happens to forget his/her password.

iv. The system does not get to detect when student send in their proposal to other lecturer.

8.4 Future Enhancement

Even though Sistem Latihan Ilmiah (SLI) have got a lot of strengths but it need some future enhancement to make it to be a perfect system in time to come. The future enhancement's, which is needed by Sistem Latihan Ilmiah are:

i. Retrieve the student records from Faculty SIS (Student Information System) database into Sistem Latihan Ilmiah database so that administrator do not need to key in the students information manually.

ii. The system should detect when the student send their proposal to other lecturer.

iii. Another feature this system should have is an online help facilities.

iv. The system should be modified so it can be even used by postgraduate students.

8.5 Problems Encountered And Solutions

Throughout the development of SAMS, a number of problems were encountered. Below are some of the problems found during the development of SAMS and the solutions of it.

8.5.1 Problem In Development Tools And Languages Selection

After the system analysis was done, I had the difficulties to select the most appropriate tools and languages in system development. This is because I myself have the limited knowledge of the Web based programming.

To overcome this problem, I have tried to gain more information of web-based programming and identified the most appropriate approach to develop Sistem Latihan Ilmiah (SLI). Depth studies and research on the Web-based programming language was carried out in the earlier stage of the development. Besides, discussions with course

mates and opinion from seniors was collected and all of these help to finalize the development tools and languages.

8.5.2 Lack Of Knowledge In Languages

The learning and developing process was carried out in parallel due to the time constraint. Without a strong base of the languages such as ASP scripting, JavaScript and VB Script, I have to spend a lot of time looking for solutions of the problem occurred during the system development. This was usually happen to cases related to concepts of language that were new for me. The difficulty is solved through reference books, tutorial downloaded from Internet and also the assistance of my course mates.

8.6 Conclusion

In this chapter I have discussed about the system strengths, limitation and future enhancements. Besides that I have also discussed about the problems I have faced while developing this system and the solutions for the problems.

CHAPTER 9
CONCLUSION

CHAPTER 9
CONCLUSION

9.1 Conclusion

As a conclusion, Sistem Latihan Ilmiah will be design as a Web based system with three different modules, each for a different group of target users. The three modules are student module, lecturer module and administrator module. The main objective of Sistem Latihan Ilmiah (SLI) is to help the students to select their thesis title straight on line.

Other objectives include:

i. Enable student to view their thesis title status straight on line.

ii. Enhance the quality of the relationship between advisors and students

iii. Provide a repository to store student's thesis title records.

Sistem Latihan Ilmiah was developed using ASP, HTML and VBScript. The development tool for this project is Macromedia Dreamweaver MX and Microsoft Front Page 2000. Microsoft Access was used as a database platform. Other software requirements are Microsoft Windows XP Professional, Internet Information Service (IIS) 5.0, and Internet Explorer 5.5. The methodology chosen for the development of Sistem Latihan Ilmiah is V model. Upon completion of this project, student, lecturer and administrator will a more convenient system for managing issues related thesis.

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