The Modelling and Designing of E-Supervised (E-SUV) for Distance Learning Centre

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Abstract:- E-services is a suite of web-based products brings profound changes in business models and value chains especially for Professional and Continuing Education Centre (PACE) environment due to its responsibility to manage all courses provided by every faculty to private colleges. PACE is currently running resourcefully but it is facing a few problems such as the difficulties of each faculty officer to get information about private colleges, and a lack of information management in private colleges itself. Therefore, the objective of this study is to propose a model of e-service application called E-Supervised (E-SUV) to provide the information related to twinning programmes between Universiti Utara Malaysia (UUM) and private colleges by enabling users to interact via portal by using the UML-based Web Engineering (UWE) approach. This methodology includes four modeling activities which are requirement analysis, conceptual model, navigation model and presentation

Salehuddin Shuib, Suhardi Hamid, H. S. Hanizan,
Roshidi Din, Kamaruzaman Jusoff

model. This research results in a web-based environment consisting of major modules such as profiles, forums, and email service for users to utilize. In a nutshell, UWE approach is a viable option to facilitate e-services in education environment and thus could serve as a guideline model of future e-distance learning centre. Rigorous tests to see how this model behaves under real-life practice would be a way forward to identifying its effectiveness.

Key-Words: - E-Services, UML, UWE, PACE, UUM, E-SUV

1 Introduction

E-Services will have significant effects on how enterprise IT approaches management and administration [3]. It brings profound changes in business models and value chains, for example, new models of distribution and retailing. As the Web has become a *runtime environment* for small-scale to large-scale business applications [9], a more structured and disciplined approach for design, implementation, maintenance respectively evolution, and integration of such Web applications is required [4]. E-services represent self-contained and Internet-based applications besides increasing competition, broadening distribution channels, lowering costs through easier outsourcing, and easing the integration efforts required to implement value-added partnerships [7].

E-services have a potential growth in Universiti Utara Malaysia (UUM) especially for Professional and Continuing Education Centre (PACE) environment. PACE has manages three units which are *Unit Pendidikan Jarak Jauh* (UPJJ), *Unit Kerjasama dan Berkembar* (UKB), and *Unit Kawal Selia* (UKS) with the function to manage and coordinate all of the supervised programme activities. As a distance learning centre in UUM, PACE has a responsibility to manage all the courses provided by every faculty to private colleges. One Programme Coordinator is assigned to manage supervised programme activities between UUM and private colleges in every faculty. Each faculty will select faculty members to be a Course Supervisor as an assistant to Program Coordinators, in which the number will be based on the number of colleges the twinning programmes are hosted. Course Supervisor will supervise all of the courses in each private college. This complexity makes e-services as a viable and wiser alternative to provide more effective services from PACE to private colleges. PACE had found a few problems such as the difficulties of each faculty officer to get information about private colleges, inability to communicate directly between PACE and private colleges, and a lack of information management in private colleges itself. This study tries to propose a model of e-service application called E-Supervised (E-SUV) to provide the information related to twinning programmes between UUM and private colleges by enabling users to interact via portal through forum as a medium for discussion and bridging communication gap between both of them. The prototype of this model has been developed using Internet scripting languages such as JavaScript, VBScripts, HTML and Active Server Pages (ASP).

2 Method

This study has used a precise UML-based authoring method [6] for Web applications. This authoring method is part of the UML-based Web Engineering (UWE) approach [1]. The notation is using the "lightweight" Unified Modeling Language [12] profile developed by researchers [2, 10]. There are four activities of modeling involved in this study, which are requirement analysis, conceptual model, navigation model and presentation model [10]. The conceptual models, however, have been used as a guideline for modeling the E-SUV environment. Fig.1 shows the modeling of E-SUV environment.
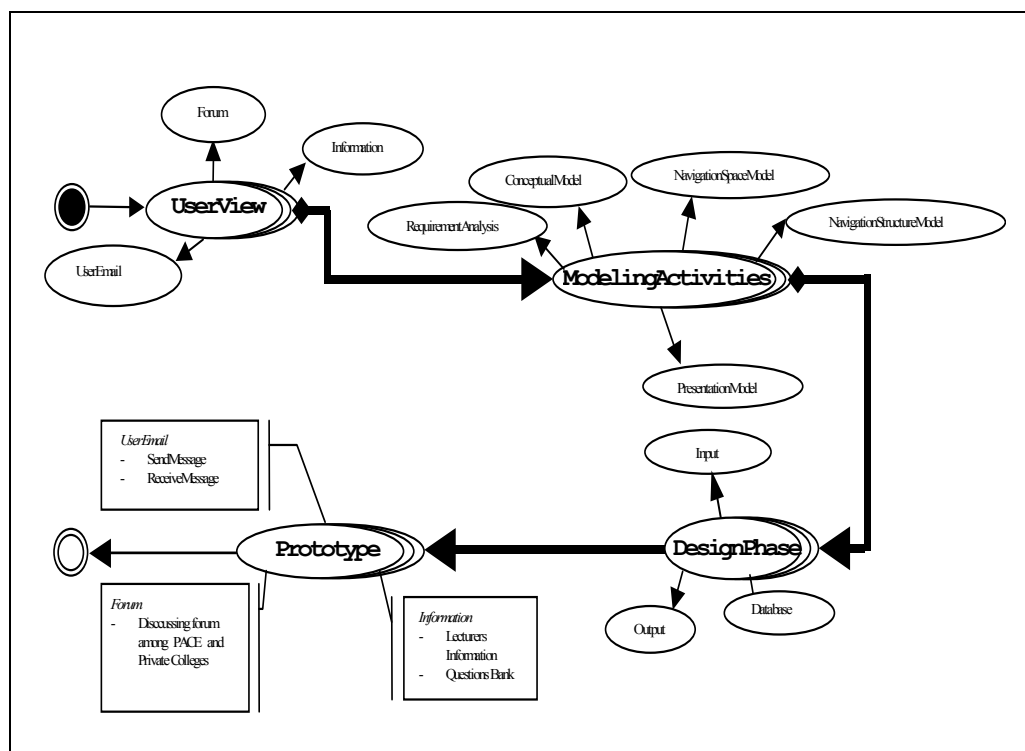
Salehuddin Shuib, Suhardi Hamid, H. S. Hanizan,
Roshidi Din, Kamaruzaman Jusoff

Fig.1 The modelling of E-SUV

3 E-SUV Frameworks

The goal of the requirement analysis is to find the functional requirements and to represent these requirements as use cases. It is a user-centric technique that forces to define who are the users (actors) of the application and offers an intuitive way to represent the functionality an application has to fulfil for each actor. The main modelling elements used for use case modelling are: *actors* and *use* cases. They can be related by *inheritance*, *include* or *extend* relationships. All of the use case models have been generated by the guidelines [5, 8, 11]. The actors and use cases are generated based on the data that has been collected from the PACE environment. Based on the current environment at PACE, there are three use case models which are forum, email and information have been identified.

The second step is the conceptual model that aims to build a class model with their objects, which attempts to ignore as many as possible of the navigation paths, presentation and interaction aspects. The use case packages will offer information about the activities of each actor. The actors are identified during the requirement analysis. Meanwhile, the objects, relationships and operations are identified traditionally based on the existing use case and textual description.

The third step, navigation model, is divided into two parts; navigation space model and navigation structure model. The navigation space model represents the modelling elements used and the method applied to construct the navigation space model. In the process of building the navigation space model the project focuses on which view of the conceptual model is needed for the application and navigation paths that are required to ensure the application's functionality. The model decisions are based on the conceptual model and the application requirements defined in the use case model. Meanwhile, the navigation structure model describes how the navigation is supported by access elements such as indexes, guided tours, queries and menus. Technically, the navigation paths together with the access elements are presented by a class model, which will be systematically constructed from the navigation space model in two steps. The first step is enhancing the navigation space model by indexes, guided tours and queries. The second step is deriving menus directly from the enhanced model. Menus represent the possibilities of choices for navigation. The result of the navigation model is a UML class diagram built with UML stereotypes, which are defined according to the extension mechanism of the UML.

Salehuddin Shuib, Suhardi Hamid, H. S. Hanizan,
Roshidi Din, Kamaruzaman Jusoff

The last step is the presentation design, which supports the construction of a presentation model based on the navigation structure model and additional information collected during the requirement analysis. The presentation model consists of a set of views that show the content and the structure of the single node and how the user can interact with them. The objective of the presentation flow model is to show *where* the user interface views of the storyboard are presented to the user, i.e. in which frame or window they are displayed. It also shows which contents are replaced when the user interacts with the system. The focus of this step is to model the dynamics of the presentation showing *where* the navigation objects and access elements will be presented to the user. A presentation flow model of E-SUV model is built with stereotyped classes «window», «frameset» and «frame». It uses these stereotypes to indicate the location of the presentation.

4 E-SUV Design

The physical design of E-SUV model has been developed to consist of four main components which are a server, a client, Internet network and scripting files. Likewise, the input design of E-SUV model has been developed using Macromedia Dreamweaver MX, Dreamweaver Firework MX, Microsoft FrontPage and Adobe Photoshop. All fields for inputs have been decided based on the requirement analysis in the previous step. Scripting languages such as Active Server Pages (ASP), VB Script, and Java Scripts have been used to process and manipulate data in the database. All data are stored in SQL Server DBMS located in the Computer Centre in UUM. The modelling of design has two different sites that are members' design and administrator's design. There are six member input designs which include members log in, compose message, upload, display message, read message and change password whereas for admin input design, it consists of inserting profile, deleting profile, creating forum, deleting forum, registering members and deleting members. The database only uses one engine, where each table has one primary key for indexing purposes. This engine uses DBMS SQL Server that supports large amount of data storage and easy for future maintenance. There are five tables used; user table, forums table, messages (forum) table, email table and information table.

5 Results And Discussion

5.1 The E-SUV Activities
Fig.2 shows the E-Supervised activities. It starts by requesting the URL through browser and the *Interface* component will load the requested page. The *Maintenance* component will display the page for every actor on the Internet. It will wait for actors to key-in their password. If the password is correct, it will redirect to members page. Otherwise, actors need to re-login. The actors can choose the menu that has been displayed. All activities requested will be served by *Maintenance* component. Actors can logout if there are no activities to do. The *Interface* component will close the windows after logout finishes.
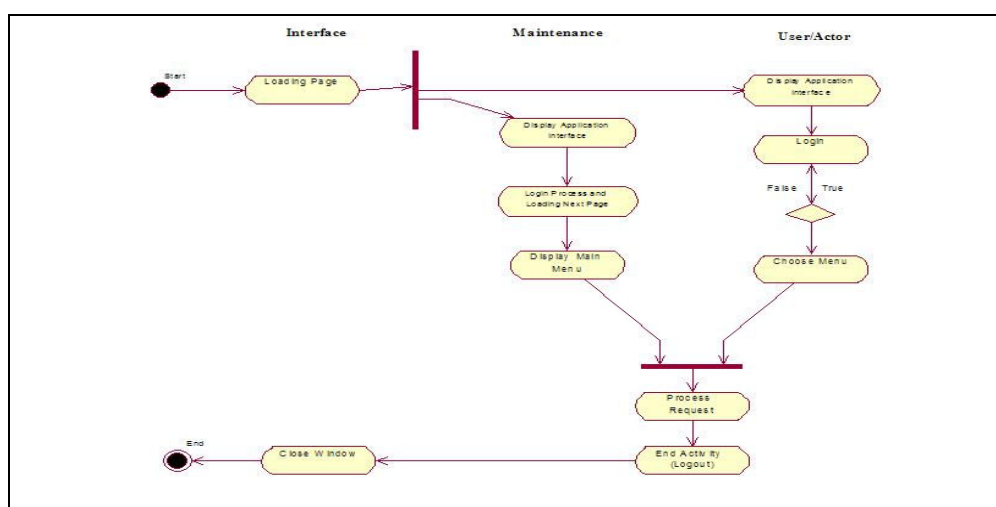
Salehuddin Shuib, Suhardi Hamid, H. S. Hanizan,
Roshidi Din, Kamaruzaman Jusoff

Fig.2 The activities of E-SUV environment

5.2 Conceptual Model

Fig.3 represents the *User View* of the conceptual model. The users are modelled by tracking their interests in problems that have been defined in requirement analysis. At a particular session a user of the system uses the system in one of the following roles: administrator and registered members. Administrator will register members according to personal profile that has been given. Administrator will also create the forum according to current circumstances. All members will be able to use the forum for discussion and interaction. Besides, members can send files and browse information about courses.
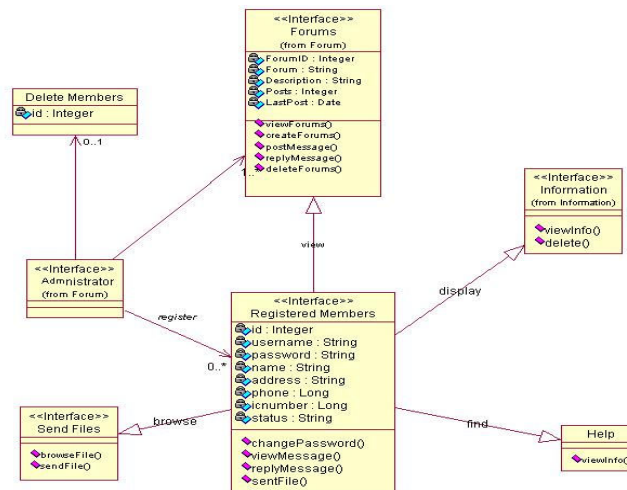
Fig.3 User view of E-SUV environment

Fig.4 below depicts the *Forum View*, which includes the main class Forum, Messages and Registered Members. The forum class contains information such as forum name and description about it. The date of post and last post of the forum is a derived attribute (time dependent). It changes when a message is sent by a user. A message is described by the forum title and ids of the user. Each message has an automatic generated id so that it can be matched with the forums. Message can be displayed if users have any question regarding E-SUV problems. Other users can reply to the message by answering the question. The administrator will monitor all forums and users by registering it before they can be used. Registered users can use all the utilities after being registered.

Salehuddin Shuib, Suhardi Hamid, H. S. Hanizan,
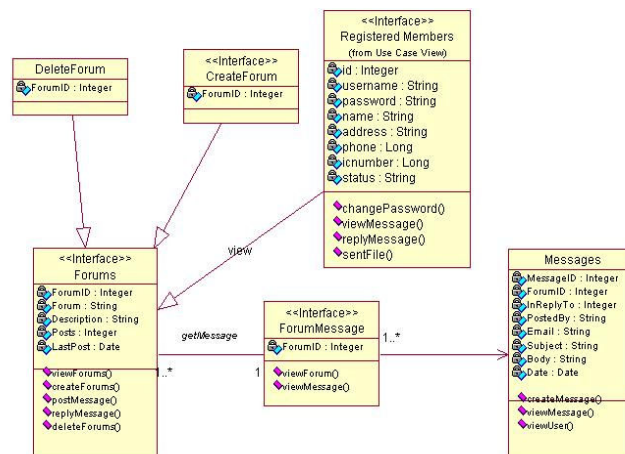Roshidi Din, Kamaruzaman Jusoff

Fig.4 Forum view of E-SUV environment

The last view is a user email that shows the interaction between members and user email menu. Members can compose mail or attach files to other registered user in the database. Members also can change password and read e-mail from other users.

Files can be attached with e-mail to other users. By enabling this function, members don't need to post file traditionally. The user email view is shown in fig.5.
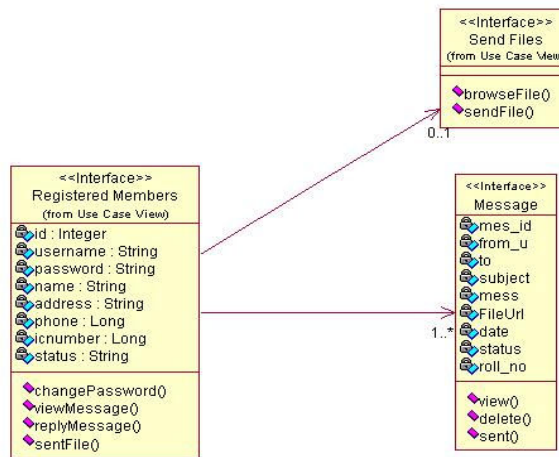
Fig.5 User e-mail view of E-SUV environment

The *Information View* shows the relationship between members and information. Members can search on information on courses and coordinators if they want to know something. Information is stored in the database and will be updated by administrator from time to time. Administrator will key-in all new

information to the database. Members can browse for profile information such as coordinators, supervisors and lecturer in private colleges. Other information like courses and examination question are also included in this feature. Fig.6 shows the information view.
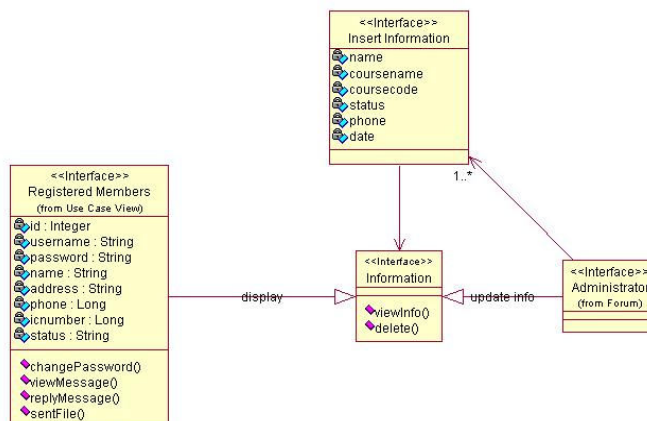
Fig.6 Information view of E-SUV environment

5.3 Navigation Model

Users are divided into two categories that are administrators and registered members. The registered members can navigate in the forums by reading and submitting questions or problems. They can only use the forum but cannot delete or create a new forum topic. These functions can only be accessed by administrators. For email class model, users can use the facility at the same level and can compose or read message in their mailbox. They can also attach and send files to other users in the site. Some of the inputs for the email message are not required, such as the attachment, but users can fill in the form optionally. Users are also provided with password changing facility. They can use this menu if necessary.

For Information class model, administrator will store the information into the database and also update it from time to time. Administrators also can delete information that is not needed. Registered members can view the information about coordinators, course supervisors and courses that have been entered by administrators. They are also able to view or download previous examination questions. The E-SUV class diagram shown in Fig. 7 summarizes the navigation space views of *Forum*, *User Email* and *Information* in the global navigation space model. Fig.8 below shows how the navigation space model of the *E-SUV* environment can be enhanced by indexes, guided tours and queries.
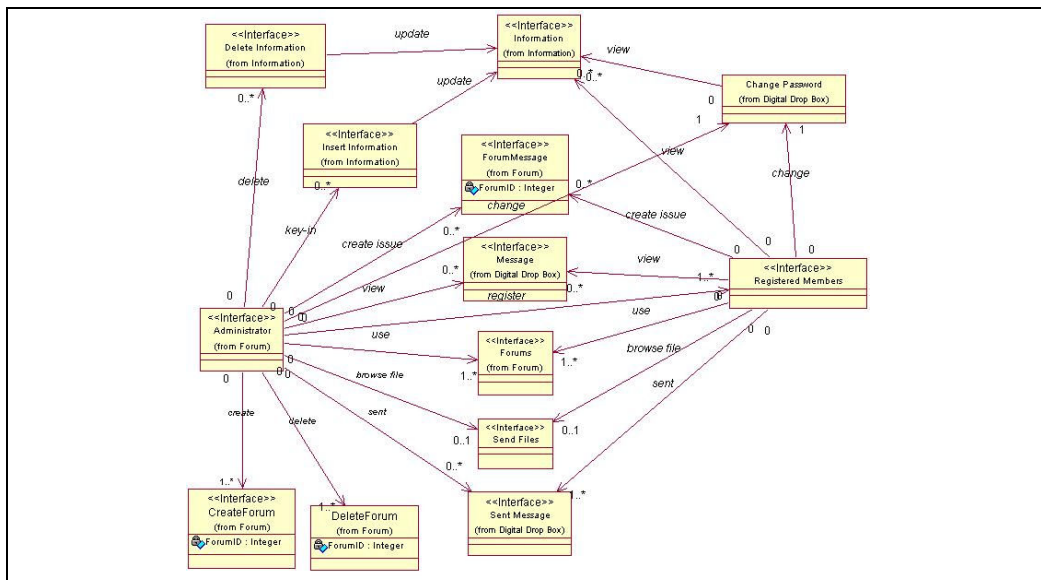
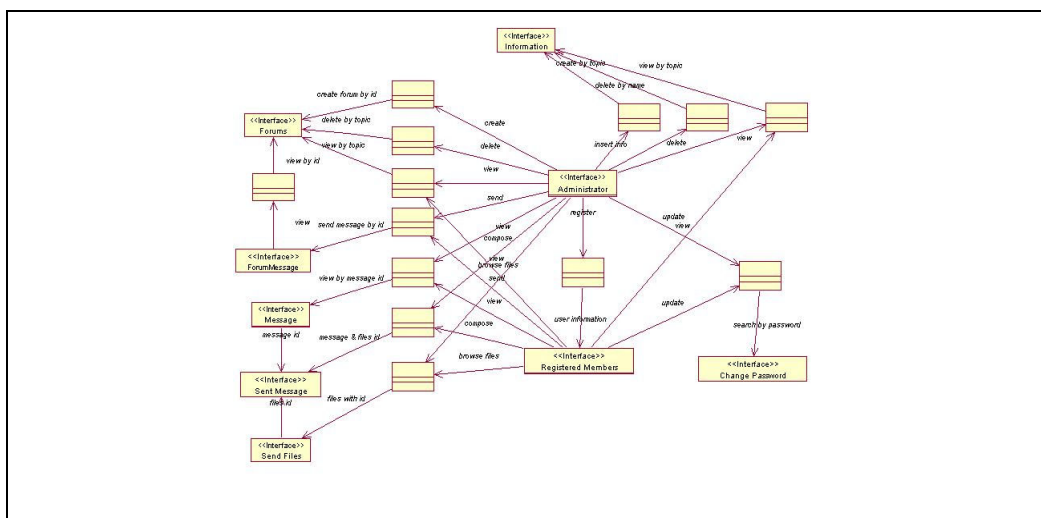

Fig.7 Navigation space model of the E-SUV environment

Fig.8 Navigation structure model of the E-SUV environment

Salehuddin Shuib, Suhardi Hamid, H. S. Hanizan,
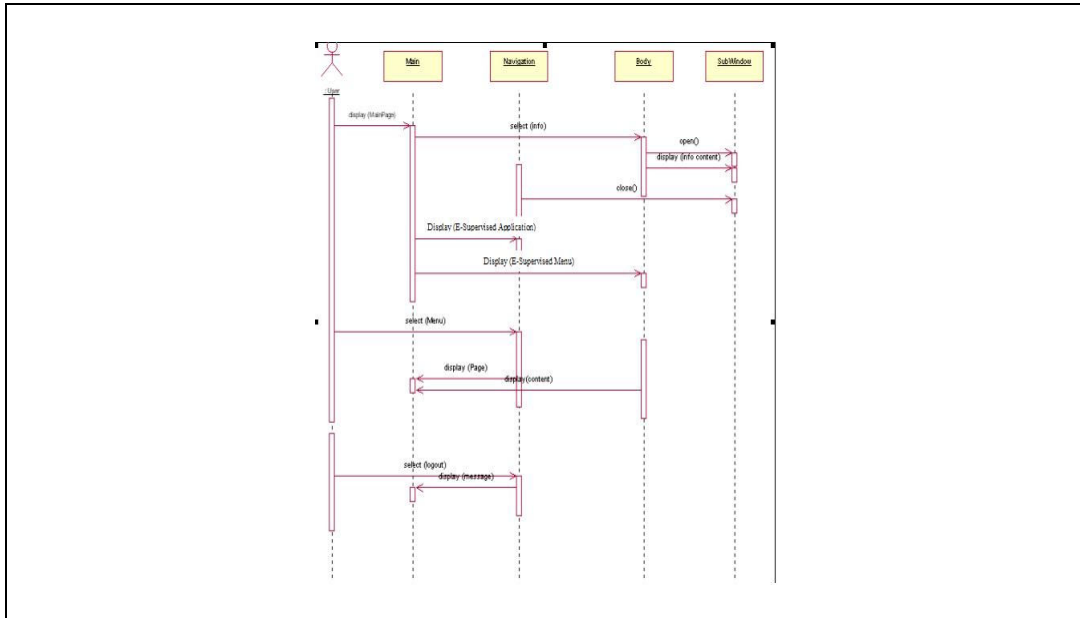Roshidi Din, Kamaruzaman Jusoff

5.4 Presentation Flow

Fig.9 Presentation flow of E-SUV

Fig.9 shows a presentation flow representing a scenario for a sequence of possible navigation activities that can be performed by the user of the application. The user will start from the main page of the portal and the menu will be displayed. If the user selects to browse the main menu, they will move to sub-window page. The content will be displayed. Besides, user can also choose the model of E-SUV to use the facilities. The user will select one or more menus in the page and the body will display the content. If the user chooses to logout, the application will terminate the current session and the user needs to re-login to use the facilities.

5.5 Prototype Design

The main interface for E-SUV is shown in Fig.10. Through this interface three major modules have been developed which are forum module, email module and information module.
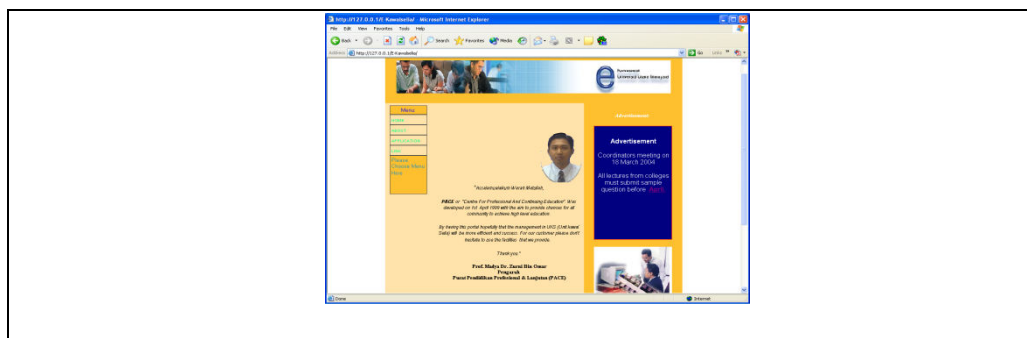

Fig.10 Main interface for E-SUV application

Forum module can be used as a discussion board. Members can choose forum topic and submit any related issue trough this module. It enables users to view and select forum topic. Users can send discussion topic and answers to other question.

Forum screen has been developed using default.asp, forum.asp, message.asp, post.asp and inc-dbconnection.asp files. Fig.11 has shows the display screen of forum.
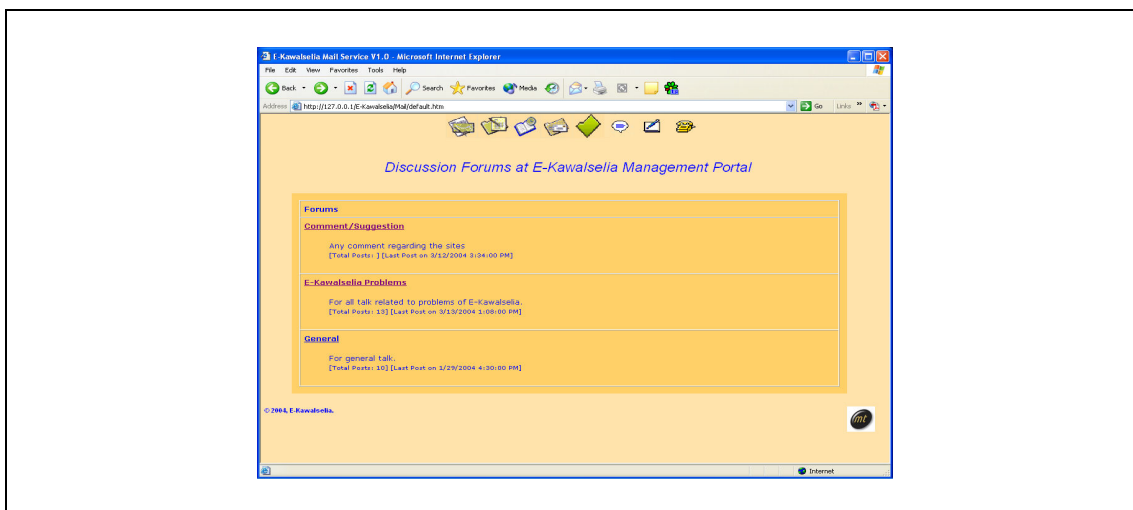

Fig.11 Forum display screen

The module has been divided into two parts which are post message and reply message. It enables users to post and reply messages for any discussion topic in the forum.

As for the email module, five have been developed; check message, compose message, address book, message history and change password. All of these parts are composed and integrated in one page called email.asp. The check message page will enable users to display all of the messages in their respective mailboxes. Users also can delete and read the message based on sender's name. Check message page has been developed using both inbox.asp and read.asp files.
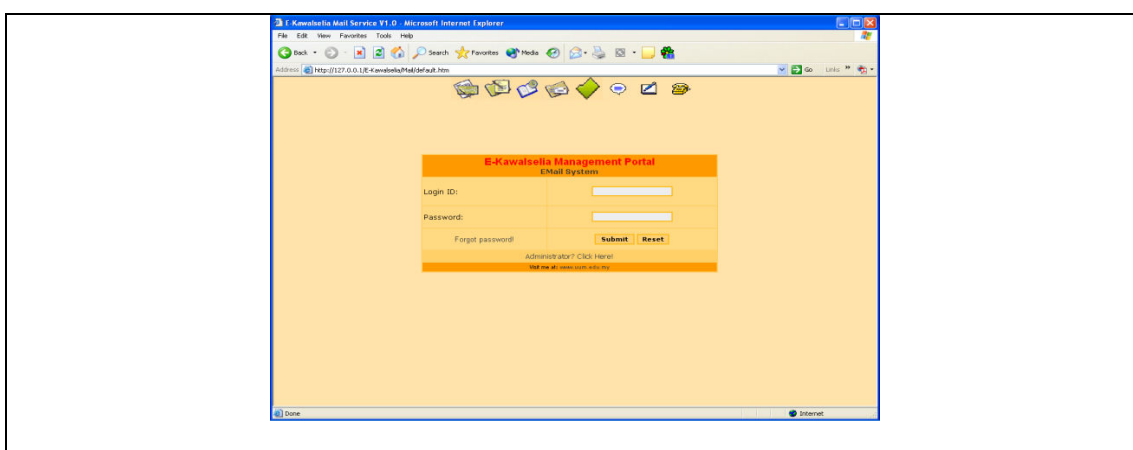

Fig.12 Email screen

The second part of this module is compose message. This page enables users to send email and

attach files to other members as shown in fig.12. Users also can view the other members' information

through this page. This compose message page has been developed using compose.asp, book_res.asp, upload_form.asp and upload_process.asp files. The third part of this module is address book. This page enables users to view other members profile by member's name or member's status. Address book page has been developed using add_book.htm, add_book_res.asp and banner.htm files. The next part of this module is message history. This page enables user to display the information on history message. Users are unable to delete the history message unless other members who have received the message have deleted it. Message history page has been developed using sent.asp file. The last part of this module is change password. This page enables users to change their passwords if

necessary. Change password page has been developed using change_pass.asp and changepass_acn.asp files.

The last module is an information module consists of profile information, courses information and courses details information as shown in fig. 13. The profile information enables members to search for the information about Coordinators, Supervisors and Private College Lecturers. Meanwhile, the course information enables members to search for courses information by section. Finally for the course details information enables members to view information about courses details such as syllabus and sample questions. Members can browse each subject's information independently.
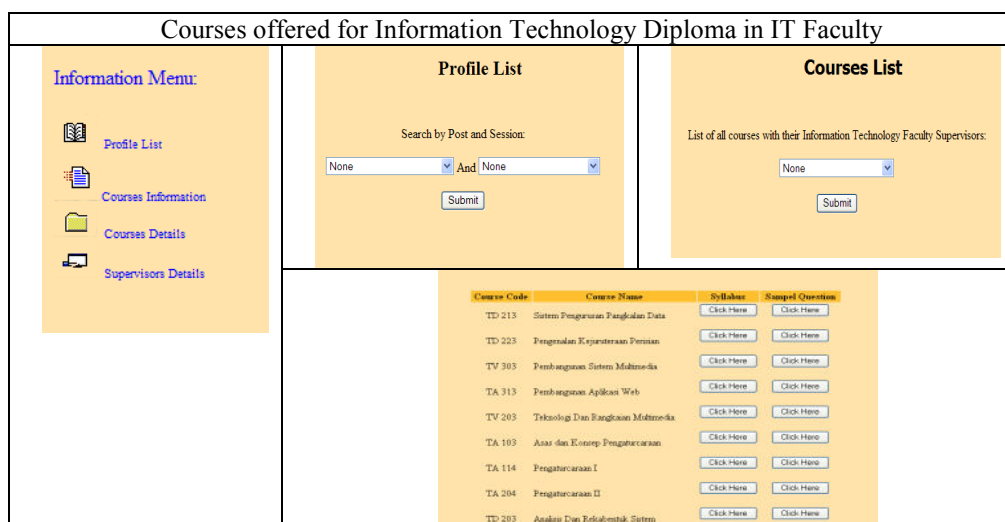

Fig.13 Information screen

There are two environments of information module, which are member environment and administrator environment. For member environment, this module enables users to search and view related information about courses, coordinators and supervisors. Users are able to download the information via the portal. Member environment screen has been developed using info.asp, displaycoordinators.asp, displaycourses.asp, question.asp, popupquestion.asp, collegequestion.asp and samplequestion.asp files. Meanwhile, administrators

environment enables administrators to create and delete information. Only administrators can use these facilities. Administrator environment screen has been developed using registermembers.asp, deletemembers.asp, registerforum.asp, deleteaforum.asp, create.asp and deleteuser.asp files. The database structure for E-SUV is divided into five tables based on user, forum, message (forum), email and information. All of the information about database structure is shown in the Table 1.

Salehuddin Shuib, Suhardi Hamid, H. S. Hanizan,
Roshidi Din, Kamaruzaman Jusoff

Table 1
Table for e-suv database structure

Table	Name	Type	Size
User	mem_id	int	4
	mem_name, mem_password, name, question, answer, sex, status, address, phone	nvarchar	50
Forum	ForumID	int	4
	Forum	nvarchar	255
	Description	ntext	16
	Posts	int	4
	LastPost	smalldatetime	4
Message(forum)	MessageID, InReplyTo	int	4
	PostedBy	nvarchar nvarchar nvarchar	50
	Email		100
	Subject		255
	Body	ntext	16
	Date	smalldatetime	4
Email	mes_id	int	4
	from_u	nvarchar nvarchar nvarchar	20
	to	nvarchar nvarchar nvarchar	30
	subject		100
	FileUrl		100
	status		1
	roll_no		50
	Mess	ntext	16
	Date	timestamp	8
Information	id	int	4
	name, status, phone, college, coursecode, coursename, Date	nvarchar	50

6 Conclusions

We have presented a UWE approach to develop a model of e-services in education environment. Because of the potential benefits in terms of being able to provide e-services through information and communication technology (ICT), E-SUV and its modelling activities could be a guideline model of future e-distance learning centre. Moving towards a goal of a practicable e-service, this paper has highlighted the main components of E-SUV support environment. For future work, we intend to investigate the effectiveness of this model after it is implemented in real practices.

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