Student Society Information System (SSIS)

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ABSTRACT

This is a project proposal report of the WXES3181 subject and a project report of the WXES3182 subject, taken by the final year student of Faculty of Computer Science and Information Technology (FSKTM). It is a delineation of intended project describing the proposed idea supported by a literature survey, its plan and design.

The system to be developed by the author is a web-based system intends to manage and store the information of the society in the University Malaya, besides providing society information such as society and activity list on the Internet. The software knowledge used to develop the system covers the Microsoft Visual Interdev6, ASP2.0, SQL Server Database7.0, Internet Information Server5.0 and so on.

The main user of the system is the HEP's staff that responsible to the society information management. The system enables the FSKTM management level to keep track the society information and its activities. Since this system will display information through Internet, its information will be viewed by all of the students and then they will gain the benefit from it. The on-line's user who need that information also get advantages from the system.

The current system used to manage the society information is carried on manually and most information is documented in paper. The current system faces a problem that the effectiveness of keeping track the society information and the smoothness of retrieving information is not satisfied enough.

Pursuing the trend of moving forward to the office automation and paperless era, the computerization of the society information management will enable the process carried out in a more smoothly, effectively, efficiently and economically way. Hopefully the system will contribute to the achievement of the E-Faculty and E-University.

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Contents

Part 2 SYSTEM DOCUMENTATION

CHAPTER 5 : SYSTEM DESIGN

CHAPTER 6 : IMPLEMENTATION

CHAPTER 7 : TESTING AND EVALUATION

CHAPTER 8 : CONCLUSIONS AND RECOMMENDATION

List of Figures

Part 1

Part 2

List of Tables

Part 1

Part 2

PART 1: SYSTEM PROPOSAL

CHAPTER 1 INTRODUCTION

1.1 Project Introduction

The project to be developed is a computer system that manages the society information of the FSKTM. The project is one of the e-Faculty group projects, which is under the e-Universiti. E-University is proposed to address the problems inherent in the public universities. E-University is hoped to achieve dramatic improvements at all levels of implementation. The detail description of the e-University will be described in chapter two. There is a group of student following up the e-Faculty project. The author and his course-mates are proposed to the different project title. However, all of the project titles are related to the faculty and may share the same database.

The project scope is within the faculty, where the produced system will be used in the faculty. However, the author found that there is only a society in FSKTM. Obviously, this has decreased the significance of the proposed system. As a result of that, the author decides to change the project scope from "faculty" to "university". In other words, the produced system would be applied in university to store the information of the societies that registered in University Malaya.

There are three main parties involve in the current system, which are HEP, student's society and student. HEP is responsible to manage all the data and information regard to the societies in university. The societies must interact with HEP whenever they want to carry out their activities in university. They have to follow the rules and the formal procedures in doing so. The students are important in the current system because they may join the societies as committee or join the societies' activities. These three parties are playing important role while we go through this proposal.

1.2 Project Objectives

The objectives of developing this project are as follows:

1. Store and retrieve information

   The developing system includes an application used to store the society's information. The basic information covers its particulars, whole year plan, brief activities report and so on. The system will simplify the information storage and the retrieving process. The related staffs manage the society information when they are on-line.

2. Keep track society's activities

   The society's information can be viewed easily at any time and anywhere whenever the user on-line. The management level and the related staff will know the current and the latest news of the society. They are 86 societies information kept track in the system.

3. Display applying results

   The system shows the results of the applying of the societies. The societies committee are able to know whether their apply is approved or rejected by HEP when they are on-line.

1.3 Project Scope

The Society Information Project can manage more than one society's information. The new system is divided into two major modules, which are administrator and user module. The administrator module will receive information in the paper type from the society and the other sources. They include:

- Society particulars
- Annual meeting report
- Society's whole year plan
- Activity proposal
- Activity Report
- Society registration procedures
- Activity running procedure

The staff has to key in the brief data from the paper's information. That means, the staff is no need to enter all of the data on the paper.

On the other hand, the user module will retrieve information from the database that store the data and display it to the students. The data covers:

- Society particulars
- Society's whole year plan
- Society registration procedures
- Activity running procedure

1.4 PROJECT SIGNIFICANCE

Below are the importance and the advantages of the proposed system:

Provide an environment for the collaboration and interaction between faculty and society.

Since the faculty knows society very well includes its activities, situation and so on, the society can get helps where they need from the faculty easier. The faculty can interact successfully with the society because of knowing each other. Besides, the faculty may need the society's help to send some message to the students or to achieve some objectives concern with the faculty through the society's activities. After seeing some activity showed on-line, which is suitable, the faculty will try to communicate with the society. The collaboration between faculty and the society certainly will benefit both of themselves and also the students.

2. Introduction of the society

The society has the chance to promote itself to the students within and also outside the faculty. The students will know the activities of the society in the whole

year. They may interest of the activities and thus the related activities will gain a satisfy reaction from the students.

3. Common society knowledge

   The society section of the FSKTM home page will also present some common society information. The information covers the society registration procedures, procedures of carry out an activities in UM and so on. The students outside the faculty will also gain the benefit of knowing this common knowledge. The societies committee especially the first year student will know better the situation and rules of running an activity in UM.

4. Contribute to the e-Faculty

   This computer system tries to start the trend of moving forward to the paper-less and automation office area. It desires to enhance and improve the implementation quality of the society information management process. Besides contribute to the e-Faculty project, it also helps to success the e-University project.

1.5 Limitation

This web page module is not intends to create a society home page for the FSKTM Society. This web page's objectives are present the current situation of societies in FSKTM and provide some guideline concern of society registration and the procedures of running an activity. There is no space retained for the societies to design according to their favorite style and promote their home page. If they have their home page that they want to link to the user module, they need to get permission from the faculty.

The related staff that maintains the user module's information needs to update the latest information to it because some information may change after a certain time. For example, the society information will change annually and the common society information may change according to the university's policy.

1.6 Project Schedule

To achieve the project objectives, a project schedule is planned to manage the time for the tasks that needed to be accomplished.

Table 1.1: Project Schedule

ALPS Project Schedule (Jul 2000 – February 2001)								
Key Activity	Jul 2000	Aug 2000	Sept 2000	Oct 2000	Nov 2000	Dec 2000	Jan 2001	Feb 2001
System Study								
Requirements Analysis								
Design								
Coding								
Testing								
Documentation								

CHAPTER 2 LITERATURE REVIEW

2.1Purpose

Review of literature is a background study about the knowledge and information gained to develop this project. The purpose of this review of literature is to get the better understanding on the development tools and techniques that can be used in the development process. It enables the author to get more knowledge on the development methodologies used in the project.

Apart from that, the review of literature also enables the developer to have an overview of how to improve the weakness of the current system and fulfill the requirement needed.

2.2 Approach

A system is a regularly interacting or independent group of elements forming a unified whole. Thus, a system is a collection of related parts treated as a unit where its components interact among them [4]. Before developing of a system, a lot of information needed to be gathered. The information includes the real system information, the developing procedures and the methodologies the can be applied. There are many sources to obtain the information.

The resources are system user, computer programs, procedure manuals, forms and documents, books and Internet. The system users can be considered includes the individual and organization that involved in the system. The information can be gained through the observation of the user activities and behaviors, questionnaires or interviews. The computer program includes the current used program (if exist), the past-developed programs and the related programs. The information gained in this context covers the program documentation, data structures and the processes that involved.

Procedure manual specifies user activities that important in detailed system design. On the other hand, reports indicate the kinds of outputs needed by the users. Form and documents are useful sources of information relate to the system's data flow and transactions. If these sources are being used, the most recent and relevant forms and documents must be obtained and examined [1].

There a lot of books can be referred to obtain the knowledge, ancient experiences, and the information needed. The books able to give detail description and information to the author. Besides that, the Internet is a helpful source that much current and valuable information can be obtained easily. The information can be gained from various sites on software, methodology and tools to be used in the developing process. The available search engines include Yahoo, Altavista, MSN, Excite search and so on.

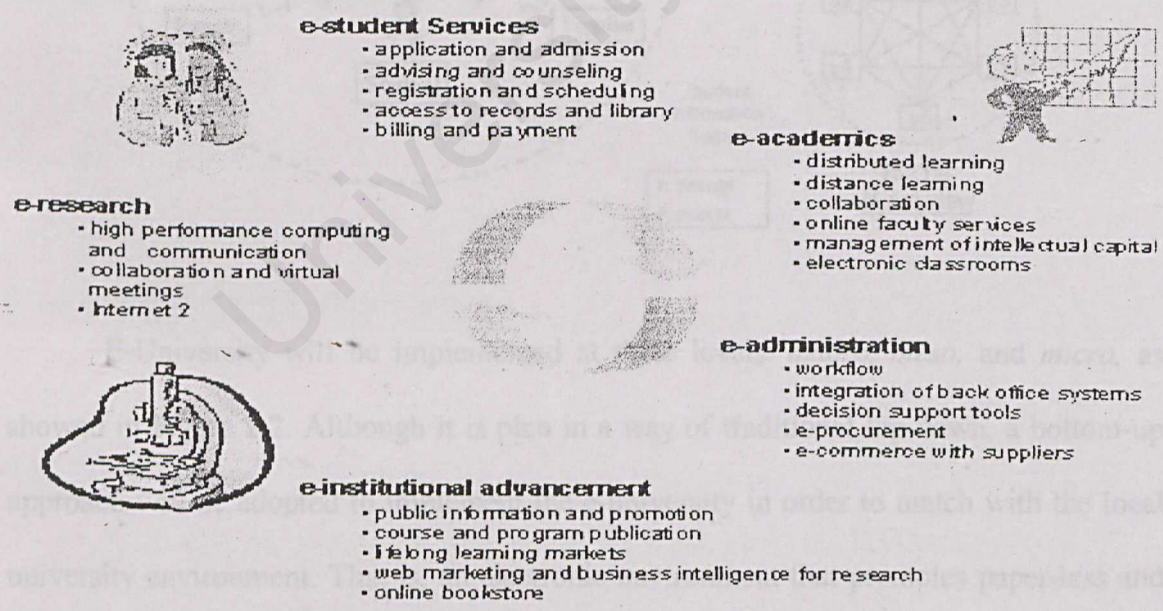
2.3 Findings

2.3.1 E-University

E-University can best be defined as a conceptual model that incorporates stability (*traditionalist*), opportunities (*progressivist*), production efficiency (*enterprising*), and values that meets the expectations of the society (*social constructivism*). The proposed mission of the e-University is stated below:

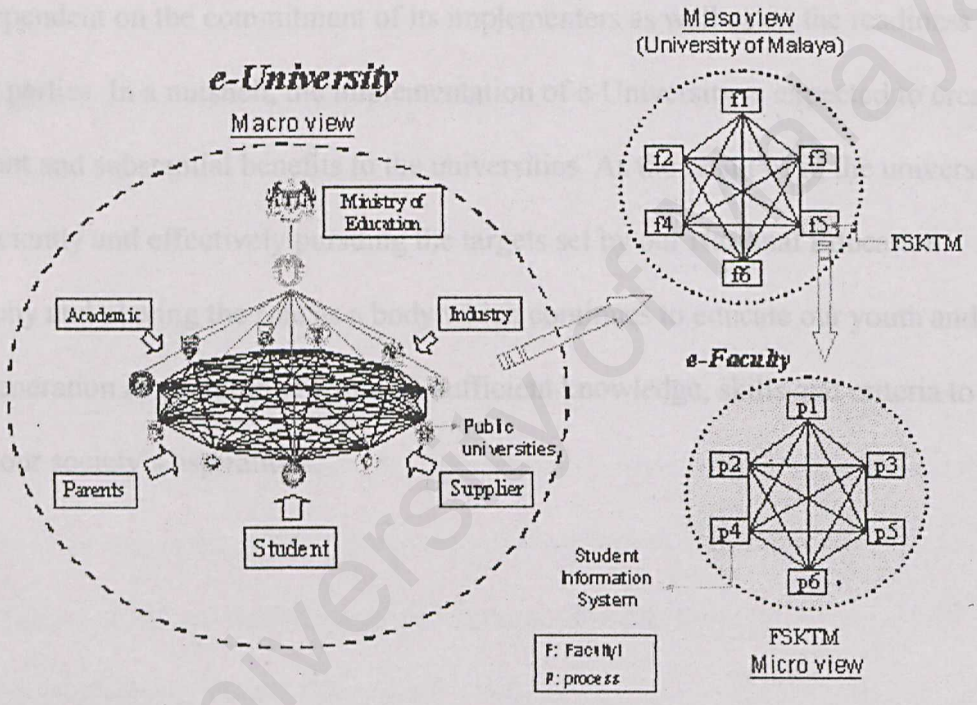
- High availability of ICT
- Integrated and accessible information systems
- A critical mass of technology users (faculty, students, and staff)
- Improved products (teaching and learning materials) and services to internal and external clients
- Improved collaboration with other institutions

Figure 2.1: Operational/business model of the e-University



adapted from Bernbrock (2000) model to suit the environment and the needs of Malaysian public universities. The model consists of 5 core processes, which are academic, administrative, student services, research, and institutional advancement. The student services process includes the application and admission, advising and counseling, registration and scheduling, accessing to records and library as well as billing and payment. The author's project is under the student services, which involves the first four processes of it.

Figure 2.2: An overview of e-University



E-University will be implemented at three levels: *macro, meso,* and *micro,* as showed in Figure 2.2. Although it is plan in a way of traditional top-down, a bottom-up approach will be adopted to implement the e-university in order to match with the local university environment. That is, an electronic environment that promotes paper-less and system's efficiency. The first level of the implementation will be at the faculty. Upon the

successful implementation at the faculty level, the next implementation will be at each public university. The author' system is considered in the faculty level, which applied in the faculty FSKTM and also a little relates to the university level, which the system linked to the university home page. The macro level will see all the reengineered public universities connected to each other through an integrated network.

E-University is proposed to address the problems inherent in the public universities. E-University is hoped to achieve dramatic improvements at all levels of implementation. However, the implementation success of e-University will be very much dependent on the commitment of its implementers as well as on the readiness of the affected parties. In a nutshell, the implementation of e-University is expected to create significant and substantial benefits to the universities. As the result of it, the universities will efficiently and effectively pursuing the targets set by our National Education Philosophy and playing the role as a body which continues to educate our youth and future generation in equipping them with sufficient knowledge, skills and criteria to support our society's aspirations.

2.3.2 Business Process Reengineering

The New World Of Business

From the end World War II to nowadays, the market structure has changed tremendously. With trade barrier falling, competition intensifies by oversee competitors.

The market is driven by customers because of excess suppliers. Customers take charge and demand products and services that are designed for their unique need. As the needs and tastes of the customers change constantly, the nature of change has also changed; it has become both pervasive and persistent. Under the of notion of the division of labour principle that divides process into small and clearly defined tasks, classical business structures are no longer suitable in a world where competition, customers and change demand flexibility and quick response. A good example to show this is order-fulfilment. It starts when a customer places an order and ends when the goods are delivered. The process typically involves a dozen or so steps that are performed by different people in different departments. Clearly, there are no customer service and no flexibility to respond to special requests. No-one is responsible for the whole process and can tell a customer when the order will arrive. Furthermore, the order passing across different departments makes the process error-prone and also delays progress at every hand-off. There are still many further problems. In particular, people working in different departments look inward and upward toward their boss and department, rather than outward toward their customers. The notion of business process re-engineering addresses the problems of the way we should work and the hierarchical structure of organisations.

Definition of Business Process Reengineering (BPR)

The term 'reengineering' was first introduced in 1990 in a Harvard Business Review article: Reengineering Work: Don't Automate Obliterate. The article's author was Michael Hammer, a former Computer Science professor at the Massachusetts Institute of Technology. Hammer then went on to develop the concept further in a book:

Reengineering is not about making marginal improvements or modification but about achieving dramatic improvements in performance. There are three kinds of companies that undertake reengineering in general. First are companies that find themselves in deep trouble. They have no choice. Second are companies that foresee themselves in trouble because of changing economic environment. Third are companies that are in the peak conditions. They see reengineering as a chance to further their lead over their competitors.

Keyword: *Processes*

Process is the most important concept in reengineering. In classic business structure, organisation are divided into departments, and process is separated into simplest tasks distributing across the departments. The preceding order-fulfilment example shows that the fragmented tasks - receiving the order form, picking the goods from the warehouses and so forth - are delayed by the artificial departmental boundaries. This type of task-based thinking needs to shift to process-based thinking in order to gain efficiency. The following example is taken from Hammer and Champy to illustrate the characteristics of reengineering - fundamental, radical, dramatic, and especially process.

The Enabling Role of Information Technology

Information technology (IT) plays a crucial role in business reengineering and is an essential enabler. However, most people misuse the technology. They look at the technology through the lens of their existing tasks. i.e. they only computerize the old existing tasks.

State of the art information technology allows to break conventional rules/assumptions of processes. These rules were designed when the processes were created. Therefore, the rules may be no longer valid nowadays.

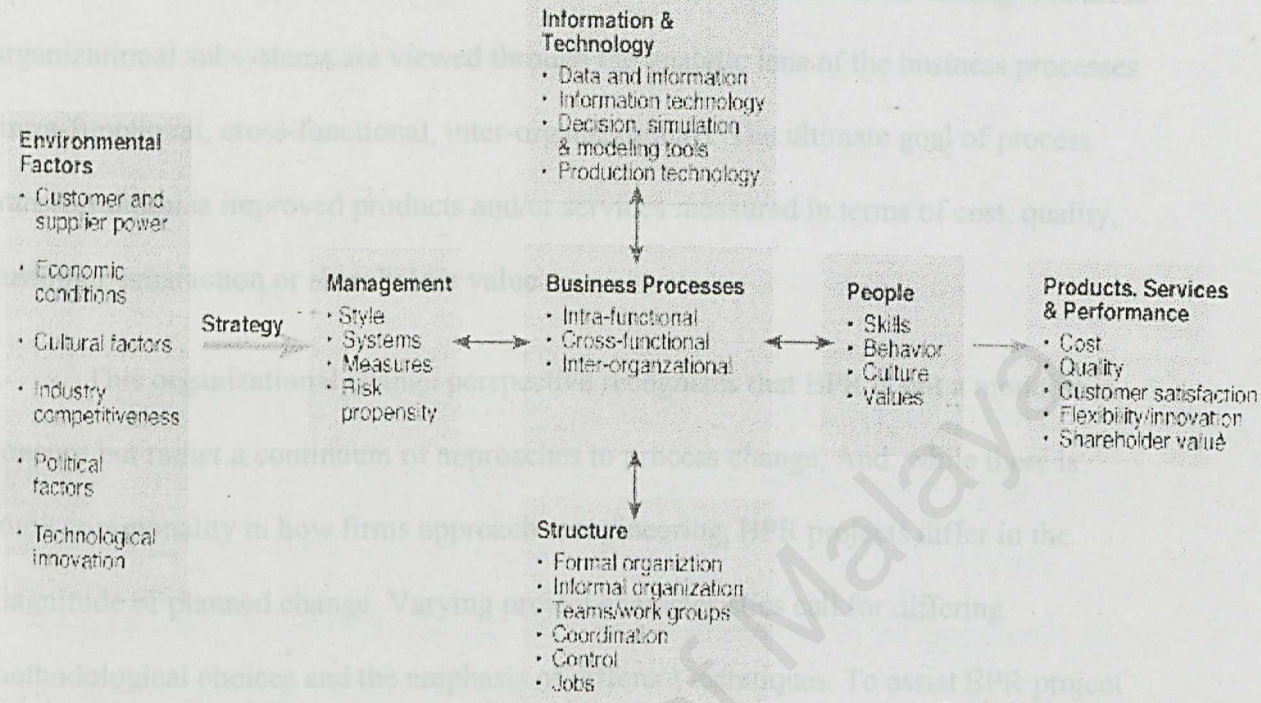
IT should not be involved in redesign process. Redesigning process is like programming. When solving a problem, we first outline and design the solution at the top level, then implement it by a suitable language, e.g. C or Prolog. The language itself should never be constrained the design. It is the same idea that a specific IT should not be constrained the redesign in reengineering. After the redesign, we then should seek for the best technology to implement it. Similarly, past investments in IT should not be allowed to constrain the redesign. Reengineering is about to reinvent processes. IT is just a tool.

Discussion on BPR

Over the past decade, firms have faced unprecedented change: globalization, political realignments, recession and the rapid advance of information technology. Against this backdrop the concept of BPR quickly caught the imagination of corporate leaders. Early BPR success stories pushed most IS executives to participate in, or lead, process redesign projects. Fueled by BPR's continued growth, there has been a corresponding flood of BPR consultants and a proliferation of methodologies, techniques and tools (MTTs) for conducting BPR projects. Faced with this onslaught, BPR project planners are often confused as to which methods are best suited for the project at hand.

Adding to this confusion, there has been a lack of consensus on precisely what makes up a proto-typical BPR project. Early consultants prescribed BPR "principles" that demanded *radical* change. For example, Hammer (1990) strongly advocated process "obliteration." His guiding concepts pushed strong top-down leadership, information technology (IT) enablement, parallel processing and employee empowerment (Hammer and Champy, 1993). However, with time the "absoluteness" of these guidelines was dispelled as "Myth" (Davenport and Stoddard, 1994). For example, even in BPR's early years, "clean slate" BPR was not universally practiced. Stoddard and Jarvenpaa (1995) found BPR projects often attempted "revolutionary" (radical) change but due to political, organizational and resource constraints, took on "evolutionary" (incremental) implementations. In practice, consultants tailored their BPR efforts to unique situational factors and many in-house BPR teams merely modified their existing Total Quality Management (TQM) methods to accommodate more proactive process changes on cross-functional business processes (Harkness, et. al., 1996). BPR practice continues to evolve with recent emphasis being placed on smaller projects implemented through fast-cycle methods and active "bottom-up" participation (Davenport, 1995). While this evolution adds new techniques and tools to the BPR arsenal, it has not, thus far, provided a BPR project planner with a universal method.

Figure 2.3: Business Process Change Model



Source: Kettinger and Grover, 1995

Rather than a "quick fix," BPR is increasingly recognized as a form of *organizational change* characterized by strategic transformation of interrelated organizational sub-systems producing varied levels of impact. The unique contribution of BPR over past organizational change approaches is its primary focus on the *business process*. A *process* is "a lateral or horizontal organizational form, that encapsulates the interdependence of tasks, roles, people, departments and functions required to provide a customer with a product or service" (Earl, 1994, p.13). Kettinger and Grover (1995) portray process change as strategy driven and based on an assessment of customer/supplier relationships and competitiveness factors. BPR projects typically

include attempts to transform the organizational subsystems of management (style, values, measures), people (jobs, skills, culture), information technology and organizational structures, including team and coordination mechanisms. Changes to these organizational subsystems are viewed through the analytic lens of the business processes (intra-functional, cross-functional, inter-organizational). The ultimate goal of process transformation is improved products and/or services measured in terms of cost, quality, customer satisfaction or shareholder value.

This organizational change perspective recognizes that BPR is not a monolithic concept but rather a continuum of approaches to process change. And, while there is some commonality in how firms approach reengineering, BPR projects differ in the magnitude of planned change. Varying project characteristics call for differing methodological choices and the emphasis of different techniques. To assist BPR project planners, the primary objective of this article is to empirically derive a BPR planning framework outlining the stages and activity of a BPR project archetype. This framework provides a point of comparison upon which contingent projects approaches can be planned. The authors then map commonly used BPR techniques and tools to this framework. Next, unique project characteristics that influence alternative configurations of this BPR project framework are identified as well as are the most appropriate techniques for the job. Finally, implications for practice, education and research are drawn.

Conclusion

The reengineering profoundly changes all aspects of business and people. Part of the organization is easy to change by reinventing a way to work. However, the other part,

people, is very difficult to change. In particular, it requires not only jobs and skills change but also people's styles - the ways in which they think and behave - and their attitudes - what they believe is important about their work. These are indispensable factors to determine whether reengineering succeeds or not. Leaders must help people to cope with these changes.

2.3.3 Current System

The current system has three parties, which are HEP, societies and student, as mentioned before. The author had interviewed these parties and also achieved the related data from some documents, such as "Activity management" handbook of "Seksyen Pembangunan dan Perhubungan Pelajar HEP, "sistem maklumat Pelajar Bersepadu" of "Bangunan Perkhidmatan Komputer"(BPK) and so on.

All the student societies are established under Act of "Seksyen 49, Jadual Perlembagaan Akta Universiti dan Akta Universiti & Kolej Universiti 1971". The registered student societies in University Malaya are managed by "Pendaftar Badan Pelajar"(PBP), which is a full-time University officer and has the power, function and duty that determined in "Statut Malaya". He is doing his job under the order of the "Majlis University" or "Timbalan Naib Cancelor"(TNC). The next level of the PBP is HEP before go to the student society. All of the information related to the registration, management and constitution of the student society are stated in "Statut University Malaya (Badan Pelajar)".

There are one project officer, one project officer assistant and two staffs in HEP that responsible to the society activity management. The staffs will serve the society

committees that come to the counter to make applying. The staffs have to arrange and record the documents of the related societies. These documents will be sent to the project officer for the next approval process. The project officer can be considered as an important person in the approval process. The higher level of the approval process normally will prove the applying if it had passed from the project officer. The interviewed project officer and ex-project officer had complained that the society committees seldom follow the correct procedure in applying process.

There are 86 registered societies in University Malaya. From the information given by project officer, there are around 43 societies active in their activities. To become a formal society in University Malaya, the related committee must firstly register to the "Majlis University Malaya" through the "Pejabat Timbalan Naib Canselor" (TNC). The societies in university run their activities under the Act of "Akta Universiti dan Kolej Universiti 1971 (Akta 30) and Akta Universiti dan Kolej Universiti (Pindaan), 1975 (Akta A295)". The committees could get the information regarding to the formal procedures in the "Activity management" handbook. The applying process normally takes a few days till a few weeks depend on the applying type. The applying includes running activity, poster, fund gathering, ad hoc committee registration, banner and so on.

Joining society activity is an important part of the university student's life besides the academic. They join the society to learn thing that is very useful when they step out from the university to the working area. They learn self-discipline, management skill, communication skill, collaboration, leadership experience, responsibility and so on. Thus, they get the impact of the proposed system very much. Their activity joining will be successful and efficient if the system that produced achieves its objectives. The

information they need is the list of the societies in university, whole year projects, activity around the corner and so on.

2.3.4 Other researchers work

During the literature process, the author had interviewed the Project Officer of HEP and found that there is a computer system used to store the society information in year 1996. However, the system was failed because of some reasons. As a customer of the system, the Project Officer said that there is lack of customer support for their staff to do the data entering. Besides that, some the of the database's data was corrupted and the system was not efficient as what they want. According to the Project Officer, Bangunan Perkhidmatan Kompter Universiti Malaya (BPK) maintained the old system when that system was being used. BPK is a department responsible to maintain some of the computer system in the university. Thus, the author goes to BPK for the detail and more technical information. In BPK, the author met the related staff, Miss Asiah Abu Samah and had gained some meaningful information. The system was developed by a software company, CaidMark Sdn Bhd and lunched in the year 1996. They used Oracle Developer in the development of the system. The system used Oracle Database to store the data and information. From her experience, Miss Asiah said that the ASP and the SQL Database is more superior for applying to the proposed system. These technology are popular in the market now days and had proved their ability of solving the problem such as multiple user, database security, access time and so on.

From the aspect of a technician or a system maintainer, she said that there is no time for BPK to do so much work on a such system, since there are many other computer system are need to maintained in the university. Besides that, the changes of the staff in HEP is so frequent that BPK does not have the time to give customer support so many times. Due to this reason, the staff in HEP could not handle the data entering job very well and thus lead to the incorrect data entering. Finally, the database was corrupted.

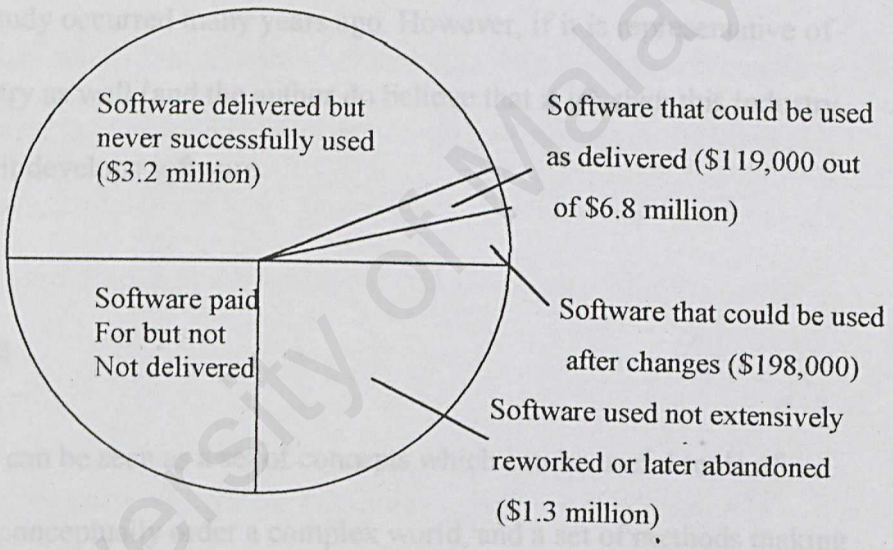
BPK had lent author the System Requirement Specification (SRS) of the old system. SRS is a formal document that states all the requirements of the system, which include the input and the function of the system. There are many important information of the current system stated in the SRS. The SRS specifies the objectives, scope, input (document), printed output, maintenance's aspect and so on. It also describes the current system and the proposed system. Studying the SRS made the situation of the problem domain a more clearer.

2.3.5 Software Engineering

Software engineering is the application of science principle to (1) the orderly transformation of a problem into a working software solution and (2) the subsequent maintenance of that software until the end of its useful life. Software engineering is more than just programming; the software engineering process initial version of the program has been completed. People and projects following an engineered approach to software development generally pass through a series of phases, or stages.

Writing software is an art as well as a science, and is important for student or computer science to understand why. Computer scientists and software engineer researches study computer study computer mechanisms and theory about how to make them mire productive of efficient. However, they also design computer system and write programs to perform task on those systems, a practice that involves a great deal of art, ingenuity and skill.

Figure 2.4: Nine software development contracts



With new application areas and the increasing complexity of problems that we are trying to solve with computers, there is a corresponding decrease in the probability of designing a correct solution. In 1979, the Government Accounting Office (GAO) published a report indicating that many, if not most, of the money spent on the software are being wasted. Figure 2.4 shows out the phenomenon. The GAO selected nine software development projects that were recently completed for the U.S. Federal Government. Although the size of the projects was quite small (the sum of the nine contracts was less than $7 million), the finding were depressing: Forty-seven percent of the dollars were spent for software that was never used! To make matters even worse, an

additional 29 percent of the dollars were spent for software that was never even delivered, and another 19 percent resulted in software that was either extensively reworked after delivery or abandoned after delivery but before the GAO study was conducted. All in all, that leaves very little for the success projects, some additional modifications were required to about $198K of it, and only $119K worth of the software could be used as delivered. That means that less than

Percent of the dollars spent resulted in software that met its requirements. The $119K happens to represent a project that was a preprocessor to a COBOL compiler. What made the project unique was that relatively simple, the requirements were well understood by all parties up front, and the requirements did not change during the course of the project. Obviously, the GAO study occurred many years ago. However, if it is representative of today's software industry as well (and the author do believe that it is), then this industry needs to improve how it develops software.

2.3.6 System Thinking

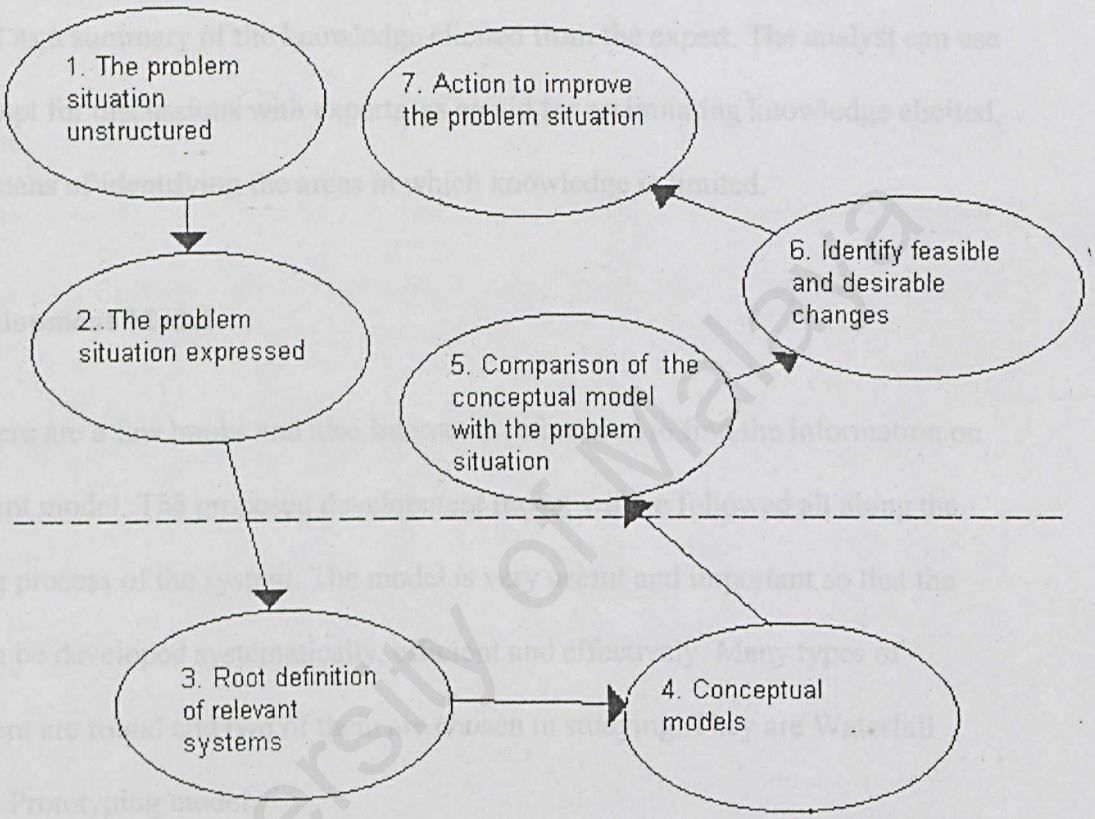
Systems theory can be seen as a set of concepts which can be useful tools of analysis, helping us to conceptually order a complex world, and a set of methods making use of those concepts.

The design and maintenance of information systems are activities which are pervaded by complexity. In dealing with complexity, it is relevant to identify relationships between entities which together constitute what we consider to be complex phenomena in reality. Systems theory or systems thinking can substantially contribute in such a process. The role of information in controlling activities and processes are dealt with in cybernetics, which constitutes a part of systems theory. Methodologies for

An SSM claim to fame is as a general problem solving methodology. Since it does not limit it self to specific methods or techniques, makes it robust and flexible in most situation. On the other hand, because it is robust and flexible, SSM is very hard to implement. It is hard to implement because it is hard to determine after each iteration whether we are converging or diverging towards a solution to the problem situation. Hence, we have to have a mechanism to evaluate after each iteration to determine whether we are converging or diverging towards a solution or improvement. For that very reason, present usage of SSM is more of a process evaluation, even though it still has the image of problem solver methodology. SSM like any techniques, can also be used to solicit Requirements to limited extend. In conclusion, it is up to the Requirements Engineer or Software Engineer to make the call and use SSM appropriately, accordingly, and in a timely manner where it makes sense to use it.[12]

Rich picture

Figure 2.5: Seven Stage Process of SSM



The Soft Systems Methodology is described by Wilson [13] as "a seven stage process of analysis which uses the concept of a human activity as a means of getting from finding out about the situation to taking action to improve the situation". Figure 2.5 shows the seven stages of the SSM.

The first two stages of Soft Systems Methodology involve the examination of the background of the problem. This is expressed the form of the "Rich Picture" (Figure 2.5)

which aims to show the elements of slow-to-change *structure* and elements of constantly-changing *process* within the situation being investigated.

The Rich Picture can be applied to the initial stages of the knowledge elicitation process to help develop a representation of relevant domains, and an understanding of the views of people within each domain. Stowell and West suggest that the Rich Picture is very useful as a summary of the knowledge elicited from the expert. The analyst can use it as a prompt for discussions with experts, as an aid for assimilating knowledge elicited, and as a means of identifying the areas in which knowledge is limited.

2.3.7 Development Model

There are a few books and also Internet is referenced to find the information on development model. The proposed development model will be followed all along the developing process of the system. The model is very useful and important so that the system can be developed systematically, efficient and effectively. Many types of development are found and two of them are chosen in studying. They are Waterfall model and Prototyping model.

System Development Life Cycle (SDLC)

The SDLC is a phased approach to analysis and design, which holds that system, are best developed the use of a specific cycle of analyst and user activities. This can be divided into seven sequential phases, although in reality the phase are interrelated and often are accomplished simultaneously. The seven phases are [5]:

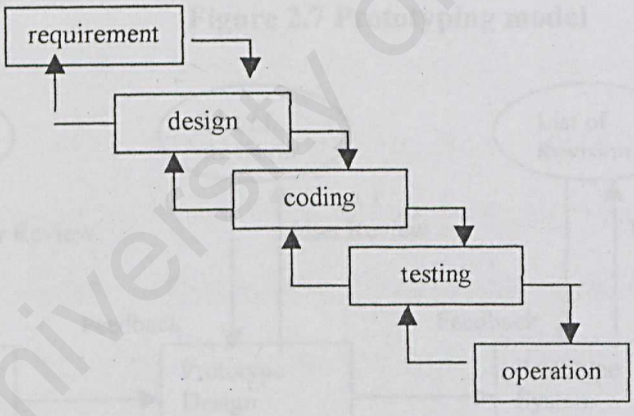
- Identifying problem, opportunities, and needs.
- Determining information requirements

- Analyzing system needs
- Designing the recommended system
- Developing and documenting software
- Testing and maintaining the system
- Implementing and evaluating the system

Waterfall Model

People and projects following an engineered approach to software development generally pass through a series of phases, or stage. Royce (Roy, 1970) was the first to coin the phrase "the waterfall model" to characterize the series of software engineering stages. Figure 1.3 shows the original model that Royce presented.

Figure 2.6: Standard Waterfall Life Cycle Model.



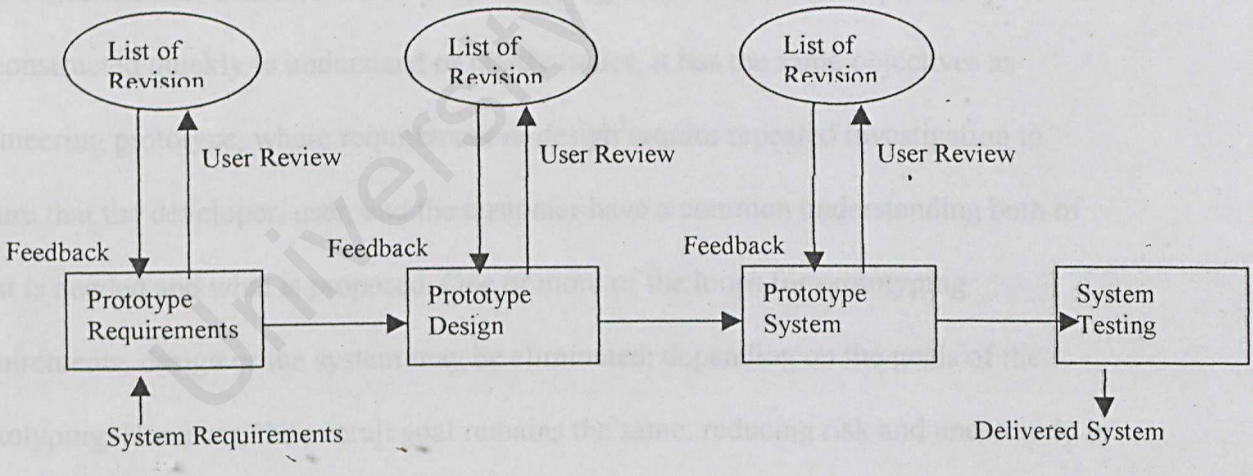
The stages are depicted as cascading from one to another. One development stage will be completed before going down to the next stage. The Waterfall Model presents a very high level view of what is going on during the development and it suggests to developers the sequence of events they expect to counter.

The waterfall model can be very useful in helping developers lay out what they need to do. Its simplicity makes it easy to explain to customers who are not familiar with software development. It makes explicit which intermediate products are necessary in order to begin the next stage of development [2].

Linear cycle phases of waterfall model cycle are chosen to encourage top-down problem solving. Designers must first define the problem to be solved and then use an ordered set of steps to reach a solution. The linear cycle gives the project direction, and provides guidance on what should be done as the project proceeds. It is integrated with the management process through reports on project status and keeping track of resource needs [1].

Prototyping Model

Figure 2.7 Prototyping model



Prototyping is an information-gathering technique useful for supplementing the traditional system development life cycle. When system analysts use prototyping, they are seeking user reactions, suggestions, innovations and revision plans in order to make

improvements to the prototype and thereby modify system plans with a minimum of expense and disruption [5]. Systems that support semi structured decision making (as decision support systems do) are prime candidates for prototyping.

Some analysts argue that prototyping should be considered as an alternative to the SDLC. Complaints about going through the SDLC center around two main concerns, which are interrelated [5]. The first concern is the extended time required to through the development life cycle. As the investment of analyst time increases, the cost of the delivered system rises proportionately. The second concern about using SDLC is that user requirements change over time. During the long interval between the time user requirements are analyzed and the finished system is delivered, user requirements are involving. Thus, because of the extended development cycle, the resulting system may be criticized for inadequately addressing current user information requirements.

Prototyping is often used to design a good user interface: the part of the system with which the user interacts. Since the prototyping model allows all or part of system to be constructed quickly to understand or clarify issues, it has the same objectives as engineering prototype, where requirement or design require repeated investigation to ensure that the developer, user, and the customer have a common understanding both of what is needed and what is proposed. One or more of the loops for prototyping requirements, design or the system may be eliminated, depending on the goals of the prototyping. However, the overall goal remains the same: reducing risk and uncertainly in development [2].

2.3.8 Client-server

Client-server is a network architecture where each computer of process on the network is either a client or a server. Client-server architecture is also called 2-tier architecture. It started becoming popular in the early nineties. There were two actually sub-types to this architecture: client-centric (smart client) and server-centric (smart server). Server is powerful computer or processor dedicated to managing disk drive (file server), printer (print server) or network traffic (network server). Clients are PC or workstation on which user run application. Client normally rely on server for resources, such as files, devices and even processing power.

Client-Centric

The client-centric version of client-server lived on the notion that PCs are cheap (the driving force behind most client-server development) and the users are going to get the most power when they distribute the computing requirements as much as possible. As such, whenever possible, only the data services piece of things was performed on the server. The business and the user interface side of thing was performed at the client. This thus ensuring that no one system had to all that much of the work. Every computer sort of did their fair share (at least, that was the idea). The problem faced by the client-centric client-server was and is bandwith. If all the business logic is on the client, there tends to be a very large numbers of round trips (network send and receives) between the client and the server. Frequently, large chunk of raw data are sent to the client. This quickly logging the network and slowdown anyone else trying to get their own huge blocks of data back and forth. Table 2.1 shows the advantages and the disadvantages of the cleint-centric system.

Table 2.1: Advantages and disadvantages of the client-centric client-server system.

Advantages	Disadvantages
Distribute the workload to a large number of relatively cheap clients.	Is a terrible bandwith hog, which clogs up network very quickly.
If one user needs more speed, a faster system must purchased just for him/her rather than a large expensive host system that everyone is going to take a piece of.	Installation are time-consuming and difficult to coordinate. New software or version of software must be installed on multiple machines. Version upgrades can be particularly problematic since old clients are not always compatible with the new server components and vice versa. All client may have to be upgraded at one time which can create quite a serious logistic problem.
The same money that buys the computing power on the client side also buys power for other productivity application such as	

word processing and spreadsheet application.	

Server-Centric

The server-centric still lives on the notion that computing power is cheaper in PCs than in host system, but tries to gain some of the advantages of centralized system. Only user services are distributed to the client. Only information that actually needs to be displayed on the screen is sent to the client. Business and data services remain at the server. Network bandwith is far more host system like. Table 2.2 shows the advantages and the disadvantages of this architecture.

Table 2.2: Advantages and disadvantages of the server-centric client-server system.

Advantages	Disadvantages
Some upgrades can be done entirely at the server level.	Other upgrades sill require a "touch" on every client computer where upgrades and new install are both very tedious and difficult logistically.
A large number of homogeneous product are available off-the-shelf and the pre-made software is cheap.	Long-running and heavy-load jobs by one user affect all users.
Since only the information to be displayed is sent on the network, there is little network bandwith comparatively to the	Large servers grow exponentially in price. Some are every bit as expensive as host system.

client-server model.	
	Though the model start to look like a host system model, there is considerably more downtime.

2.3.9 Software and Hardware

In order to develop a comprehensive system, related information of the development tools have been gathered from books and Internet.

Database Design

Databases and database technology are having a major impact on the growing use of computers. It is fair to say that database will play a critical role in almost all areas where computers are used, including business, engineering, and etc. A Database Management System (DBMS) is a collection of programs that enables users to create and maintain a database. The DBMS is hence a general-purpose software system that facilitates the processes of defining, constructing, and manipulating databases for various applications.

Controlling Redundancy

Redundancy occurs in database when much of the data is stored twice [7]. This redundancy in storing the same data multiple times leads to several problems. First, there is a need to perform a single logical update in multiple time. This leads to duplication of effort. Second, storage space is wasted when the same data is stored repeatedly, and this problem may be serious for large databases. Third, files that represent the same data may become inconsistent. This may happen because an update is applied to some of the files but not to others. For consistency, we should have a database design that stores each logical data item in only one place in the database. This does not permit any inconsistency, and it saves storage space.

Database Security

Security has always been a major concern when implementing information technology. However, the level of security that should be included in an information system involves some judgment about the dangers associated with the system and the resource implications of various means of avoiding or minimizing those dangers. Current thinking in information system security is that the issues center on confidentiality, integrity, and availability [8].

The information system is confidentiality when the information is only disclosed to those users who are authorized to have access to it. In the integrity information system, the information is modified only by those users who have the right to do so. When authorized users can access the information resources when needed, the system is availability.

Database security is concerned with the ability of the system to enforce a security policy governing the disclosure, modification or destruction of information. Humans

typically use a database as a technical tool for storing, processing and communicating information. The database relays the messages by persistently memorizing the corresponding data following the three phase procedure: 'accept message = = > store / process data = = > assemble, duplicate and communicate data on demand [9]. The quality of mediation is dependably assured by special protocols enforcing completion of transactions and integrity constraints on stored data. Mediation is shared among many users and is required to be efficient in time and space. We can classify the requirements for database security into four basic categories [9].

1. *The authorization policies*, which govern the disclosure and modification of information in the database (access control). We can identify three major types of authorization policies which include (as see below) the mandatory policies, the discretionary policies, and the personal knowledge approach.
2. *The data consistency policies*, which govern the consistency and correctness of information in the database. Three basic issues involved in this area are the integrity constraints, the database recovery policies, and the concurrency policies.
3. *The availability policies*, which govern the availability of the information in the database.
4. *The identification, authentication and audit policies*, which govern the identification and authentication procedures to be followed and the auditing policies for the database.

User Interface Design

The interface is the system for most users. However well or poorly designed, it stands as the representation of the system, and, by reflection, the competence as a systems analyst. We goal must be to design interface that help users and businesses get the information they need in and out of the system by addressing the following objective [5]:

1. Effectiveness as achieved through design of interface that allows users to access the system in a way that is congruent with their individual needs.
2. Efficiency as demonstrated through interfaces that increase speed of data entry and reduce errors.
3. User consideration as demonstrated in designing suitable interfaces and providing appropriate feedback to users from the system.

Productivity as show through following ergonomically sound principles of design for user interface and workspaces.

Active Server Pages (ASP)

Microsoft Active Server Pages (ASP) is a server-side scripting environment that you can use to create and run dynamic, interactive Web server applications. With ASP, you can combine HTML pages, script commands, and ActiveX components to create interactive Web pages or powerful Web-based applications. ASP applications are easy to develop and modify.

For the HTML Author

If you are an HTML author, you will find that ASP scripts are an easy way to begin creating interactive pages. If you have ever wanted to collect information from an HTML form, personalize an HTML document with a customer's name, or use different HTML features based on the browser, you will find that ASP provides a compelling solution. Previously, to collect information from an HTML form, you would have had to learn a programming language to build a Common Gateway Interface (CGI) application. Now you can collect and analyze data from a form by using simple instructions that you embed directly into your HTML documents. You do not need to learn a full programming language or compile programs separately to create interactive pages.

As your skill with ASP and scripting languages grows, you can create increasingly complex scripts. With ASP, you can easily use ActiveX components to perform complex tasks, such as connecting to a database to store and retrieve information.

For a step-by-step introduction to ASP scripting, see ASP Tutorial. You can then return to these topics for more detailed information on writing ASP scripts.

For the Experienced Script Author

If you already know a scripting language, such as VBScript, JavaScript, or PERL, you already know how to use Active Server Pages. In your ASP pages you can use any scripting language for which you have installed a scripting engine that follows the ActiveX Scripting standard. ASP comes with scripting engines for Microsoft® Visual

Basic® Scripting Edition (VBScript) and Microsoft® JScript™ so that you can immediately begin writing scripts. ActiveX Scripting engines for PERL, REXX, and Python are available through third-party developers.

For the Web Developer

If you already know a programming language, such as Visual Basic, you will find ASP a flexible way to quickly create Web applications. By adding script commands to HTML pages, you create an HTML interface for your application. By creating your own ActiveX components, you can encapsulate your application's business logic into reusable modules that you can call from a script, from another component, or from another program.

Web computing with ASP translates into tangible benefits, enabling Web providers to provide interactive business applications rather than merely publishing content. For example, a travel agency can do more than just publish flight schedules; it can use ASP scripting to enable customers to check available flights, compare fares, and reserve a seat on a flight.

The Active Server Pages Model

An ASP script begins to run when a browser requests an .asp file from your Web server. Your Web server then calls ASP, which reads through the requested file from top to bottom, executes any script commands, and sends a Web page to the browser.

Because your scripts run on the server rather than on the client, your Web server does all the work involved in generating the Web pages that you send to browsers. You need not worry whether a browser can process your scripts: your Web server does all the script processing, transmitting standard HTML to the browser. Server-side scripts cannot be readily copied because only the result of the script is returned to the browser. Your users cannot view the script commands that created the page they are viewing.

ASP-db

ASP-db is an Active-X server-side component that lets you create fast and reliable connections to an ODBC database and return dynamically create content pages. ASP-db comes in two flavors.

- The basic component, ASP-dbView , which connects to and displays your database in a table-grid or form style, including query, drill-down, and other functions, and
- ASP-dbPro , which includes all of the component's features plus the ability to edit records directly from the web.

Visual Basic 6.0

As Microsoft releases the sixth version of its award-winning development tool, more than 50 percent of all professional developers are using the Visual Basic language. The Microsoft Visual Basic development system version 6.0 is the most productive tool

for creating high-performance components and applications. Visual Basic 6.0 offers developers the ability to create robust applications that reside on the client or server, or operate in a distributed n-tier environment. Visual Basic 6.0 is the Rapid Application Development (RAD) tool available either as a stand-alone product or as a part of the Visual Studio 6.0 suite of tools. The benefits and standard features of the Microsoft Visual Basic 6.0 are listed as below [10].

(a) Benefits

- Use the Visual Basic 6.0 integrated Visual Database Tools and new Data Environment Designer to visually design Oracle and Microsoft Structured Query Language (SQL) Server databases and create reusable data access queries – all without leaving the Visual Basic environment.
- Build server-side Web applications that are easily accessible from any browser on any platform with Visual Basic 6.0 Web Classes. Program highly interactive Web pages as easily as a Visual Basic form with the new Dynamic Hypertext Markup Language (HTML) Page Designer
- Quickly develop rich data forms, or use the new integrated Report Writer to develop sophisticated, hierarchical reports, all with drag-and-drop ease.

(b) Standard Features

- **Native Code Compiler**

  Create applications, and both client and server-side components that are optimized for throughput by the world-class Visual C++ 6.0 optimized native-code compiler.

- **New Performance Enhancements**

Use new String Functions and features such as "Retain in Memory" to create faster, more scalable applications and components.

- **ActiveX Data Objects (ADO)**

  Visual Basic 6.0 introduces ADO as the powerful new standard for data access. Included SQL Server™ 6.5, Oracle 7.3.3, Microsoft Access, Microsoft Open Database Connectivity (ODBC), and System Network Architecture (SNA) Server.

- **Integrated Professional Visual Database Tools**

  Visual Basic 6.0 provides a complete set of tools for integrating databases with any application. Database features include design tools for creating and modifying SQL Server 6.5, Oracle Hawryszkiewycz.3.3 or above, and AS/400 databases.

- **Automatic Data Binding**

  Virtually no code is needed to bind controls to data sources. Setting just two properties in the Property window connects the control to any data source.

- **Data Environment Designer**

  Visually create reusable recordset command objects with drag-and-drop functionality. Bind to multiple data sources for data aggregation manipulation.

- **Data Report Designer**

  Developers can quickly drag-and-drop custom data-bound controls to create forms or reports. Creation of custom data hierarchies is as easy as filling out a dialog box and dragging the command to the form.

- **Creation Of Custom Data Consumers And Providers**

  Create custom data-aware COM controls for the client or middle-tier and custom Object Linking and Embedding (OLE) DB Providers.

- **Middle-Tier Testing And Deployment Tools**

  Interactively debug Microsoft Transaction Server-packaged components, and package and deploy components to remote servers.

- **Visual Basic WebClass Designer**

  Create server-side applications and components that are easily accessible from any Web browser on any platform

- **Dynamic HTML Page Designer**

  Develop multimedia-rich applications using the document object model and Dynamic HTML surface as your user interface with a WYSIWYG editor.

- **Mobile Computing Support**

  Write client/server applications that work with databases whether or not a connection exists with a Local Area Network (LAN) or the Web.

Microsoft Visual J++ 6.0 Professional

Microsoft Visual J++ 6.0 Professional lets you harness the productivity of the Java language and the power of Windows to build and deploy high-performance client/server solutions for Windows and the Web. Visually design, debug, and deploy data-driven applications from within the high-productivity rapid applications development (RAD) environment. The benefits and features of the Microsoft Visual J++ 6.0 Professional are listed as below [6].

(a) Benefits

- The high-productivity RAD environment offers two-way visual design of high-performance, feature-rich Windows and Web applications. Use the Windows Foundation Classes (WFC) to rapidly create applications, components, and middle-tier business objects.
- Build powerful database applications with access to a wide variety of data and use the Visual Database Tools to quickly create, update, and view database tables and graphically design SQL queries.
- Simplify software distribution and configuration with one-button package, sign, and deployment tools that deliver your entire application to remote file and Web servers.

(b) Features

- **Visual Form Designer**

  Drag-and-drop visual designer assists in building Windows-based applications and components.

- **Visual HTML Designer**

  Simplify the development of thin-client Web applications with integrated WYSIWYG HTML authoring and scripting tools

- **Create reusable components**

  Create component that can be installed on the toolbox and used to visually construct Windows and Dynamic HTML applications and other components.

- **Visual Component Manager**

  Find, track, catalog, and reuse components using the Visual Component Manager.

- **Data Form Wizard**

  Quickly construct powerful database applications using the Data Form Wizard.

- **Visual Database Tools**

  Design and modify database tables and schemas directly within the development environment. Easily create complex SQL statements for any database through the drag-and-drop Query Designer.

- **Flexible Packaging Options**

  Easily package, sign, and deploy complete applications into file formats such as Windows EXE, COM, DLL, CAB, ZIP, and more.

- **Remote Debugging**

Debug client/server solutions with cross-process and remote debugging, easily stepping from client code to server processes running on remote machines.

Microsoft Visual Interdev 6

Visual Interdev is a comprehensive, Web-based application development tool. It provides an integrated environment that brings together various technologies to work toward a common goal of building robust and dynamic applications for the web. It achieves this integrated development environment through the use of its Microsoft Development Environment, also employed by Visual J++. User can open and work on Visual J++ projects while simultaneously creating Visual Interdev project. This feature greatly enhances productivity, especially when building components using the Microsoft Component Object Model (COM) and incorporating these objects into the Visual

Interdev application. It can also multiple Visual Interdev projects within the same workspace.

Visual Intedev enables the developer to build application that are dynamic and interactive. Visual Intedev enables the developer to build dynamic Web pages through the use of client and server side script. By default, Visual Intedev supports the use of VBScript and Jscript. Scripting language such as PerlScript, can be used for project development given that the appropriate scripting engine for the language is available.

Database integration is vital to any application. Visual Intedev provides a rich and robust set of Visual database tools to immediately enhance the developers' productivity. Visual Intedev supports the major ODBC compliant databases, both on the desktop and the server.

Furthermore, managing the Web site once it has been developed is a very crucial function. Visual Intedev provides a set of tools to view and maintain the site. These tools are similar and compatible with the site management tools found in Microsoft FrontPage.

Visual Intedev supports the major object-oriented technologies that exist for developing Web-based application, including ActiveX controls and Java applets. Transformation of script code into "object-based" functions such as Scriplets and using them within the Visual Intedev project can be done. Visual Intedev supports the use of third party ActiveX controls and enables the user to integrate custom ActiveX controls. Visual Intedev also provides set control properties when user designs the application and then use this functionality at runtime without the overhead of a typical ActiveX control [14].

Furthermore, Visual Intedev 6 enables single developer to work and test parts of a project against local Web server without interfering with the team, then synchronize and deploy changes to the shared Master Web server.

It adds database connection to a web site without any programming, including visually setting connection properties such as cursor drivers, query time-outs, and so on. It also drag and drop from the Data Environment to quickly create sophisticated data-driven HTML forms. Query Builder allows developers to visually construct complex SQL statements against any ODBC DATABASE. Test any query in the live test pane before using within a web page. The Visual Database Tools in Visual Intedev now provide enhanced support for Oracle database, as well as Microsoft SQL Server.

SQL Server Database

A database is a collection of tables containing related information. This information can be user data as well as data required by the DBMS to perform its regular functions. A SQL Server consists of multiple databases. Some of the databases are user database and some are system databases required by SQL Server to perform its own operation. SQL Server can hold up to 32,767 databases.

Server consists of the following databases [11]:

- The *master database* controls the SQL Server operations.
- The *model database* provides a template for a user database.
- The *tempdb* database provides a scratchpad area to hold temporary objects.

- The *msdb* database is used by the scheduler component (SQL Executive) of SQL Server.
- The *distribution database* is required to provide replication functionality in SQL Server.
- The *pubs database* is a demo database, which is not required for the working of SQL Server, but is provided mainly as a sample database for educational purposes.
- *User-defined databases*, consisting of a number of tables holding important information, are created to support development, testing, or production environments for business applications.

The master database is critical to the operation of SQL Server. A disk failure may result in a damaged or corrupt master database on a server, rendering all the other databases useless on that server. Therefore, it is quite important to have an up-to-date backup copy of the master database to deal with such disasters.

SQL Server Database7.0

There are 4 types of SQL Server Database 7.0 lunched in the market. They are Desktop, Small Business (SBE), Standard and Enterprise. The type affect the size of the database and also the powerful ability provided. SQL Server Database 7.0 is a kind of RDBMS. It takes the responsibility of the data integrity at the database level. Its database management system is approved as acceptable and trustable. Besides, it also provides the integrity of the Windows with the Windows application.

2.4 Summary

All this research was done mainly to investigate the background and the related information of the Society Information System (SIS) project. This is a preparation before planning the system development. The approach covers the interview, documents, books, Internet and so on.

The first study was focus on the project's background, which is concern of e-University and e-Faculty. The understanding of it can make the author working more efficient and effectively in the e-faculty group. One of the important concepts of e-University is Business Process Re-engineering (BPR). All the information gained enable the author know where is him standing, where to start and in what manner should the development process.

Next topic of the literature review was the current system. Studying on it gave the author a more universal and clearer image or idea of the problem domain. The investigation had included the definition, objectives, scope, significance, and the limitation of the SIS project. The current situation investigation had covered the involved parties, processes, conflict, system input (documents), system output (required reports) and some more. This is an important stage because it influences the methodology used and the correctness and efficient of the solution to the problem domain.

Besides the current system, the other researches' work related to SIS was studied. The old computer system developed in year 1996 was investigated include its methodology, System Requirement Specification (SRS), software and hardware used, feasibility, reason of failure and some more. Through the study, the author knows the

strengths and the weaknesses of the past-developed projects and helps to draw out the good criteria of the proposed system in providing a satisfying solution to the problem domain.

After defining the problem (at least know what should be developed and come out in the project), the author started go to the development tools or methodology that applied during the development process to produce the proposed system. Firstly, the software engineering, which is a more universal topic concern of a system producing in now days, was studied. It made the author more understand the situation of the system development in the current market.

System thinking and the system theory are important for the developers to develop a system. System thinking studied by the author tries to universally describe the methodology used to develop the SIS project. This includes the soft and hard system methodology. The author then focuses on the System Development Life Cycle (SDLC) and the specific development methodology, which includes the Waterfall and the Prototyping model. The information achieved helps the author in the methodology analysis and choosing in the next chapter.

The studying of the development tools was described at the end of this chapter. The client-server knowledge is important for SIS project because the proposed system is a web-based application attached to the Internet. The related parties include the server, client and database. One important part is manipulating the data of the database through Internet. This lead to the investigation of the software and hardware used to fulfill that kind of requirement and produce the system.

As a conclusion, the literature review had brought the interest, confidence and motivation to the author for planning and conduction of the system development.

CHAPTER 3 METHODOLOGY

3.1 Introduction

From the definition of the methodology by (Ford Neville J., Woodroffe Mark, 1994), methodology is made up of:

- A number of predefine steps.
- Each step may involve techniques such as data flow diagram.
- Each step may involve software tools such as computer aided software engineering (CASE) tools.

This can be summarized in the expression:

Methodology = Steps + Technique + Tools

From the aspect of software engineering, the development model and the problem analysis technique such as SSM are considered as methodology because they have the characters mentioned as above.

The author will like to analyze the information gained in literature review about the proposed methodology used in the developing process. In order to choose the best methodology, a few criteria should be considered. Firstly, the chosen methodology is suitable to the proposed system's situation. There are many methodology used in now

day and most of them are proved effective and efficient in its applying. However, the developer will not gain the advantages of the methodology if it is not fit to the situation's need. Secondly, the chosen methodology should be easy to used or familiar by the author so that the developing process can be handled very well. The familiarity of the author will affect the time, cost and successful of the system development.

In order to investigate the suitable of the methodology, the situation of the system and the domain problem will be studied. After determining the situation, some methodology will be compared to choose the best for the development of the system. Besides the problem analysis technique and the development model, the software and hardware will also analyzed in this chapter. This is because they are the tools that important in the system development.

3.2 Problem Analysis

There are a lot of investigations done on the current system. This is because through the situation study, the author will know the domain problem and the current system's weaknesses. This will produce the criteria that proposed system should have to solve these weaknesses. In other words, the author will know what to do and can imagine what system should come out.

Firstly, as the author mentioned before, there are three main parties in the current system: HEP, society and student. The system is running under certain act and rules. HEP store the society information manually in traditional file system. There are four staff of HEP and eighty six societies taking part in this system. There is many kind of activity

organized in university, which include academic, skill courses, cultural, social gathering, exhibition, contest , guidance classes, sports, festivity, welfare activity and so on.

The system may affect by the other system outside the system's boundary. For an instance, a society is applying to organize and run a singing concert, which has more than two thousand of audiences. The other parties that may involved are Education Department of the Government, promotion parties type of newspaper or radio, invited organizer such as other university's society, sponsors include Government institute and private company and so on.

Many type of documents are received by HEP from the societies everyday. They are activity applying document, poster design, banner design, places and building rental, report of activity, meeting minutes, formal letter from other parties and so on. The related staff has to meet many societies many documents everyday and handle.

The sub-procedures of the interaction between HEP and society is considered flexible and may change where the current situation needs. This is because too many person and sub-procedures are involved in the system. Even some rules and procedures may be changed to fit to the situation's changes.

Obviously, the current system is a human activity system, where people working together to achieve something. They are different in their thinking, characteristic, cultural and so on. The system is complex because it involves many people especially when they interact and communicate in the system. As mentioned before, some of the system behaviors and inputs are periodic but some may changeable according to the current situation's changes that may involve politic, economy and cultural. The behaviors and inputs include the formal procedures and informal procedures, rules, university

implementation method, and even Act. The problem domain seems hard to determined and have a litter complex.

3.3 System Thinking

The traditional systems approach to problem solving is based on the technique of reductionism, which solves a problem, by fragmentation, one stage at a time. This technique is appropriate in complex and highly structured situations that can be well defined, particularly in terms of inputs and outputs. In information systems, this is formalized in the system development life cycle (SDLC).

What do we mean by complexity? There are four types of systems that we may observe:

1) **fixed systems**: For an example, the position of the computer relative to my desk is fixed.

2) **periodic systems**: For an example, the planetary systems - the movement of the component parts relative to each other is known during a given time - past movements can be extrapolated into the future.

3) **chaotic systems** : System where long term behavior of the system cannot be predicted.

4) **complex systems:** System that lies (or even oscillate) between periodic and chaotic system.

Through the analysis of the current system, , the proposed system seems is a Complex System that lies between periodic and chaotic system. However, the system is more like a Periodic System with a little character of the Chaotic System. In other words, the current system is a low-level Complex System in terms of its complexity. The problem domain can be considered as ill defined because of the human factors and the complexity.

As mentioned in chapter two, the soft and hard system methodologies are studied. Tables 3.1 show a summarizing the differences between Hard System Methodologies (HSM) and SSM.

Table 3.1 Differences between SSM and 'Hard' System Methodologies.

SSM	**System Engineering**	**System Analysis**
An urge to bring about improvement in a social system which has an ill-defined problem situation.	An urge to solve a well-defined problem.	
Examining elements of 'structure' and 'process' and their mutual relationships with respect to the problem situation.	Analysis by defining the system and its objectives.	Analysis by defining the system and its objectives with respect to cost.

Define root definitions of main activities of the problem situation and build conceptual models of those activities.	Design the system.	Identify alternative systems for meeting the objectives with a specified performance (e.g. costs).
Improve the conceptual model using the formal system model and other system thinking.	Optimizing the design.	Select the alternative that best meets the need and is feasible.
Compare the conceptual models with the real problem situation; use the results of the comparison to define feasible and desirable changes in the real world.	(Not applicable with 'hard' system thinking)	
Implement the agreed changes.	Implement the designed system.	

From Tables 3.1, we can compare the two methodologies to choose which of them is more suitable to the situation of the current system. Due to the current system can be considered a low level of ill-defined system; it is not suitable to apply fully the HSM in the system development. On the contrary, SSM is a methodology that is more superior in dealing with the ill-defined and human activity's system. There is an urge to bring about improvement in a social system in SSM, which has an ill-defined problem situation. The effect is obvious because the current system involves the social, cultural and so on.

As a conclusion, the SSM is chosen to apply in the beginning of the system development, which is the problem analysis stage. The Rich Picture of the SSM will be used to help to define and analyze the situation of the current system. However, after the

problem become more structured and well defined, the HSM is applied at the next series of stages. The related hard system methodology is development model and will be discussed at the next topic.

3.4 Development Model

After choosing the SSM for applying in the problem analysis, the development model is investigated. The model is required in a development system like Society Information System (SIS) project, which involves the software engineering. The author had studied some types of the development model in the literature review process (see chapter 2). The development model is the methodology, or a sequence of steps that the developer will follow in the development process. The chosen methodology can influence the quality of the produced system. The choosing of it depends on the type of the domain problem.

Table 3.2 Comparison between Waterfall model and Prototyping model.

Waterfall Model	Prototyping Model
The Waterfall Model presents a very high level view of what is going on during the development and it suggests to developers the sequence of events they expect to counter.	Allows all or part of system to be constructed quickly to understand or clarify issues where requirement or design require repeated investigation to ensure that the developer, user,

	and the customer have a common understanding both of what is needed and what is proposed.
Developers must first define the problem to be solved and then use an ordered set of steps to reach a solution.	The problem defining process occurs during the development process in the discussion among the developer, user and the customer.

From the discussion of the problem domain, we found that the situation of the problem is ill defined and influenced by the human factors. Due to the developer of the Waterfall model must first define the problem to be solved, as stated in the Table 3.2, the Waterfall model is not suitable to used in the system development. Besides that, the complexity and the human factors made the system a low-level Complex System, which some of its input and the behavior are not periodic for the long terms.

On the other hand, the character of the Prototyping model seems fit to the problem's type. This model emphasizes the clarity of the problem and the elaborations of the user, customers and the developer. The Prototyping model trains the customer and also the user during the developing process because they are invited to investigate the design requirement and the interface design during that time. The investigation decreases the need of the customer support when the system had produced. This helps to solve the problem between HEP and BPK regarding to the customer support. Even if the related staffs always change, the customer also know the system and able to train the new staffs.

Below are the summary of the choosing comparison:

Why not choosing Waterfall?

- Ill defined problem – Problem faced here is not a full structured and well defined problem. Applying this model may lead to the incorrect system be produced and thus waste the time and cost in development time. Time is an essential element because this is a final year thesis project that critical in the time using and planing.
- Factor human activity – This model is too "hard" (compared to "soft" system methodology) to be applied to the human activity system that involves social, cultural and politic elements.

Why choosing Prototyping?

- Correctness – System and design requirements are investigated many times that enables the developer, user and the customer know what they need.
- Fast – The model enables all or part of the system constructed quickly in order to understand and clarify the issues.

For a conclusion, the Prototyping is chosen for the system development because it fits to the need of the situation of the problem domain.

3.5 Soft System Methodology

When applying systems engineering to what he came to call "human activity systems" (people working together to achieve something) Checkland (1994) found a number of problems. Organization goals (I use "goals" and "objectives" more or less interchangeably) were matters of controversy; in particular most investigators assumed

that all members of the organization accepted goals set by top management, but this is usually not the case. Formal methods usually begin with a problem statement; Checkland found that fixing the problem too early made investigators unlikely to see different, possibly more basic, problems. And the method itself restricted what could be found out; if we expect the organization to be describable by the interaction among a number of clearly bounded subsystems then that will happen - we will see in the organization a reflection of our methods.

The Soft Systems approach is an evolving methodology that has been steadily developed into a systemic process of enquiry structured around a comparison between a real-world problem situation and conceptual models of relevant systems of purposeful activity.

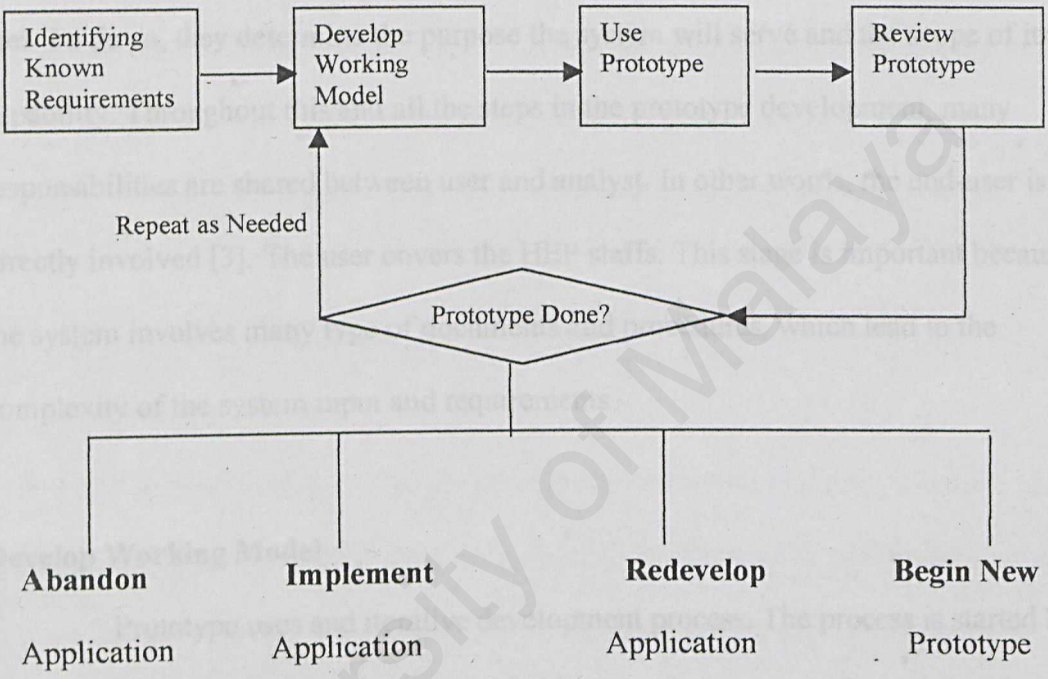
Rich Pictures

Checkland tends to describe his systems with diagrams known as "rich pictures". Some students have commented that this can be any sort of picture, a diagram "without rules". This is exactly the point, though rich pictures do have some distinguishing features. They show the people involved, their stated purposes, and their desires and fears (usually in think bubbles). They show more environmental detail than most diagrams (human activities, like processes, cross organizational boundaries). And they show how interests agree or conflict. Rich pictures are cartoons - they can be funny, sad, political, preferably all at once.

The application of Rich Picture for the problem analysis in the sense of the SIS project will be described in the next chapter (system analysis).

3.6 Prototyping Model

Figure 3.1 Prototyping Development Model



Prototyping is an information-gathering technique useful for supplementing the traditional system development life cycle. When system analysts use prototyping, they are seeking user reactions, suggestions, innovations and revision plans in order to make improvements to the prototype and thereby modify system plans with a minimum of expense and disruption. Below are the description of the Prototyping model showed in Figure 3.1.

a) Identify Known Requirements

The determination of application requirements is as important under the prototype development method as when using the classical system development life cycle method or structured analysis. Therefore, before a prototype is create, both user and system analyst work together to identify the known requirements that must be met. To do so, they determine the purpose the system will serve and the scope of its capability. Throughout this and all the steps in the prototype development, many responsibilities are shared between user and analyst. In other words, the end-user is directly involved [3]. The user covers the HEP staffs. This stage is important because the system involves many type of documents and procedures, which lead to the complexity of the system input and requirements.

b) Develop Working Model

Prototype uses and iterative development process. The process is started by developing a general plan so that individual knows what to expect from each other and from the development process. However, because of the nature of this development method, it is difficult to set a firm completion date. To begin the first iteration, user and analyst jointly identify the data that are needed in the system and specify the output the application must produce. This means describing the individual reports and documents that system should provide and the layout of each. This includes the applying form, formal letter, particulars forms, activity reports, society list reports and so on. The analyst has to estimates the prototyping cost. Construction of the initial prototype is performed by the system analyst. Speed in

producing a running system is essential that momentum on the project is not lost and so that user can quickly begin evaluating the application [3].

c) Use Prototype

It is the user's responsibility to work with the prototype and evaluate its feature and operation. Experience with the system in the actual application setting should provide the familiarity needed to determine what changes or enhancements ate necessary or which inadequate undesirable feature to eliminate [3]. The analyst of course, has to give customer support to lead the user in dealing with the system interface.

d) Review Prototype

The analyst have to ready to receive any comments and respond of the user during the prototype use. During the evaluation, there is a need to capture information on what users like and dislike, noticing why they react as they do. The information will influence the features the next version of the application should have. It also provides insight into characteristics of the users and the business setting for the application. Changes for the prototype are planned with the users before they are made [3].

e) Repeat As Needed

The process described may be repeated several times to evolve the application. Four to six iteration are typical. This process end when both users and analyst agree that the system has evolved to include the necessary features or when it is evident that there is no benefit to additional iteration [3].

The use of the prototype

There are four ways to proceed after the information gained from developing and using the prototype has been evaluate:

1. Abandon Application

   Both prototype and application are discarded. Developing the prototype provide information from which to determine that the application or the intended approach is inappropriate to justify additional development. In some cases, circumstances may have changed so that the application is no longer needed [3].

2. Implement Prototype

   The features and performance of the prototype will meet user needs either permanently or for the foreseeable future. This strategy may be selected when the application environment is changing so fast that it is difficult to determine long term or stable application requirements [3].

3. Redevelop Application

   Development of the prototype provided sufficient information determine the features necessary in the full application. This information is used as the starting point for development of the application in a manner that makes the best possible use of resources [3].

4. Begin New Prototype

   Information gained by development of the initial prototype suggests alternative strategies or circumstances. A different prototype id constructed to add to information about application requirements [3].

Advantages of Prototyping

1. User orientation – The model is flexible in meeting the user requirements to a greater extend.
2. Fast development time – It can take a few weeks or months to obtain meaningfull results, compared to the traditional approach, which can take years for the complete system to be in operation.
3. Fewer errors – Prototyping allows errors to be detected earlier in the prototype evaluation and review. Enhancement done after the every prototype evaluation reduces the possible errors.
4. More opportunity for changes – With this model, the users can see and work with the outputs from each subsystem or component as it is being developed, enabling the users to suggest changes during the development process (Shelly, Cashman, Adamski & Adamski, 1991).

CHAPTER 4 SYSTEM ANALYSIS

4.1 Current System

Figure 4.1 Current System

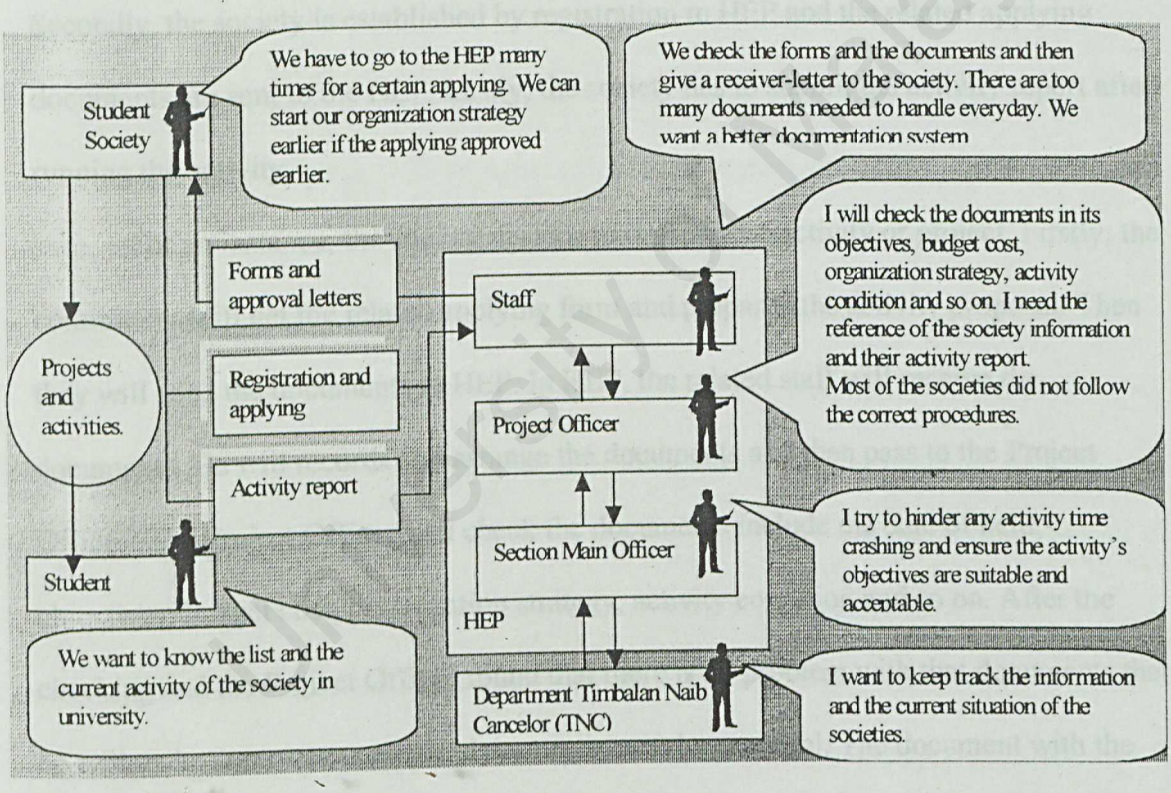


Figure 4.1 shows the Rich Picture that describes the situation of the current system. As we know, the current system composed of three main parties: HEP, society and student. Besides that, the department of TNC (Pejabat Timbalan Naib Canselor), also included in the picture because it plays an important roles in the current system.

The picture illustrate the process and the procedure that occur between HEP and society. There are some comments and job descriptions showed based on the information of the interview and document in the literature review process. There are three main processes take place between HEP and society. Firstly, HEP produces the forms that needed to fill in by the society and also produces letter that tells the applying results. Secondly, the society is established by registration to HEP and the related applying documents are sent to the HEP. Lastly, the society has to submit the activity report after running the activity.

For an instance, the society decides to organize an activity or project. Firstly, the committees will get the related applying form and prepared the activity proposal. Then they will send the documents to HEP. In HEP, the related staff will receive the documents. He will records and arrange the documents and then pass to the Project Officer. The Project Officer will check the documents include the date of held, objectives, budget cost, organization strategy, activity condition and so on. After the checking and the Project Officer found that there is no problem with that documents then he will make some comments and description of the proposal. The document with the Project Officers' description will sent to the Section Main Officer. The Section Main Officer considers the Project Officers' comment and also checks if the activity time-

crashing occur and the suitable of the proposed activity objectives. Lastly, the documents will reach to the TNC department.

The approval letter will be signed and then sent back to the society through Section Main Officer and Project Officer. Having the approval from HEP, the society run the activity and participated by students. After running the activity, the society will submit the activity report includes the account report.

There are a lot of comments given by the involved parties. Firstly, the societies hope they need not to refer to HEP for many times to get the result of the applying. They also hope that the applying process is faster that they can start their activity earlier. This is because some of their plan could start only if the approve letter comes out. The examples include sponsor finding, building renting, fund gathering and so on.

On the other hand, HEP said that most of the society did not follow the correct procedure. In the right way, the society has to send their documents to the staff to make arrangement and recording. However, most society goes straightly to the Project Officer's room at the first time. Actually, the society only goes for the Project officer if they are asked to do so. This is because sometimes Project Officer needs to see the society for the details discussion. The phenomenon had lead to the increasing work of the Project Officer because of the amount of 86 societies in the university.

The staffs which using the traditional file system said that manual system could not handle the society information very well. They are not satisfied by the current system from its efficient and the effect. They hope that the system can be computerized to enhance its ability of information management.

By the way, the students have their comments too. They hope to get the needed information easily and fast, especially in the century of the technology. They want to know the list of the societies that exist in university. They want to know the societies' current activity so that they can make decision on which activity they want to join.

Weaknesses

The society's information is documented in hard copy in the current system. The information covers annual meeting report, whole year plan, activity proposal (before running an activity), activity report (after running an activity) and so on. The data stored on paper and keep in the office using file system.

The traditional approach has some weakness. Firstly, the data stored on paper is hard or not convenient to be retrieved. For an instance, there will a lot of step to get a certain activity report. The related staff has to find out the file in a certain cupboard, certain drawer and so on. After that the staff has to find the report throughout the file. After using the report, the staff has to put back the report according to the backward way of the previous procedures. Obviously, the process is time-wasting and boring. This shows that the old file system is not suitable to be applied in the student society information management that involves many types of documents. What makes the situation become worse is the increasing number of the society and their activity.

Secondly, there is a limitation when the information is presented on the paper. The way of the data displayed is boring and not attractive to the readers. There are no colors, graphics and animations can be applied to put on the paper, which is normally a

formal paper. From the aspect of the HEP, this will reduce the desire of the related staff to do well their job regarding to the society and the management level to concern of the society. From the aspect of the society, the committee will feel that interaction with the HEP concern of the society activity is boring and full of formal procedures. Truly, the way of the data and information presented can influence the productivity and efficient of the society information management.

The third drawback is the lack of an interaction media between HEP and the society. The society does not know how far the HEP is concern about them, especially during the applying process. The HEP does not have a convenient method and motivation to keep track the society information. The weakness of the current system could be viewed from the fact that societies have to HEP many times to ask their applying result. A good communication environment is important to a human activity system as SIS. Through the investigation of the current system, we can see there is kinds of conflicts occur among the system's "actors". The people in the system really need a medium to enable them interact well to achieve each target.

The last weakness of the current system is the weak availability of the society information. The implementation of the information system is a closed process that hinder from the outside world. This kind of implementation is very poor especially applied in the human activity system. The information is useful to the students, societies, Project Officer, Section main Officer, TNC, as showed in Figure 4.1. Even the parties outside the system's boundary like other university, social and cultural researches, Internet users that want to know about the situation of the societies in University Malaya and some more need the related information.

These weaknesses should be eliminated so that will improve the implementation of the process. To achieve the e-University's objectives, the traditional and conventional approach should be converted to an update approach that involves the use of a computer system.

4.2 Suggestion Solution

Solution Analysis

After analyzing the current system, the summary weaknesses of the system are summarize as below:

1. The data stored on paper is hard or not convenient to be retrieved.
2. Poor information presentation method.
3. Poor communication environment.
4. availability of the society information.

Using a computer system can solve the first and the second weakness. Computer system is proved on its ability, efficient and effective in information management. The use of the computer is the good evolution from the traditional office to the paper-less office. The computer system is able to provide a good user interface to interact with the users. The information can be presented in a arranged and systematic manner and increase the ability to bring the information to the users.

The third and the fourth weaknesses can be overcome by turning the system into a web-based system. Internet can definitely provide a superior communication environment for the parties of the system. Every one of them can get into the Internet anytime and

conveniently. The availability of the society information is optimized if they can be gained on Internet.

After realizing the problem and the solution of the current system, the author suggests to use computer technology to achieve the solution. Since this is the beginning of the evolution from the traditional office to the paper-less office, the new suggested system will add in a web-based computer system but also retain the paper system. The computer system will store and display the society information briefer than the paper does. In the other words, the user has to get into the traditional file system if he or she wants to gain more detail information. Besides that, these documents are important to stored as backup.

There are many advantages of the proposed system. Since the administrators can do their job anytime and anywhere if they are on-line, the new system simplifies the information storage and the retrieving process. It minimizes the time used to handle the society information and make the process be done smoothly. In other word, the system improves the efficiency and effectiveness of society information management. The HEP will keep track the society activities and achieve the updated society's information easier. The system can minimize the distance between HEP and the society. Besides, the common society information can benefit the students and they may gain further profit if they interested in joining the societies in activity organization or attending the activities.

Suggestion System

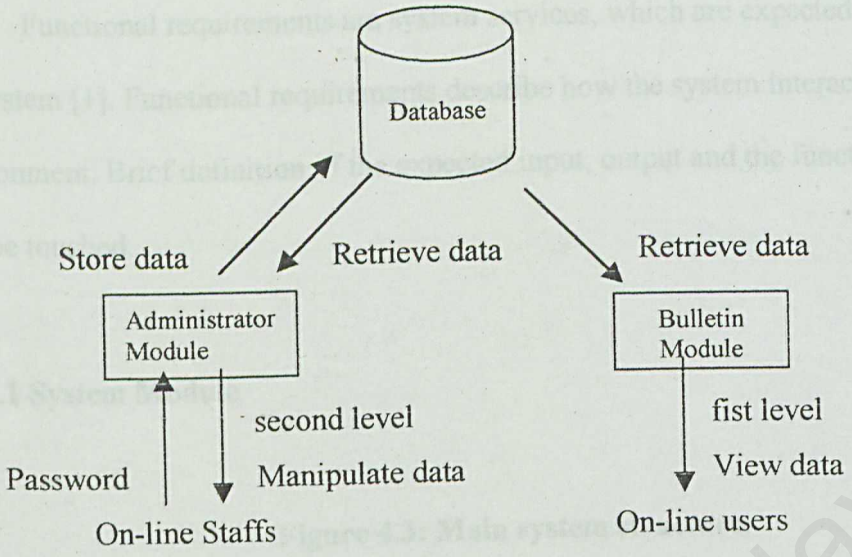
The system is an application used by on-line users. In other words, this is a web-base application system. The staff will use this program to manipulate the society information when accessing the Internet. The system may also attach to the university's

home page or FSKTM's home page and can be viewed by the students when they are on-line. The system model is showed in Figure 1.2.

As showed in figure 1.2, the system is divided into two major modules. The management level will use the administrator module whereas students or the people who on-lines use the user module. The two modules are place into the same system. That means, there are two levels of accession to the system. The first level, user module can be accessed by all the on-line users but the second level require password to be accessed. Thus, the related administrator will be told the password to access the second level, administrator module.

The data presented by the user module is created and edited at the administrator part. Actually, the information manipulated at the administrator module is stored in a place called database. The user module retrieves data from database and displays it to the on-line users. The information displayed at the user module is not the whole information stored in database but only part of it. This is because not all information needed to be view and known by the first level users.

Figure 4.2: System model of SIS.



4.3 Proposed System

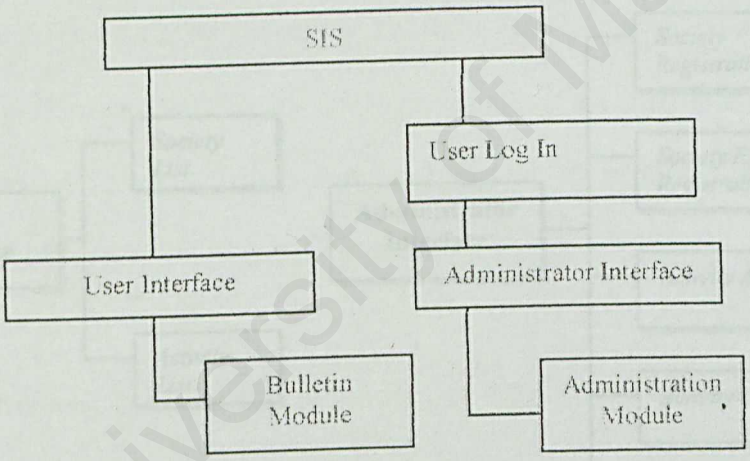
SIS is going to be a web-based computer system that stored and display the society information. The SIS would be developed based on the model showed in Figure 4.2 in the previous section. That model was produced through the investigation of the best solution for the problem domain. The proposed system would be described through its functional requirements, non-functional requirements and its development tools. The description would not go too deep because the detail description of the proposed system will be touched in the system design topic, which is not mentioned in this proposal.

4.3.1 Functional Requirements

Functional requirements are system services, which are expected by the user of the system [1]. Functional requirements describe how the system interacts with its environment. Brief definition of the expected input, output and the function of the system will be touched.

4.3.1.1 System Module

Figure 4.3: Main system structure.



Overall, there are 2 main modules in the system. The structure of the system is showed in Figure 4.3. The Bulletin Module can be access by all of the on-line user to gain the needed information. The user interface is provided to enable the users interact

with the module. The second module is Administrator Module. It is used by the administrative staff that responsible to manage the society information. Thus, the Administrator only used by the authorized user. In other words, the users must log in their user name and password to access to the Administrator Module. The sub-structure and component of the system is illustrated in Figure 4.4 as below.

4.3.1.2 System Module Component

Figure 4.4: System Module Structure.

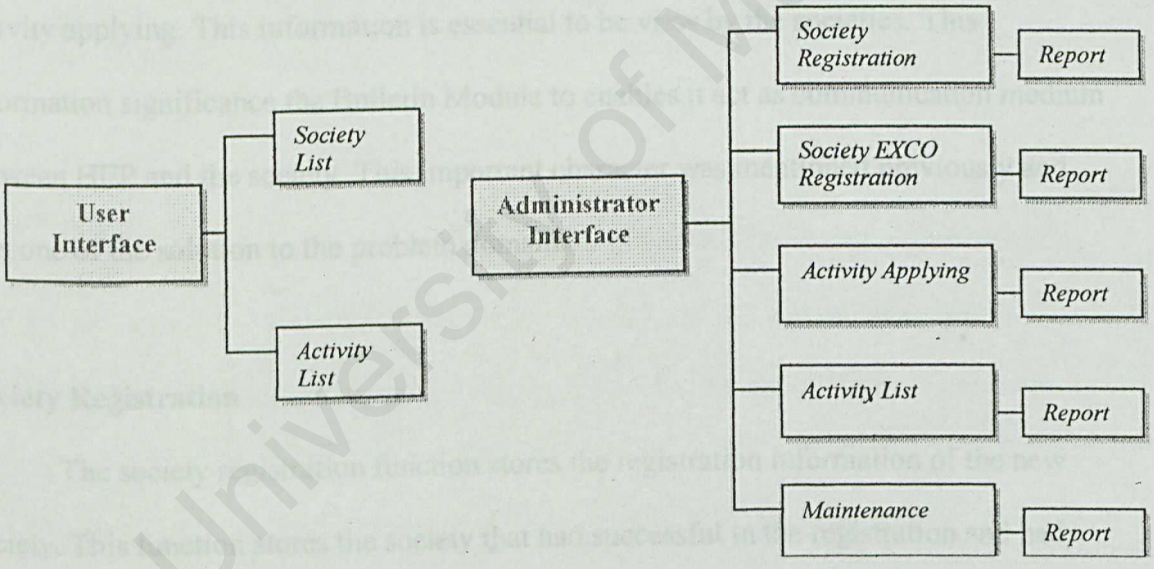


Figure 4.4 shows the components (function) of the two module that mentioned previously. Through the user interface, the Bulletin Module provides two main function. They are Society List and Activity List. In the meanwhile, the Administration Module provides five function which is Society Registration, Society EXCO Registration,

Activity Applying, Activity List and Maintenance. These functions produce their reports respectively. Below are the description of the functions.

Society List and Activity List

Society List function will provides the information of the society in a list. This function displays common particulars of the registered society that exist currently in the university. The particulars cover In the meanwhile, Activity List function would gives the information about the current activities of the societies. The information displayed in both function is depends on what is provided by HEP according to the needs. However, one information must be displayed by the Activity List function is the result of the activity applying. This information is essential to be view by the societies. This information significance the Bulletin Module to enables it act as communication medium between HEP and the society. This important character was mentioned previously and was one of the solution to the problem domain.

Society Registration

The society registration function stores the registration information of the new society. This function stores the society that had successful in the registration and had establish formally. The information is come from the registration documents and the first meeting report of the new establish society. This basic particulars cover society's name and objectives, committee post list, date of establish, number of members and so on.

Society EXCO Registration

Society EXCO Registration function stores the particulars of the EXCO of the society. Society EXCO is a group of the society members that chosen in the general meeting to undertake the main post the committee. The general meeting is held annually that the EXCO is change every year. This is differ from the society information where the information is seldom change compare to the EXCO information.

Activity Applying

Activity Applying function stored the information of the society's applying. The information is get from the society's proposal and applying form. The information covers activity name, objectives, date, place, organizer, cost budget and some more. This information is stored and will be retrieved for the use of the Bulletin Module.

Activity List

Activity List function stores the particulars of the activities of the societies. The activity list is used to keep track the society's activity and act as a reference for the Project Officer and some other related parties. The activities particulars are get from the reports that submitted by the societies after the activity ends. The information to be store covers activity name, objectives, date, place, organizer, accounts of project, brief description of the program and so on.

Maintenance

Maintenance function is used to maintain the SIS and also the Bulletin Module. The function maintains the log in sub-function that important as a security of the system.

Besides, the Maintenance function maintains the cods that cover society category cod, society type cod, activity condition cod, committee cod and so on.

4.3.1.3 Reports

Below are the reports required by HEP to be generated as the output of the SIS:

1. Organization structure list
2. Applying status list
3. Activity information list
4. Committee of "hoc" member list
5. Activity accounts report
6. Pass-project list

4.3.2 Non-Functional Requirements Analysis

Non-functional specifications are the constraints under which a system must operate and the standards, which must be met by the delivered system.

The non-requirements of the system are:

1. Operate under the acts

Since the implementation of the information management has to follow the rules stated in the "Akta University dan Kolej University Pindaan 1975 Act, the system design

should beware of it. All of the information related to the registration, management and constitution of the student society are stated in "Statut University Malaya (Badan Pelajar)". That means the information processing and the related procedure is standardized. The sub-procedures or processing that not stated in "Statut University Malaya (Badan Pelajar)" only can be handle according to the current situation.

2. System Output

The reports that required by the HEP are produced by the system. The reports' standard format is follow to the HEP's requirements and needs.

3. User Friendliness

The system is required to have a very user-friendly interface because of the changes of the staffs in HEP and the lack of the customer support provided. The good criteria of the system covers:

1. User are allowed to go to any function where the need.
2. Provide help files that describe the function of the system.
3. The system will display more message box to guide the user especially when they are using the system incorrectly.
4. The interface design is not complex and easy to understand. This is helpful because the system involves many data related to the society information.
5. The system's user friendliness is improved by the use of the Prototyping model where the users and customer are involved in the system development.

4. Flexibility

The application should have the capability to take advantages of new technologies and resources, and can implemented in changing environment. The system allows the user to store more than hundred of societies (since the current number of society in the university is 86 and will increase in future). The user can retrieve the data as much as what we have in the database.

5. Understandability

Understandability in terms of the coding method used, allows other programmers to understand the logic of program flows, thus changes can be made easily upon the necessary program segments without modifying other essential logic of the program. Simple and clear sentences or messages are displayed so that user can use this system without difficulty. The readability is important because the university does not have enough technicians to maintain the system, as told by BPK before this. Thus, the produced system must easy to maintain.

6. Efficiency

Efficiency computer terminology means process or a procedure that can be called or accessed in an unlimited number of times to produce similar outcomes or output at a creditable pace or speed. Thus, the system is robust and maintain its efficiency even multiple users are using it.

7. Reliability

A system is said to have reliability if it does not produce dangerous or costly failures when it is used in a reasonable manner, that is in a manner that a typical user expects is normal. This definition recognizes that a system may not always use in the ways that the designer expects. SIS is a reliable system because all the possible failure and errors, which could occur, are taken into consideration. This is important especially the system has to produce the standard output and reports.

4.3.3 Development Tools

The software and hardware choosing is more depending on the e-Faculty's choice. Due to the author is developing the system under the e-Faculty Project group, some decisions are made depend on the group. There are many topics conducted within the group by each group member, such as student exam schedule, software and hardware inventory system and some more. The different projects will be combined into a big system to be attached onto the Internet. That means the system may use the same server, database and some more, that limits the choice of the software and hardware.

Below are the software and hardware chosen for the author's project. The choices is within the Microsoft family's products. To develop a web-based application system like SIS, the popular and updated software can be choose are Active Server Pages3.0(ASP3.0), SQL Server Database7.0, Microsoft Visual InterDev6.0 and may include the Microsoft Visual Basic6.0 (VB6.0), if it is needed. At this moment, the author would like to use ASP without using VB6.0. This is because the system can be developed

by ASP without VB6. The use of both may cause some trouble in combining the codes and the error testing works.

Development Software Requirements

- ✓ Windows NT Server 4.0
- ✓ ASP 3.0
- ✓ Microsoft Visual InterDev6.0
- ✓ SQL Server Database7.0
- ✓ Internet Information Server5.0

Development Hardware Requirements

- ✓ System development requires a machine with
- ✓ At least 32 MB RAM
- ✓ At least a Pentium 180 MHz processor
- ✓ Other standard Peripheral like mouse, keyboard and monitor.

4.4 Expected output

Once the SIS is developed and produced, it is expected to be a effective and efficient web-based computer system of society information system, meet all of its requirements, with the two main modules as below:

- ✓ Administration Module used by the authorized users to manages the society information and maintains the system easily, effective and efficiently.

- ✓ Bulletin Module that give the advantages and convenience to the on-line users through the presented information.

This system is hope to improve and enhance the implementation of the society information management besides give the advantages to all the users that need the society information.

PART 2: SYSTEM DOCUMENTATION

CHAPTER 5: SYSTEM DESIGN

5.0 Intorduction

System design is a creative process of transforming the problem into a solution [15]. It is used to design, and implement improvements in the functioning of business that can be accomplish through the use of computerized information system.

- System Architecture
- Data Flow Design
- Data Modeling Design
- User Interface Design

This is a very important part in the system development process. Normally this phrase takes the major time period of the total time spent in the process. It play a great role in resulting the appropriate product and ensure the product's quality. If the design fulfills the user requirements then the next phrase and till the end of the development process would be smooth and successful.

5.1 System Architecture

Figure 5.1 depicts the system architecture of SSIS. A centralized server which is running in Windows 2000 is connected by number of personal computers which is running in Windows 98 and Windows 95 or Windows NT.

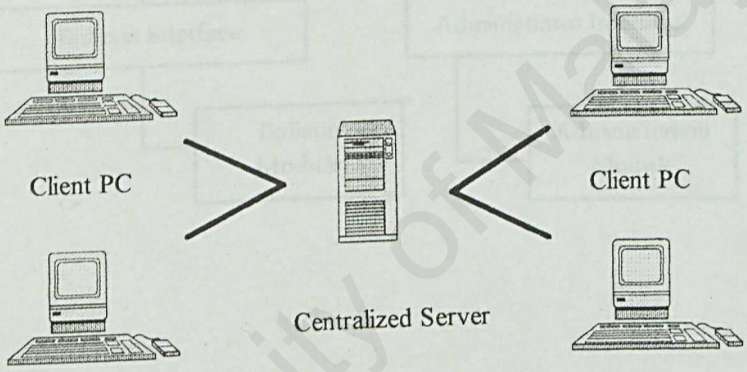


Figure 5.1 System Architecture

5.1.1 Structure Chart

Structure chart is used to depicts high level abstraction of a specified system. The use of structure chart is to describe the interaction between independent modules. Major functions from the initial component part of the structure chart, which can be broken into detailed sub-component.

This module of SSIS consists of three sub-systems, which are the information, administrator and user system. The following are the diagrams to illustrate this.

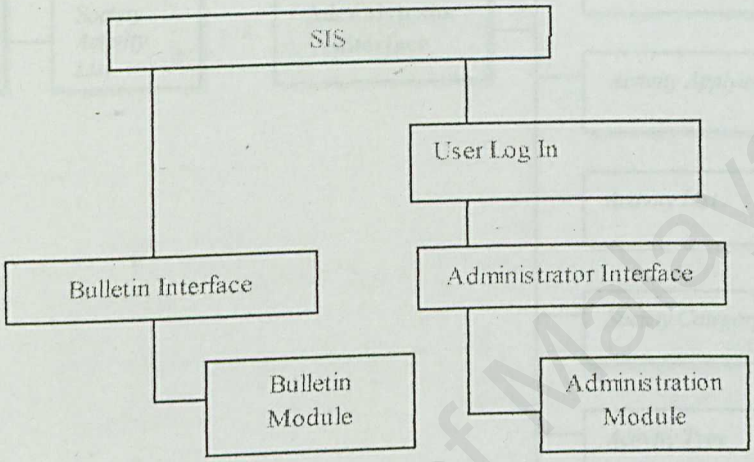


Figure 5.2 Architecture Design for SSIS

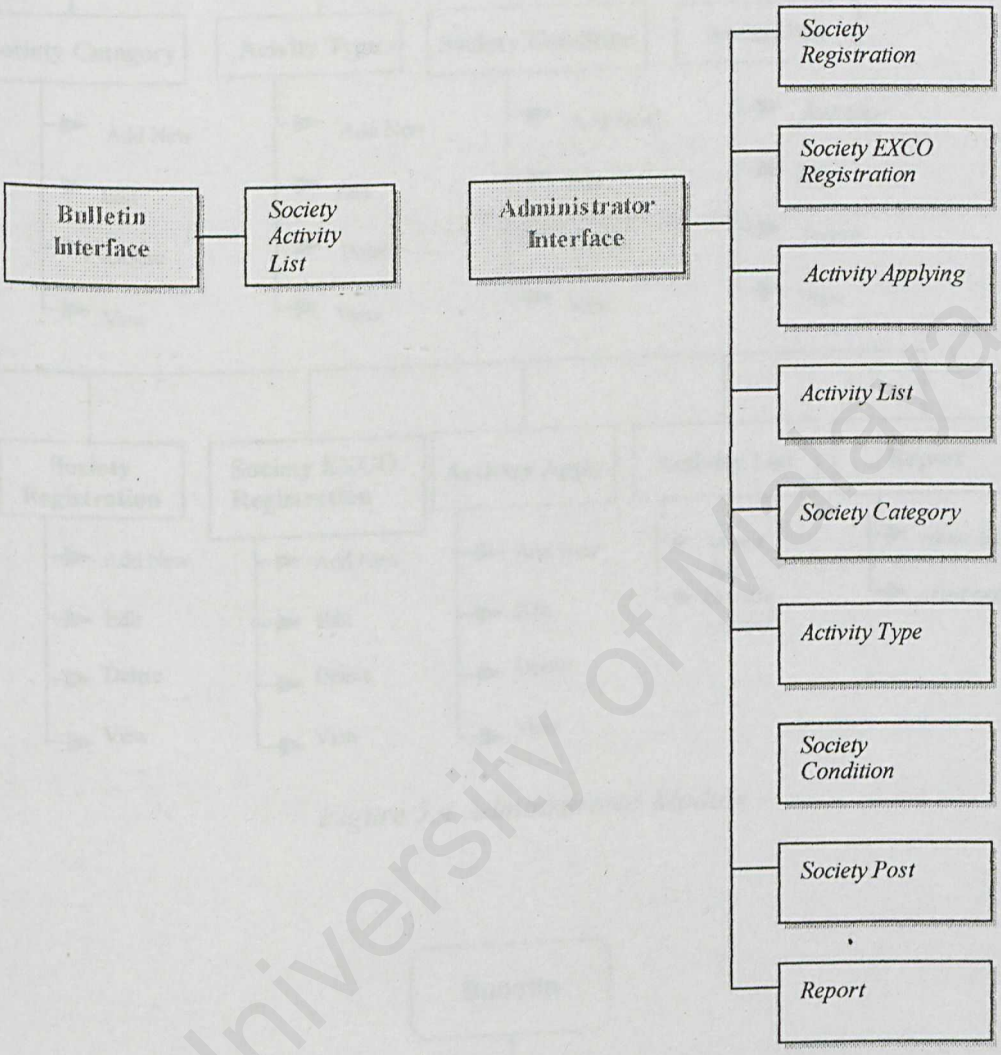


Figure 5.3 System Module Structure

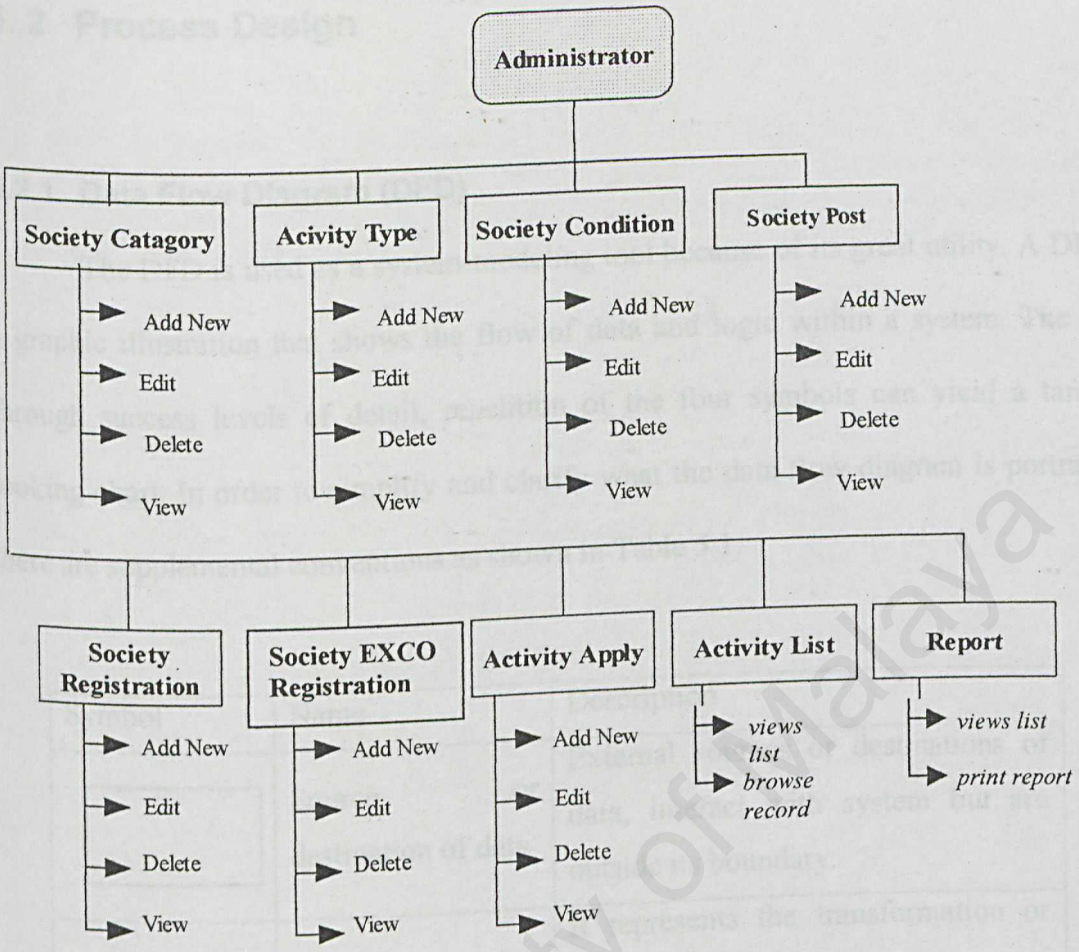


Figure 5.4 Administrator Module

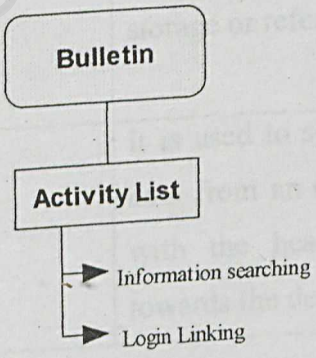


Figure 5.5 User Module

5..2 Process Design

5.2.1 Data Flow Diagram (DFD)

The DFD is used as a system-modeling tool because of its great utility. A DFD is a graphic illustration that shows the flow of data and logic within a system. The DFD through success levels of detail, repetition of the four symbols can yield a tangled-looking chart. In order to simplify and clarify what the data flow diagram is portraying, there are supplemental conventions as shown in Table 5.1.

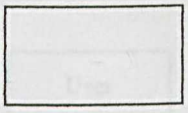
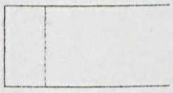
Symbol	Name	Description
	Source or destination of data	External sources or destinations of data, interact with system but are outside its boundary.
	Processes	It represents the transformation or processing of information within a system.
	Data Store	It is used for showing the data storage or referenced by a process.
	Data Flow	It is used to show the movement of data from an origin to a destination with the head of arrow pointing towards the destination.

Table 5.0 Symbols using Gane and Sardon Method

System's DFD

Due to the Bulletin module can be access by every on-line user, the DFD that would described below will focus on the Administrator module. To gain access into the module, firstly the user must get into the login system. Figure 5.6 to figure 5.15 depicted the DFD diagram of SSIS in different levels.

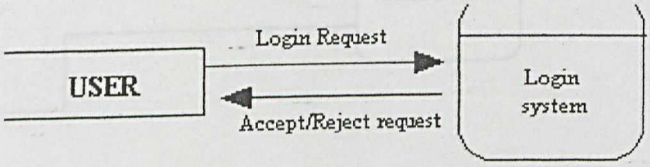


Figure 5.6 Data Flow Diagram Level - 0

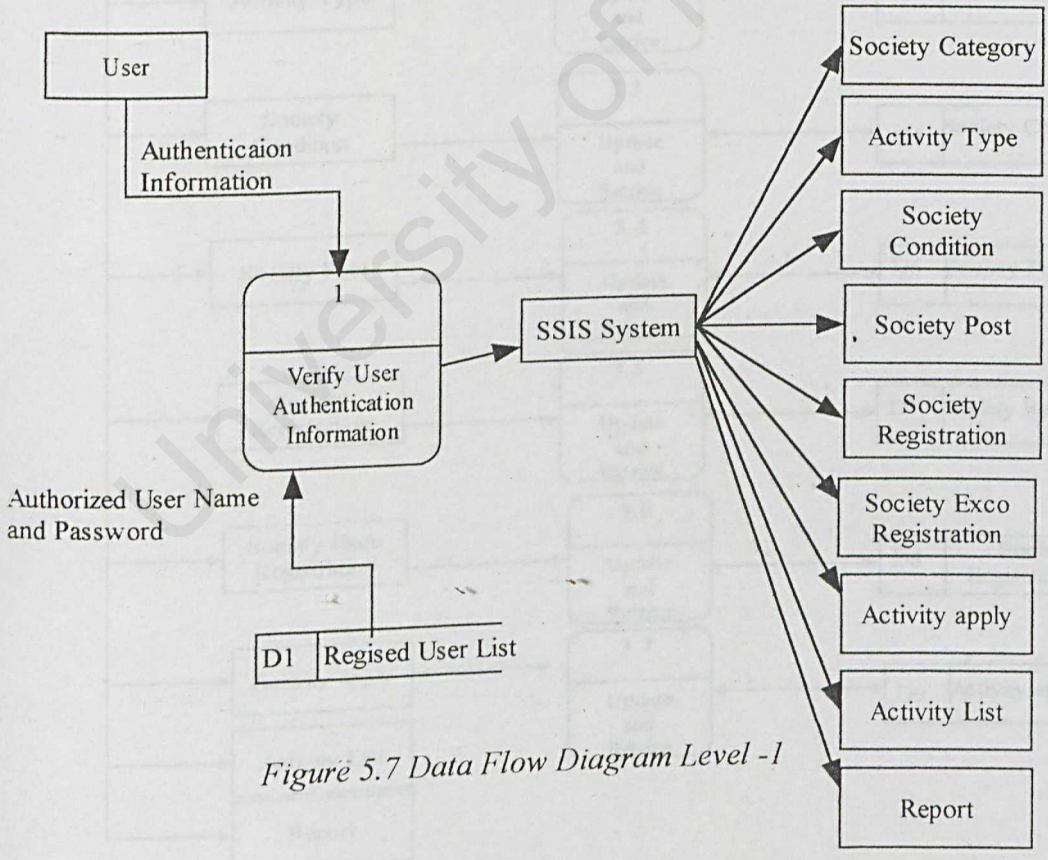


Figure 5.7 Data Flow Diagram Level -1

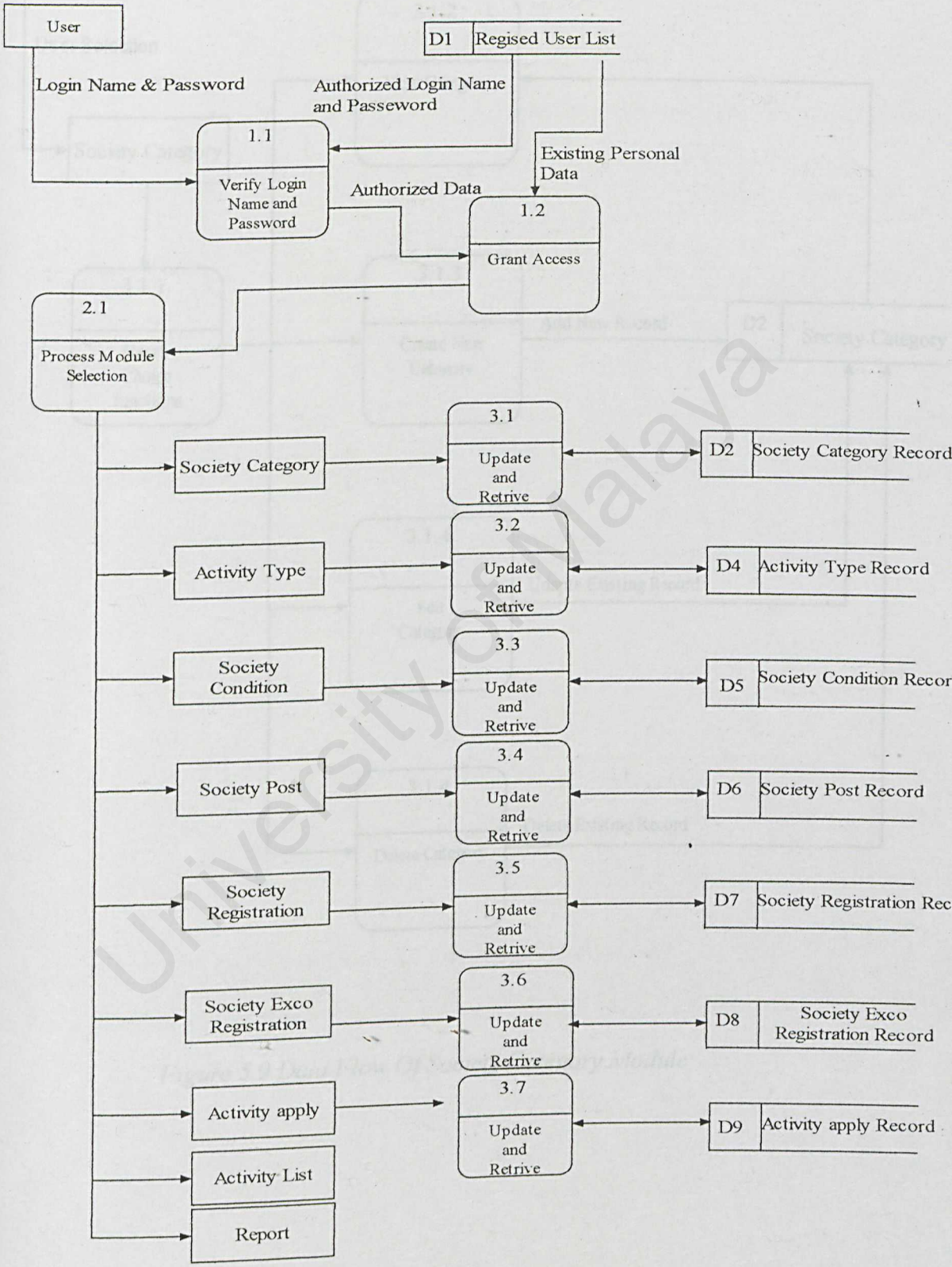


Figure 5.8 Data Flow Diagram Level -2

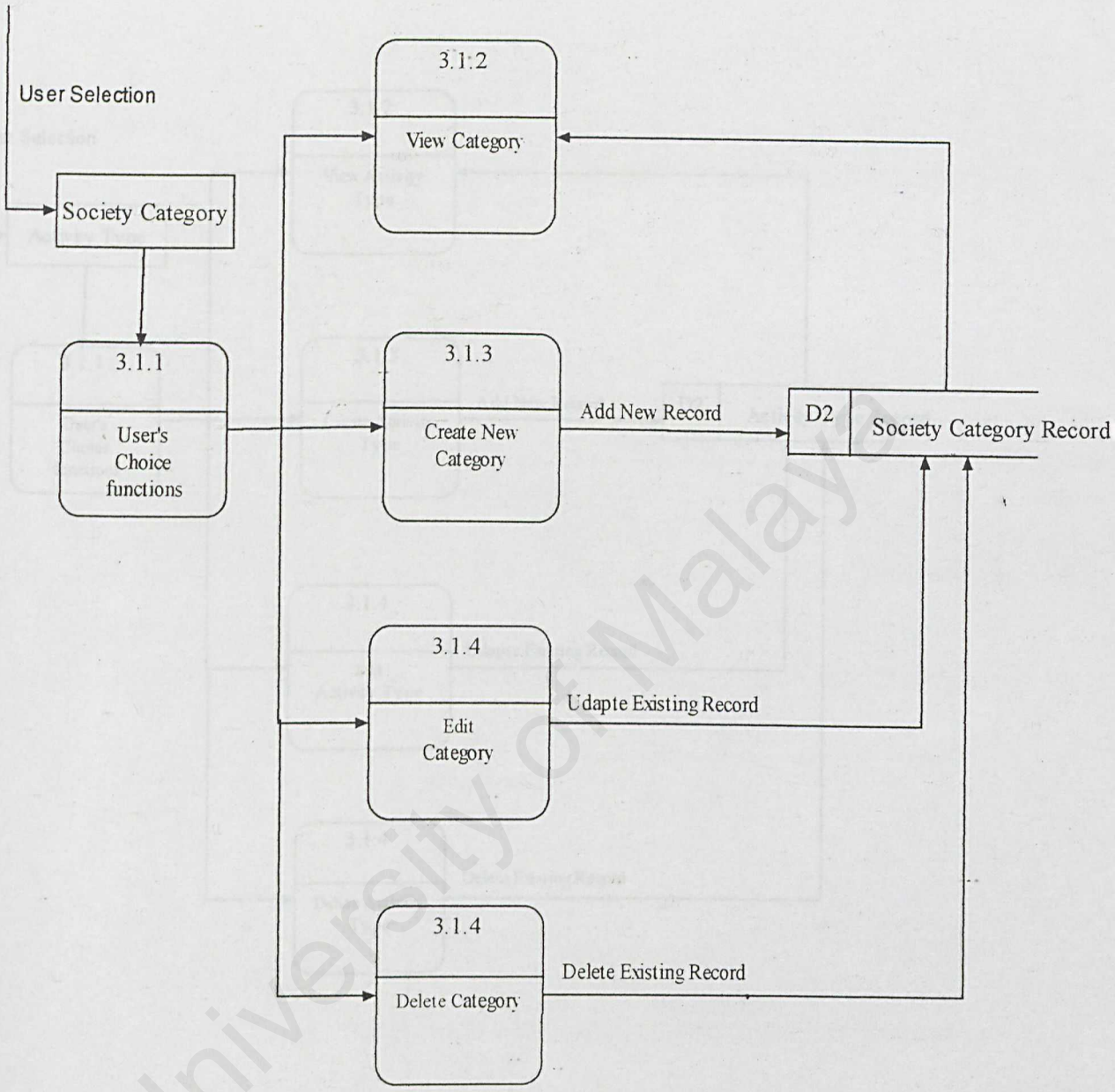


Figure 5.9 Data Flow Of Society Category Module

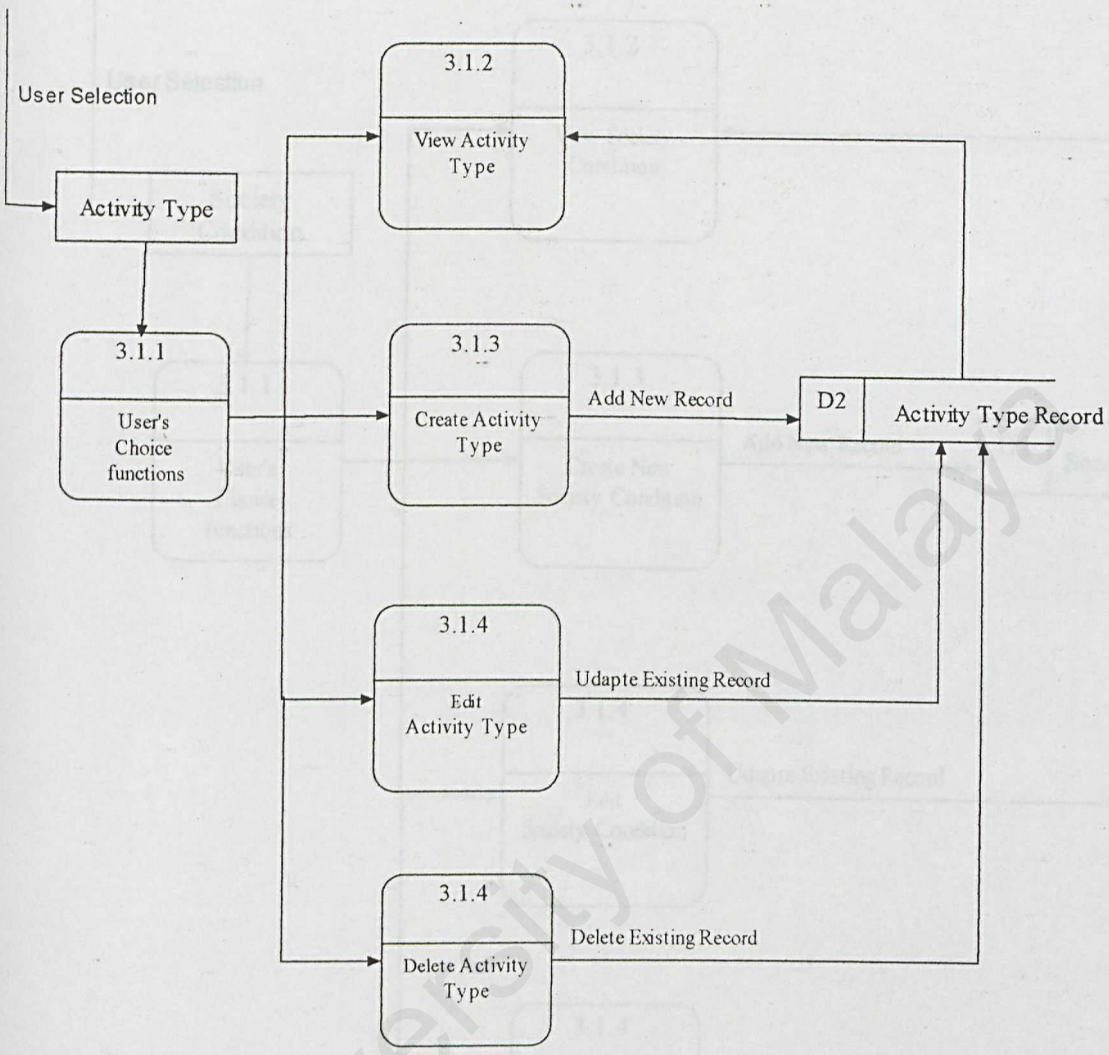


Figure 5.10 Data Flow Activity Type Module

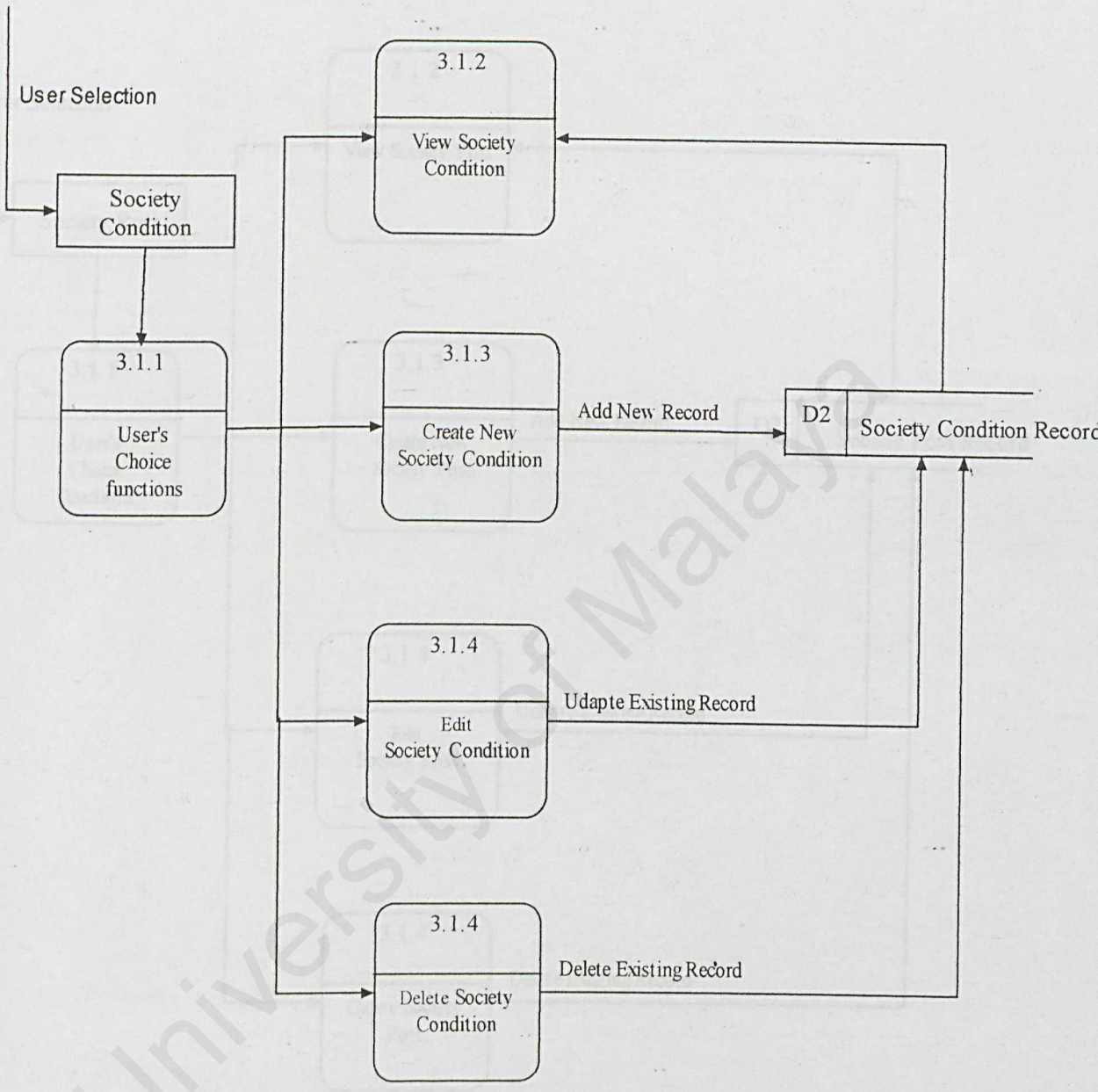


Figure 5.11 Data Flow Of Society Condition Module

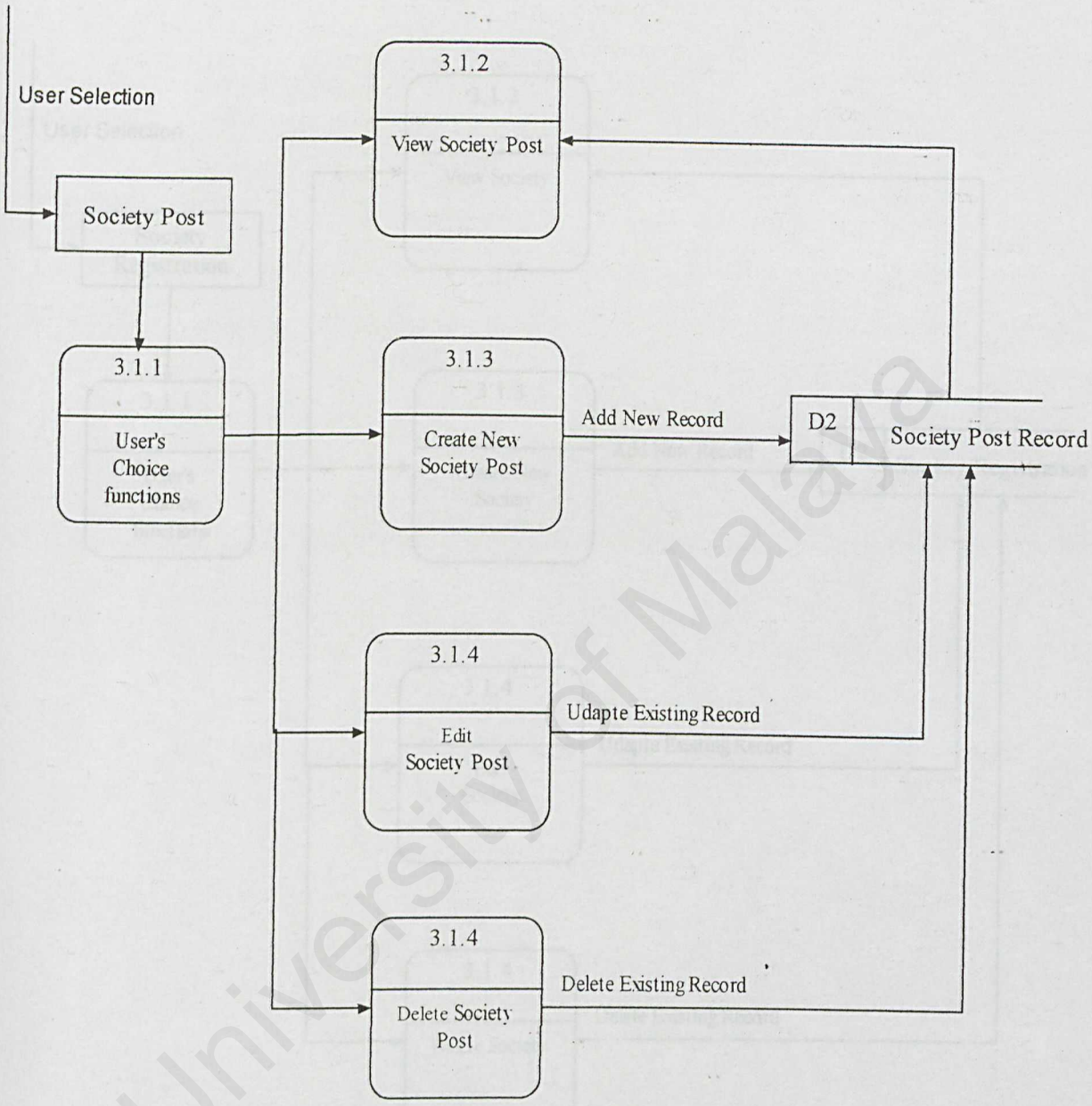


Figure 5.12 Data Flow Of Society Post Module

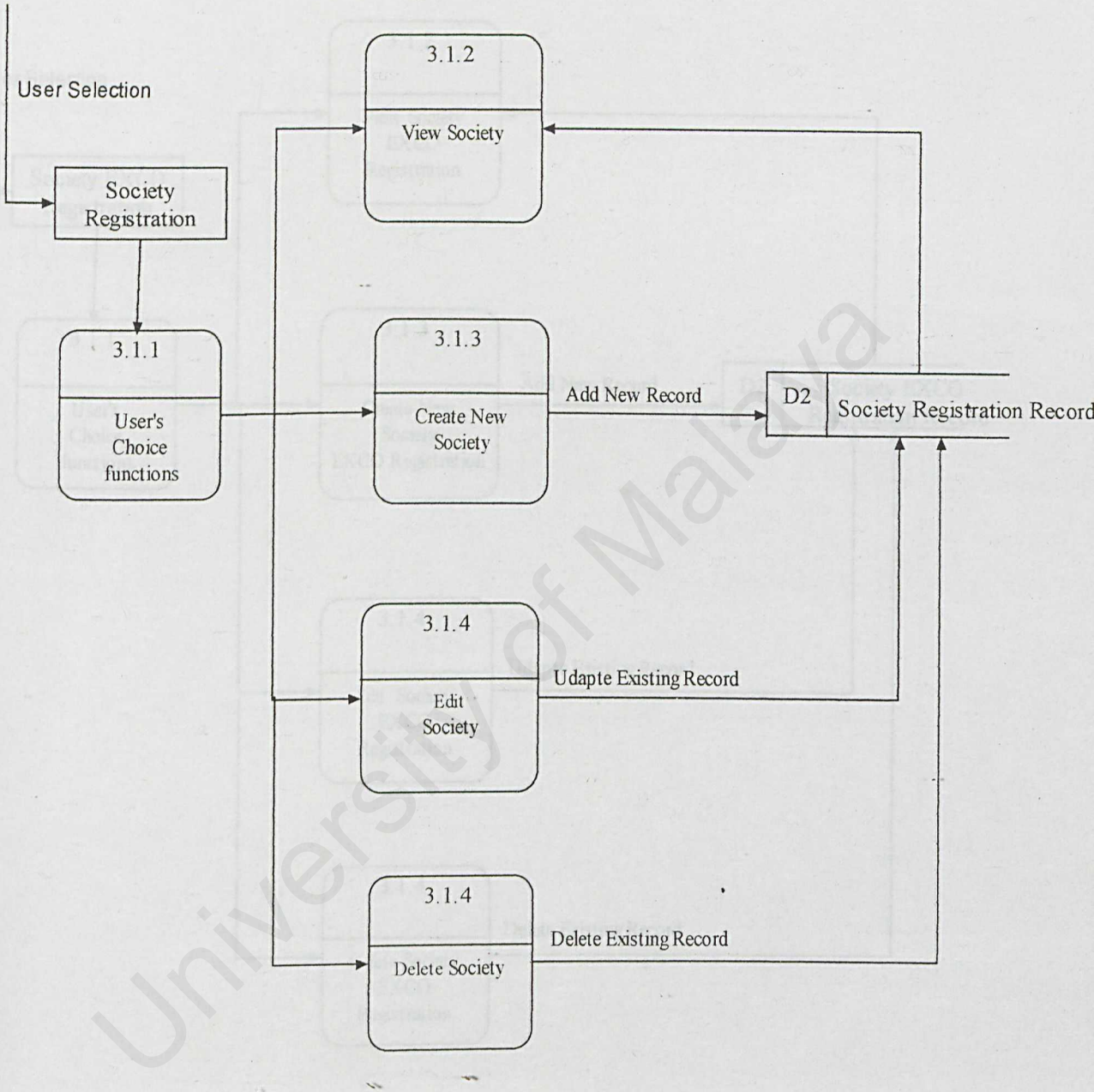


Figure 5.13 Data Flow Of Society Registration Module

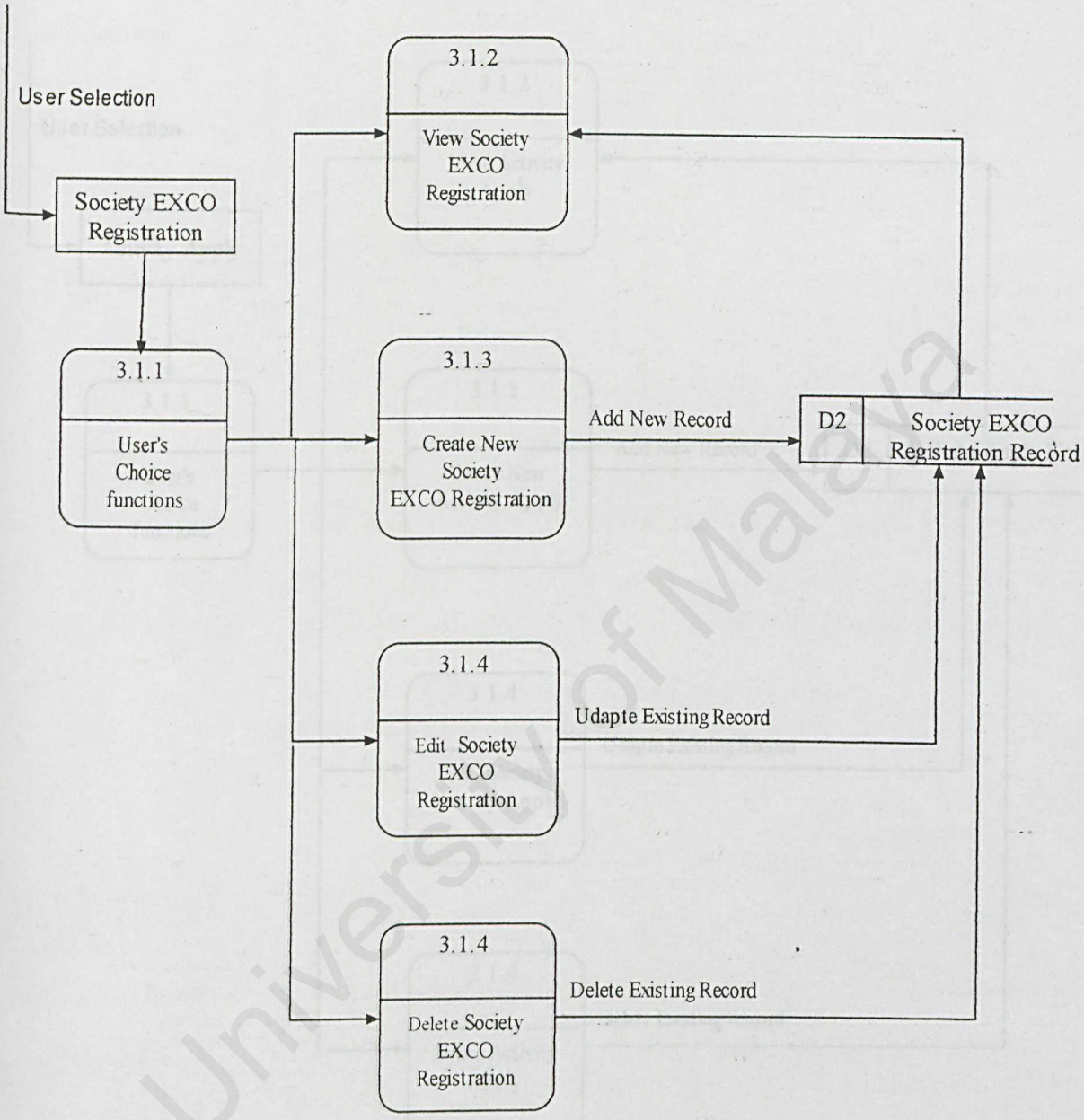


Figure 5.14 Data Flow Of Society EXCO Registration Module

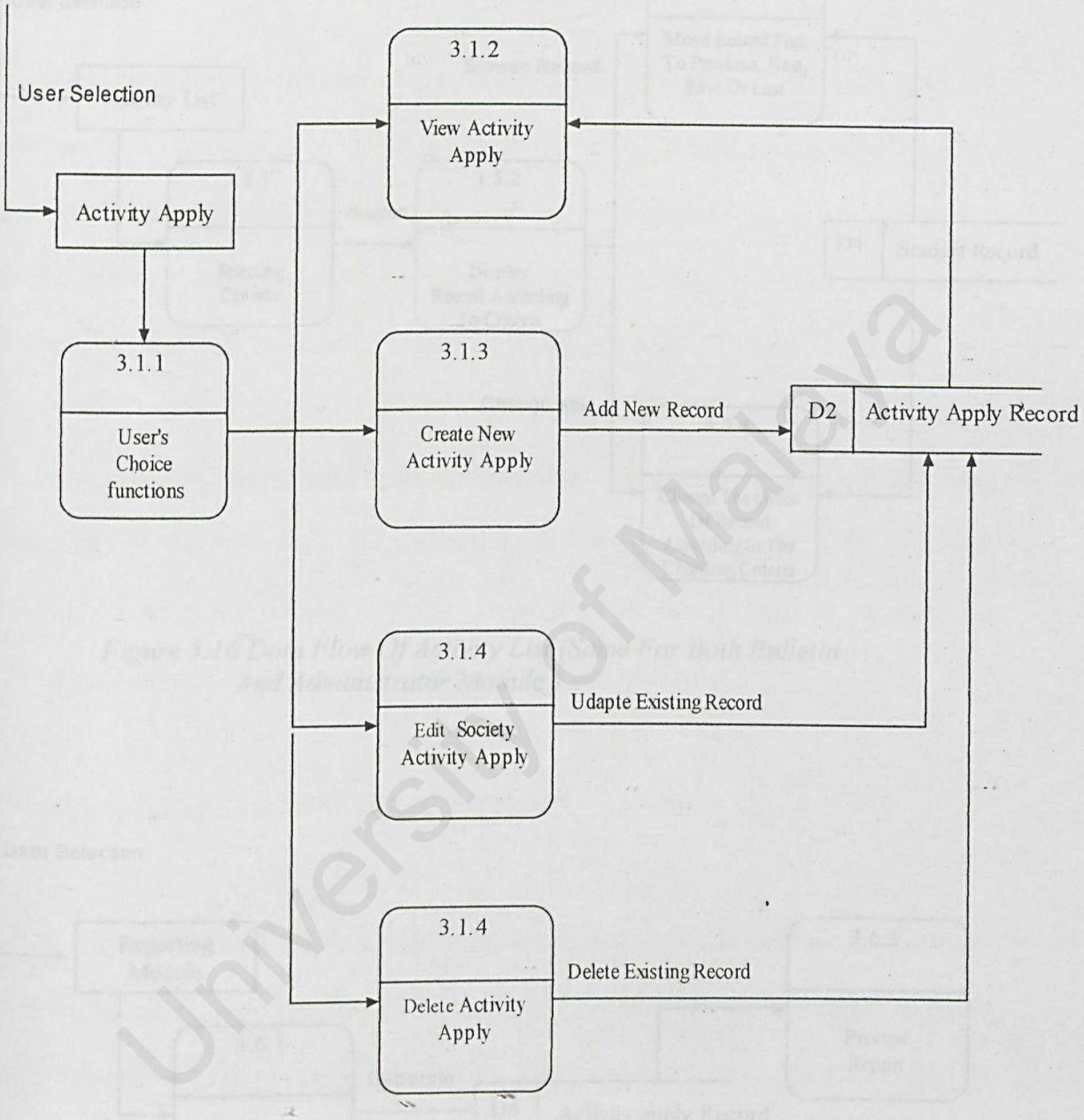


Figure 5.15 Data Flow Of Activity Apply Module

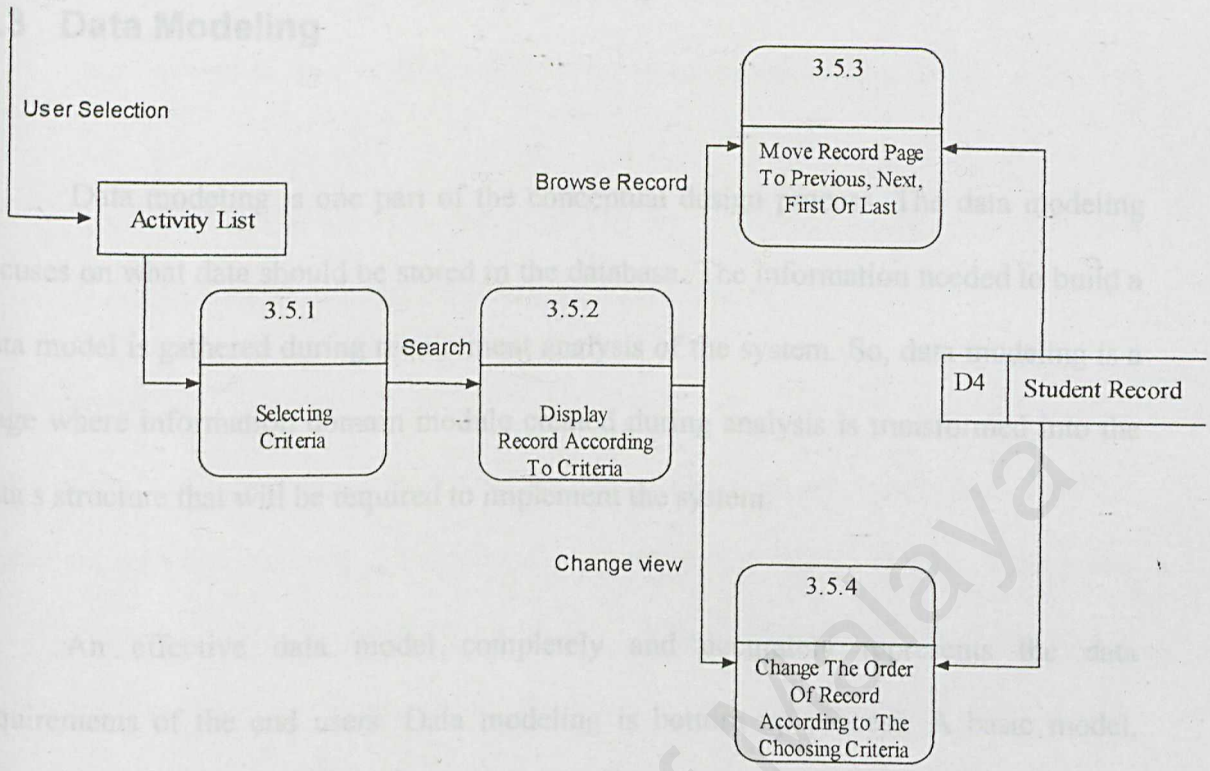


Figure 5.16 Data Flow Of Activity List (Same For Both Bulletin And Administrator Module)

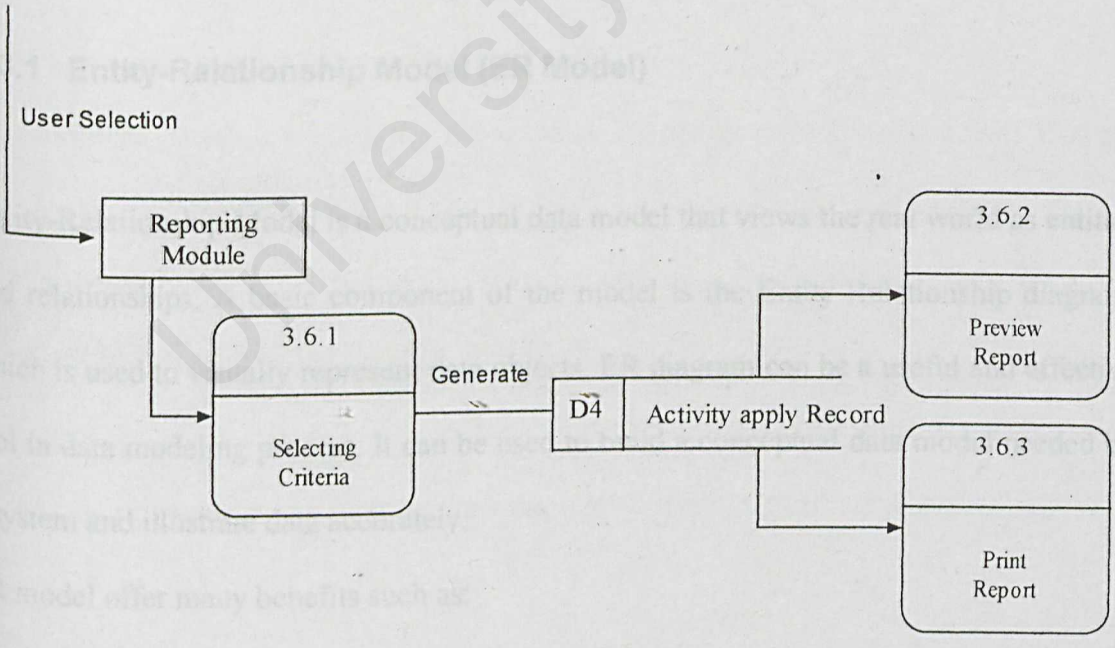


Figure 5.17 Data Flow Of Report Module

5.3 Data Modeling

Data modeling is one part of the conceptual design process. The data modeling focuses on what data should be stored in the database. The information needed to build a data model is gathered during requirement analysis of the system. So, data modeling is a stage where information domain module created during analysis is transformed into the data s structure that will be required to implement the system.

An effective data model completely and accurately represents the data requirements of the end users. Data modeling is bottom up process. A basic model, representing entities and relationships, is developed first. Then detail is added to the model by including information about attributes and business rules.

5.3.1 Entity-Relationship Model (ER Model)

Entity-Relationship Model is a conceptual data model that views the real world as entities and relationships. A basic component of the model is the Entity-Relationship diagram, which is used to visually represent data objects. ER diagram can be a useful and effective tool in data modeling process. It can be used to build a conceptual data model needed by a system and illustrate data accurately.

ER model offer many benefits such as:

- It maps well to the relational model. The constructs used in the ER model can easily be transformed into relational tables.

- It is simple and easy to understand with a minimum of training. Therefore, model can be used to by the database designer to communicate the design to the end user.
- The model can be used as a design plan by the database developer to implement a data model in specific database management software.

ER Notation

There are many types of notation used in ER model such as crow's foot, IDEFIX, Bachman and Chen notation. All notational styles represent entities as rectangular boxes and relationships as lines connecting boxes. Each style uses a special set of symbols to represent the cardinality of a connection. The notation used in this project is from Martin. The symbols used for the basic BR constructs is as below:

- Entities are represented by labeled rectangles. The label is the name of the entity.
- Relationship is represented by a solid line connect two entities. The name of the relationship is written above the line.
- Attributes, when included, are listed inside the entity rectangle. Attributes that are identifiers are underlined.
- Cardinality of many is represented by a line ending in a crow's foot. If the crow's foot is omitted, the cardinality is one.
- Existence is represented by placing a circle or a perpendicular bar on the line. Mandatory existence is shown by the bar next to the entity for an instance is required.

Concepts of ER Model

Entities:

Entities are the principal data objects about which information is to be collected. Entities are usually recognizable concepts, either concrete or abstract, such as person, things or events that have relevance to the database.

Relationship:

Represents an association between two or more entities.

Attributes:

Describes the entity of which they are associated. A particular instance of attributes is a value. The domain of an attribute is the collection of all possible values an attribute can have.

Degree of Relationship:

The number of entities associated with the relationship.

Connectivity:

Describes the mapping of associated entity instances in the relationship. The values of connectivity are "one' or "many". The basic types of connectivity are: one-to-one, one-to-many and many-to-many.

Cardinality of Relationship:

The actual numbers of related occurrences for reach of the two entities.

Direction:

Indicates the originating entity of a binary relationship. The entity from which a relationship originates is the parent entity; the entity where the relationship terminates is the child entity.

5.3.2 Relational Database Model

Relational database model is chosen as the database model in this system design. Relational database consists of collection of tables in which data are stored. Data is represented in the form of tables. Tables also called relations, as they are related to each other by storing a common entity characteristic.

The reasons for choosing relational database model as the underlying implementation model is listed as below:

- Relational model leads to structure and data independence, which makes data design process simpler and the final system easy to maintain. The physical path to access the database is of no concern to the developer.
- Provides very powerful and flexible query capability that is the Structural Query Language (SQL) which makes the data retrieval and queries process much more efficient.
- Moreover, RDBMS model contains many facilities that make it easy to design and generate reports. Therefore, reports such as the monthly time report project report task list, address list and list of reminders can be generated easily.

A relation is a named, two dimensional table of data. Each relation consists of a set of named columns and an arbitrary number of unnamed rows. Each column in a relation

corresponds to an attribute of that relation. Each row of a relation corresponds to a record that contains data values for an entity.

5.3.3 Normalization

Normalization is a process for converting complex data structures into simple, stable data structures. It can be accomplished in stages; each of which corresponds to a normal form. A normal form is a relation state that can be determined by applying simple rules regarding dependencies (or relationships between attributes) to that relation. This project concentrated on the three most frequently used:

1. *First Normal Form (MF)*

   A relation is in first normal form if and only if all underlying entries in columns are atomic. Any repeating value is removed, so there is a single value at the intersection of each row and column of the relation.

2. *Second Normal Form (2NF)*

   A relation is in second normal form if and only if it is in I NT and every non-key attribute is fully dependent on the primary key.

3. *Third Normal Form (3NF)*

   A relation is in third normal form if and only if it is in 2NF and every non-key attribute is non-transitively dependent on the primary key.

5. *Boyce-Codd Normal Form (BCNF)*

A relation is in Boyce-Codd normal form (BCNF) if and only if every determinant is a candidate key.

Everything has its advantages and its drawback. Normalization does. Normalization is one of those things that database designers sometimes wear like a cross. It is somehow turned into a religion for them, and they begin normalizing data for the sake of normalization rather than for the good things it does to their database. Here are a couple of things to think about in this context:

- If declaring a computed column or storing some derived data is going to allowing us to run a report more effectively, then, by all means, we should put it in. Just remember to take into account the benefit vs. the risk (for example, what if our "summary" data gets out of synch with the data it can be derived from? –How will we determine that it happened, and how will we fix it if it does happen?).
- Sometimes, but including this one de-normalized column in a table, we can eliminate or significantly cut down the number the joins necessary to retrieve information. Watch for these scenarios, they actually come up reasonably frequently. There is a case where adding one column to one commonly used base table cut a nine table join down to just three, and cut the query time by about 90% in the process.
- If we are keeping historical data, which will largely unchanged and just be used for reporting, then the integrity issue becomes a much smaller consideration. Once the data is written to a read-only area and verified, we can be reasonably certain that we would not have the kind of out of sync problems that is one of the

major things that data normalization addresses. At that point, it may be much nicer (and faster) to just "flatten" (de-normalize) the data out into few tables, and speed up things up.

- The fewer tables that have to be joined, the happier our users who do their own reports are going to be. The user base out there continue to get more and more savvy with the tools they are using. More and more often, users are coming to their DBA and asking for direct access to the database to be able to do their own custom reporting. For these users, a highly normalized database can look like a maze and become virtually useless. De-normalizing our data can make life much easier for these users.

5.3.4 Tables

There are all fourteen tables in the system. *Table 5.1* lists out all the tables and its purpose. *Table 5.1.1 – table 5.1.17* shows the details of all of the tables needed in the system with description and data types.

Table Name	Description
LogIn	To store all the administrator login and password authorization
Temp	To Store the prefix of the Society registration and activity applying code.
SocReg	To Store the society registration information.
SocConCod	To Store the society register conditions.

SocCod	To store the distinct society condition code with its description.
SocCat	To store the distinct society category with its description.
ExcReg	To Store the society EXCO information.
AJKCod	To store the distinct EXCO's post code with its description.
StuDet	To Store the society member or EXCO's information.
TempExc	As a temporally table to store the EXCO's information in the updating process.
ActReg	To Store the activity applying information.
ActTyp	To store the distinct activity type's code with its description.
ActCon	To store the activity conditions .
ActConCod	To store the distinct activity condition code with its description.

Table 5.1 Tables Needed In SSIS

Attributes	**Data Type**	**Description**
Usernam	Char	Admin Login
Passw	Char	Admin Password

Table 5.1.1 LogIn Table (Login) Attributes

Attributes	Data Type	Description
PreCod	Char	Prefix of Activity number
PreSoc	Char	Prefix of Society number

Table 5.1.2 Temp Table (Temporally) Attributes

Attributes	Data Type	Description
Auto	Int	Number which automatic increase one.
SocNo	Char	Society number
SocName	Char	Soiety name
SocCat	Char	Society Category
Add1	VarChar	Address one (house number and road).
Add2	VarChar	Address two (full address).
PosCod	Char	Pos Cod.
City	Char	City name.
State	Char	State
Tel	Char	Contact numbet.
ApplDat	Datetime	Apply date.
ApprDat	Datetime	Approve date.
EstbDat	Datetime	Establish date.
MovDat	Datetime	Remove date.
Obj	VarChar	Objectives of society.
SocCon	VarChar	Society conditions.
MemQua	Char	Member qualifiction.

Table 5.1.3 SocReg Table (Society Registration) Attributes

Field Name	Data Type	Description
ConCod	Char	Society Condition cod.
ConDesc	Char	Society condition cod description.

Table 5.1.4 SocConCod Table (Society Condition Cod) Attributes

Field Name	Data Type	Description
Auto	Int	Number which automatic increase one.
SocNo	Char	Society number.
ConCod	Char	Society condition cod.

Table 5.1.5 SocCon Table (Society Conditions) Attributes

Field Name	Data Type	Description
SocCat	Char	Society Category cod.
CatDesc	Char	Society Category cod description.

Table 5.1.6 SocCat (Society Category Cod) Attributes).

Field Name	Data Type	Description
SocNo	Char	Society number.
ActNo	Char	Activity number.
MemSta	Char	EXCO status.
Ic	Char	EXCO ic number.
Sess	Char	Session.
StatDat	Datetime	Start date.
EndDat	Datetime	End date.

PosCod	Char	EXCO post cod.

Table 5.1.7 ExcReg (EXCO Registration) Attributes

Field Name	Data Type	Description
PosCod	Char	Society EXCO's post cod.
PCodDesc	Char	Description of society EXCO's post cod.

Table 5.1.8 AJKCod *Table (EXCO Cod) Attributes.*

Field Name	Data Type	Description
Name	Char	Student name.
Fac	Char	Faculty.
IcNo	Char	Ic number.
Year	Tinyint	Student's year.
Fe	Char	Sex.
Race	Char	Race.
HAdd	Char	Home address.
CAdd	Char	College address.
Tel	Char	Telephone number.
RooNo	Char	Student's room Number (if lives in college).
Course	Char	Course undertaking.
PosCod	Char	Post cod in society.

Table 5.1.9 StuDet Table (Student Details) Attributes

Field Name	Data Type	Description
SocNo	Char	Society number of the society that student takes part.
Sess	Char	Session of the student taking part in the society.
Name	Char	Student name.
Fac	Char	Faculty.
IcNo	Char	Ic number.
Year	Tinyint	Student's year.
Fe	Char	Sex.
Race	Char	Race.
HAdd	Char	Home address.
CAdd	Char	College address.
Tel	Char	Telephone number.
RooNo	Char	Student's room Number (if lives in college).
Course	Char	Course undertaking.
PosCod	Char	Post cod in society.

Table 5.1.10 TempExc Table (Temporally EXCO Details) Attributes

Field Name	Data Type	Description
SocNo	Char	Society number.
SName	Char	Society name.
ActNo	Char	Activity number.
Auto	Int	Auto number that automatic increase one.
Sess	Char	Session.
RegDat	Datetime	Apply date.

ApplIc	Char	Applier Ic number.
PosCod	Char	Applier post cod.
TypCod	Char	Activity type.
Title	Varchar	Activity title.
Obj	Varchar	Objectives.
Place	Varchar	Place.
StaDat	Datetime	Start date.
EndDat	Datetime	End date.
StaTim	Char	Start time.
EndTim	Char	End time.
Ope	Char	Activity opening.
Clo	Char	Activity closing.
ParSta	Char	Participates status.
BudCos	Smallmoney	Budget cost.
Benef	Smallmoney	Benefit or money earned.
Appr	Char	Approval status totally.
ApprOff	Char	Official's approval.
ApprTNC	Char	TNC's approval.
ApprDat	Datetime	Approve date.
HEPSub	Smallmoney	Subsidies given by HEP.
OthCon	Varchar	Other activity condition.

Table 5.1.11 ActReg Table (Activity Registration) Attributes

Field Name	**Data Type**	**Description**
ActCod	Char	Activity type cod.
AtypDesc	Char	Activity type description.

Table 5.1.12 ActTyp Table (Activity Type) Attributes

Field Name	Data Type	Description
Auto	Int	Auto number that automatic increase one.
ActNo	Int	Activity number.
ConCod	Char	Activity condition cods.
ConDesc	Char	Activity condition cods description..

Table 5.1.13 ActCon Table (Activity Conditions) Attributes

Field Name	Data Type	Description
ConCod	Char	Activity condition cods.
ConDesc	Char	Activity condition cods description..

Table 5.1.14 ActConCod Table (Activity Condition Cod) Attributes

5.4 User Interface Design

User interface is important act as a communication medium in the human-machine interaction. A fundamental reality of application development is that the user interface is the system to the users. Constantine (1995) points out that the reality is that a good user interface allows people who understand the problem domain to work with the application without having to read the manuals or receive training.

There are 3 categories of Human Communication Interface design:

- General Interaction
- Information Display and Printed Output
- Data Input

5.4.1 General Interaction

The General interaction often crosses the boundary into information display, data entry and overall system control. The user interface design objective is mainly for better interaction between the user and the system. Therefore, the design must be simple that enables the user to interact with the system as easily as possible and the design must be user friendly. The following guidelines are adhere in during the development of SSIS to achieve the above mentioned objective:-

1.Be consistent

- Screen layout, menu selection and data display are consistent throughout the system to avoid user confusion.

2.Display messages and comments

- The messages are given to indicate the status of processing. If error has been detected then it requests user to select an action.

Ask for verification for any non-trivial actions

- The user will verify against request that will produce significant changes. For example, if the user request the deletion of a file, then to verify the user action, a message "Are you sure you want to delete ?" should appear.

5.4.2 Information Display and Printed Output

Information Display

The information display in the system is in the grid or tabular form with the appropriate column heading for each fields figure. Scrollbar is provided to facilitate user navigation when information display occupies space than the display grid. The vertical scrollbar will scroll individual data lines form up or down. On the other hand, the horizontal scroll will scroll the information display from left to right to see the complete details of that particular record.

Printed Output

Reports on timetable, homework list, to do list, event list and address list can be generating to aid user for time management purpose and to monitor their daily activities. The generated reports have a standard layout with the following attributes:

1) Headings

- All output must have a title to inform the user what they are working with. The

headings are presented at center of the upper portion of the report.

2) Date and Time

- Dates printed on the report can inform the user the date on which it was prepares together with the current time.

CHAPTER 6:IMPLEMENTATION

6.0 System Implementation

System implementation is a process that converts the system requirement and designs into program codes. It describes how the design system was implemented to convert into real system. It involves coding step that translates a details design representation of software into a program language realization.

6.1 Development Environment

Development environment has certain impact on the development of a system. Using the suitable hardware will help speed up system development. The hardware and software tools used to develop and documented the entire system is as discuss below.

6.1.1 Hardware Requirement

The hardware used to develop this project are listed below:

- 233MHz Pentium II Processor
- 128MB RAM

- 3.2GB Hard Disk
- Other standard desktop PC components

6.1.2 Software Tools/Components requirements

1. Software Tools for Design and Report Writing

Design involves creating of charts like data flow diagram and structure chart that provides a greater overview of the system designed. Smart Draw 5.0 was used to do the graphical design and Microsoft Word 2000 and Microsoft Excel 2000 was used to do the documentation and user manual in the report writing.

2. Software Tools for Development

Some software tools were used for the system development as listed in Table 6.1.

Software/Tools	Purpose	Description
Windows NT Server 4.0	System Requirement	Operating System (OS)
Smart Draw 5.0	Data Modeling and Process Design	Design of ER Diagram and DFD
Microsoft SQL Server 7.0	Database	As the system database to store information
Microsoft InterDev 6.0	Coding and interface design	Coding ASP and HTML
Adobe Photoshop	Interface design	Create image

Table 6.1 Software Tools Used

6.2 Development of SSIS System

This section explained the development of this project, which focuses on the analysis of usage of the technology and development tools that had been used.

6.2.1 Application Development

The application development involves creating and designing the user interfaces, coding the application using Microsoft InterDev 6.0 and ASP2.0 technology and linking the application to the database.

6.2.2 Database Development

The backend of this project is Microsoft SQL Server 7.0. The database is built matching the system requirements as depicted in Chapter 4. Some of the tables in this system have been normalized until BCNF to optimize the database usability.

6.2.3 User Interface Development

The user interface for this project was mainly developed using Microsoft Interdev. Image editing tool like Adobe Photoshop are used to create some image to used in the

graphical user interface. They provide good ability in building friendly user interface design tools that are user friendly and easy to use.

6.2.4 Structured Programming

Structure programming extends the principles governing structured design to the writing of a program. It also is based on the principle of the modularization that follows from the top-down development.

Structure is a method of organizing and coding programs that simplifies control paths so that the programs can be easily understood and modified. Structured programming reduces the complexity created when programs jump forward and backward to other parts of the program, obscuring the logic and flow of the program [15]. ASP (Active Server Pages) supports structured programming by providing sequential, iteration (FOR and WHILE statements etc.) and sub-routine or function calling.

6.2.5 Modular Programming

Modular programming is defined as breaking and application into small programming units that perform a single task. In ASP, this can be done by using the function and sub function based on the events. Breaking the system into distinct ASP file also contributes to the modular programming. When an application is composed of small functions that perform a single task, maintenance is much easier. Functions can be shared among forms by coding the functions into .inc or .asp file. The other file can share these functions by include that file in the header. This makes the system gains the advantages of usability.

6.2.6 Algorithm

Searching Algorithm

Searching is a basic and conventional technique that can be found in the application. The algorithm that used for the searching part is by using the codes that manipulates the database. The algorithm has been used in many modules in the system, especially the system is a typical application system. The searching criteria include siri number, date, name, session and so on. All the searching is done by applying the record browsing tool. Typical browsing techniques are move records on forward, backward, straight to the first record or last record and so on. Besides, the browser also allows the user to enter the certain data of the criteria to search for that specific record. A button is provided to help the user during the searching. A set of validated data is popped up for choosing after the button is pressed. This makes the system more user-friendly and easy to be used.

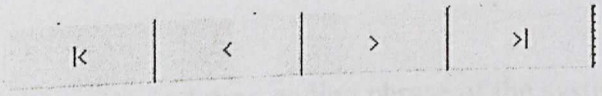


Figure 6.1 Example of Search Browser

Chapter 7: Testing And Evaluation

7.1 Testing

Testing is an important stage to ensure the system's quality. It ensures the system is developed fulfill the system requirements. There are many levels of testing. It is starts since the development of the user interface and the coding process start and carried out till the end of the development process. The SSIS has undergone four stages of testing. They are unit testing, module test, integrated testing and system testing.

7.1.1 Unit Testing

Normally this stage of testing is during coding phrase of the system. In this stage, the program code is examined by reading through it to spot any algorithm, logical and data errors. The syntax error is more easy to found compare to these kind of errors.

7.1.2 Module Testing

SSIS is tested according to the function modules of the system in this stage. The function interfaces are tested individually. They are tested with a set of data to ensure the operations of record viewing, adding, editing and deleting are well function. These operations are tested on by one to ensure the input is properly converted to the desired output.

Besides, the individual modules are tested with a set of the incorrect data the see the response of the system in overcoming the invalid data entering problem. The author assume himself as a new user and use the system in some rare way. This can test the error handling of the individual modules.

7.1.3 Integrated Testing

This stage of testing is testing the correctness of the integrated system. The function modules passing the unit test are combined into a working system. The motive of the testing is to make certain that all modules can be executed as a complete module.

The test is focus mainly on the Society Registration, Society EXCO Registration and Activity apply. The relationship of these module must match with the system

requirements. For example, a society must exist in the Society Registration society list before can adding its member in the Society EXCO Registration module and the same in the contrary.

This stage makes sure that system is running in the correct way from the start till the user logs out. The output of the system are tested to match with the input. The Activity List records and the report are ensured in showing the correct output.

7.14 System Testing

Lastly, the system is tested its reliability, performance, security, platform testing, flexibility, ease to use and so on. Due to the system is an on-line system, it must have the fast response time. System testing are also important to verify the system's overall system's objectives are achieved.

7.2 System Evaluation

The author had gained some users comments and their evaluation against the system. Below are the conclusion of the system evaluation:

7.2.1 System Strength

User-friendly Interface

The Bulletin module is easy to use and its buttons are typical buttons. The record view has record browser with the current page and the total page number. Besides, the order of the record being display can be changed according to the user need. The users also mentioned that the Administrator module is easy to learn and use.

Flexibility

The SSIS is flexible in the record viewing and the operational processing. In the Society EXCO Registration for example, which is letting the user to edit the member particulars until they are satisfy with it.

Response Time

Due to the author does not using too much image and animation, the response time is considered good.

7.2.2 System Weaknesses

Report

The main weaknesses of the system is the report generating. There is only one report generated in SSIS and is too few. It is not enough for the actual use.

Chapter 8 Conclusions And Recommendation

8.1 Evaluation Result

The testing and evaluation results are analyzed from the previous chapter. SSIS are evaluate whether it meets the system requirement that defined in the proposal.

8.1.1 Objective Achievement

The overall system requirements are fulfilled. There is a Bulletin module to act as an important communication point between the society information management level and the societies. It shows the society activities with the apply status. The society information management level can now manage the information in a systematic and easy way. At the meanwhile, the societies could know the apply status of the activity they are applying easily. Besides, all the student can gain the activity information easily when they are on-line.

SSIS is considered easy to used because it consist of the components that are typically found in the common application. The complexity of the operation in SSIS is low. Besides, it is flexible to be used. This can be shown in the Society EXCO Registration module. The objective of these strength is to minimize the need of the user support and in turn overcome the turn over problem in HEP.

The only thing that is not done well in SSIS is the report generating. Only a report is generated in SSIS, Society Activity List Report. But this is an important report contains the valuable information. The author does not generates much report because these kind of reports need much time to produced.

The main reasons are, the reports of SSIS is formal report and is too customize to be produced. The author thinks that he is lack of time in doing this in a semester besides the study. Moreover, these customized reports need the involvement of the users (HEP) in format determination and discussion. They also lack of time to doing so or have to use much time to do so.

8.1.2 Problems Encountered and Solution

This is the first time of the author in developing a web-based system. Thus, there are a lot of problems encountered during the development process.

- Difficulties in Learning ASP and SQL Server 7.0

  At the starting of the project, ASP and SQL Server 7.0 are strange for the author. The author had to spend much time in learning them. Besides, the author had to learn the Java script too. That means the author had to learn the all the technologies that used in the development process. Hard working and smart study are the main method to

overcome this problem. Other solution include asking friends and information searching from the Internet.

- Determining Scope of the System

  The author had faced the problem of determining the scope of the system. This is because the author was new to the related technology and the web-based application development. Thus, the author ask some opinion form the lecturer, senior and friends.

- Lack Of Time

  SSIS project is the only project of the author in the semester. He has to cover his study and the other assignments at the same time. This had brought the author much problems cause by the time factor. Time is important for the author to learn the technology, produce a good system design and test the system. Smartly planning the development schedule and hard working is used to overcome this time problem.

- Computer Problem

  Since the author does not own a computer, the author has to use the computer lab in the faculty. This is not convenience to the author. Moreover, the lab was not ready for use in earlier and not open in the public holidays. The author went to the lab frequently to solve this problem.

- ASP 2.0

  The version of ASP 2.0 does not have some technique that provided in ASP3.0. This had decreased the system's performance and flexibility. The author just use whatever provided because every project has its constraints.

- Unexpected Problems

  The lab's computer had been attacked by the computer viruses. This had consumed a few days to fix it and redo the work because some important data had lost in that crisis. Besides, the sudden stop of the electricity providing had brought few problems to the author too. The author had backup his system to prevent any losses of data.

8.2 Future Enhancements

Some ideas are recommends as below to improve the system's performance and functionality.

- System Performance

  Web-based application has some advantages like need not to install and the convenience in achieving the application. However, the response time is very important to the system. Thus, the database should be updated in moving out the old data into the backup table so that the amount of the current data manipulated is not

too much or too big. The amount of the data is influence the response time so much. Some function should be added if the old data have to refer back.

- Reports

  All the formal report could be produced to maximize the usability and functionality of the system. One of the system output, approved letter, can be produced by the system. That will conveniences the office staff and the activity applying processing. The activity approval would become easier.

- Bulletin Information

  The Bulletin module could be added some other information like the formal procedures of activity applying, meeting booking schedule between the Official and the societies, announcements and so on.

- Advance Operation

  The system could be enhanced so that societies can send their activity apply form through the on-line system. That means they fill up the forms of the system in the way of paperless. Besides, they can send their activity report to HEP through the system too.

8.3 Summary

The SSIS is a new start to computerize the society information management process. In overall, SSIS has meet its objectives as noted in the proposal. Although developing the system is not an easy task for the author because of various problem encountered, the author had learned so much during this project. And the important thing is, the author was enjoying the whole process of the system development.

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User Manual

Introduction

This user manual benefits the users especially not familiar to computer. The main target of this manual is administrator that operates the data entering. SSIS is easy for use and is same as normal desktop application. Users can refer to this manual to gain soma guideline when they start using the system. When users face some operating problem, the manual is a good source of aid.

The manual will start with main home page of SSIS and next we go through the function provided by the system. Then the author will describe the common buttons that appear frequently in SSIS system. Lastly, the dialog boxes that may pop out would be explained.

1. Bulletin Module

1.1 Starting Home Page

Firstly, the on-line user must go to the system's web-site by typing the URL address: *http://efaculty.fsktm.um.edu.my/socis/Login.asp*. The user will goes to the SSIS home page as depicted in Figure A1.0. This is the Bulletin module of SSIS. This page is opens to every on-line user. This site shows the student society's activity in University Malaya and also as the place the administrator get into the Admin module of SSIS. Bulletin site contains a searching function in viewing the information. The user must input the criteria of search to view the searching result. There are two main criteria as shown in the figure. Here are the steps in using it:

1. Choose either search by session and society name or by apply date.
2. Click the appropriate button or just type in the criteria value.
3. Click the Submit button to view the searching results.

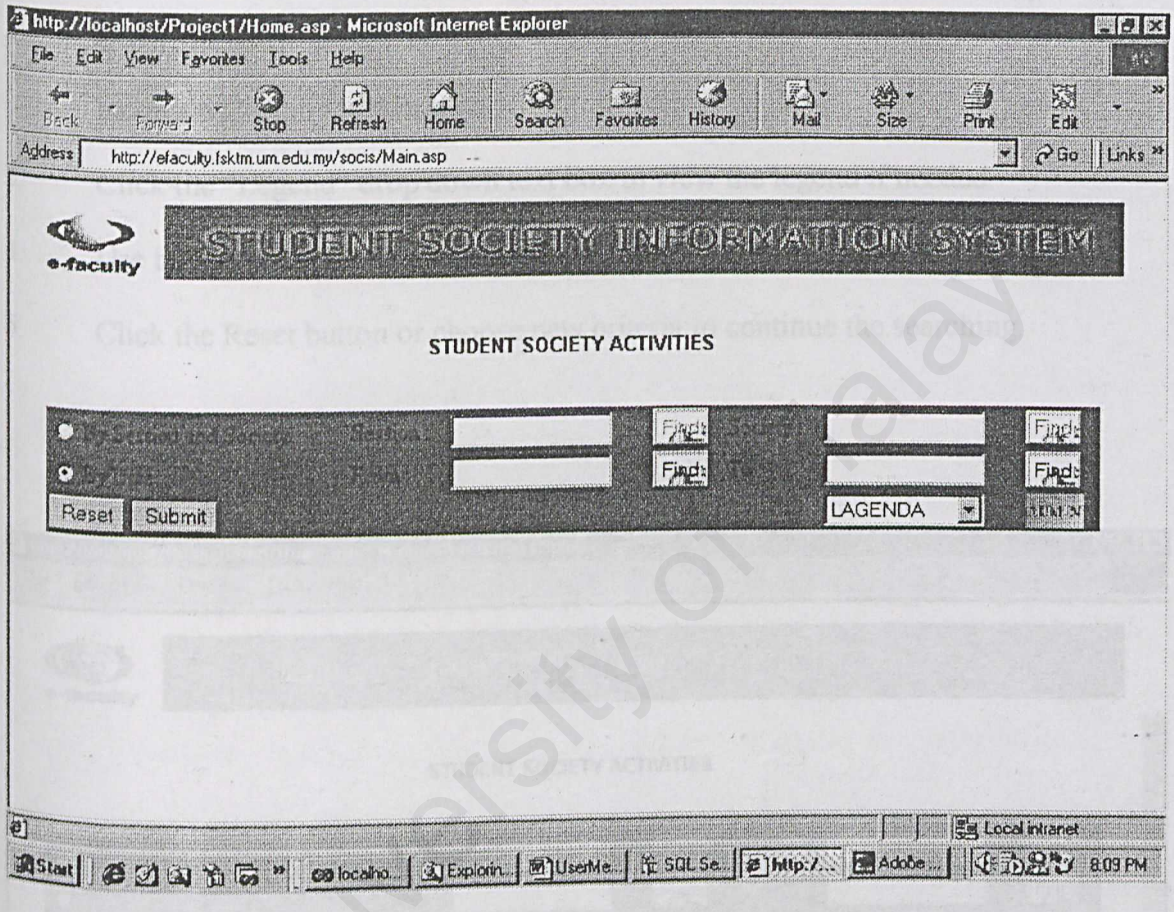


Figure A1.0: Starting page of SSIS.

The searching result of the 02/03 session is show in Figure A1.1 as an example. There is a browser tool at the left top and left bottom of the result table. At the meanwhile, the current page number and total page number is locates at the right top and

right bottom of the result table. A "Back To Top" hyper link is display at the bottom of the page. Here are some guidelines to manipulate the information display:

1. With the help of the current page number and total page, use the browser to browse the information.
2. Click the table field's title in the type of hyper link to change the order of the records according to that title.
3. Click the "Legend" drop down text box to view the legend if needed.
4. Use the "Back To Top" hyper link to get back to the top when needed.
5. Click the Reset button or choose new criteria to continue the searching.

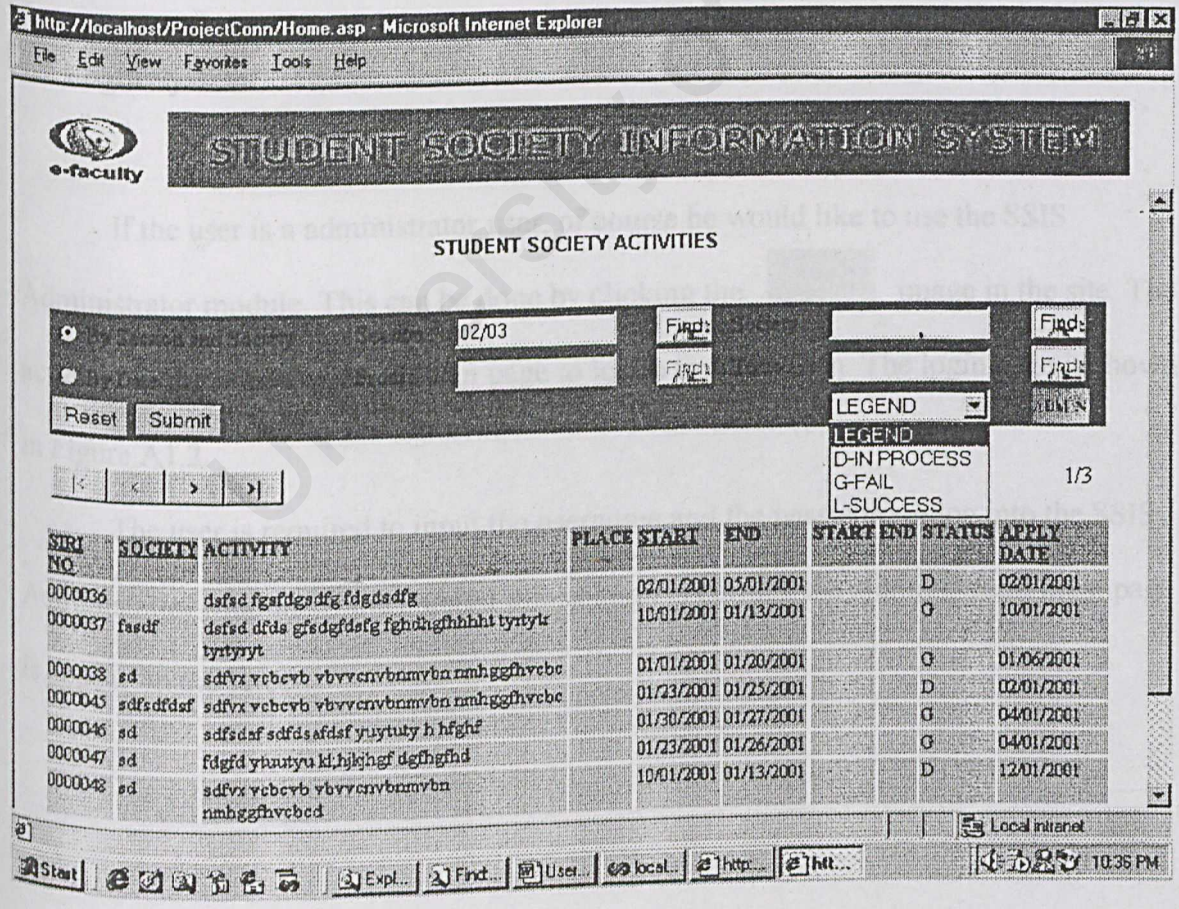
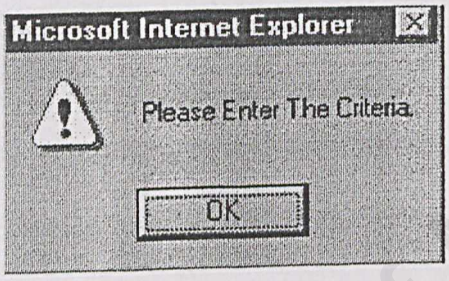


Figure A1.1: Searching the information.

The dialog box that may pop up in this function is (when the user submit the form without selecting any criteria):



1.2 Login System

If the user is a administrator user, of course he would like to use the SSIS Administrator module. This can be done by clicking the  image in the site. The action would bring user to the login page to log in to the system. The login page is shown in Figure A1.2.

The user is required to input the username and the password to log into the SSIS Administrator Module. If the entered information is correct, the Administrator main page is appear in the screen.

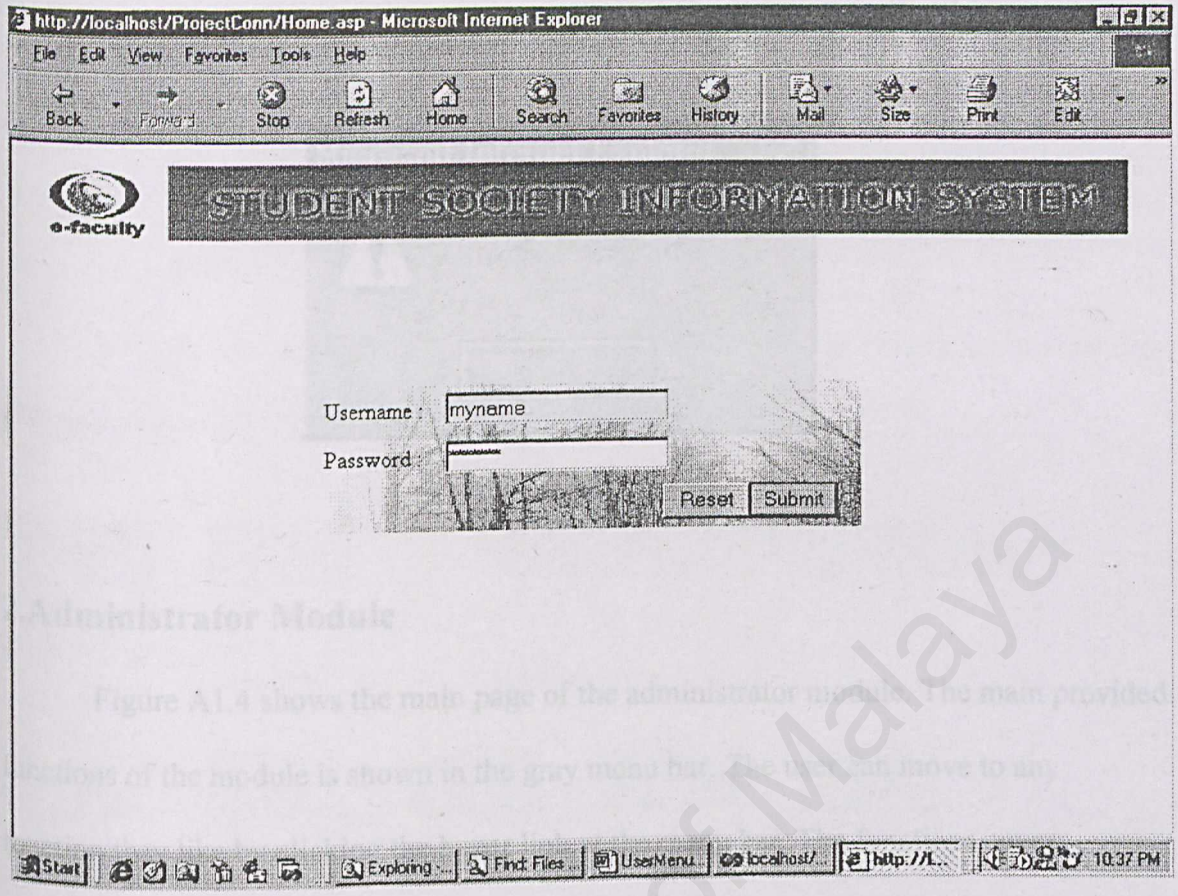
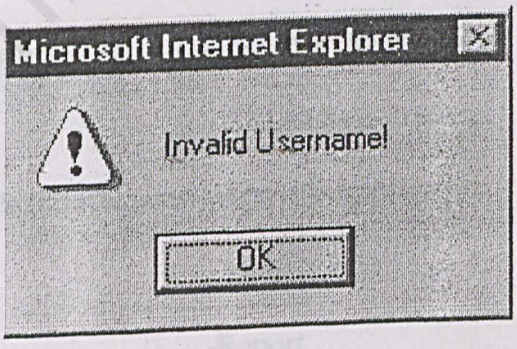


Figure A1.3: SSIS Administrator Login system.

Dialog boxes that may come out in this section are shown as below:



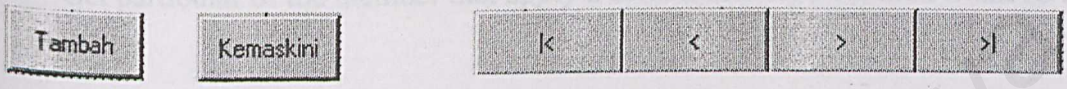
2.Administrator Module

Figure A1.4 shows the main page of the administrator module. The main provided functions of the module is shown in the gray menu bar. The user can move to any function they like by clicking the hyper link at the menu bar. The functions cover:

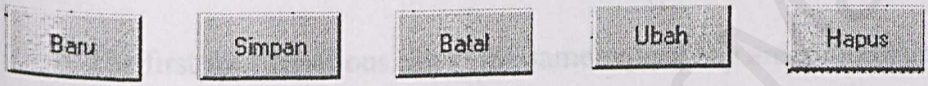
1. Kategori Persatuan – Society Category
2. Jenis Kegiatan – Activity Type
3. Syarat Persatuan – Society Condition
4. Jawatan Persatuan – Society Post
5. Pendaftaran Persatuan – Society Registration
6. Pendaftaran EXCO – EXCO Registration
7. Permohonan Mngadakan Kegiatan –Activity Application
8. Senarai Kegiatan -Activity List
9. Report -Report

The first four functions are in the same type. They are maintenance function for the code used in the system and the report and have the same operation style. Thus, the author would like to describe one of these functions instead of all of them. The following functions will be described one by one.

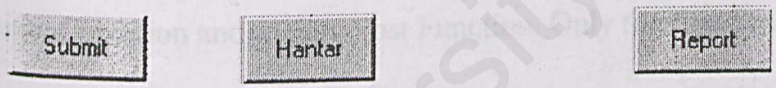
Before going deeper, the author would like to describe the general button that used in the system.



Add Update Record browser tool



New Save Cancel Edit Delete



Submit form submit to view records Submit to preview report

Remove Reset to initial mode

Open a small date selector window to pick a date.

Open a small selector window to choose a value.

Get particular of the member that apply a certain activity with the certain IC no.

2.1 Maintenance Function

The first four functions are in the same type. They are maintenance function for the code used in the system and the report and have the same operation style. As you can see in the function menu bar in Figure A1.4, they are Society Category, Activity Type, Society Condition and society Post Function. Only the first function will be described here.

2.11 Society Category Function

The function is shown in Figure A1.4. It contains the general buttons and text fields. The screen is divided into two parts. The first part is the record table that shows the society codes and the appropriate description. The second part shows the operation provided to the user.

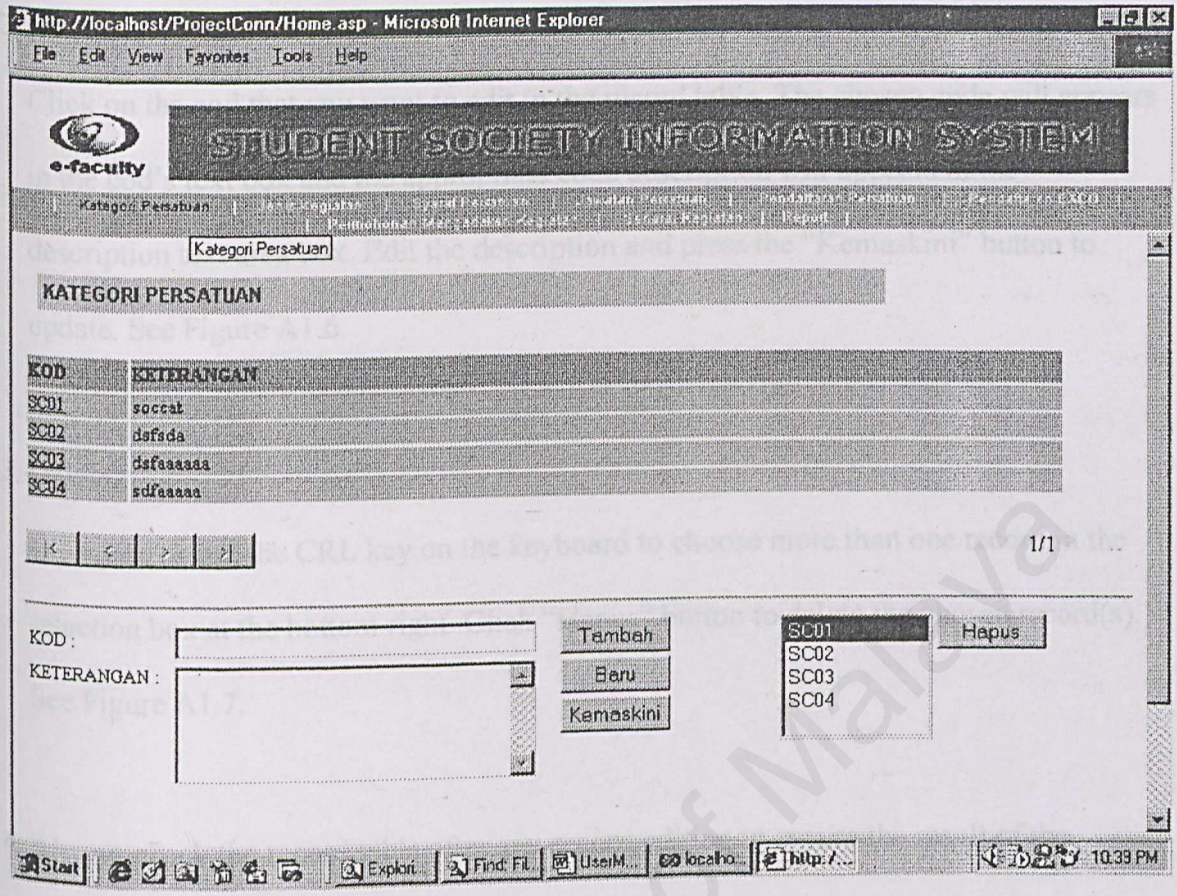


Figure A1.4: Society Category function

The maintenance functions show all the operation function at once, as shown in the figure. These include data view, add, edit (update) and delete operation. These are the description:

1. Add

Input the cod and code description and click "tambah" button. See Figure A1.5.

2. Edit

Click on the cod that you want to edit in the record table. The chosen code will appears in the cod's text box and the appropriate code description will appears in the description text area box. Edit the description and press the "Kemaskini" button to update. See Figure A1.6.

3. Delete

Click one or use the CRL key on the keyboard to choose more than one record in the selection box at the bottom right. Click "Hapus" button to delete the chosen record(s). See Figure A1.7.

4. Always check the record table after any record edition to ensure the result of the operation.

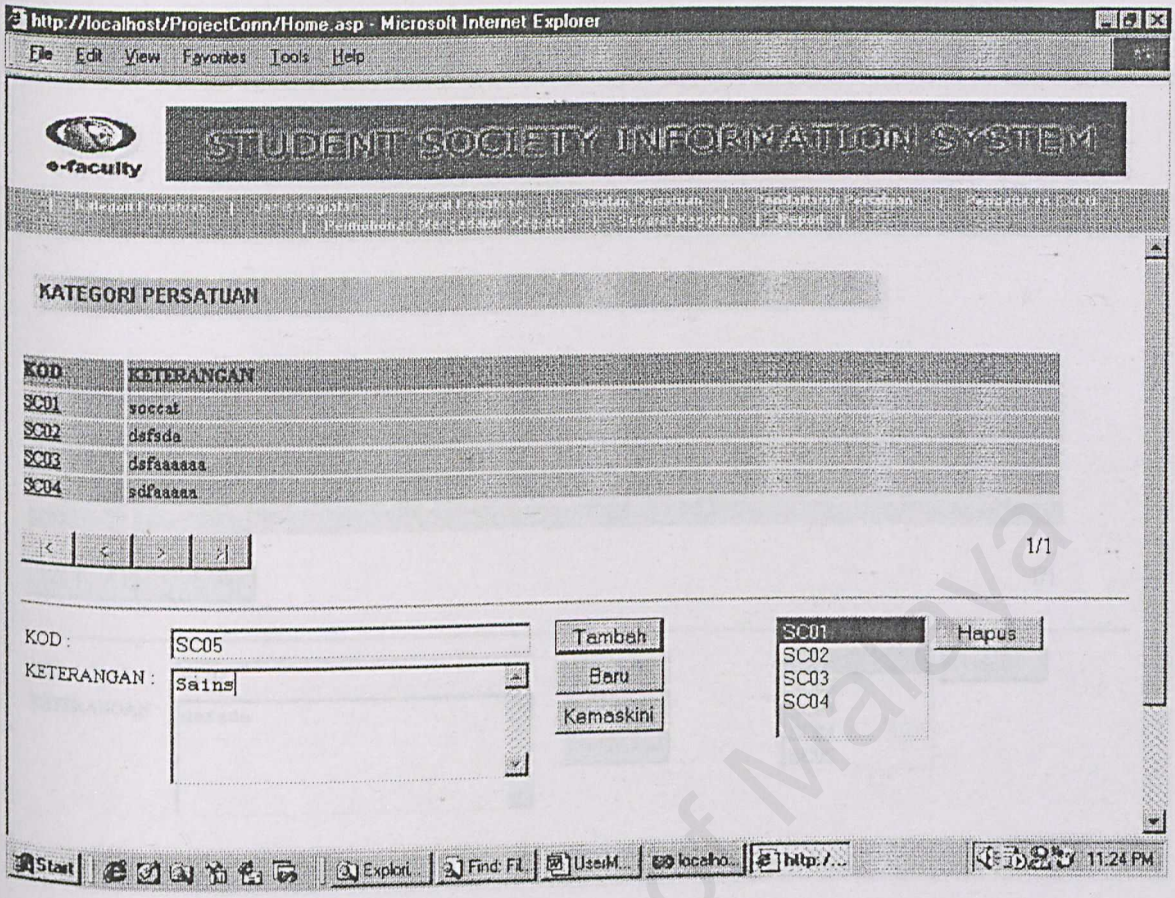


Figure A1.5 Add mode of Category Function.

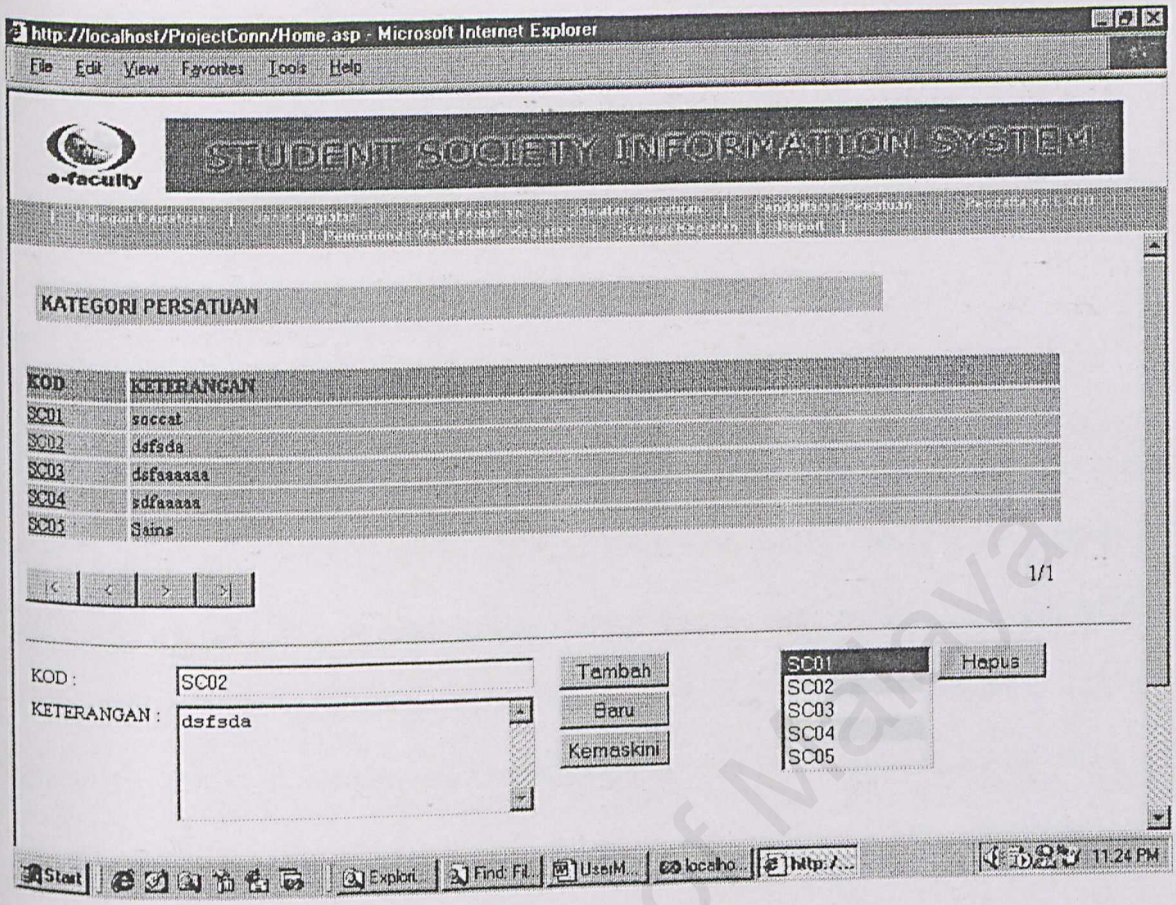


Figure A1.6 Edit record.

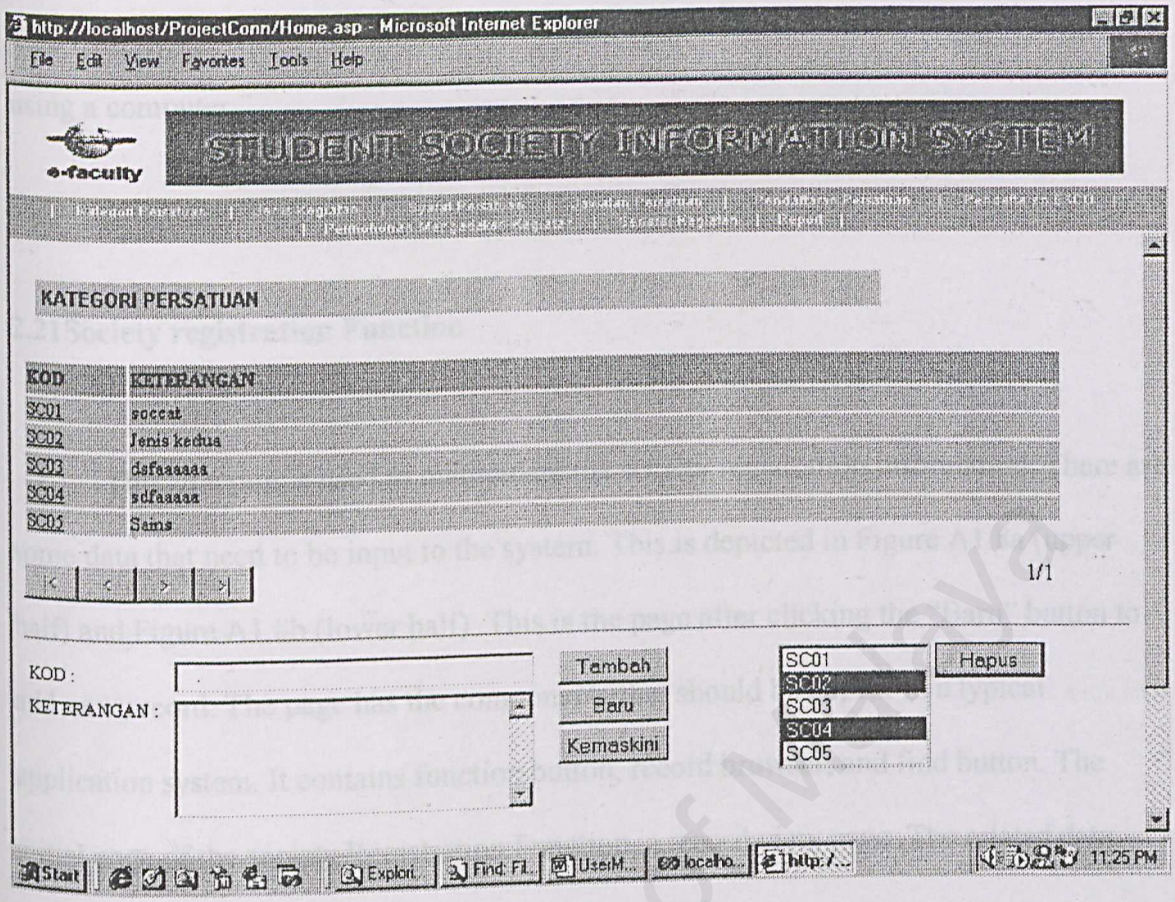


Figure A1.7: Delete Records.

2.2 Data Operation Function

There are three functions belong to this type. They are Society Registration Function, Society EXCO Registration Function and society Activity Function. Generally, the initial or starting page of these functions is data view page. User can browses records in this page but can not edit any data in the state because all input text boxes are read-only. User can manipulate the functions' information using the operation bar. The operations include

add, edit and delete record. User must familiar with all these things if she or he has been using a computer.

2.21 Society registration Function

This function is used to manipulate the society registration information. There are some data that need to be input to the system. This is depicted in Figure A1.8a (upper half) and Figure A1.8b (lower half). This is the page after clicking the "Baru" button to add new record. The page has the components that should be appear in a typical application system. It contains function button, record browser, and find button. The initial page of the society Registration Function is record view page. The related data manipulation operations provided are described as follow:

1. Record browsing

   1.1 User can browses the record using the browser tool. Besides, user can choose to Click the "Cari" button to pop up a small window with the valid record searching value. By choosing the appropriate value, user can go straight to the record with that criteria value.

2. Add record

   2.1 Click "Baru" button to open new blank page. The "NO. PENDAFTARAN" auto generated and user need not to insert data into this text box. Fill up the form in

Figure A1.8a.

2.2 Now we have reach to the form of Figure A1.8b. The left-hand sight's box contains the society cod that can be added. Meanwhile, the right-hand sight's box is the chosen result.

2.3 To add any society condition, just click the code (you can view its description in the record table using browser tool) in the left box. The code will appear in the right hand side's box.

2.4 User can remove the society condition in the result box. First select the code you want to remove by clicking or with the help of the CRL key on the key board (you hfave done this before in the Maintenance Function). Clicking the central button. Then you can see the related code is removed from the box.

2.5 After filling up the form, click "Simpan" to save the new record or click "Batal" button to cancel the operation. Both would return back to the view page.

3. Edit record

3.1 Browse to the record that needed to edit.

3.2 Click the "Ubah" button so that the form is enabled for data changing.

3.3 Make changes to the form. The society condition editing operation is done in the same way as adding operation.

3.4 After satisfy editing, click "simpan" to save the changes or click "Batal" button to cancel the operation. Both would return back to the view page.

4. Delete record

5.1 Browse to the record that needed to delete.

5.2 Click the "Hapus" button to delete the records. When you are asked for the confirmation of the operation by the popup dialog box, click "Yes" to delete the record or "Cancel" button to cancel the operation and return back to the previous page.

5. Always check the record in record view after any record edition to ensure the result of the operation.

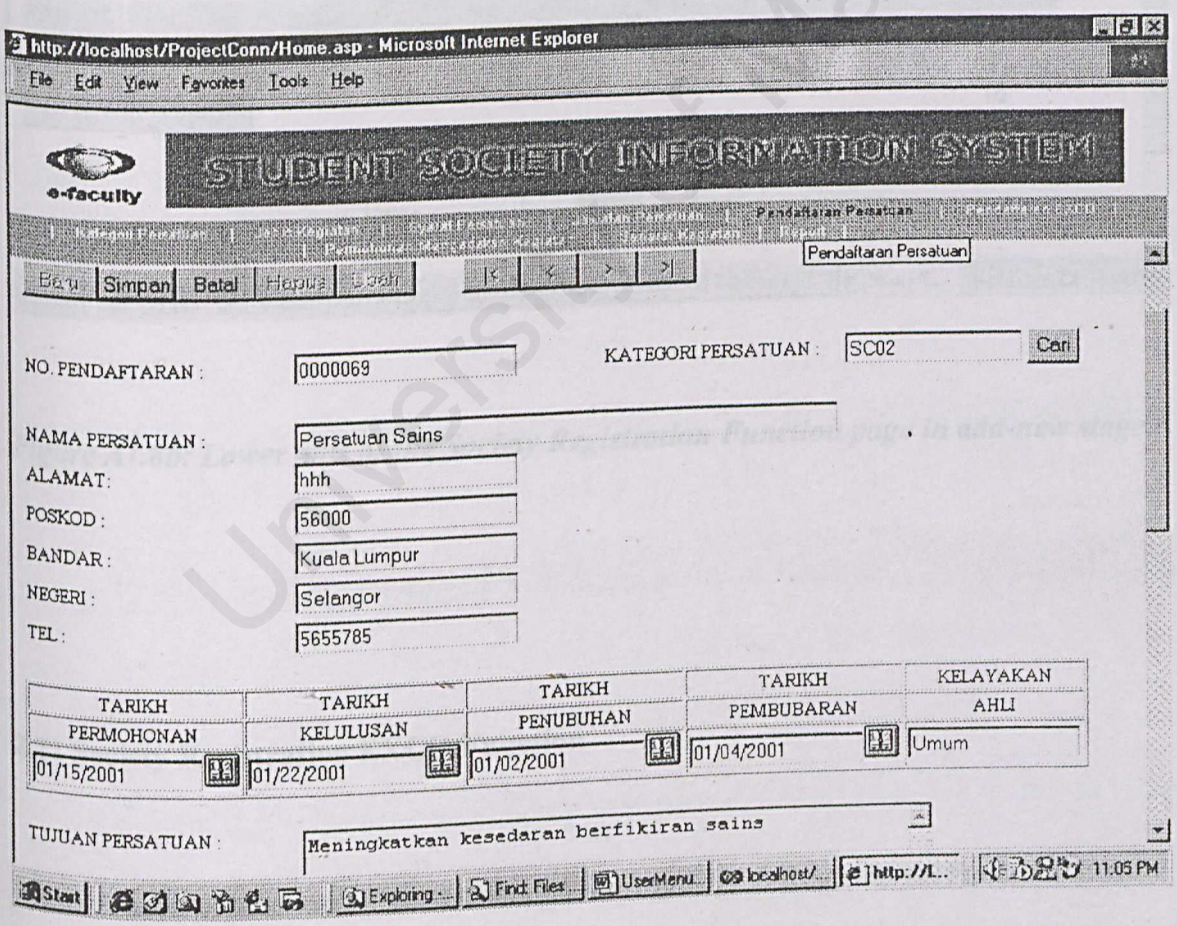


Figure A1.8a: Upper part of the Society Registration Function page in add-new stage.

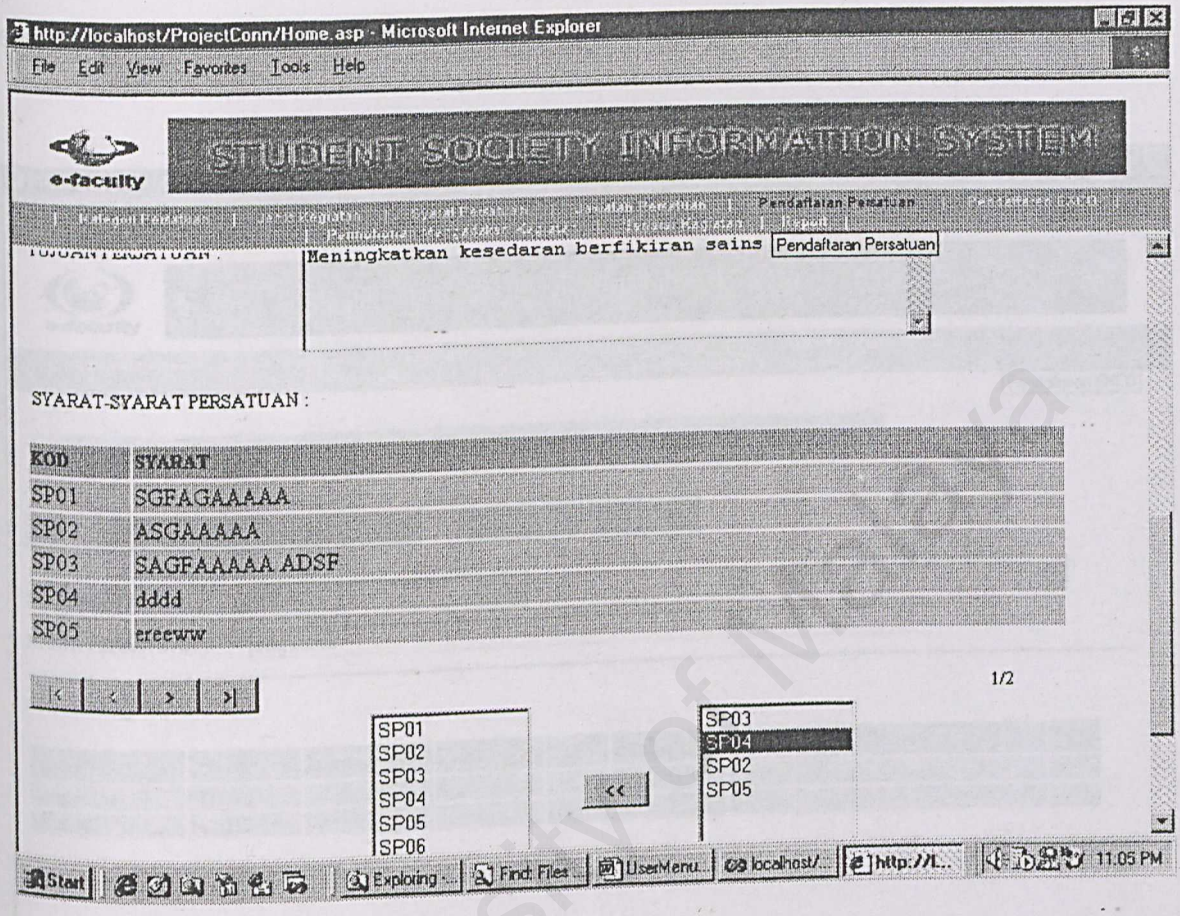


Figure A1.8b: Lower part of the Society Registration Function page in add-new stage.

2.22 Society Registration EXCO Function

The next function to be described is Society EXCO Registration Function. It is used to store the information of a society's EXCO every year (session). As we can see in

figure A1.9, The initial page (record views) is divided into two parts. The Header part (at the top) shows the society's brief information and the Detail part (below the Header part) shows its members' particulars.

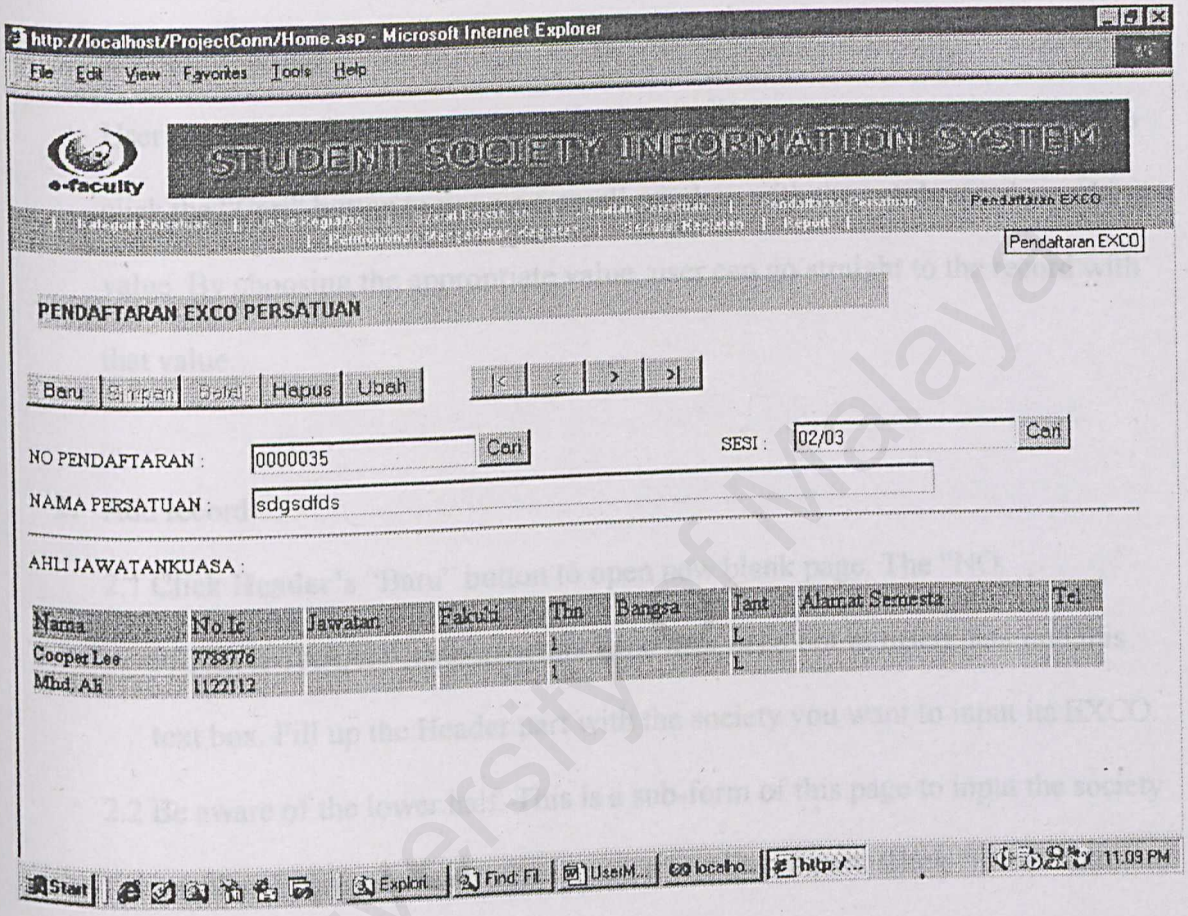


Figure A1.9: Record view of Society EXCO Registration Function.

Figure A2.0 shows the screen in the edit operation. As we can see, the main part is the Header part that used to input a certain society's society number, session and society name. The second part (below the Header part) is the Detail part that used to input that

certain society's members (EXCO) particulars. The operations provided in the function are shown as below:

1. Record browsing

   User can browses the record using the browser tool. Besides, user can choose to click the "Cari" button to pop up a small window with the valid record searching value. By choosing the appropriate value, user can go straight to the record with that value.

2. Add record

   2.1 Click **Header's** "Baru" button to open new blank page. The "NO. PENDAFTARAN" auto generated and user need not to insert data into this text box. Fill up the Header part with the society you want to input its EXCO.

   2.2 Be aware of the lower half. This is a sub-form of this page to input the society members' particulars. So now we are at the Detail part. Click "Baru" button to add first member. Fill up the member's particulars and click "Simpan" to save the new record. The Detail part will now at its record view showing the first record that input just now.

   2.3 Now click the "Baru" button again to input the second member's particulars 2 and click "Simpan" to save the second record as in step 2. Now the record view has two records of member which you can browse them using the browser tool.

2.4 Continue inserting all the members as describe above. Use the browser tool and the operation bar (of course now you are familiar with it) in the Detail part to add, edit and delete records.

2.5 After satisfy all the members fillings, click the **Header's** "Simpan" button to save the new society with its members information or "Batal" button to cancel the add-new operation. Both will bring user back to the record view of Society EXCO Registration Function.

3. Edit record

3.1 Click **Header's** "Ubah" button to enable the page to be edit. User is not allowed to edit the "NO PENDAFTARAN"'s information. (Editing this information is done by delete the society and adding a new record). The edit operation actually is for members editing.

3.2 Now let's go to the Detail part with its record view stage. Browse to the member record you want to edit. Click "Ubah" button to enable the editing of rst member and edit the member's information. Click "Simpan" to save the edit. The Detail part will now at its record view showing the last member. Browse to the member edited just now to see the result of the edit.

3.3 Continue editing members information if needed as describe above. Besides editing a certain member, you can even add new or delete the society member using the browser tool and the operation bar.

3.4 After satisfy editing, click the **Header's** "Simpan" button to save the edited society with its members information or "Batal" button to cancel the edit

operation. Both will bring user back to the record view of Society EXCO Registration Function.

4. Delete record

   Browse to the record that needed to delete. Click the "Hapus" button to delete the records. When user is asked the confirmation of the operation by the popup dialog box, click "Yes" to delete the record or "Cancel" button to cancel the operation and return back to the previous page.

5. Always check the record in record view after any record edition to ensure the result of the operation.

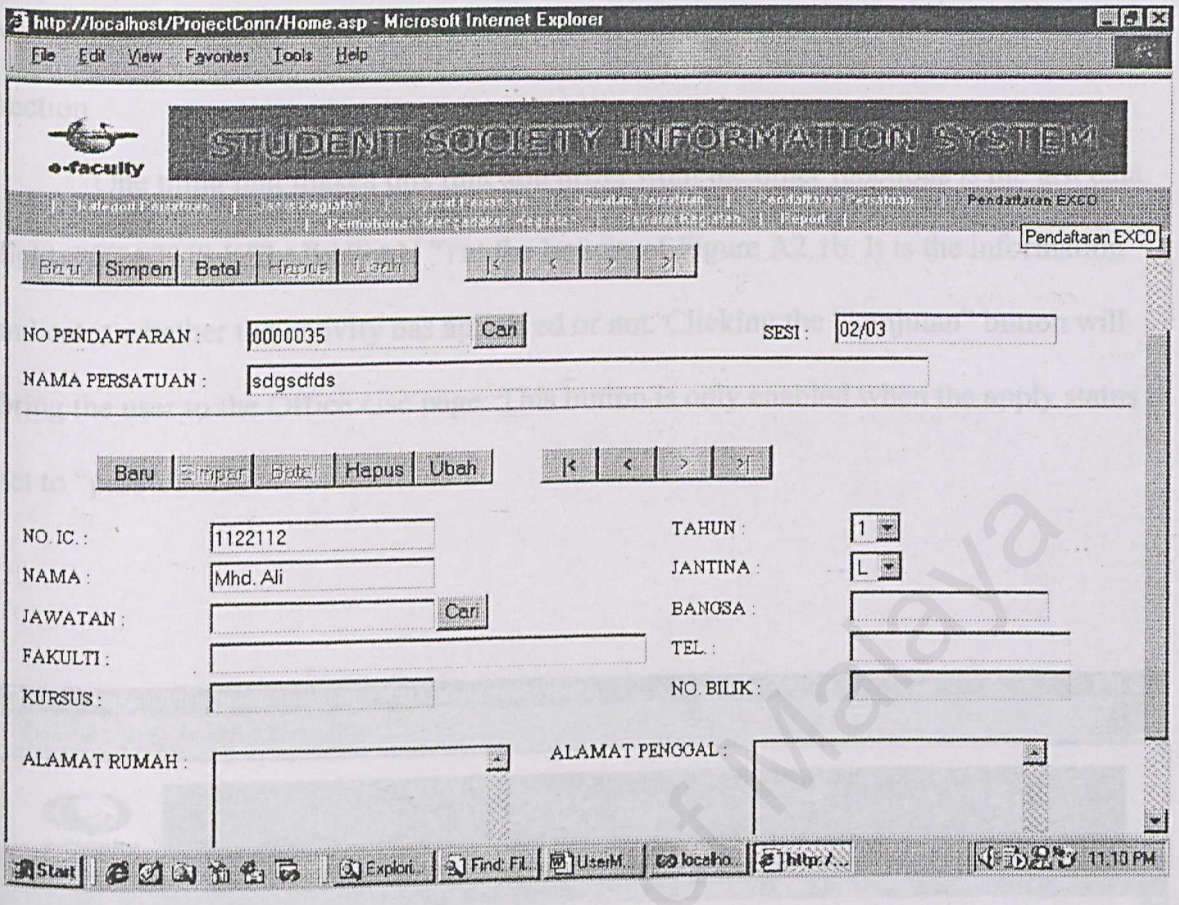


Figure A2.0 Adding mode of the Society EXCO Registration Function.

2.23 Activity Apply

This function is used to manipulate the society activity apply information. There are some data that need to be which is depicted in Figure A2.1a and A2.1b. This is the page after clicking the "Baru" button and adding some new record's information. The add, edit and delete operation is same as mentioned at the previous part and the author

will not touch so much on it. The add operation would be described in this function section.

One thing that makes this function differ from the other functions is the last data field ("STATUS KELULUSAN ") at the bottom of Figure A2.1b. It is the information indicates whether the activity has approved or not. Clicking the "Lanjutan" button will bring the user to the Office Use page. This button is only enabled when the apply status is set to "pass".

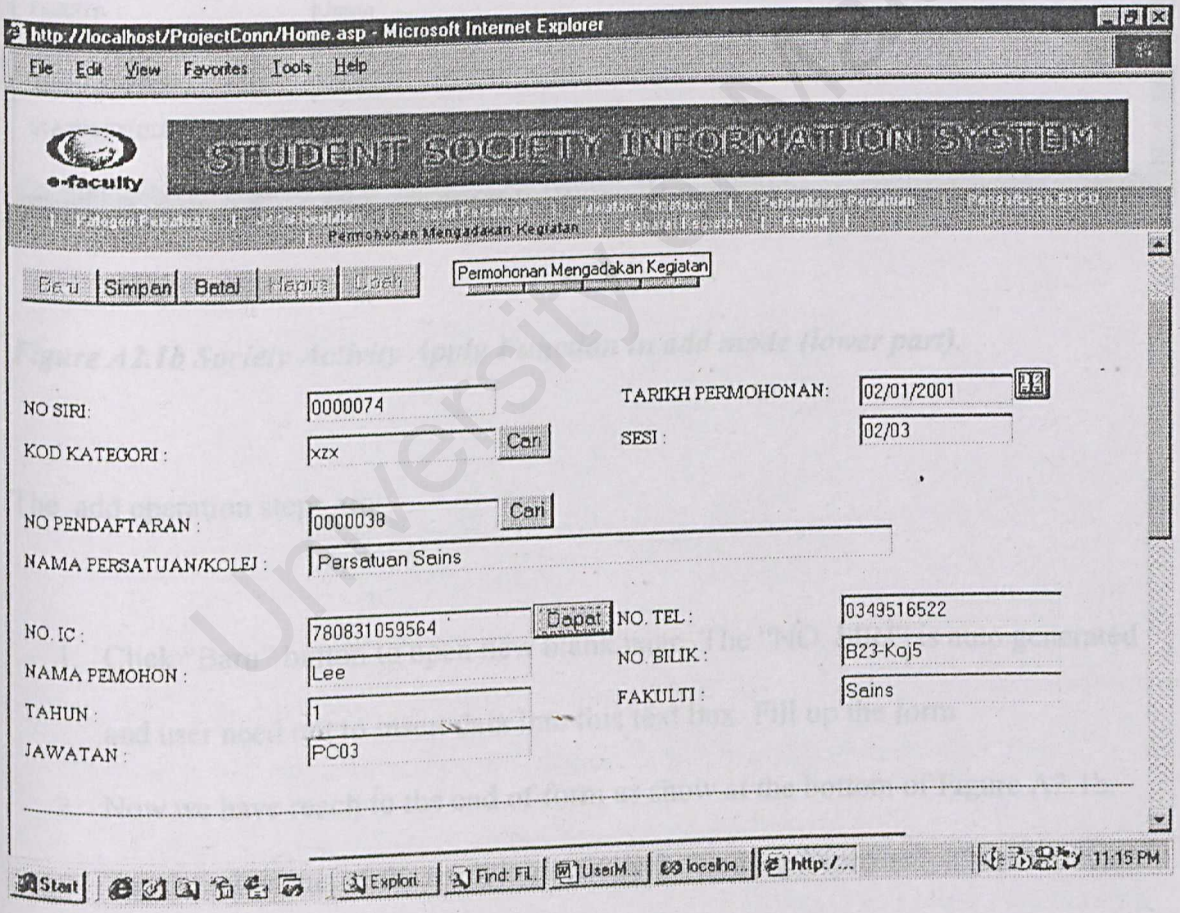


Figure A2.1a Society Activity Apply Function in add mode (upper part).

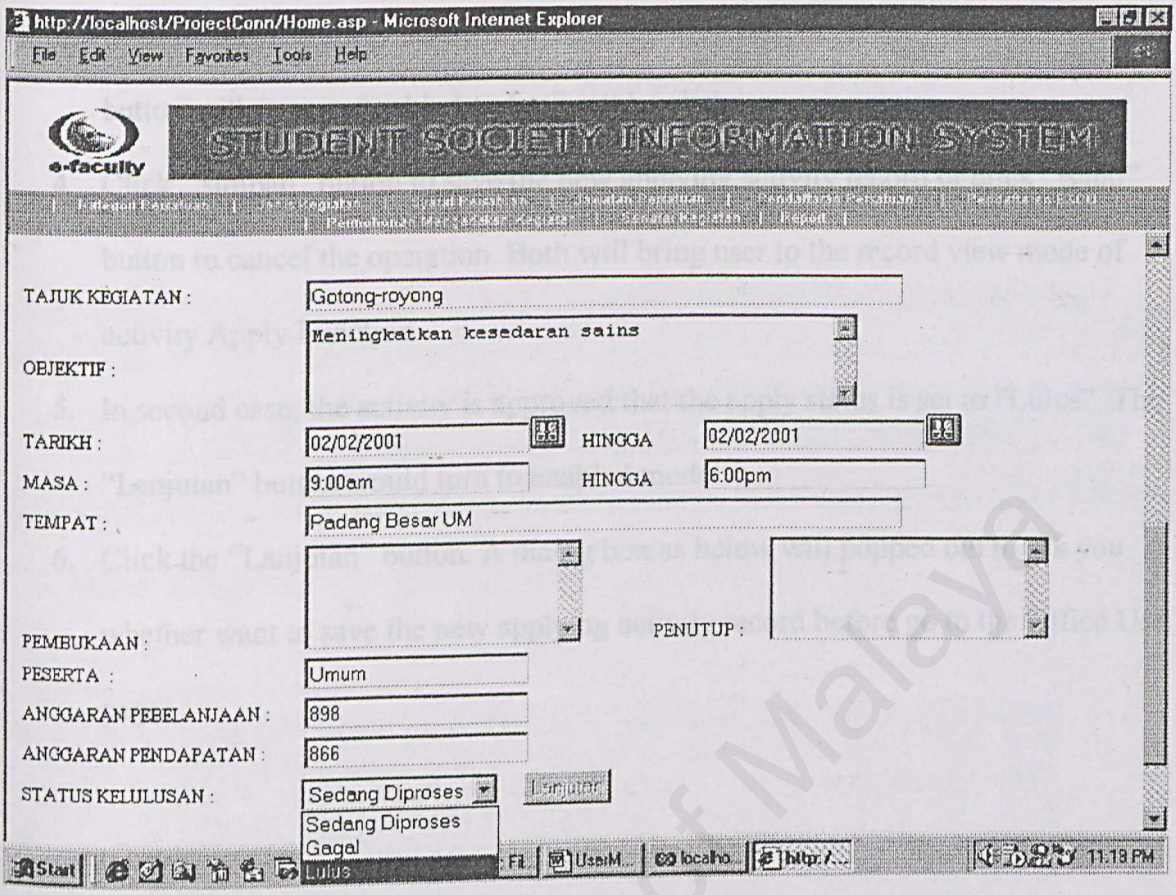
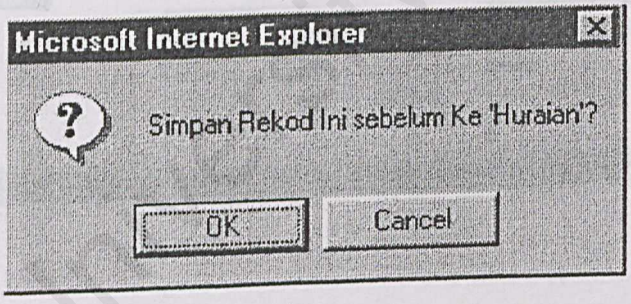


Figure A2.1b Society Activity Apply Function in add mode (lower part).

The add operation steps are:

1. Click "Baru" button to open new blank page. The "NO. SIRI" is auto generated and user need not to insert data into this text box. Fill up the form.
2. Now we have reach to the end of form as show at the bottom of Figure A2.1b. The default status of the applying activity is "Sedang Diproses". There are two cases to input the apply status.

3. In first case, the apply status is set to whether in process or fail. The "Lanjutan" button will remain disabled and can not be click.
4. Click "Simpan" button to save the new applying activity record or click "Batal" button to cancel the operation. Both will bring user to the record view mode of activity Apply Function.
5. In second case, the activity is approved that the apply status is set to "Lulus". The "Lanjutan" button would turn to enabled mode.
6. Click the "Lanjutan" button. A dialog box as below will popped out to ask you whether want to save the new applying activity record before go to the Office Use page.



7. Even if you forget to click the "Lanjutan" button and straightly click the "Simpan" button, the same dialog box is showed to you.
8. Click "Yes" to continue processing or "Cancel" if you found some data missing or forgotten to input. Clicking "Cancel" will turn back to the add mode.
9. The Office Use page is shown in Figure A2.2a (part 1) and Figure A2.2b (part 2).

10. Fill up the form and click the "OK" button to save the record. This will bring user back to the record view mode of the Activity Apply Function.

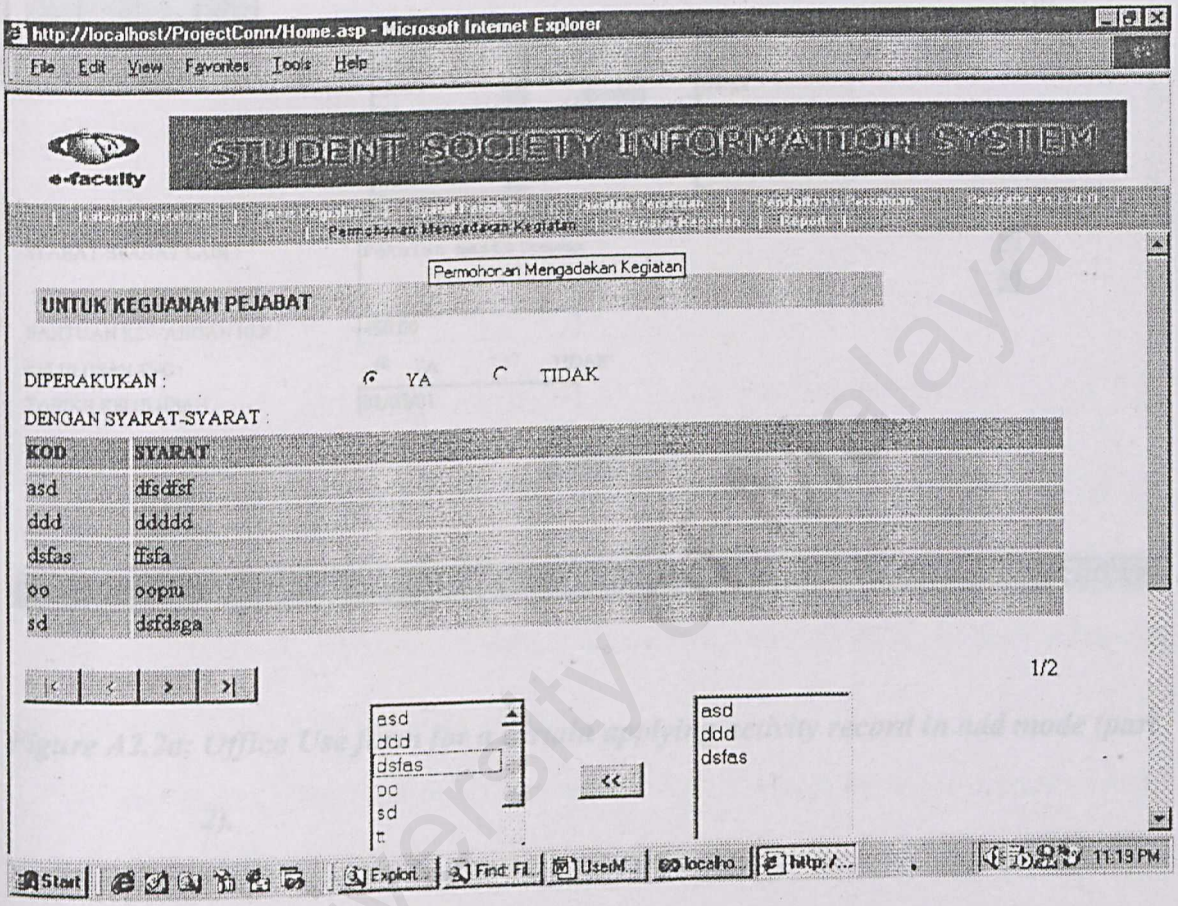


Figure A2.2a: Office Use form for a certain applying activity record in add mode (part 1).

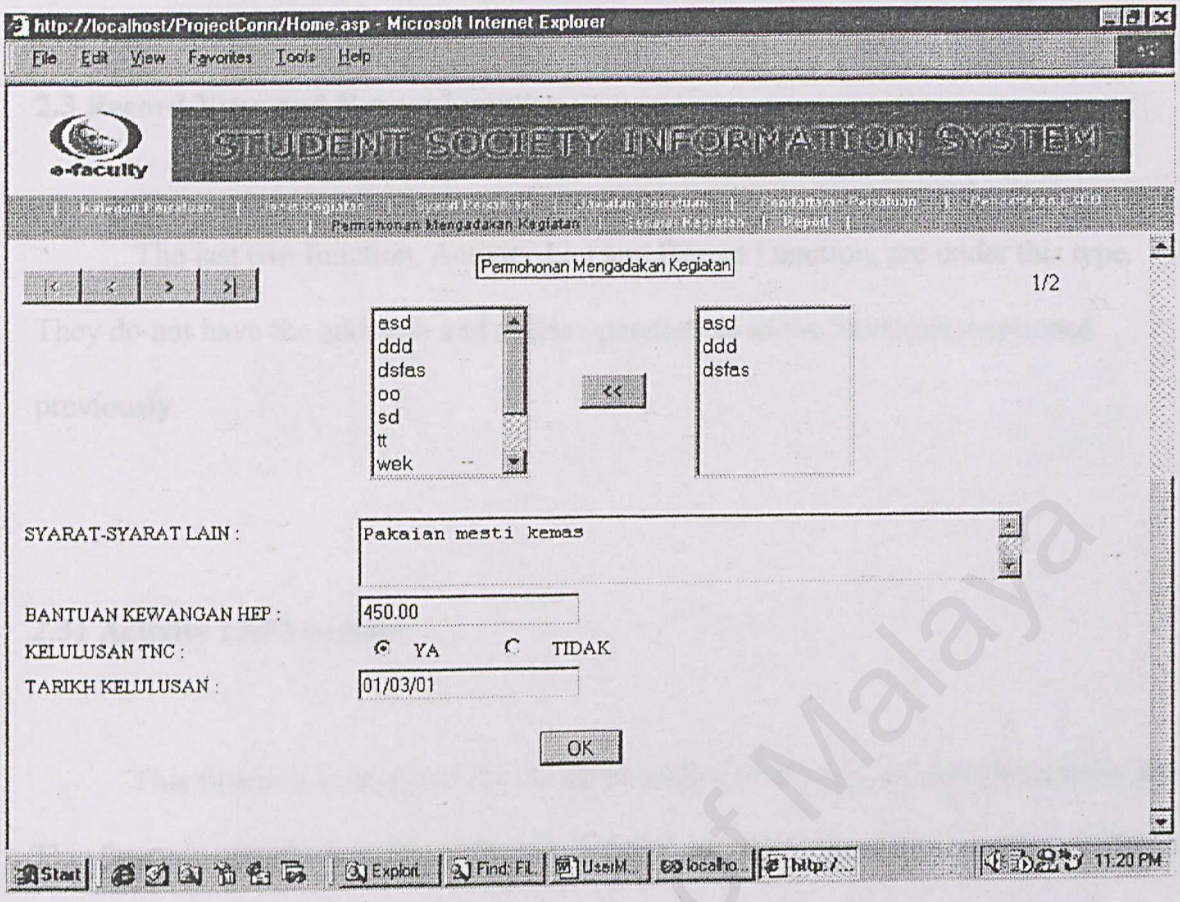


Figure A2.2a: Office Use form for a certain applying activity record in add mode (part 2).

Browse Record

1, The method is same as other functions. Only if a certain record has the apply status of "Lulus", you can click the "Lanjutan" button to see its Office Use information as shown in Figure A2.2a and Figure A2.2b.

2. Click the "OK" button to return to the record view mode of Activity Apply Function.

2.3 Record View and Report Function

The last two function, Activity List and Report Function, are under this type. They do not have the add, edit and delete operation as in the functions mentioned previously.

2.31 Activity List Function

This function is provided for the convenience of the user to view the activity list. This function actually is same as the one in SSIS main page (Bulletin module). By having this function in the Administrator module, the administrator needs not to browse between the two module to see the activity list result.

This function has litter different where it does not have the log in entrance and it is display in Malays language. Figure A2.3 shows the initial view of the function.

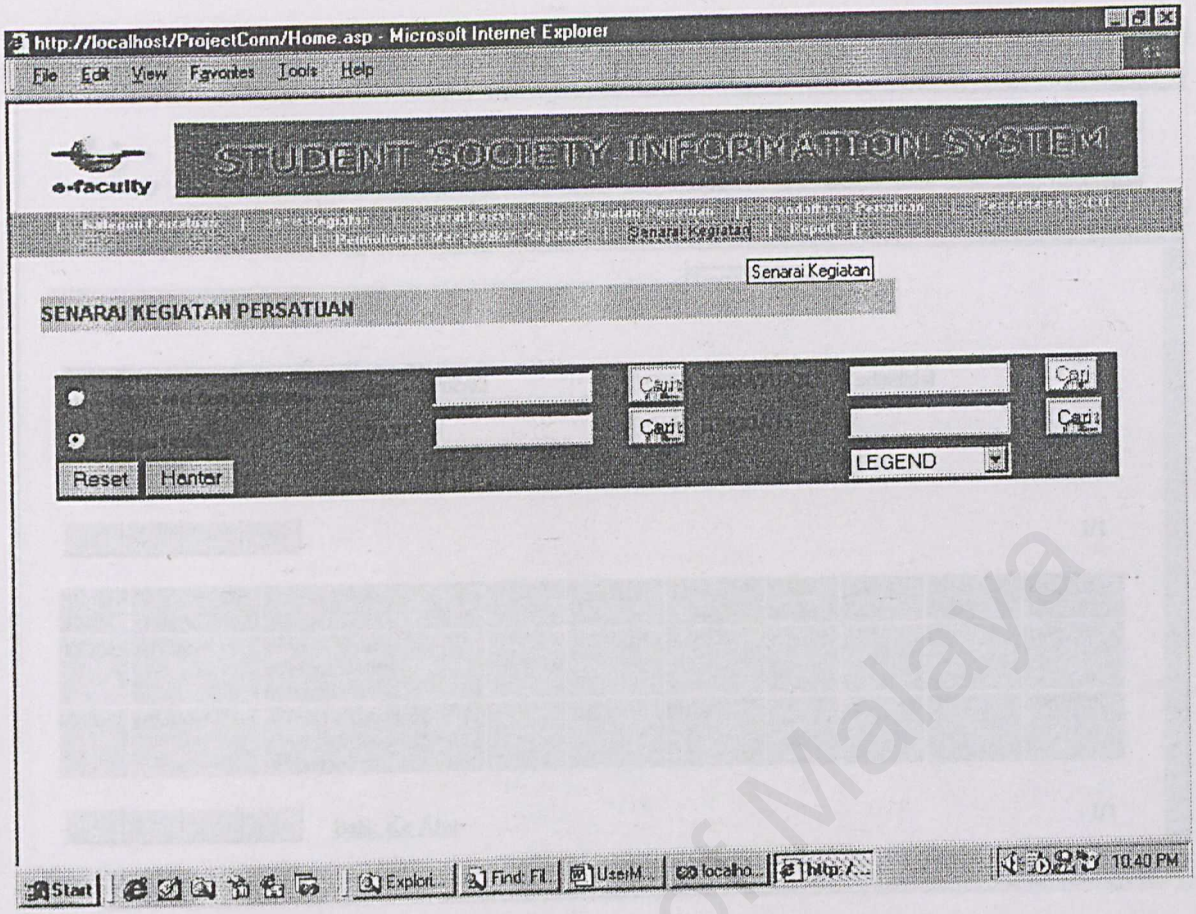


Figure A2.3: Activity List Function.

Figure A2.4 shows the generated record view after entering the criteria value and clicking the "Hantar" button.

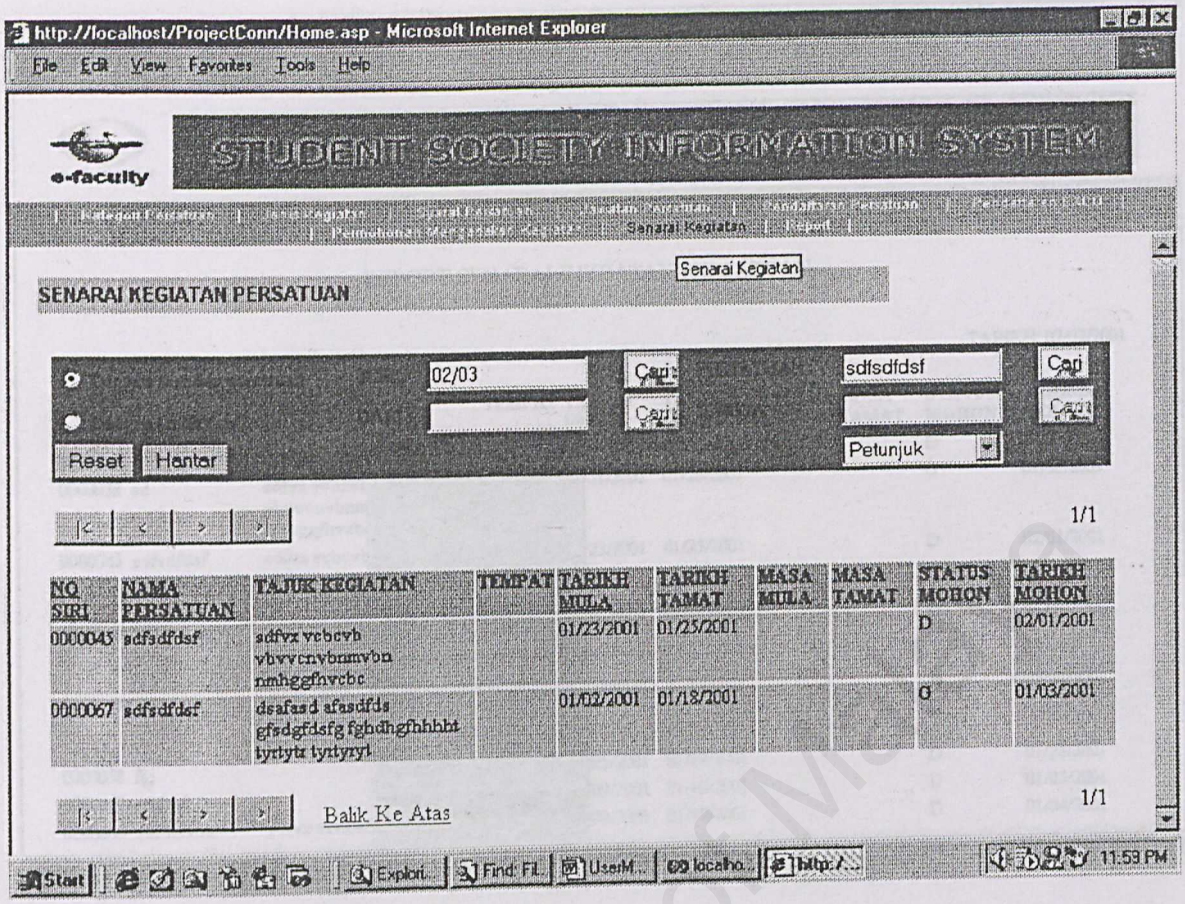


Figure A2.4: Record view of Activity List Function.

2.32 Report Function

This function is used to deal with the activity list report. It displays the report preview after the user inputs the criteria and submits the form. Its initial page is same as Activity List Function but it doe not show out the record table after submitting the form. Instead of that, it shows the report preview as shown in Figure A2.45. Just right click to select the "Print" option in the pop up menu or use the Internet Browser's tool bar to print the report.

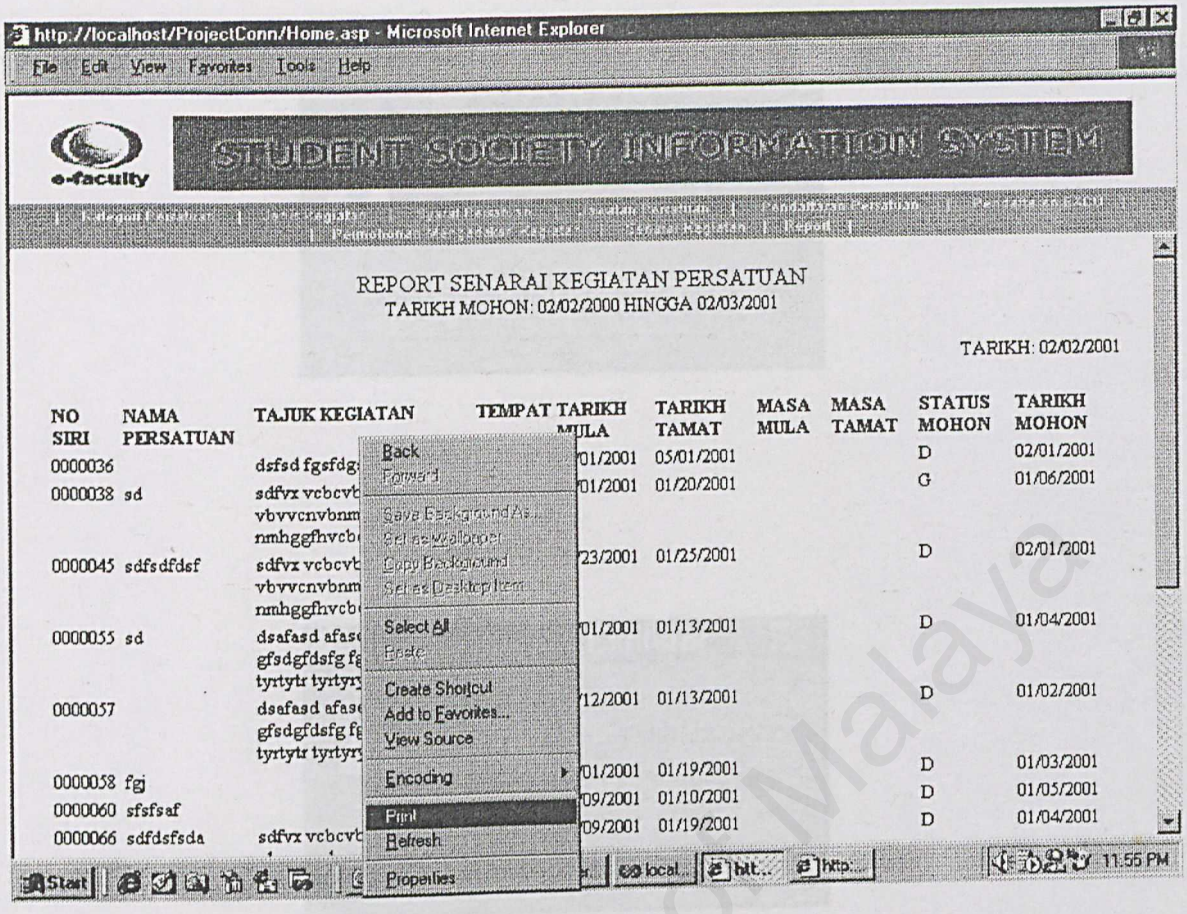


Figure A2.5: Report preview and printing.

3. Dialog Boxes

The typical dialog boxes that may pop up in the Administrator module are show as below: