

Perpustakaan SKTM

**Web Portal For Schools
(WPFS)**

WXES3182

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Abstract

Web Portal For Schools (WPFS) is a web-based school management system. It is one of the smart school's concepts to integrate all the school management stuffs into an electronic environment. It is a revolution of the traditional school management system. The objectives of WPFS include:

- Integrate the major school tasks which are carried out manually into a paperless environment (Web Portal).
- Enable teachers to manage their work in a more systematic and convenient way.
- Enable the headmaster to monitor the progress of every event in school easily and manage his/her task effectively.
- Enable students to get handy school's information and view their own details.
- Enable PIBG to be aware of all the activities which are held in school and review the parents' association's reports.

In order to provide such an environment in schools, WPFS has been developed to provide five main sections: Student Section, Teacher Section, Headmaster Section, PIBG Section and School Administrator Section.

The Student Section allows the students to view all the information in school such as announcements, examination results, their own profiles, school activities, calendar and timetable. The students can also interact with teachers, headmaster, school administrator or PIBG through e-forum.

The Teacher Section allows the teachers to view all the school's information, prepare syllabus plan and lesson plan for headmaster's validation, validate activities, post announcements, record students' attendance, monitor and analyze reports, prepare grading reports, manage their own timetable and interact through e-Forum.

The Headmaster Section allows the headmaster to view all the school's information, validate syllabus plan and lesson plan, monitor and analyze reports, post comments, manage his/her timetable, interact through e-Forum and post announcements.

The School Administrator Section allows the school administrator to view all the school's information, post announcements, supervise the contents of the activities, trace the action of the users in EForum Module and Activity Module, monitor and analyze reports and interact through e-Forum.

The PIBG Section allows the parents to view all the school's general information, view relevant reports and interact through e-Forum.

WPFS has been developed to help administrators to manage their task effectively and efficiently. Students and parents will also be able to get the school information easily and rapidly by using this system.

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Chapter 1- Introduction

1.1 Overviews

Education has become very important especially in recent years. Budget allocation from government for education purposes increases every year such as the large amount of money injected into smart schools, providing computer packages to the schools, funds for library and so on.

In order to step into a greater frontier, the coordination and management in schools play an important role. A good management system will avoid the resource-waste phenomenon and in parallel enhance the progress of the development in the schools. However, most of the schools are still using traditional school management system (Manual record). Although some of the schools have started using application software and integrated a part of their tasks into the system, it still does not have much interactive function which can effectively ease their jobs.

Having realized that the importance of a more advanced technology is needed to be implemented and adopted by the school management, the idea of Web Portal For Schools (WPFS) will be the focus of the project. WPFS is a web-based school management system which enables students, teachers, headmaster, school administrator and parents to log in and use the services and the functions in it.

The main purpose of WPFS is to provide a more efficient platform for every user in the system in order to accomplish their tasks. Besides, other miscellaneous services such as e-forum will provide them an interactive platform.

Online school management system will be the 21st century's trend. With WPFS, the quality of school management system will become better.

1.2 Project Motivation

Traditional school management systems use manual method. All the activities or tasks will be recorded in record books. It results in problems as mentioned in section 1.2.1. However, with the implementation of WPFS, the problems will be solved eventually.

1.2.1 Problem with Traditional School Management

Below are the problems which occur in the traditional school management:

➤ Time Consuming and inefficiency

Consume a lot of time to generate students' results reports since teachers have to analyze the results in multi-perspective way.

➤ Wastage of resources

Waste of resources since teachers will have to print out all the records or the reports although they just use them once.

➤ Information delivery failure

Students easily miss out the latest information in schools.

➤ Ineffective interaction

Students hardly express their opinions or ideas to the school's administrators.

1.2.2 Solution for Current Situation

Implementing WPFS can solve the traditional school management problems. WPFS provides a paperless environment for the schools. Only certain reports which are considered important will be printed out. This step can prevent bulky reports and reduce cost.

Information delivery will be enhanced with WPFS. Important information will be loaded into the Web. No one will miss out any information once they log in the page. E-Forum services in WPFS will hold a chance for every student, teacher, headmaster, school administrator and parent to express their ideas and interact with each other as well.

1.3 Project Objectives

The objectives of the project are as below:

- Integrate the major school tasks which are carried out manually into a paperless environment (Web Portal).
- Enable teachers to manage their work in a more systematic and convenient way.
- Enable the headmaster to monitor the progress of every event in schools easily and manage his/her task effectively.
- Enable students to get handy school's information and view their own details.
- Enable PIBG to be aware of all the activities which are held in schools and review the parents' association's reports.

1.4 Project Scope

WPFS can be divided into five major sections, **Student Section, Teacher Section, Headmaster Section, PIBG Section** and **School Administrator Section**. Figure 1.1 shows all the modules in WPFS system. The modules that I am involved in are **Syllabus Plan Module, Lesson Plan Module, Activity Module, Attendance Module, School Info Module, and EForum Module**.

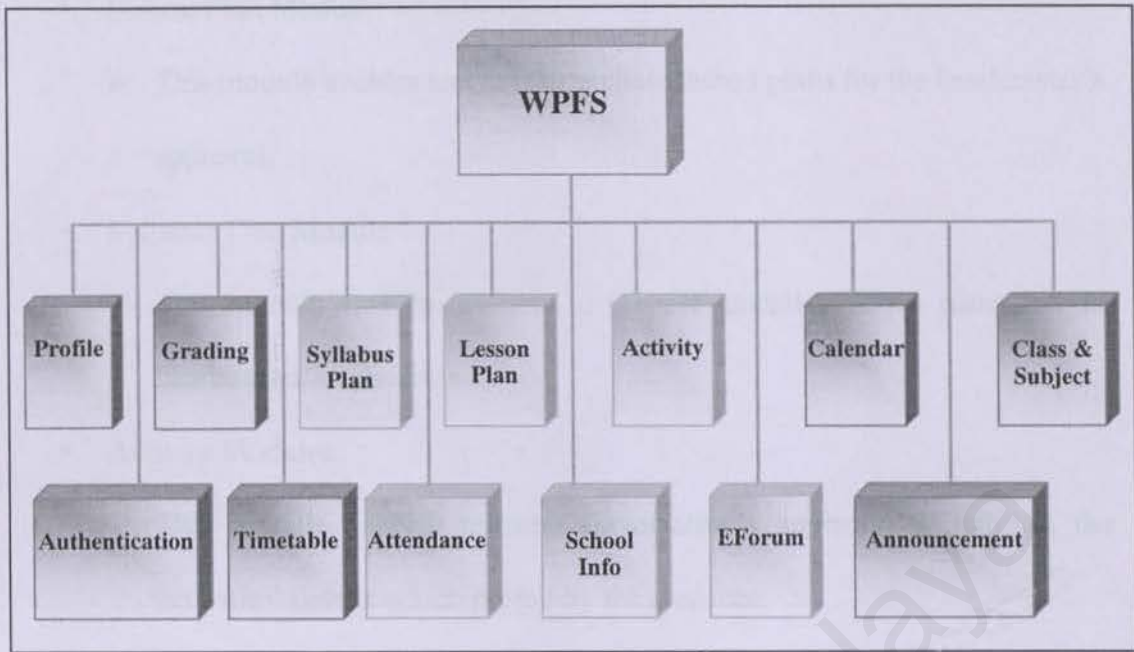


Figure 1.1: Modules of WPFS System

1.4.1 Student Section

- Activity Modules
 - This module enables students to add, edit or view school's clubs, societies, sports and uniform bodies.
- EForum Module
 - This module enables students to take part in an e-forum to have discussion with others.
- School Info Module
 - This module enables students to view all the school's information.

1.4.2 Teacher Section

- Attendance Module
 - This module enables teachers to record and view students' attendance.

- Lesson Plan Module
 - This module enables teachers to prepare lesson plans for the headmaster's approval.
- Syllabus Plan Module
 - This module enables teachers to prepare annual syllabus plans for the headmaster's validation.
- Activity Modules
 - This module enables teachers (association's advisors) to validate the activities' details which posted by the students.
 - This module enables teachers to view and delete school's clubs, societies, sports and uniform bodies.
- EForum Module
 - This module enables teachers to take part in an e-forum to have discussion with the others.
- School Info Module
 - This module enables teachers to view all the school's information.

1.4.3 Headmaster Section

- Attendance Module
 - This module allows the headmaster to check students' attendance list.
- Lesson Plan Module
 - This module allows the headmaster to view and approve the lesson plans that have been submitted by teachers.
- Syllabus Plan Module

- This module allows the headmaster to view and validate the annual syllabus plans that have been submitted by teachers.
- Activity Modules
 - This module enables the headmaster to view school's clubs, societies, sports and uniform bodies.
- EForum Module
 - This module enables the headmaster to take part in an e-forum to have discussion with the others.
- School Info Module
 - This module enables headmaster to view all the school's information

1.4.4 PIBG Section

- Activity Modules
 - This module enables parents to view school's clubs, societies, sports and uniform bodies.
- EForum Module
 - This module enables parents to take part in an e-forum to have discussion with the others.
- School Info Module
 - This module enables parents to view all the school's information.

1.4.5 School Administrator Section.

- Activity Modules
 - This module enables school administrator to view school's clubs, societies, sports and uniform bodies.

- EForum Module
 - This module enables school administrator to take part in an e-forum to have discussion with the others.
- School Info Module
 - This module enables school administrator to view all the school's information.

1.5 Expected Outcome

Expected Outcomes of WPFS for Student Section

- Viewing panel- To view all the information in schools.
- Interactive panel- To interact with teachers, headmaster, school administrator or PIBG through e-forum.
- Activity panel- To update the school's activities.

Expected Outcomes of WPFS for Teachers Section

- Lesson panel- To record lesson scope, time, date, name of subject and objective of lessons for each subject.
- Syllabus panel- To record syllabus details.
- Attendance panel- To record students' attendance.
- Interactive panel- To interact with students, headmaster, school administrator or PIBG through e-forum.
- Activity panel- To validate the contents of activities which are edited by the students.

Expected Outcomes of WPFS for Headmaster Section

- Validation panel- To validate syllabus plan, lesson plans and others applications.
- Comment and advices panel- To post the important messages or his/her opinion regarding certain issues through Eforum module.

Expected Outcomes of WPFS for School Administrator Section

- Activity panel- To supervise the contents of activities.

Expected Outcomes of WPFS for PIBG Section

- Comment and advices panel- To post the important messages or their opinion regarding certain issue through e-Forum.
- Interactive panel- To interact with students, headmaster, school administrator or teacher through e-forum.

1.6 Project Schedule for WPFS

ID	Task Name	Start	Finish	Duration	2003							2004	
					Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	
1	Preliminary study and planning	6/12/2003	6/25/2003	10d	■								
2	Literature review	6/26/2003	7/11/2003	12d		■							
3	System analysis	7/14/2003	8/8/2003	20d			■						
4	System design	8/11/2003	9/5/2003	20d				■					
5	System development and coding	9/8/2003	1/9/2004	90d					■	■	■	■	■
6	Unit testing	10/14/2003	1/8/2004	63d						■	■	■	■
7	Integration and system testing	1/12/2004	1/23/2004	10d									■
8	Implementation	1/26/2004	1/30/2004	5d									■
9	Documentation	6/30/2003	1/23/2004	150d									■

Chapter 2 - Review of Literature

2.1 Analysis Studies

2.1.1 Case Study 1 - SchoolWrite 3.1d.01 (www.schoolwrite.com)

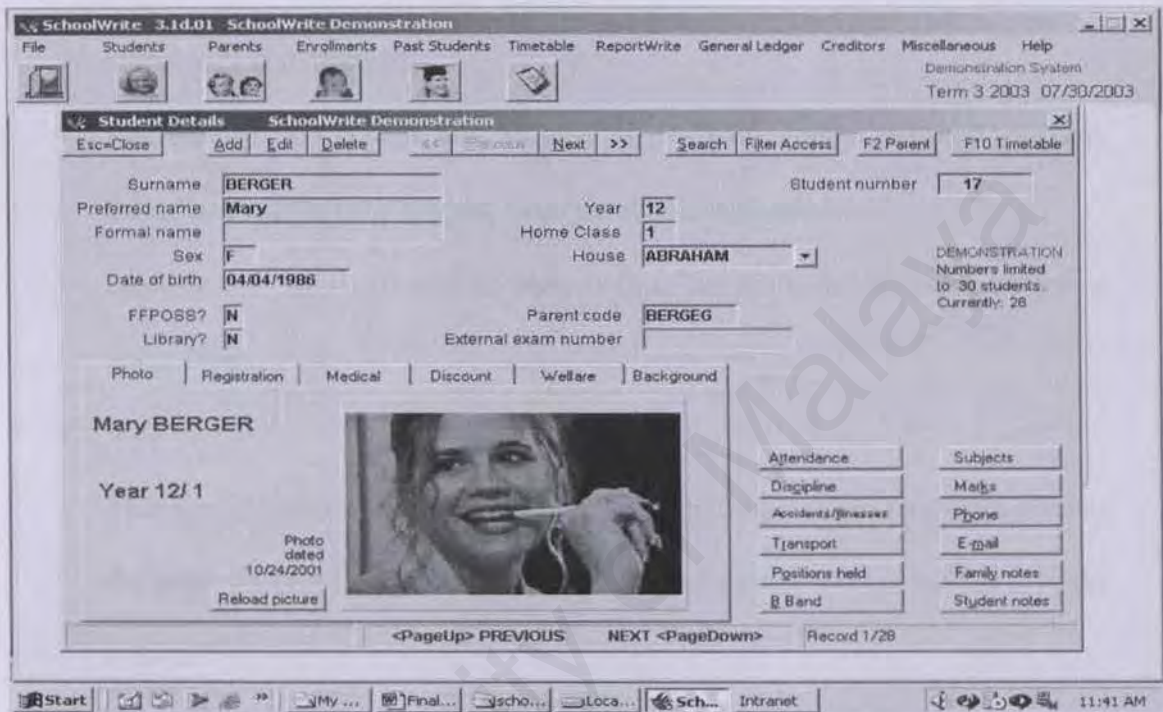


Figure 2.1 : The Student page of the SchoolWrite application

Figure 2.1 shows a stand-alone and menu-driven application designed by BBASoftware Company from Australia. SchoolWrite is an integrated database to manage all aspects of school administration. This application can help administration staffs or teachers to record all necessary information about students in the school such as students details, classes, test and assignments, attendance, medical information, discipline and registration. Besides that, it also includes details of parents, enrollments, alumni records, timetable, reports, general ledger, creditors and other miscellaneous information.

Below are some of the major modules that are available in SchoolWrite and their brief descriptions :-

➤ **Students**

- This module contains all the information regarding students in the school such as the student's profile, medical information, classes, timetable, marks, attendance and discipline.
- The user of this system will be able to add new student, edit information, delete and search for a student from the school records.
- Besides that, user will also be able to filter the students' records by year or home class.

➤ **Parents**

- This module contains all the information regarding a student's parent such as the parent's profile, financial information and names of their children in the school.
- User will be able to add new parent's information, edit, delete and search for a parent's record.

➤ **Time Table**

- This module contains all the information regarding timetables in the school including subject, teacher's name, location and time.
- User will be able to search for a teacher's timetable using the teacher's code and also to modify periods and to prepare timetables for future term.

➤ **ReportWrite**

- This module contains a few reports to be printed such as teacher's classes and mark entry control report.

➤ **Miscellaneous**

- This module allows for activities such as end-of-term report heading, saving passwords, changing term and year, changing processing date and setting control information to occur.

Strength: -

➤ **Manageability**

The application provides most of the record management tool

➤ **Completeness**

The information in the available modules are quite complete. For example, in the students' module, information available includes personal details, medical information, results, discipline and attendance.

Weaknesses: -

➤ **Lack of functionality**

The application didn't really provide any workspace for the administration part of work such as there's limited functionality for teachers to perform their daily tasks.

➤ **Poor GUI**

The Graphical User Interface (GUI) of the application is not really good.

➤ **Cannot preview reports**

The available reports cannot be previewed first before printing.

2.1.2 Case Study 2 – MazikUSA (www.mazikusa.com)

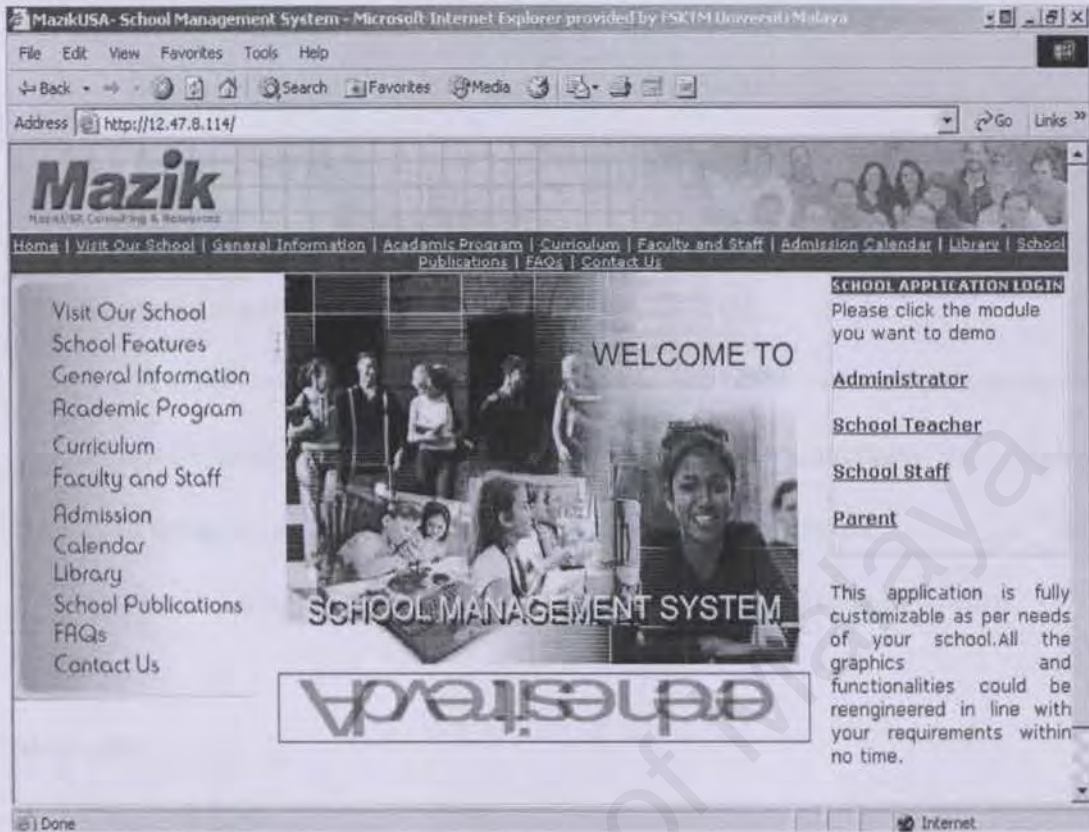


Figure 2.2: The main page of MazikUSA online school management system

Figure 2.2 shows an online school management system. There are four types of user in this system: Administrator, School Teacher, School Staff and Parent.

Below are some of the major modules that are available in MazikUSA and their brief descriptions :-

➤ **Mazik Communicator**

- It is a built-in email system for teachers, students, parents and school staff where quick email can be generated to anyone in the school.

➤ **Scheduling**

- Teachers and students can view their subject schedule anytime when they log in the system.
- They can also set up their daily and weekly calendar for easy view.

- Schedule can be printed.

➤ **Student Discipline**

- Students' discipline will be recorded under this module.
- Teachers will input student area of improvement.
- Guidelines are documented to handle critical students situation.

➤ **Student Grading**

- Teacher can grade students online or via web, create coursework categories (tests, homework, midterm), customize letter grade averages and weighted averages, and add/edit coursework, grades and comments.
- Student grades (midterm, grade reports or transcripts) can be printed.

Strength: -

➤ **Manageability**

The system provides most of the school management function. All the functions and services are arranged accordingly and information can be retrieved easily.

➤ **Good graphical user interface**

The design of the system is systematic and the animation in the main page is very attractive.

Weaknesses: -

➤ **No discussion forum is provided**

There is no discussion forum in the system. As a result there is no any platform for the students and the school administrative to interact.

2.1.3 Case Study 3 – ThinkWave Educator (www.thinkwave.com)

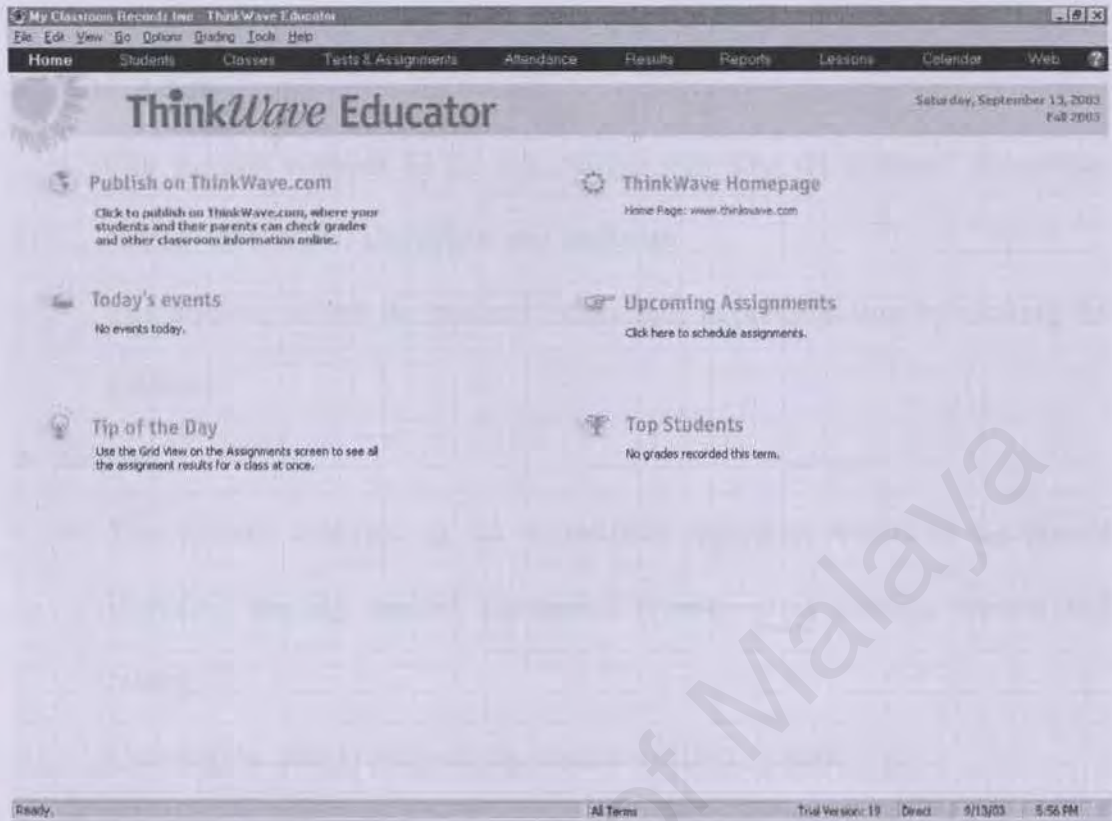


Figure 2.3: The main page of ThinkWave Educator application

Figure 2.3 shows a stand-alone and menu-driven application designed by ThinkWave Company. ThinkWave is an integrated database to manage all aspects of school administration. This application includes students' details, classes, test and assignments, attendance, result, reports, lessons, calendar and web. Besides online grading system, ThinkWave also includes information regarding events of the day and top student section.

Below are some of the major modules that are available in ThinkWave and their brief descriptions: -

➤ Students

- This module contains all the information regarding students in the school such as the student's profile, medical information, email, parent's details and notes.

- Teachers able to create a new class, new students or enroll students into their existing classes.

➤ **Attendance**

- This module contains all the information regarding the students' attendance such as their name, attendance and tardiness.
- Teachers can review the students' attendance in previous time by clicking the calendar.

➤ **Report**

- This module contains all the information regarding reports in the school including grading reports, attendance reports, class meeting reports and others.
- User will be able to print out the reports which they need.

Strength: -

➤ **Manageability**

The application provides most of the record management tool

➤ **Attractive interface**

The interface of this application is attractive.

Weaknesses : -

➤ **Highly dependency**

Users of this application have to depend on the ThinkWave server to publish their grade book and class information.

2.2 Software Architecture

There are a few software architectures available now: two-tier architecture and three-tier architecture. This current project will be a web-based application. Therefore, listed below are technologies that best suit the project.

2.2.1 Two-Tier Architecture

The two-tiered architecture contains two computers—a client, and server—with areas of logic combined on the client. The three components of an application—presentation, processing, and data—are divided among two software entities or tiers:

- Client application code (Client)
- Database server (Server)

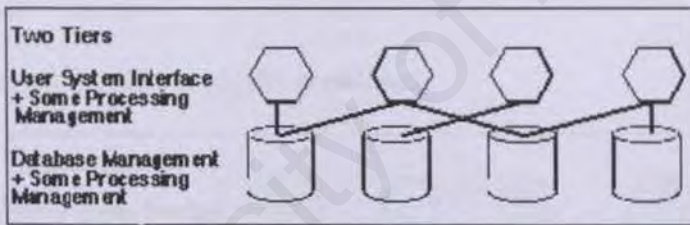


Figure 2.4: Two-tiered Architecture

The user system interface is usually located in the user's desktop environment and the database management services are usually in a server that is a more powerful machine that services many clients.

A robust client application development language and a versatile mechanism for transmitting client requests to the server are essential for a two-tier implementation. Presentation is handled exclusively by the client, processing is split between client and server, and data is stored on and accessed through the server. The

PC client assumes the bulk of responsibility for application (functionality) logic with respect to the processing component, while the data base engine-with its attendant integrity checks, query capabilities, and central repository functions-handles data intensive tasks. In a data access topology, a data engine would process requests sent from the clients.

2.2.2 Three-Tier Architecture

Sometimes it is also referred to as the multi-tier architecture. The components of three-tiered architecture are divided into three layers:

- Presentation layer,
- Functionality layer,
- Data layer.

Each of these layers must be logically separated.

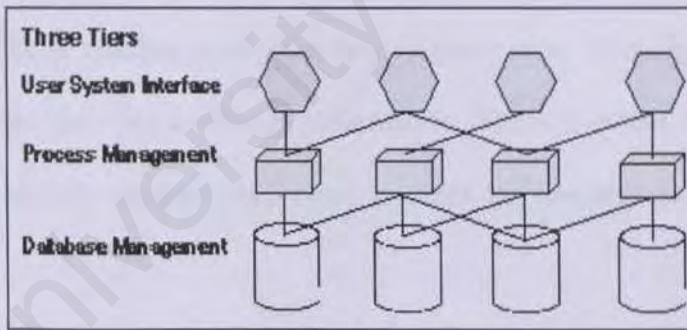


Figure 2.5: Three-tier or Multi-tier Architecture

The three-tier architecture attempts to overcome some of the limitations of the two-tier scheme by separating presentation, processing, and data into separate distinct entities. A middle tier was added between the user system interface client environment and the database management server environment. This tier performs calculations or makes requests as a client to additional servers. The middle-tier servers are typically coded in a highly portable, nonproprietary language such as C.

Middle-tier functionality servers may be multithreaded and can be accessed by multiple clients, even those from separate applications.

2.2.3 Conclusion for Software Architecture

The three-tier architecture is chosen for this project because it is the most practical and suits the system's concept tremendously. The three-tier design has many advantages over traditional two-tier or single-tier designs, the chief ones being:

- The added modularity makes it easier to modify or replace one-tier without affecting the other tiers.
- Separating the application functions from the database functions makes it easier to implement load balancing.

2.3 Network Architecture

A network is nothing more than two or more computers connected together by a cable so that they can exchange information. There is a few types of network can be considered to be used in this project: internet, intranet and extranet.

2.3.1 Internet

Internet is a collection of communication networks interconnected across 2 or more LANs or sub-networks. It is a global network connecting millions of computers. More than 100 countries are linked into exchanges of data, news and opinions.

Each Internet computer, called a host, is independent. Its operators can choose which Internet services to use and which local services to make available to the global Internet community.

There are a variety of ways to access the Internet. Most online services, such as America Online, offer access to some Internet services. It is also possible to gain access through a commercial Internet Service Provider (ISP).

2.3.2 Intranet

Intranet is a term used to refer to the implementation of internet technologies within a corporate organization rather than for external connection to the global Internet. It is a network based on TCP/IP protocols (an internet) belonging to an organization, usually a corporation, accessible only by the organization's members, employees, or others with authorization. An intranet's Web sites look and act just like any other Web sites, but the firewall surrounding an intranet fends off unauthorized access.

Like the Internet itself, intranets are used to share information. Secure intranets are now the fastest-growing segment of the Internet because they are much less expensive to build and manage than private networks based on proprietary protocols.

2.3.3 Extranet

Extranet is a new buzzword that refers to an intranet that is partially accessible to authorized outsiders. Whereas an intranet resides behind a firewall and is accessible only to people who are members of the same company or organization, an extranet provides various levels of accessibility to outsiders. User can access an extranet only

if user has a valid username and password, and user's identity determines which parts of the extranet user can view.

2.3.4 Conclusion for Network

Since Web Portal For Schools System is an web-based application that may access by students, parents, teachers and headmaster in certain schools, internet is the most suitable network to be used in this project. Users from different states can access the system if they have internet access. This means that users can manage their stuffs anytime and anywhere despite of the limitation of geographical barrier.

2.4 Security Technology

Security is an important part in developing a web site. Without a good security system, a web site can be hacked and make the user to loose confidence of web site. SSL is considered for securing the transport of information in DECP.

2.4.1 Secure Sockets Layer (SSL)

SSL is a security protocol designed to ensure data moving between a browser and a server remains private. In theory, someone could intercept information, such as a credit card number while it is in transit between the browser and the server. One solution to prevent information from being usable if it is intercepted is to encrypt it. The most widely implemented encryption system for the web at present is SSL.

SSL is an open, non-proprietary protocol developed by Netscape Communication. It uses industry, accepted RSA public key cryptography for authentication and encryption. The SSL protocol was designed to provide a data security layer between TCP/IP and application protocols such as HTTP, Telnet,

NNTP or FTP. SSL provides data encryption, server authentication, message integrity and optional client authentication for TCP/IP connection.

The advantage of the SSL Protocol is that it is application protocol independent. A "higher level" application protocol (e.g. HTTP, FTP, TELNET, etc.) can layer on top of the SSL Protocol transparently. The SSL Protocol can negotiate an encryption algorithm and session key as well as authenticate a server before the application protocol transmits or receives its first byte of data. All of the application protocol data is transmitted encrypted, ensuring privacy.

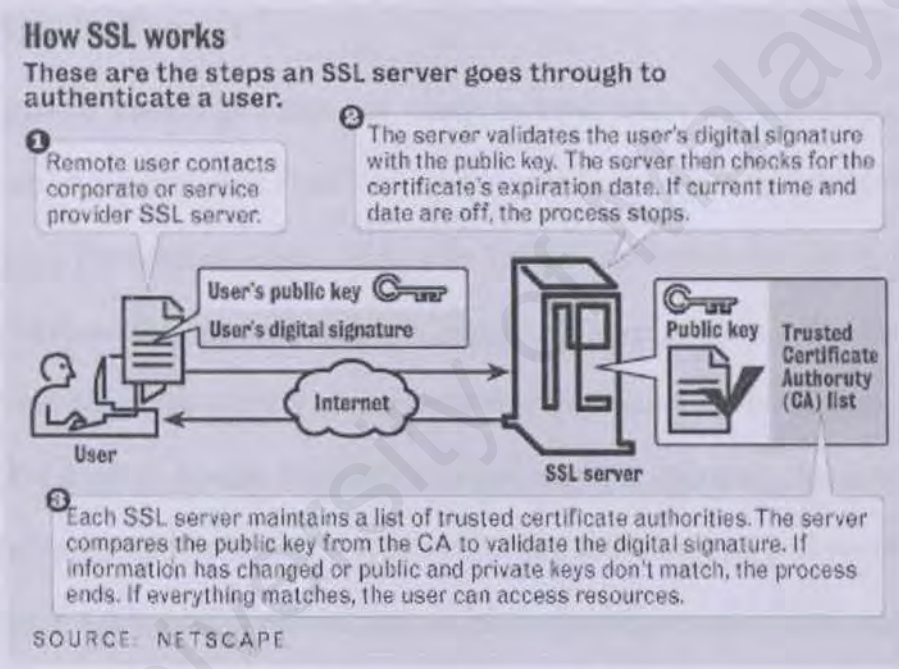


Figure 2.6: How SSL Work

2.5 Application Server

An application server is a program that serves web pages upon request. Every application server has an IP address and possibly a domain name. For example, if a user enters the URL <http://www.schoolwrite.com/index.html> in your browser, this sends a request to the server whose domain name is schoolwrite.com. The server then fetches the page named index.html and sends it to the user's browser. Application

servers and browsers communicate using HTTP(Hypertext Transfer Protocol), a simple but effective language for requesting and transmitting data over a network.

Application servers come in various shapes and sizes. They run under a variety of Operating System, have varying levels of power and complexity, and range in price from rather expensive to free. Studies on several application servers will be carried out: Apache Tomcat, Microsoft Information Server(IIS) and Personal Web Server(PWS).

2.5.1 Apache Tomcat

Apache Tomcat is a high-end enterprise level server developed by a loosely knit group of programmers from various organizations around the worldwide Java community. The original version of Apache Tomcat was written for UNIX, but there are now versions that run under OS/2, Windows and other platforms. Apache Tomcat has become one of the world's most popular free application server for Java.

The keys to Apache Tomcat's attractiveness and popularity lie instead in its extensibility, its freely distributed source code, and active user support for the server. And version 4.0.3, now in official release, is already being touted as the most stable and fastest version of Apache Tomcat ever.

2.5.2 Internet Information Server(IIS)5.0

Microsoft IIS 5.0 is the best web server for the Windows platform. This version, which comes exclusively as part of the Windows 2000 Server Operating System, contains many new features along with performance and reliability enhancements.

IIS 5.0 is good as both a first-time web server for these familiar and comfortable with Windows operating system, and a high-end server for hosting providers and large corporate installations. It handles the basics well and is better integrated in Windows than previous versions. IIS 5.0 also comes with performance and feature enhancements that will be attractive for mission-critical tasks.

The ideal computer to run IIS on is at least a 200Mhz Pentium with 128MB of RAM. Organizations should plan on doubling the RAM and CPU speed if they intend to run Advanced Server's clustering, SQL or Transaction services on the same machine as the Web server.

2.5.3 Personal Web Server(PWS)

PWS is entry-level/mid-range server for Windows 9x/NT platforms. It is a scaled-down version of the commercial Information Internet Server(IIS) included with the server edition of Microsoft Windows NT. PWS is a great entry-level Web server that makes it easy to publish personal home pages, serve small Web sites, and share documents via a local intranet.

PWS is one of the best servers available for helping to get users up and running quickly. Wizards are included to guide users through the process of setting up home pages and sharing files, and the PWS administrator reduces the complexity of actually running the Web server itself. Users can also use the familiar Explorer interface or PWS's Personal Web Manager to share directories, start and stop the server, and view Web site statistics.

One of the best uses for PWS is as a platform for testing out Web sites on Windows 95/Window NT Workstation computers before hosting them on the

Internet. This allow users to check the validity of links, scripts, and applications as well as to ensure that the overall organization of the site is functioning correctly.

PWS presents the ability to develop transactional Web applications using the Microsoft Transaction Server. Overall, while most large enterprises will likely bypass Microsoft's Personal Web Server for the high-end Internet Information Server, PWS will remain one of the best available options for those individuals who want to serve their own personal home pages and for small organizations who need to host their own websites.

2.6 Operating System

Operating system (OS) is a platform that performs basic tasks, such as recognizing input from the keyboard, sending output to the display screen, keeping track of files and directories on the disk, and controlling peripheral devices such as disk drives and printers.

Besides that, the OS makes sure that different programs and users running at the same time do not interfere with each other. For security, OS ensures that unauthorized users do not access the system. OS provides a software platform to allow application programs run on it.

The most popular operating systems currently are UNIX, Windows 98, Linux and Windows 2000.

2.6.1 Unix

Unix is a much older operating system that was created in the late 1960s. Unix is a registered trademark, and using the term involves meeting a long list of requirements and playing a sizable amount of money to be certified.

Unix is designed to provide a multi-user, multitasking system for the use by programmers. It began as an open source project that became widely used in universities, scientific labs, and by the US government. The philosophy behind the design of Unix was to provide simple and powerful utilities that could be pieced together in a flexible manner to perform a wide variety of tasks. Over the years, hundreds of talented programmers contributed their own improvements to Unix making it extremely robust, stable, and fast. However, Unix is more difficult to learn and isn't as widely supported as Microsoft Windows 2000.

2.6.2 Linux

Linux began with his post to the Usenet newsgroup comp.os.minix, in August, 1991, written by a Finnish college student. Linux has gradually become a popular operating system for Internet/intranet serving purposes. With a host of performance enhancements that will benefit Web sites and Internet sites of all sizes, Linux is a stable and high-performance operating system for Internet usage. Linux is a Unix clone, a work-alike. All of the kernel code was written from scratch, but many , many more are simply parts of software from other operating system, especially Unix and Unix-like operating system.

Linux has made progress, primarily in functionality important to Internet infrastructure and Web server capabilities, including a greater selection of drivers, easier installation, GUI-based front ends for Web administration and Window management.

Linux has always provided a rich programming environment. As a server operating system, Linux is matured. It can be found running Web servers all over the world and provides file and print services in an increasing number of businesses. On

the desktop, too, Linux continues to mature. The KDE desktop provides a GUI that rivals Microsoft Windows for ease of use and configurability.

2.6.3 Windows 98

Windows 98 is based on the popular Microsoft Windows 95 Operating System, and is designed for the consumer market. Windows 95/98 were designed for backward compatibility with older DOS and 16bit programs, as well as providing a platform for the newer (back in 1995) 32 bit programs.

Windows 98 works better by making it simple to access the Internet and by providing better system performance along with easier system diagnostics and maintenance. With Windows 98, users' system plays better as well with support for the latest graphics, sound, and multimedia technologies, the ability to easily add and remove peripheral devices with support for Universal Serial Bus (USB), and it also enables users to watch TV on PC. Besides that, Windows 98 is compatible with more software (including games) and hardware.

2.6.4 Windows 2000

Windows 2000 is Microsoft's latest version of popular Windows NT Operating System. Windows 2000 represent a significant change in functionality over Windows NT4.0. Under Windows 2000's hood are a range of core changes that improve reliability, interoperability, networking, application support, hardware support, performance, and much more.

2.7 Database Server

A database is a structured collection of data. To add, access, and process data stored in a computer database, a database server is needed. There are several database server available currently: Oracle, Microsoft SQL Server and MySQL.

2.7.1 Oracle

Oracle is a multi-user database. It provides unprecedented ease-of-user and is pre-tuned and pre-configured for today's dynamic workgroup and line-of-bus environment.

Oracle includes a fully integrated set of easy-to-use management tools, full distribution, replication and web features. Oracle also provides the highest levels of availability through fast fail over, easier management, and zero data loss disaster protection, with Data Guard, the only complete data protection solution available on the market.

Oracle can runs on UNIX, Linux and Windows platform. However, it is expensive and separate licenses are required for each of its database engine.

2.7.2 Microsoft SQL Server 2000

SQL Server 2000 provides agility to company data management and analysis, allowing organization to adapt quickly and gracefully to derive competitive advantage in a fast-changing environment. From a data management and analysis perspective, it is critical to turn raw data into business intelligence and take full advantage of the opportunities presented by the Web. A complete database and data analysis package, SQL Server 2000 opens the door to the rapid development of a new generation of enterprise-class business applications that can give your company

a critical competitive advantage. The record-holder of important benchmark awards for scalability and speed. SQL Server 2000 is a fully Web-enabled database product, providing core support for Extensible Markup Language(XML) and the ability to query across the Internet and beyond the firewall.

Microsoft SQL Server 2000 is a single process, multithreaded relational database server primarily intent for transactional processing. It is based on the client/server architecture, which divides processing into two components: a front-end, or client component, that run on a local workstation and a back-end, or server component, which runs on a remote computer.

2.7.3 MySQL

MySQL is also called as My Ess Que Ell. It is the most popular Open Source SQL database. It is provided by MySQL AB. MySQL AB is a commercial company that builds its business providing services around the MySQL database.

MySQL is a database management system (DBMS) can be vast amounts of information in a corporate network. The DBMS such as MySQL is needed to add, access, and process data stored in a computer database. It also is Relational database management system (RDBMS) that can stores data in separate tables rather than putting all the data in one big storeroom. This increases speed and flexibility. It is Open Source Software that there is possible for anyone to use, modify and download from the Internet and use it without paying anything.

2.8 Data Access Technology

Web Portal for Schools System will require data access technology to enable communication and access to its various database. A few of the Microsoft Data access strategy and technology is reviewed and considered.

2.8.1 Universal Data Access (UDA)

UDA is a high-level specification developed by Microsoft for accessing data objects regardless of their structure. The strategy of Universal Data Access is to assure open, integrated, standards-based access to all types of data, that is from SQL to non-SQL to even unstructured data across a wide variety of applications, from traditional client/server to the web. The main components of UDA are ADO, OLE DB and ODBC.

2.8.2 ADO (Active Data Object)

Active Data Object (ADO) is the Microsoft's newest high-level interface for data objects that most applications developers will use.

ADO is designed to eventually replace *Data Access Objects (DAO)* and *Remote Data Objects (RDO)*. Unlike RDO and DAO, which are designed only for accessing relational databases, ADO is more general and can be used to access all sorts of different types of data, including web pages, spreadsheets, and other types of documents.

ADO provides consistent access to data for creating a front-end database client or middle-tier business object using an application, tool, language, or even an Internet browser. ADO is the single data interface for developers creating 1 to n-tier client/server and Web-based data-driven applications.

2.8.3 ADO .NET

ADO .NET is Microsoft's latest data access technology and, as an integral part of the .NET Framework, is far more than simply an upgrade of previous incarnations of ActiveX® Data Objects ADO. ADO.NET provides an extensive set of .NET classes that facilitate efficient access to data from a large variety of sources, enables sophisticated manipulation and sorting of data, and forms an important framework within which to implement inter-application in communication and XML Web services.

ADO.NET is essentially a collection of classes that expose methods and attributes used to manage communications between an application and a data store. An integral part of the .NET Framework, ADO.NET simplifies integration of data sharing in distributed ASP.NET applications.

ADO.NET is an expansion of ADO with some of the key concepts retained. ADO.NET has greatly extended to provide access to structured data from diverse sources, which are all accommodated in a consistent, standardized programming model.

ADO.NET can be used in any consumer application that needs to connect to, and communicate with data sources such as Microsoft SQL Server™, as well as data sources exposed via OLE DB and XML.

2.8.4 OLE DB

OLE DB Providers are the data access engines or services, as well as the business logic components that these applications can use in a highly interoperable, component-based environment.

OLE DB is a set of interfaces that are designed to provide data access to *all* data, regardless of type, format or location. It effectively "componentizes" database and related data processing functionality, breaking it up into interoperable components that can run as middleware on the client or server across a wide variety of applications. The OLE DB architecture provides for components such as direct data access interfaces, query engines, cursor engines, optimizers, business rules and transaction managers.

The concept of OLE DB is to explode the database into its basic parts. OLE DB delivers components, external to the database, that provide this typical database functionality in reusable component architecture. And these components, because they are not directly linked to the database itself, can be shared across multiple applications, systems and data stores to provide a higher level, universal interface.

2.8.5 ODBC (Open Database Connectivity)

ODBC is a standard database access method developed by Microsoft Corporation. The goal of ODBC is to make it possible to access any data from any application, regardless of which database management system (DBMS) is handling the data. ODBC manages this by inserting a middle layer, called a database *driver*, between an application and the DBMS. The purpose of this layer is to translate the application's data queries into commands that the DBMS understands. For this to work, both the application and the DBMS must be *ODBC-compliant* -- that is, the application must be capable of issuing ODBC commands and the DBMS must be capable of responding to them. Since version 2.0, the standard supports SAG SQL.

2.8.6 JDBC

JDBC technology is an API that lets you access virtually any tabular data source from the Java programming language. It provides cross-DBMS connectivity to a wide range of SQL databases, and now, with the new JDBC API, it also provides access to other tabular data sources, such as spreadsheets or flat files.

The JDBC API allows developers to take advantage of the Java platform's "Write Once, Run Anywhere" capabilities for industrial strength, cross-platform applications that require access to enterprise data. With a JDBC technology-enabled driver, a developer can easily connect all corporate data even in a heterogeneous environment

2.9 Language

2.9.1 ASP

ASP is a server-side scripting technology. ASP is indeed HTML page with an .asp extension. ASP allows for HTML and a scripting language such as VBScript, JScript or Perl to be interspersed in a Web page. When a browser requests an ASP page, the Web server generates a page with HTML code and sends it back to the browser.

One of the most important features about ASP is that it allows user to easily access data and put it on a Web page. User can simply display data from an ODBC-compliant database, or use ASP to make decisions about what to display on a Web page. User can then format the results in any way that they please.

Another important ASP feature is the ability to use cookies to store and retrieve information. The Request object has a Cookie collection, and user can use this in data processing.

2.9.2 ASP.NET

ASP.NET is a revolutionary programming framework that enables the rapid development of powerful web applications and services. Part of the emerging Microsoft .NET platform, it provides the easiest and most scalable way to build, deploy and run distributed web applications that can target any browser or device. ASP.NET applications are a mixture of client side markup and code, and server side programming.

ASP.NET allows programmers and developers to work both VB.NET and C# within the same ASP.NET page. .NET is a milestone for Microsoft; it marks Microsoft entry into “run once, run anywhere” compiler market alongside Java and Ruby. .NET allows the programmer to use any number of .NET framework. ASP.NET can take advantage of all that .NET has to offer, including supports for around 20 or more .NET languages from C# to Perl.NET, and the full set of .NET Framework Software libraries.

2.9.3 JSP

Java Server Page(JSP) is a template for a web page that uses Java code to generate an HTML document dynamically. JSP runs in server-side component which is known as JSP container, which translate them into equivalent Java servelets.

By default, JSP uses Java as its scripting language; however, the specification allows other languages to be used, just as ASP can use other languages(such as Java Script and VBScript). While JSP with Java will be more flexible and robust than scripting platforms based on simpler languages like Java Script and VB Script.

JSP provides a number of server-side tags that allow developers to perform most dynamic content operations. So developers who are only familiar with scripting,

or even those who are simply HTML designers, can use JSP tags for generating simple output. Advanced scriptures or Java developers can also use tags, or they can use the full Java language if they want to perform advanced operations in JSP pages.

2.9.4 Javascript

Javascript is a scripting language developed by Netscape to enable web authors to design interactive sites. Javascript is different from Java. Although it shares many of the features and structures of the full Java language, it was developed independently. Javascript can interact with HTML source code to enable web authors to spice up their sites with dynamic content. JavaScript is endorsed by a number of software companies and is an open language that anyone can use without purchasing a license. It is supported by recent browsers from Netscape and Microsoft, though Internet Explorer supports only a subset, which Microsoft calls Jscript.

2.10 Authoring Tools

2.10.1 Seagate Crystal Report

Seagate Crystal Report is a powerful stand-alone report creation. It provides a report-writing module that you can add to your own applications. As a developer using C, C++, Visual Basic, ASP, ASP.NET, object Vision, Turbo Pascal, Visual DBASE, Delphi or any programming languages that can access a DLL, you can add sophisticated report generating and printing capabilities to your applications without the time consuming task for writing your own code.

2.10.2 Microsoft Visual InterDev

Microsoft Visual InterDev is a Web development tool designed for programmers to create an interactive Web page with data as simple as dragging and dropping, setting some properties, and saving the page. No coding is required in using Visual InterDev.

Visual InterDev includes site design tools that help user easily plan pages, organize their links, and apply a consistent theme to your Web site. Visual InterDev includes three ways to view your HTML and ASP pages.

These three views are the cornerstone of Visual InterDev. They replace the simple source code editor included with Visual InterDev 1.0 and supports design-time controls (DTCs), debugging, statement completion, and object browsing.

The new data environment provides easy commands for making Web application data-driven. Instead of burying complex SQL statements deep within an .asp file, the statements are now exposed, maintained, and reused at the application level through the data environment under the Global asp file. Instead of modifying the query within each page, developers can modify the data command and changes are incorporated into files that reference that data command. Developers also can drag fields from the command directly onto HTML or ASP page.

However, for those so inclined, Visual InterDev exposes a full object model that allows developers to fine-tune their application, perform client validation, and have full control of Web application. Visual InterDev supports not only full-reach applications, using the ASP engine to produce simple HTML pages for the client, but also DHTML and Microsoft Internet Explorer 4.0 data binding for a richer client experience.

2.10.3 Microsoft Visual Studio .NET

Visual Studio .NET Professional offers a visionary yet practical development tool for creating the next generation of applications. Developers can use Visual Studio .NET Professional to employ XML and build-in Microsoft ADO.NET tools to build high-performance data-driven applications that target a variety of platforms. With an integrated development environment(IDE) for all languages, developers can take advantage of a common toolbox, debugger, and task window, greatly reducing the developer learning curve. Microsoft Visual Studio .NET also creates solution that span any device and integrate with any platform besides giving developers the tools for integrating solutions across operating system and languages.

2.10.4 Macromedia Dreamweaver MX

Macromedia Dreamweaver is professional visual editor for creating and managing web sites and pages. It gives developers the productivity of a visual web page layout tool, the control of an HTML text, editor and support for new web technologies, all in one software packing.

Developers can use it to create web sites visually, with confidences that HTML being generated is concise and always editable. It includes advanced features that takes advantage of the latest innovations on the web, such as dynamic HTML and CSS, while still ensuring that web pages work well in a variety of web browsers. All of the code generated by it is carefully created to work on as many platforms and browsers as possible.

Others features include easy integration of Active X components, Java applets, Plug-ins for improved web page interactivity. It also integrates seamlessly

with other components of Macromedia, such as Flash Movies, Shockwave, and Fireworks, which are essential for the development of interactive web pages.

3.1 Methodology

2.10.5 Adobe Photoshop

Adobe Photoshop is the most popular image-editing available for Macintosh and Windows-based computers. It is used as drawing, painting and designing purposes. Users can retouch an image, apply special effects, swap details between photos, introduce text and logos, adjust color balance, and even add color to a grayscale scan. All these functions are included under a set of user-friendly editing tools in Adobe Photoshop. It contains graphical icons to represent every functions of each button. Besides that, it also provides many shortcut keys that is easier and save time for users and for those who do not like to use mouse.

Chapter 3 – System Requirements Analysis

3.1 Methodology

A methodology is a collection of procedures, techniques, tools and documentation aids, supported by a philosophy, which will help the system developers in their efforts to implement a new information system. A methodology will consist of phases and sub-phases, which will guide the systems developers in their choice of techniques that might be appropriate at each stage of the projects [Avison and Fitzgerald, 1995].

There are several process models in system development:

- Waterfall Model
- Waterfall Model with Prototyping
- V Model
- Spiral Model
- Rational Unified Process

3.1.1 Rational Unified Process (RUP)

The Rational Unified Process® is a **Software Engineering Process**. It provides a disciplined approach to assigning tasks and responsibilities within a development organization. Its goal is to ensure the production of high-quality software that meets the needs of its end-users, within a predictable schedule and budget.

The Rational Unified Process is a **process product**, developed and maintained by Rational® Software. The development team for the Rational Unified Process are working closely with customers, partners, Rational's product groups as

well as Rational's consultant organization, to ensure that the process is continuously updated and improved upon to reflect recent experiences and evolving and proven best practices.

The Rational Unified Process enhances **team productivity**, by providing every team member with easy access to a knowledge base with guidelines, templates and tool mentors for all critical development activities. By having all team members accessing the same knowledge base, no matter if our work with requirements, design, test, project management, or configuration management, we ensure that all team members share a common language, process and view of how to develop software.

The Rational Unified Process activities create and maintain **models**. Rather than focusing on the production of large amount of paper documents, the Unified Process emphasizes the development and maintenance of models—semantically rich representations of the software system under development.

The Rational Unified Process is a guide for how to effectively use the **Unified Modeling Language (UML)**. The UML is an industry-standard language that allows us to clearly communicate requirements, architectures and designs. The UML was originally created by Rational Software, and is now maintained by the standards organization Object Management Group (OMG).

The Rational Unified Process is supported by **tools**, which automate large parts of the process. They are used to create and maintain the various artifacts—models in particular—of the software engineering process: visual modeling, programming, testing, etc. They are invaluable in supporting all the bookkeeping associated with the change management as well as the configuration management that accompanies each iteration.

The Rational Unified Process is a **configurable process**. No single process is suitable for all software development. The Unified Process fits small development teams as well as large development organizations. The Unified Process is founded on a simple and clear process architecture that provides commonality across a family of processes. Yet, it can be varied to accommodate different situations. It contains a Development Kit, providing support for configuring the process to suit the needs of a given organization.

The Rational Unified Process captures many of the **best practices** in modern software development in a form that is suitable for a wide range of projects and organizations. Deploying these best practices using the Rational Unified Process as our guide offers development teams a number of key advantages. In next section, we describe the six fundamental best practices of the Rational Unified Process.

3.1.2 Process Overview

Two Dimensions

The process can be described in two dimensions, or along two axis:

- the horizontal axis represents time and shows the dynamic aspect of the process as it is enacted, and it is expressed in terms of cycles, phases, iterations, and milestones.
- the vertical axis represents the static aspect of the process: how it is described in terms of activities, artifacts, workers and workflows.

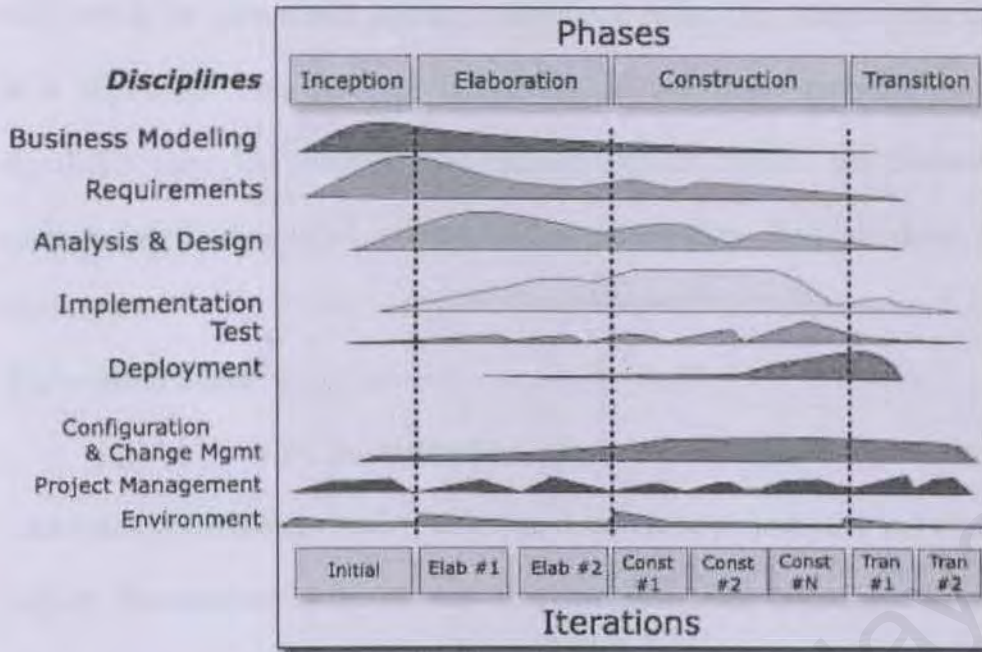


Figure 3.1: RUP Phases

3.1.3 Phases and Iterations - The Time Dimension

This is the dynamic organization of the process along time. The software lifecycle is broken into cycles, each cycle working on a new generation of the product. The Rational Unified Process divides one development cycle in four consecutive phases

- Inception phase
- Elaboration phase
- Construction phase
- Transition phase

Each phase is concluded with a well-defined milestone—a point in time at which certain critical decisions must be made, and therefore key goals must have been achieved.

Inception Phase

During the inception phase, we establish the business case for the system and delimit the project scope. To accomplish this we must identify all external entities

with which the system will interact (actors) and define the nature of this interaction at a high-level. This involves identifying all use cases and describing a few significant ones. The business case includes success criteria, risk assessment, and estimate of the resources needed, and a phase plan showing dates of major milestones.

Elaboration Phase

The purpose of the elaboration phase is to analyze the problem domain, establish a sound architectural foundation, develop the project plan, and eliminate the highest risk elements of the project. To accomplish these objectives, we must have the “mile wide and inch deep” view of the system. Architectural decisions have to be made with an understanding of the whole system: its scope, major functionality and nonfunctional requirements such as performance requirements.

It is easy to argue that the elaboration phase is the most critical of the four phases. At the end of this phase, the hard “engineering” is considered complete and the project undergoes its most important day of reckoning: the decision on whether or not to commit to the construction and transition phases. For most projects, this also corresponds to the transition from a mobile, light and nimble, low-risk operation to a high-cost, high-risk operation with substantial inertia. While the process must always accommodate changes, the elaboration phase activities ensure that the architecture, requirements and plans are stable enough, and the risks are sufficiently mitigated, so we can predictably determine the cost and schedule for the completion of the development. Conceptually, this level of fidelity would correspond to the level necessary for an organization to commit to a fixed-price construction phase.

In the elaboration phase, an executable architecture prototype is built in one or more iterations, depending on the scope, size, risk, and novelty of the project. This

effort should at least address the critical use cases identified in the inception phase, which typically expose the major technical risks of the project. While an evolutionary prototype of a production-quality component is always the goal, this does not exclude the development of one or more exploratory, throwaway prototypes to mitigate specific risks such as design/requirements trade-offs, component feasibility study, or demonstrations to investors, customers, and end-users.

Construction Phase

During the construction phase, all remaining components and application features are developed and integrated into the product, and all features are thoroughly tested. The construction phase is, in one sense, a manufacturing process where emphasis is placed on managing resources and controlling operations to optimize costs, schedules, and quality. In this sense, the management mindset undergoes a transition from the development of intellectual property during inception and elaboration, to the development of deployable products during construction and transition. Many projects are large enough that parallel construction increments can be spawned. These parallel activities can significantly accelerate the availability of deployable releases; they can also increase the complexity of resource management and workflow synchronization. A robust architecture and an understandable plan are highly correlated.

In other words, one of the critical qualities of the architecture is its ease of construction. This is one reason why the balanced development of the architecture and the plan is stressed during the elaboration phase.

Transition Phase

The purpose of the transition phase is to transition the software product to the user community. Once the product has been given to the end user, issues usually

arise that require us to develop new releases, correct some problems, or finish the features that were postponed.

The transition phase is entered when a baseline is mature enough to be deployed in the end-user domain. This typically requires that some usable subset of the system has been completed to an acceptable level of quality and that user documentation is available so that the transition to the user will provide positive results for all parties.

Iterations

Each phase in the Rational Unified Process can be further broken down into iterations. An iteration is a complete development loop resulting in a release (internal or external) of an executable product, a subset of the final product under development, which grows incrementally from iteration to iteration to become the final system.

3.2 Chosen Platform, Web Server, Database and Tools

3.2.1 Chosen Development

For the WPF5, Windows is chosen as the development platform. Microsoft's Windows 2000 is built to work with a series of microprocessors from the Intel Corporation that share the same or similar sets of instructions.

The main reason for choosing Microsoft's Windows 2000 as the development operating system is because most of the computers in FSKTM are currently installed with Windows 2000. Therefore, the implementation of the new system can be done easily and effectively.

Benefits using Microsoft Windows 2000 Professional

Reliable: Windows®2000 Professional is built upon the rock-solid reliability of Windows NT® technology, which makes it significantly more reliable than either Windows 95 or Windows 98 technology. Reliability improvements in Windows 2000 Professional make it even more stable than Windows NT Workstation. Windows 2000 Professional offers high system uptime, dynamic system configuration and resilience to application failures.

Manageable and easy to use: The support for standards-based security in Windows 2000 Professional protects corporate data in stand-alone and networked environment. Windows 2000 Professional offers a set of built-in tools that make it easier to deploy and manage. In addition, Windows 2000 Professional offers an intelligent user interface that adapts to the way users work thereby making the users more efficient.

Internet-enable user business: Windows 2000 Professional is designed to make it easier for organizations to embrace the Internet. The built-in Internet Explorer(IE), a tightly integrated browser, provides users with a faster and richer Internet experience with support for Dynamic HTML (DHTML) and Extensible Markup Language (XML), it offers a powerful platform for developers to create highly scalable end-to-end e-Commerce and line-of-business web applications.

3.2.2 Chosen Database Management System

As we make comparison between Oracle 9i and SQL Server 2000, a fact that Oracle 9i can support much more complex database compared to SQL Server 2000. Nevertheless, as SQL Server also incorporates a world-class feature set for distributed client-server computing, therefore it is still chosen as database management system as it is strongly believed that customers who use SQL.

Benefits using Microsoft Server SQL 2000

Fully Web-Enabled: SQL Server 2000 provides extensive database programming capabilities built on Web standards. Rich XML and internet standard support give user the ability to store and retrieve data in XML format easily with built-in stored procedures. Users can also use XML updategrams to insert, update and delete data easily.

Easy access to data through the Web: With SQL Server 2000, user can use HTTP to send queries to the database, perform full-text search on documents stored in database, and run queries over the Web with natural language.

Powerful, flexible Web-base analysis: SQL Server 2000 Analysis Services capabilities are extended to the internet. Users can access and manipulate cube data by means of a Web browser.

Quick development, debugging, and data transformation: SQL Server 2000 features the ability to interactively tune and debug queries, quickly move and transform data from any source, and define and use functions as if they were built in to transact SQL. Users can visually design and code database applications from any Visual Studio tool.

Simplified management and tuning: With SQL Server 2000, it's easy to manage databases centrally alongside all enterprise resources. Stay online while easily moving and copying databases.

Internet, Intranet and Commerce: SQL Server is very important in Internet, Intranet and Electronic Commerce strategy due to its cutting-edge features and seamless integration with Microsoft Windows NT and Microsoft Back Office. Furthermore, the Web assistant enhances the SQL Server Assistant to easily generate HTML and WML files from SQL Server data. It also supports Internet database integration and allows the users to automate the publishing of database information

in the HTML documents, built active web sites and conduct the processes on the Internet.

Ease of Use-Features provided by SQL Server: ensure easy-to-use for database administrators in building, managing and deploying business applications. For example, the Dynamic Self-Management automates many routine tasks. Besides, the profiling and tuning tools also help to simplify the process of finding and fixing database problems by capturing and replaying server activity.

3.2.3 Chosen Development Data Access Technology

ADO.NET is chosen as this system data access technology. ADO .NET is Microsoft's latest data access technology and, as an integral part of the .NET Framework, is far more than simply an upgrade of previous incarnations of ActiveX® Data Objects ADO. ADO.NET provides an extensive set of .NET classes that facilitate efficient access to data from a large variety of sources, enables sophisticated manipulation and sorting of data, and forms an important framework within which to implement inter-application in communication and XML Web services.

ADO.NET is essentially a collection of classes that expose methods and attributes used to manage communications between an application and a data store. An integral part of the .NET Framework, ADO.NET simplifies integration of data sharing in distributed ASP.NET applications.

ADO.NET is an expansion of ADO with some of the key concepts retained. ADO.NET has greatly extended to provide access to structured data from diverse sources, which are all accommodated in a consistent, standardized programming model.

ADO.NET can be used in any consumer application that needs to connect to, and communicate with data sources such as Microsoft SQL Server™, as well as data sources exposed via OLE DB and XML.

Features	ADO	ADO.NET
Programmability	Uses connection object to transmit commands	Uses strongly typed programming characteristics of XML
Memory-Resident Representation	Require the JOIN query	Supports the Data Relation object
Data Visitation	Scans Recordset rows sequentially	Uses a navigation paradigm for non-sequential access
Disconnected Access	Provided by Recordset but typically supports connected access	Communicates with standardized calls to the Data Adapter

Table 3.1: Different between ADO and ADO.NET

3.2.4 Chosen Development Web Server

IIS is chosen as the web-publishing server. IIS is a web server, a collection of software programs designed to service requests for information and other resources from client on the internet, World Wide Web or organizational Intranets. In a broader sense, IIS provides a comprehensive web server operating system. Apart from that, it also allows security features to be implemented on specific virtual directories to control access.

3.2.5 Chosen Programming Environment

ASP.NET has been selected as the web development tool for the proposed system. The reasons of choosing ASP.NET are as follows:

Enhanced Performance: ASP.NET is compiled common language runtime code running on the server. Unlike its interpreted predecessors, ASP.NET can take advantage of early binding, just-in-time compilation, native optimization, and

caching services right out of the box. This amounts to dramatically better performance before we ever write a line of code.

World-Class Tool Support: The ASP.NET Framework is complemented by a rich toolbox and designer in the Visual Studio integrated development environment. WYSIWYG editing, drag-and-drop server controls, and automatic deployment are just a few of the features this powerful tool provides.

Power and Flexibility: Because ASP.NET is based on the common language runtime, the power and flexibility of that entire platform is available to web application developers. The .NET Framework class library, messaging, and Data Access solutions are all seamlessly accessible from the Web. ASP.NET is also language-independent, so we can choose the language that best applies to our application or partition our application across many languages. Further, common language runtime interoperability guarantees that our existing investment in COM-based development is preserved when migrating to ASP.NET.

Simplicity: ASP.NET makes it easy to perform common tasks, from simple form submission and client authentication to deployment and site configuration. For example, the ASP.NET page framework allows us to build user interfaces that cleanly separate application logic from presentation code and to handle events in a simple, VB-like forms processing model. Additionally, the common language runtime simplifies development, with managed code services such as automatic reference counting and garbage collection.

Manageability: ASP.NET employs a text-based, hierarchical configuration system which simplifies applying settings to our server environment and web applications. Because configuration information is stored as plain text, new settings may be applied without the aid of local administration tools. This “zero local administration”

philosophy extends to deploying ASP.NET Framework applications as well. An ASP.NET Framework application is deployed to a server simply by copying the necessary files to the server. No server restart is required, even to deploy or replace running compiled code.

Scalability and Availability: ASP.NET has been designed with scalability in mind with features specifically tailored to improve performance in clustered and multiprocessor environments. Further, processes are closely monitored and managed by the ASP.NET runtime, so that if one misbehaves(leaks, deadlocks), a new process can be created in its place, which helps keep our application constantly available to handle requests.

Customizability and Extensibility: ASP.NET delivers a well-factored architecture that allows developers to “plug-in” their code at the appropriate level. In fact, it is possible to extend or replace any subcomponent. Implementing custom authentication or state services has never been easier.

Security: With built in Windows authentications and pre-application configuration, we can be assured that our applications are secure.

3.2.6 Chosen Web Development Tool

3.2.6.1 Visual Studio.NET

Visual Studio.NET is selected to be the web development tool in this project.

It has the following advantages:

- Visual Studio.NET allows applications to share data over the Internet and as such this enable developers to assemble applications from new and existing code, regardless of platform, programming language and object model.

- Visual Studio.NET allows the creation of powerful applications quickly and effectively by using the rich toolbox, debugger, and task window in the tool.
- Solutions created can span any device and integrate with any platform besides giving developers the tools for integrating solutions across operating system and languages.

3.2.6.2 Crystal Reports 9

Crystal Report 9 is chosen as the report tool for WPFS. The reasons and advantages of using this tool are:

- Compatible with Visual Studio .NET.
- Provides several features to address complex reporting requirements.
- Increase productivity and reduce resource requirements when creating and integrating reports.
- Offer the end user more functionality and independence.
- Provide flexibility and usability.

Chapter 4- System Analysis

System analysis is a problem-solving technique that decomposes a system into its component pieces for the purpose of studying how well those component parts work and interact to accomplish their purpose. (Whitten, Bentley, Dittman, 2002)

4.1 Data Gathering Techniques

Effective and appropriate techniques must be used to define and elicit users requirements and gather needed information. A couple of research methods such as internet research, brainstorming, document review, research on sample thesis, research on reference books and interview have been used.

4.1.1 Internet Research

Internet research is the most common, effective and fastest method to gather lots of valuable information. Required information can be found within seconds through the powerful search engine such as www.google.com.

4.1.2 Brainstorming with thesis partner

Though a few discussion and brainstorming with thesis partners, a lot of precious suggestions and ideas can be gained to overcome some of the weaknesses of the proposed system architecture and functionalities.

4.2.3 Document Review

Several of information can be gained by reviewing to the relevant documents, this helps a lot in defining the project scope, functional and non-functional requirements of WPFS.

4.1.4 Research done on sample thesis and reference books

Techniques to write and structure a thesis report can be learnt from the research done on the sample thesis and reference books. In fact, it helps to clarify the strengths and weaknesses of WPFS compared to other similar systems.

4.1.5 Interview Teachers

Interview sessions had been conducted with the teacher from SMJK Perempuan Perak, Ipoh to have a better understanding to their existing school management system. We discovered the problems faced by the existing system from that precious interview. We also received good suggestions to produce a better system through the interview session.

4.1.6 Questionnaire

Questionnaires have been conducted to get a clearer view of students' roles in school and their responds towards a school management system. Questionnaires are done to a large number of students in order to gather relevant information which helps in defining user's requirements in short time.

4.2 Functional Requirement

Functional requirement is a statement of the service or functions that a system should provide not the system reacts to particular inputs, and how the system should behave in particular situations. [Sommerville, 1998]

4.2.1 Attendance Module

This module records students' attendance. Form teachers will key in their students attendance everyday. Headmaster can check all the students' attendance lists.

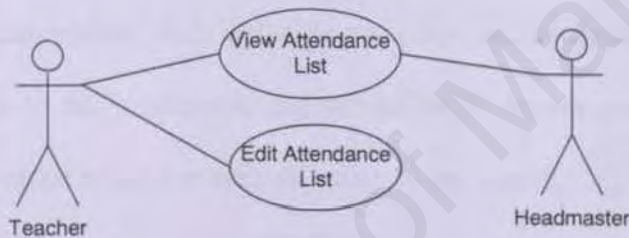


Figure 4.1 Use Case Diagram for Attendance Module

4.2.2 Syllabus Module

This module includes the syllabus of the teaching subject where teachers able to record the subject name, its objectives or contents according to chapters and the references used.

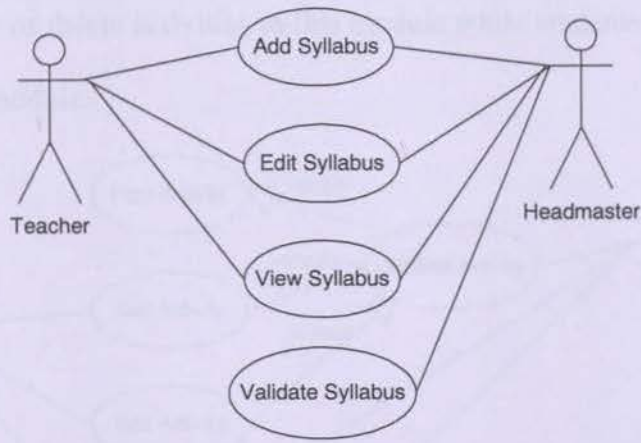


Figure 4.2 Use Case Diagram for Syllabus Plan Module

4.2.3 Lesson Plan

Teachers can record their daily lesson plans in this module. Daily lesson plans will be sent to the headmaster for validation. A lesson plan includes lesson scope, time, date, name of subject and objective of the lesson.

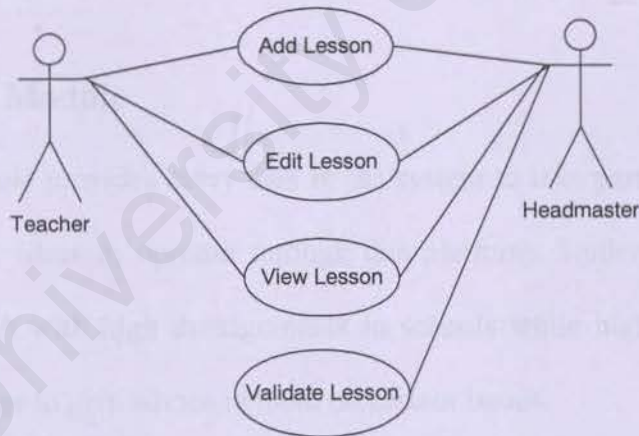


Figure 4.3 Use Case Diagram for Lesson Plan Module

4.2.4 Activity Module

This module stores schools activities which consist of societies, clubs, sports and uniform bodies. Students will enter all the activities' information. All the information will be validated by advisor (teacher) before being posted on the website. Headmaster, school administrator and PIBG members can view this module.

Teacher can view or delete activities in this module while students can view and edit activities in this module.

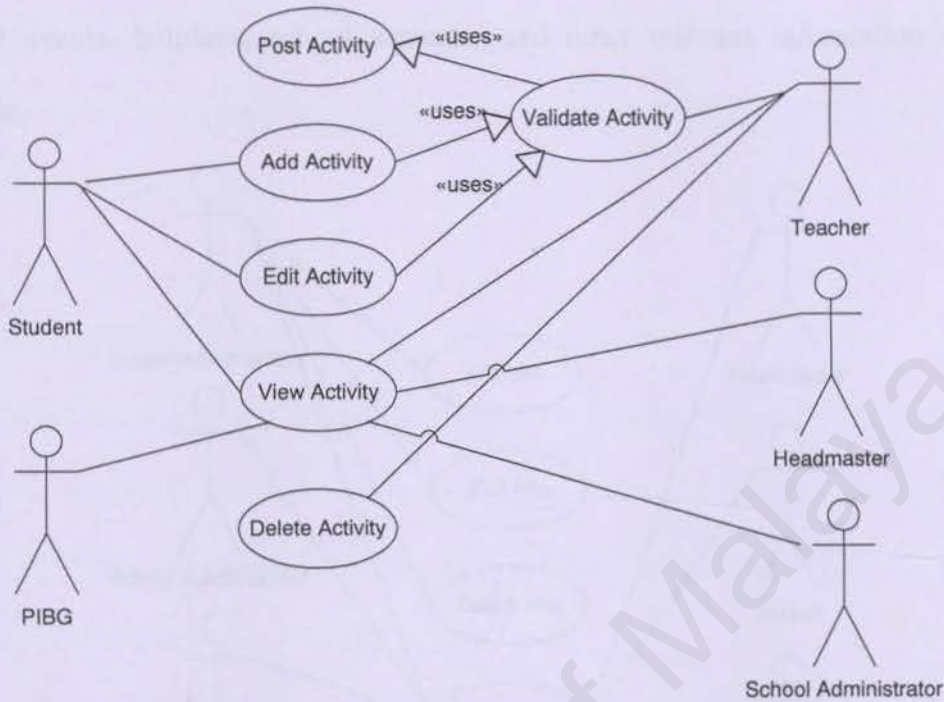


Figure 4.4 Use Case Diagram for Activity Module

4.2.5 EForum Module

This module provides every user in the system to take part in any discussion and express their ideas or opinion through this platform. Students will be able to share their thought with high managements in schools while high managements in school will manage to give advice to them on certain issues.

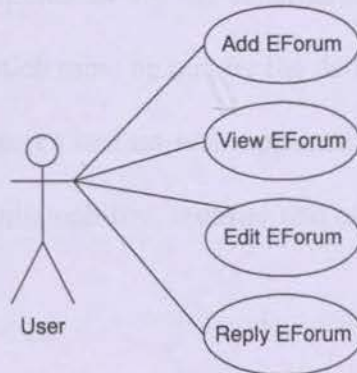


Figure 4.5 Use Case Diagram for EForum Module

4.2.6 School Info Module

School administrator will provide the latest information about the school's annual events, holidays, school semester and other relevant information in this module.

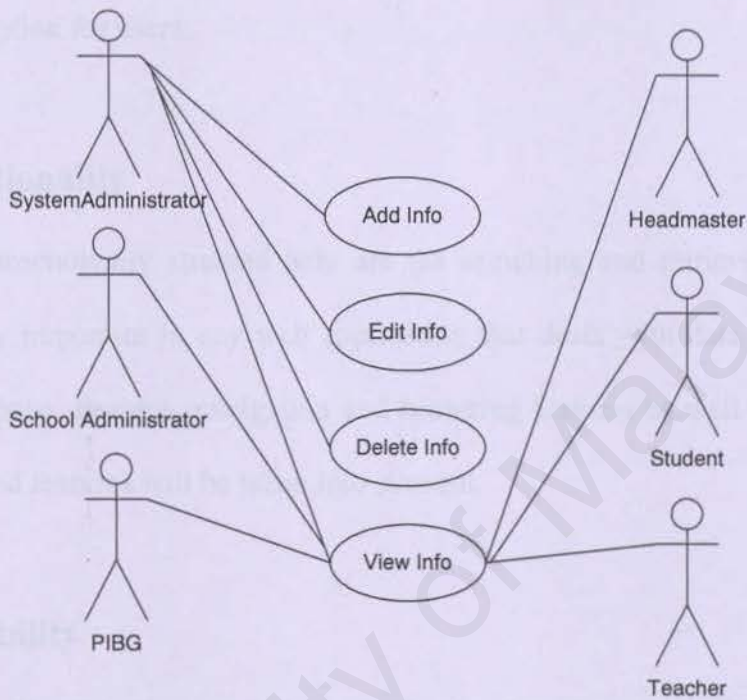


Figure 4.6 Use Case Diagram for School Info Module

4.3 Non Functional Requirement

Non-functional specifications are the constraints under which a system must operate and the standards which must be met by the delivered system [Sommerwille, 1995]. The WPFS must ensure certain web application qualities like consistency, functionality, reliability, maintainability, security and others.

4.3.1 Consistency

The WPFS act as a media that accommodates functional components to assist in performing daily tasks in an efficient and convenient manner. Consistency across all components in the WPFS is an important issue to maintain “ONE LOOK ONE FEEL” perception for users.

4.3.2 Functionality

The functionality stressed here are the searching and retrieving capability, which is very important in any web application that deals with data retrieval from existing database. Besides, navigation and browsing features as well as application domain-related features will be taken into account.

4.3.3 Reliability

Reliability is an important issue in the development of the WPFS, as it will greatly influence the performance of the processes. Reliability in general means that the output of the WPFS must be consistent with the same input. Reliability also affected by availability.

4.3.4 Maintainability

System maintainability accounts would require more effort if the system is not designed according to good programming practices. Maintainability is the ease with which a program can be corrected if an error is encountered, adapted if its environment changes, or enhanced if the customer desires a change in requirements [Pressman, 2001]. As the to-be-developed WPFS will be built by using Microsoft .NET platform in ASP.NET which is Visual Basic .NET based programming that

enhances code-behind concept, therefore, it is strongly believed that bugs or system faults can be detected and fixed in the shortest time.

4.3.5 Security

The proposed system has also security measures to minimize the risk of data exposure to unauthorized people.



4.4 Sequence Diagrams for WPFS

The process of creating sequence diagrams is a systematic way to think about how a use case(scenario) of the system can take place. By using sequence diagrams, a more specific analysis can be modeled and they assist in the design of the system by modeling the interactions between objects in the system.

Based on the use cases above, sequence diagrams have been built. Below are the sequence diagrams:

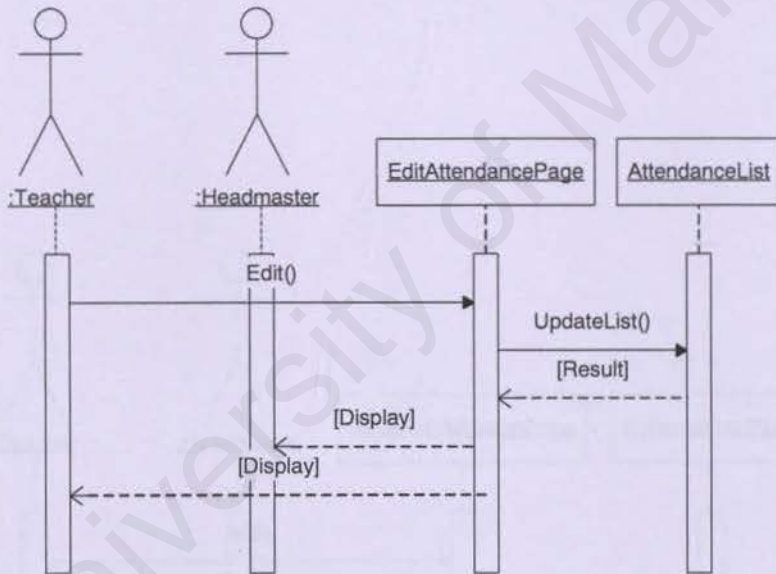


Figure 4.7 Sequence Diagram for Edit Attendance Use Case

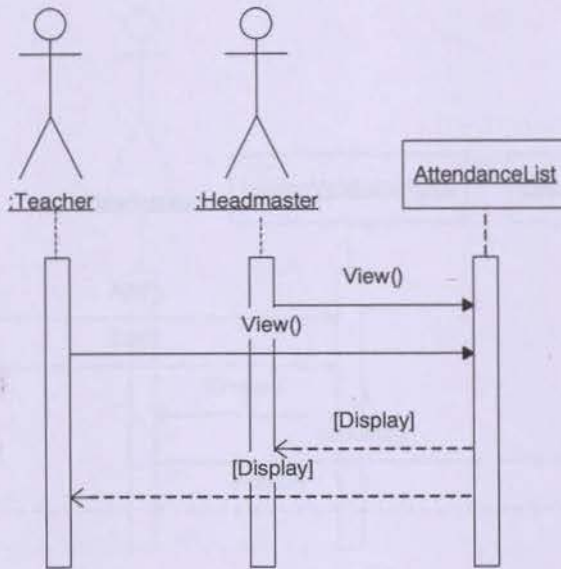


Figure 4.8 Sequence Diagram for View Attendance Use Case

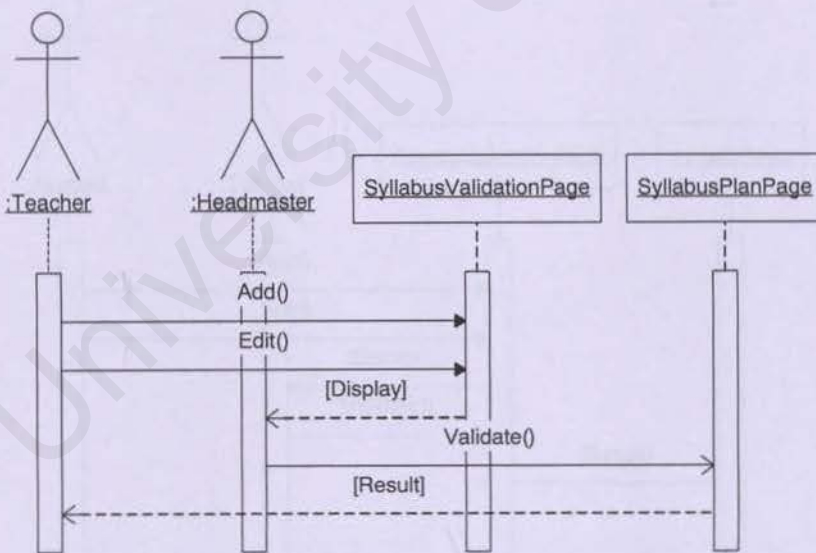


Figure 4.9 Sequence Diagram for Add/Edit Syllabus Plan Use Case

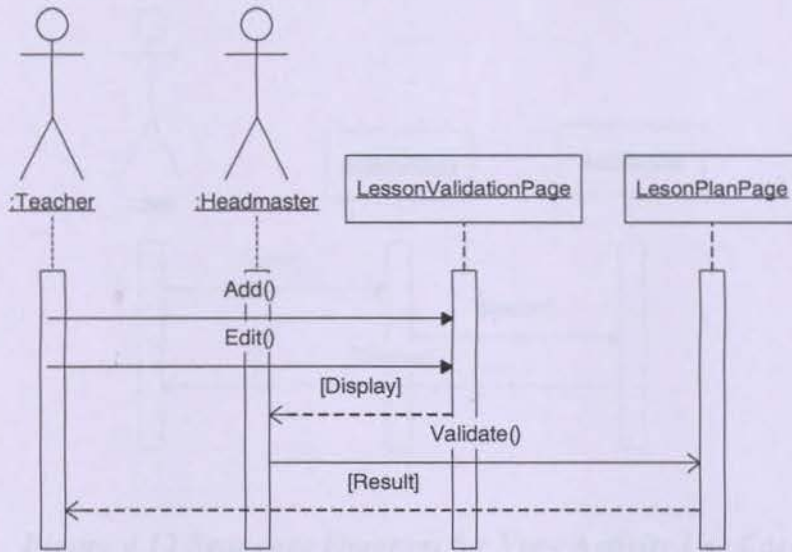


Figure 4.10 Sequence Diagram for Add/Edit Lesson Plan Use Case

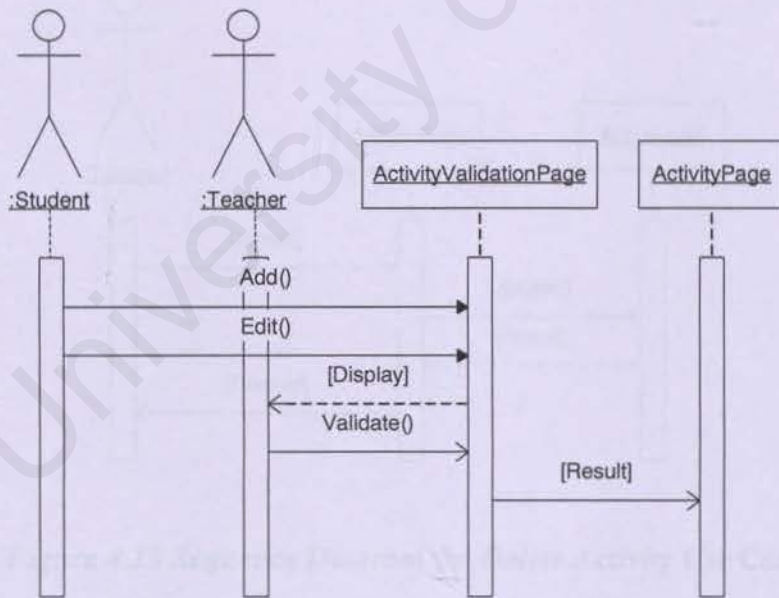


Figure 4.11 Sequence Diagram for Add/Edit Activity Use Case

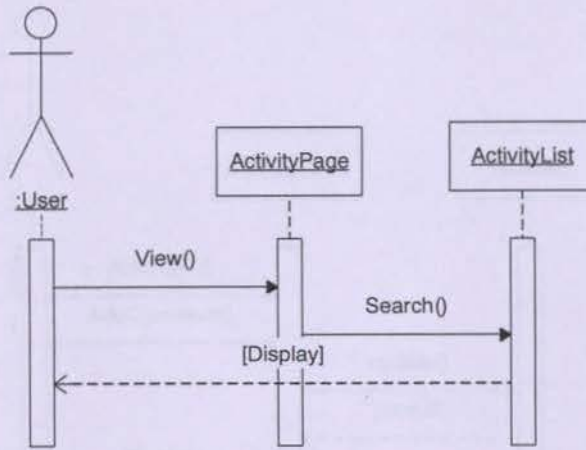


Figure 4.12 Sequence Diagram for View Activity Use Case

Figure 4.14 Sequence Diagram for Add Activity Use Case

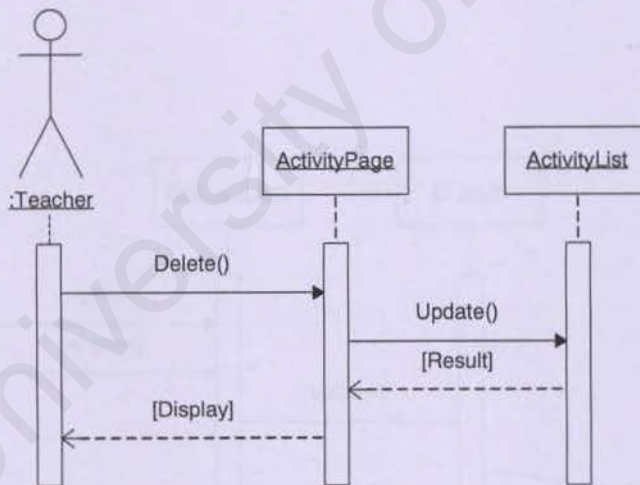


Figure 4.13 Sequence Diagram for Delete Activity Use Case

Figure 4.15 Sequence Diagram for Edit Activity Use Case

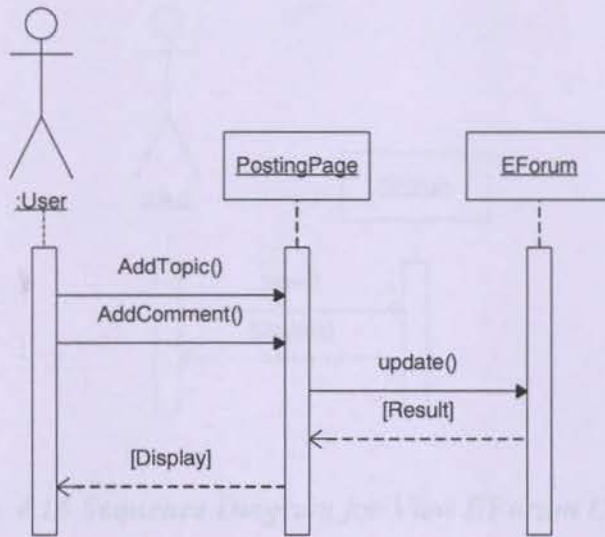


Figure 4.14 Sequence Diagram for Add EForum Use Case

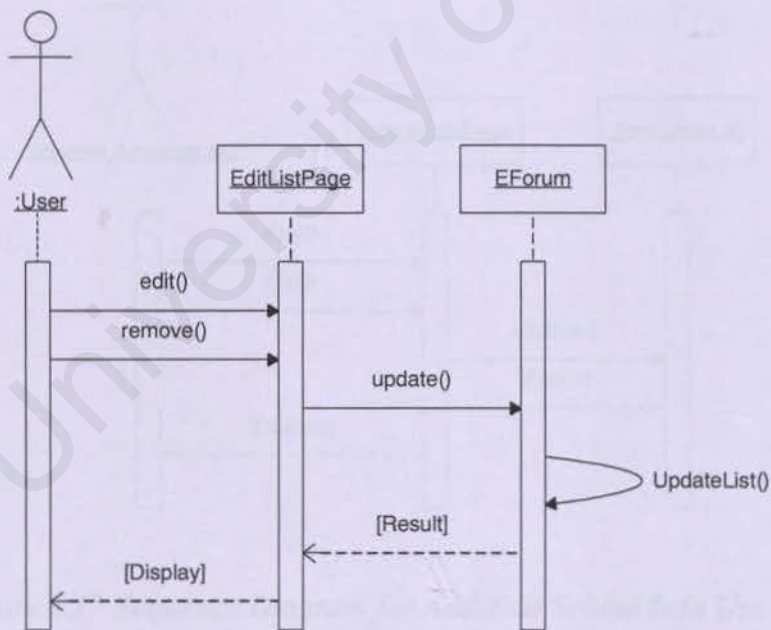


Figure 4.15 Sequence Diagram for Edit EForum Use Case

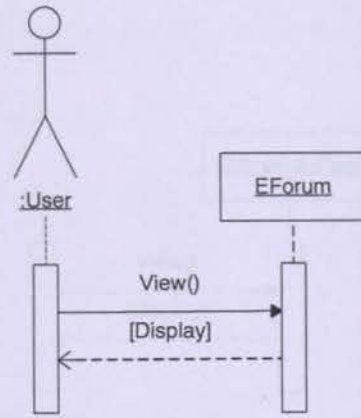


Figure 4.16 Sequence Diagram for View EForum Use Case

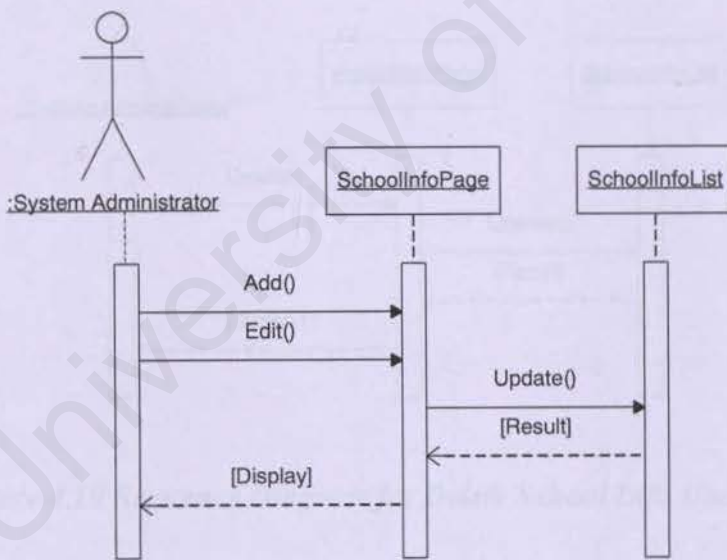


Figure 4.17 Sequence Diagram for Add/Edit School Info Use Case

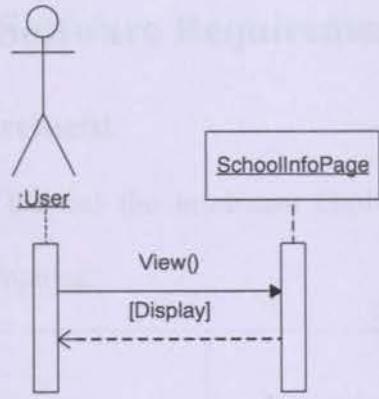


Figure 4.18 Sequence Diagram for View School Info Use Case

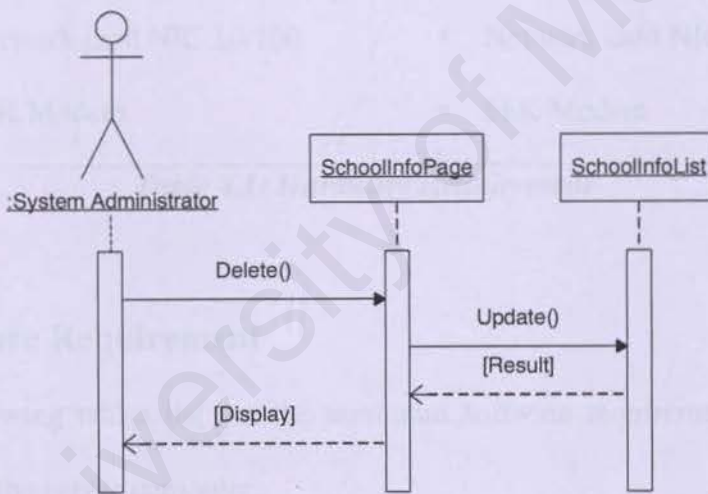


Figure 4.19 Sequence Diagram for Delete School Info Use Case

4.5 Hardware And Software Requirement

4.5.1 Hardware Requirement

The following tables list out the minimum hardware requirement the client computer and the server computer.

Server	Client
<ul style="list-style-type: none">▪ Intel Pentium III 450Mhz and above (or equivalent)▪ Memory 64MB RAM or above▪ 2.0GB Hard Disk or above▪ Network card NIC 10/100▪ 56K Modem	<ul style="list-style-type: none">▪ Intel Pentium 133Mhz and above (or equivalent)▪ Memory 64MB RAM or above▪ 2.0GB Hard Disk or above▪ Network card NIC 10/100▪ 56K Modem

Table 4.1: Hardware Requirement

4.5.2 Software Requirement

The following tables list out the minimum software requirement of the client computer and the server computer.

Server	Client
<ul style="list-style-type: none">▪ Microsoft Windows 2000 Professional▪ Microsoft Visual Studio.NET▪ Microsoft SQL Server 2000 Developer Edition▪ Seagate Crystal Report	<ul style="list-style-type: none">▪ Microsoft Windows 98 or later▪ Microsoft .NET Framework▪ Microsoft SQL Server Client▪ Seagate Crystal Report 9

Table 4.2: Software Requirement

Chapter 5- System Design

5.1 Introduction

System design requires the design developers to evaluate the model into actual objects that can perform the task required by the application. The objects or classes identified during analysis phase provide them a framework for the design phase. The object-oriented design process consists of the following activities:

- Design classes, methods, attributes and associations
- Refine UML class diagrams by applying design axioms
- Design view/access layers and prototype
- Iterate and refine the whole design

5.2 Design classes, methods, attributes and associations

Classes in WPFS are designed in protected protocol where the methods or attributes can be used by the class or its subclasses. As for the attribute types and for classes which represent the state of an object and their methods used, they are set to multi value type with the protected visibility. This means that the attributes in the class are only accessible to subclasses and operations of the class.

5.2.1 Class Diagram for Web Portal For Schools

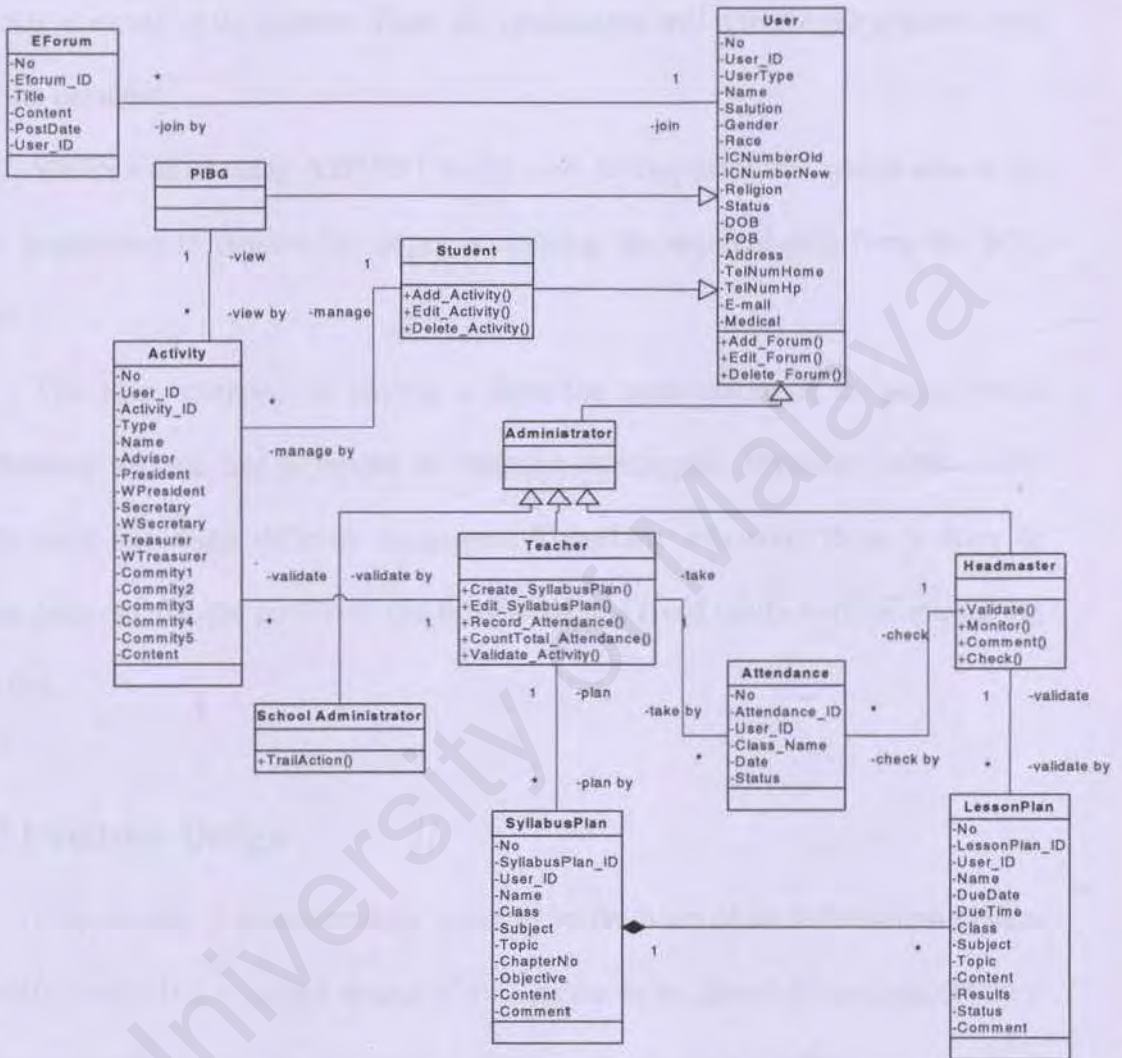


Figure 5.1: WPFS class diagram

5.3 Design access layers

The main idea of designing access layers is to create a set of classes that know how to communicate with a data source whether the data actually are in file, relational database, mainframe or Internet.

5.3.1 System Architecture

WPFS has chosen to use the three tier architecture due to security access of the data in the database. Clients can access through the Internet or LAN to an application server of the system. Then, the application will retrieve the required data from the database.

WPFS will be using ASP.NET as the web development tool which acts as the client application to request the pages containing the required data from the SOL Server.

The main purpose of having a three-tier architecture is to assign main functionality to each tier to ensure no function overlapped. Different people could handle each tier using different languages. Therefore, whenever there is error or system fault occurs, the problems can be deleted and fixed easily without interfering other tier.

5.3.2 Database Design

Data storage is considered by some to be the heart of an information system (Kendall, 1996). It is a central source of data meant to be shared by many users for a variety of applications. The heart of a database is the OODBMS (object-oriented database management system), which allows the creation, medication and updating of the database; the retrieval of data; and the generation of reports. The main objective of database design is to make sure that data is available when the user wants to use it. Apart from that, the accuracy, consistency and integrity of data must be assured from time to time, to provide efficient data storage as well as efficient updating and retrieval.

5.3.3 Object-Relation Mapping

In relational database, tables consist of rows and columns where each column has a name and a simple data type. In object model, a table is a class (or classes) which has a set of attributes and object classes describe behavior with methods. To define how relational data maps to and from application objects, the system must support the following mapping capabilities:

- Table-class mapping
- Table(s)-inherited classes mapping

5.3.3.1 Table-class mapping

Table-class mapping is a simple one to one mapping of a table to a class and the mapping of columns in a table to properties in a class.

Eforum Table

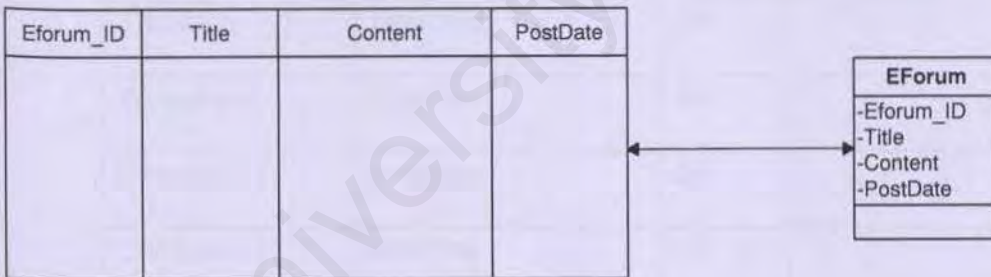


Figure 5.2: Table Class mapping for Eforum class

5.3.4 Data Dictionary

Data dictionary or metadata can be defined as descriptions of the database structure and contents. Data dictionary defines the field, field type and descriptions of each table. In Web Portal for Schools, one database had been namely **WPFS** and contained seven tables, which are **Activity**, **Attendance**, **LessonPlan**, **SyllabusPlan**, **Eforum**, **AuditTrail** and **Report**

Database: **WPFS**

Table name: **Activity**

Field Name	Data Type	Length	Note
AutoNo	int	4	Auto Number
User_ID	nvarchar	20	
Activity_ID	nvarchar	10	
Type	nvarchar	20	
Name	nvarchar	60	
Advisor	nvarchar	50	
President	nvarchar	50	
Wpresident	nvarchar	50	
Secretary	nvarchar	50	
Wsecretary	nvarchar	50	
Treasurer	nvarchar	50	
Wtreasurer	nvarchar	50	
Commitee1	nvarchar	50	
Commitee2	nvarchar	50	
Commitee3	nvarchar	50	
Commitee4	nvarchar	50	
Commitee5	nvarchar	50	
Content	ntext	16	
Status	int	4	
PostDate	Datetime	8	

Table 5.1: Table of Activity

Table name: **Attendance**

Field Name	Data Type	Length	Note
AutoNo	int	4	Auto Number
Attendance_ID	nvarchar	20	
User_ID	nvarchar	20	
Class_Name	nvarchar	30	
Date	datetime	8	
Status	nvarchar	60	0-Absent 1-Present
Form	nvarchar	20	

Table 5.2: Table of Attendance

Table name: **LessonPlan**

Field Name	Data Type	Length	Note
AutoNo	int	4	Auto Number
LessonPlan_ID	nvarchar	10	
User_ID	nvarchar	20	
Name	nvarchar	100	
DueDate	datetime	8	
DueTime	datetime	8	
Form	nvarchar	30	
ClassName	nvarchar	30	
Subject	datetime	8	
Topic	ntext	16	
Content	ntext	16	

Status	int	2	0-Not validated 1-Validated
Comment	ntext	16	

Table 5.3: Table of LessonPlan

Table name: **SyllabusPlan**

Field Name	Data Type	Length	Note
AutoNo	int	4	Auto Number
SyllabusPlan_ID	nvarchar	10	
User_ID	nvarchar	20	
Name	nvarchar	100	
Form	nvarchar	30	
ClassName	nvarchar	30	
Subject	nvarchar	60	
Topic	nvarchar	100	
ChapterNo	int	4	
Objective	nvarchar	200	
Content	nvarchar	600	
Comment	nvarchar	1000	
DueDate	datetime	8	
DueTime	datetime	8	
Status	int	2	0-Not validated 1-Validated

Table 5.4: Table of SyllabusPlan

Table name: EForum

Field Name	Data Type	Length	Note
AutoNo	int	4	Auto Number
Eforum_ID	nvarchar	10	
Thread	nvarchar	100	
Content	nvarchar	2000	
PostDate	datetime	8	
User_ID	nvarchar	20	
Name	nvarchar	50	
Status	int	4	
Type	nvarchar	50	

Table 5.5: Table of Eforum

5.4 User Interface Design

WPFS WEB PORTAL FOR SCHOOLS

Welcome to our portal!..... Towards an effect [Logout](#)

FORUM

[New Thread](#)

	Thread	Author	Post Date	Type
	Welcome	Sivanathan	2/17/2004 5:07:12 PM	SA
	ABC	Lee Kok Chung	2/16/2004 4:30:17 PM	S
	Exam	En. Tan Wai Hong	2/16/2004 2:48:00 PM	H
	Sports	Lee Kok Chung	2/16/2004 10:28:13 AM	S
	Games	En. Azri	2/14/2004 1:07:40 PM	

[Back](#)

Figure 5.3: EForum interface for WPFS

Chapter 6- System Implementation

6.1 Introduction

System implementation is the process that converts the system requirements and designs into program codes using selected programming language. It focuses on implementing the solution as software. This stage involves both application and database implementation. Nevertheless, the system analysis, system design and implementation phases are usually overlapping with one another, as they do not have a clear boundary. Hence, this phase at times involves some modifications to the previous design.

6.2 Development Environment

Development environment has certain impact on the development of a system. Appropriate hardware and software chosen will not only help to speed up the system development but also determine the success of the project. Below are the lists of hardware and software tools being used to develop WPFS.

6.2.1 Hardware in Development Environment

The hardware configured for the development environment is the underlying element of the whole system. The hardware used in system implementation plays an important role in realizing the final the final system architecture. Below are the hardware configurations of the development environment:

- Pentium III 450Mhz and above
- 64MB RAM or above
- 2.0GB Hard Disk or above
- Other standard desktop PC components
- Network connection

6.2.2 Software in Development Environment

Hardware and software form a tightly coupled cohesion that operates in unison to perform programmed tasks. Without software, the fastest or most powerful computer will also be inoperative and idling in the corner. Below are the software tools utilized in the development environment:

- Operating system – Microsoft Windows 2000 Professional
- Web server – Microsoft Internet Information Services 5.0
- Database management system – Microsoft SQL Server 2000
- Web development tool – Microsoft Visual Studio .NET 2003
- Web browser – Microsoft Internet Explorer 6.0
- Image design tools – Swish 2.0, Adobe Photoshop 6.0
- Documentation – Microsoft Word XP

6.3 Development of the System

6.3.1 Database Development

The system database is created in Microsoft SQL Server 2000 which is the Database Management System (DBMS). Here, the Enterprise Manager which is a graphical interface tool is used to administer the SQL Server. The Enterprise Manager can be used to configure SQL Server options, create/edit/view databases and perform maintenance and backups.

The system database named WPFS is created by using the Enterprise Manager tool. Then, all the tables that have been identified are created. All tables' fields and each field's property such as data type are specified. After all the tables have been successfully added to the database, relationships between the tables are established to enforce referential integrity. The referential integrity is an important constant on a relationship that ensures the consistency between the related tables.

Name	Owner	Type	Create Date
Activity	dbo	User	1/27/2004 10:07:52 PM
Announcement	dbo	User	1/27/2004 9:41:57 PM
Attendance	dbo	User	1/27/2004 10:08:12 PM
AttendanceAbsentTotal	dbo	User	1/27/2004 9:42:56 PM
AuditTrail	dbo	User	1/27/2004 10:09:02 PM
Authentication	dbo	User	1/27/2004 9:44:24 PM
Calendar	dbo	User	1/27/2004 9:45:32 PM
ClassSetup	dbo	User	1/27/2004 9:45:56 PM
Class timetable	dbo	User	1/27/2004 9:46:20 PM
Comment	dbo	User	1/27/2004 9:46:53 PM
EForum	dbo	User	1/27/2004 10:10:24 PM
FinalExam	dbo	User	1/27/2004 9:47:32 PM
LessonPlan	dbo	User	1/27/2004 10:11:12 PM
MidExam	dbo	User	1/27/2004 9:48:39 PM
MyProfile_Administrator	dbo	User	1/27/2004 9:49:19 PM
MyProfile_Headmaster	dbo	User	1/27/2004 10:12:19 PM
MyProfile_PDSG	dbo	User	1/27/2004 9:50:24 PM
MyProfile_Student	dbo	User	1/27/2004 9:50:51 PM
MyProfile_Teacher	dbo	User	1/27/2004 10:13:10 PM
MyProfile_User	dbo	User	1/27/2004 9:51:47 PM
Organizer	dbo	User	1/27/2004 9:52:11 PM
Report	dbo	User	1/27/2003 12:47:30 AM
SchoolCalendar	dbo	User	1/27/2004 9:52:31 PM
StudentActivity	dbo	User	1/27/2004 9:53:43 PM
StudentClass	dbo	User	1/27/2004 9:54:04 PM
StudentSubject	dbo	User	1/27/2004 9:54:36 PM
SubjectPackageSetup	dbo	User	1/27/2004 10:07:36 AM
SyllabusPlan	dbo	User	1/27/2004 10:15:44 PM
TeacherTimetable	dbo	User	1/27/2004 9:55:40 PM
Term	dbo	User	1/27/2004 2:13:52 PM
TERM2	dbo	User	1/27/2004 2:13:52 PM
Timetable	dbo	User	1/27/2004 9:56:27 PM
Timetable_hmp	dbo	User	2/3/2004 4:17:44 PM
coursesites	dbo	System	12/2/2003 3:02:50 PM
synccolumns	dbo	System	8/6/2003 1:29:12 AM

Figure 6.1: The WPF5 Database Tables in Enterprise Manager

6.3.2 Prototype Development

The prototype development is basically the construction of the system utilizing the necessary means to achieve the proposed specification. WPF5 is mainly consists of ASP.NET. ASP.NET is the recent version of ASP that allows in creating dynamic Web applications and is divided into two main types that is WebForms and Web Services. For WPF5, basically WebForms is used. The Microsoft Visual Studio .NET is the most apparent tool for working with ASP.NET. It is the core tool of prototype development that facilitates tasks such as editing, debugging and code building.

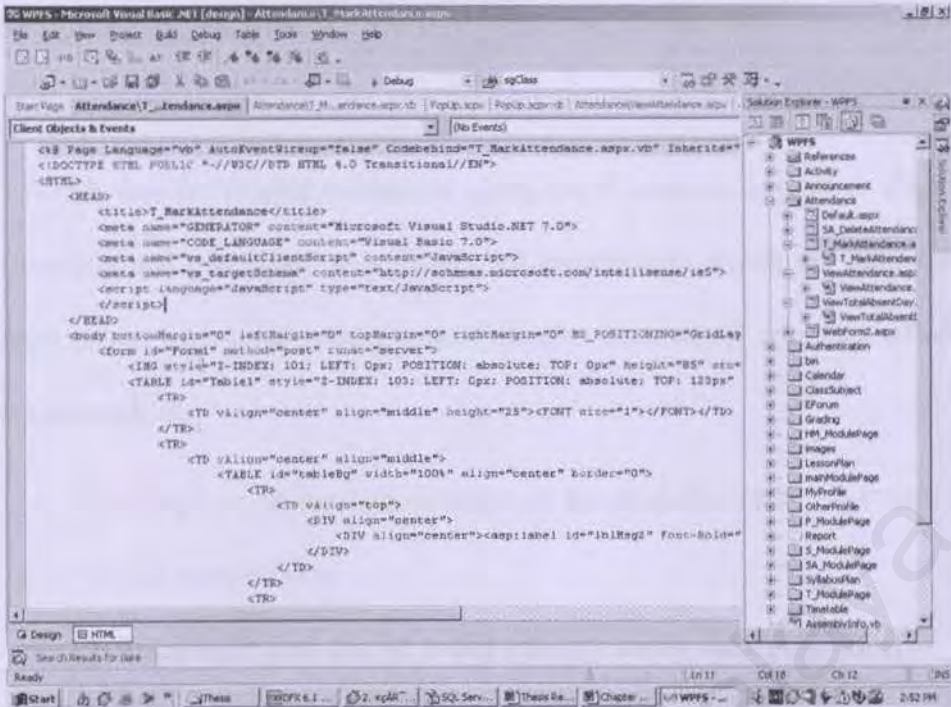


Figure 6.2: Microsoft Visual Studio .NET Environment

6.4 System Coding

System coding is referred as converting the prior system design into a working and functional system. This mainly involves software programming and preliminary testing of the prototype model. Programming is the process of transforming the structure shorts, logical and physical data flow diagrams, and also interface designs into a working prototype model. The testing that involves here is the development testing. Preliminary testing that focuses on the correctness of individual modules and integration of multiple modules of the prototype model will be conducted.

6.4.1 Coding Approach

There are properly two types of coding approach, namely top-down and bottom-up. The bottom-up coding is based on coding the lower-level modules initially and leaving the high-level modules merely as skeletons that are used to call

the lower modules, whereas the top-down approach is the reverse of the bottom-up approach.

WPFS was developed modularly using the bottom-up approach. Each lower-level function and procedure was developed individually which are then integrated into appropriate high-level modules accordingly. Bottom-up approach offers some advantages such as:

- Testing can be conducted on some of the modules while the others are still under construction.
- Critical functions can be coded initially to test their efficiency.
- Increase the development process as the lower-level modules or functions can be built independently and simultaneously without waiting or delaying the others.
- Faults are easier to be detected.

6.4.2 Activity Module Coding

Headmaster Section	School Administrator Section	Teacher Section	Student Section	PIBG Section
ViewAllActivity.aspx	ViewAllActivity.aspx	ViewAllActivity.aspx	ViewAllActivity.aspx	ViewAllActivity.aspx
ViewUniformActivity.aspx	ViewUniformActivity.aspx	ViewUniformActivity.aspx	ViewUniformActivity.aspx	ViewUniformActivity.aspx
ViewSportActivity.aspx	ViewSportActivity.aspx	ViewSportActivity.aspx	ViewSportActivity.aspx	ViewSportActivity.aspx
ViewSocietyActivity.aspx	ViewSocietyActivity.aspx	ViewSocietyActivity.aspx	ViewSocietyActivity.aspx	ViewSocietyActivity.aspx
ViewClubActivity.aspx	ViewClubActivity.aspx	ViewClubActivity.aspx	ViewClubActivity.aspx	ViewClubActivity.aspx
		ValidateActivity.aspx	AddActivity.aspx	
		DeleteActivity.aspx	UpdateActivity.aspx	

Table 6.1: The List of Files Created for the Activity Modules

Chapter 7- System Testing

7.1 Introduction

After coding the program components, system testing is conducted where codes are usually examined to spot faults and the faults are eliminated right away. Testing is a process that focused on finding faults. The main objective of testing is to uncover different types of errors that exist while executing the system and to test the system reliability. Types of tests used are depend on what is being tested, components, group of components, or the whole system.

A test is considered successful only when a fault is discovered or a failure occurs as a result of our testing procedures. Fault identification is the process of determining what fault or faults caused the failure, and fault correction is the process of making changes to the system so that the fault are removed.

System testing is a critical element of software quality assurance and represents the ultimate review of specification, design and coding. However, testing cannot show the absence of defects, it can only show that software defects are present.

7.2 Stages Of Testing

The testing process is implemented throughout the development of WPFS system. It is implemented in stages as the system itself is composed of modules. The stages involve in the testing process consists of three stages that is unit testing, integration testing and system testing. Figure 7.1 depicts the flow of stages in testing.

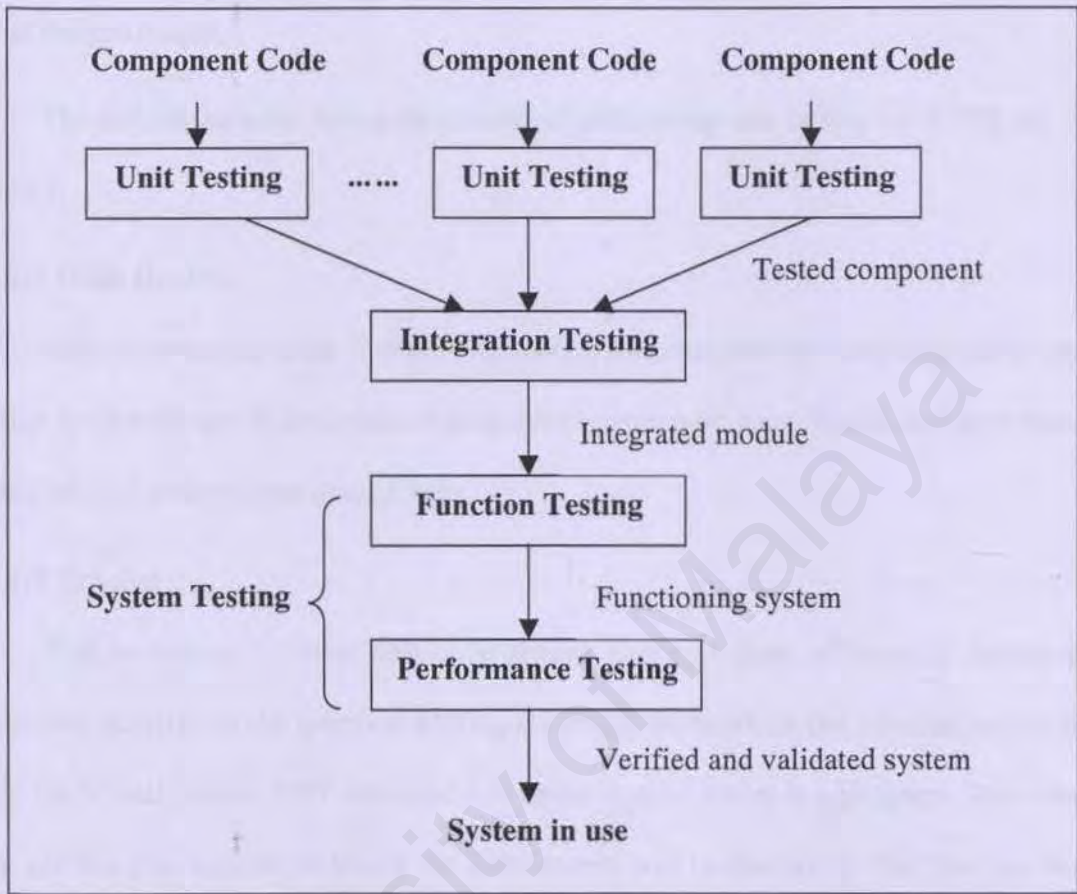


Figure 7.1: The flow of WPFs Testing Stages

7.2.1 Unit Testing

Unit testing is a testing process to verify that the component functions properly with the types of input expected from studying the component's design. Each program component is tested on its own, isolated from the other components in the system. Testing can start by examining the program code by reading through it, trying to spot algorithm, data and syntax faults. Test also can be performed by comparing the code with the predefine specifications and design to ensure that all relevant cases have been

considered. Finally, test cases are developed ensure that the input is properly converted to the desired output.

The techniques used during the process of performing unit testing for WPFS are as follows:

7.2.1.1 Code Review

Before the source code is deploying, codes are examined by reviewing them line by line to identify any faults; either syntax error or semantic error. Faults that have been identified will be corrected immediately.

7.2.1.2 Tracing

This technique is faster than code review and it is more efficient in detecting faults that occurred in the program. During the compilation where the solution project is built, the Visual Studio .NET compiler will detect type of errors in a program. The error type and the line number in which the error occurs will be displayed. The line number will be traced in order to make the correction.

7.2.1.3 Test Cases

To test a component, input data and condition are chosen. Then the component is allowed to manipulate that data, and the output is observed. The input is selected so that the output demonstrates something about the behavior of the code. A test point or test case is a particular choice of input data to be used in testing a program. A test is a finite collection of test cases.

To perform tests on the components, the test objectives are determined. Test cases are selected test cases and a test designed to meet the specific objective is defined. Some data are purposely chosen to be improper. This is to check that the code handles

incorrect data gracefully. A number of unit testing cases have been performed for the WPFS system.

7.2.2 Integration Testing

As each module was tested successfully, these components are then being combined into a working system. In other words, integration testing is the process of verifying that the system components work together as described in the system and program design specifications.

Integration testing is used to uncover errors associated with interfacing. Interfaces are navigated repeatedly to detect any interface mismatch problem. Several important aspects are checked to ensure that the flow of data in WPFS is well organized and is user friendly to all users.

The WPFS integration testing is based on the bottom up approach. This approach facilitates that each component at the lowest level of the system hierarchy is tested individually first. Then, the next components to be tested are those that call the previously tested ones. This approach is followed repeatedly until all components are included in the testing. Several modules in WPFS such as Announcement Module, Timetable Module, Calendar Module, Class&Subject Module and others were tested for integration. Figure 7.2 shows an example of a constructed component testing hierarchy.

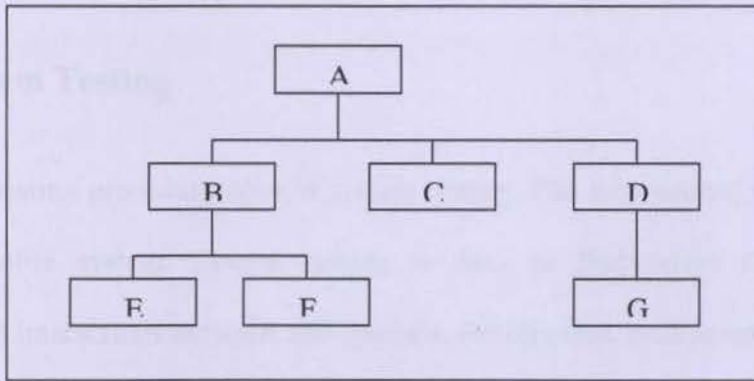


Figure 7.2: An Example of Component Testing Hierarchy

Figure 7.3 shows the sequence of tests and their dependencies of bottom-up testing approach in the above constructed component hierarchy.

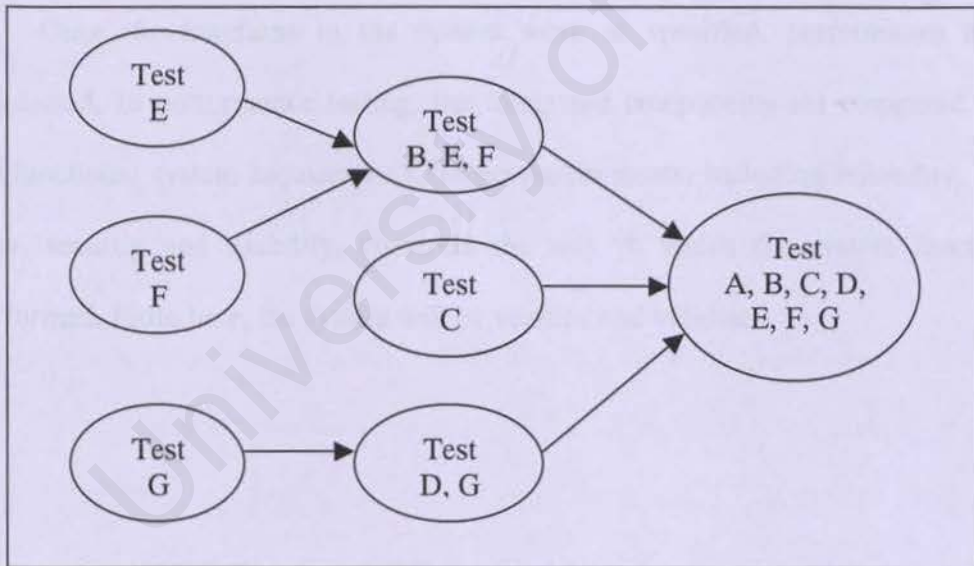


Figure 7.3: Bottom-up Testing Approach

7.2.3 System Testing

Final testing procedure done is system testing. The sub-systems are integrated to make the entire system. System testing is done to find errors that result from unanticipated interactions between sub-systems. Besides that, system testing is to ensure that the system does what the users want it to do.

There are several testing scenario exists. Yet, this WPFS system was tested with Function Testing and Performance Testing. In function testing, the functions performed by the system are tested to ensure that the integrated system performs its functions as specified in the requirements.

Once the functions in the system work as specified, performance testing is conducted. In performance testing, the integrated components are compared with the nonfunctional system requirements. These requirements, including reliability, response time, security and usability, constrain the way in which the system functions are performed. From here, the system will be verified and validated.

Chapter 8- System Evaluation and Conclusion

8.1 Introduction

Evaluation is the ultimate phase of developing a system and an important phase before delivery the system to the end users. Evaluation was related to user environment, attitudes, information priorities and several other concerns that are to be considered carefully before effectiveness can be concluded. Evaluation is a process that occurs continuously, drawing on a variety of sources and information.

8.2 Problems Encountered And Solutions

Some of the problems that have arisen throughout the development of WPFS are as follows:

8.2.1 Selecting System Development Tools

There are many potential development tools available to develop a web portal system currently as stated in the earlier chapters. Choosing a suitable technology and tool was a critical process as all tools have their strengths and weaknesses. In addition, the availability of the required tools for development is also a major consideration.

Therefore, in order to search for the best combination development tools, the system requirements and some information finding methods are analyzed. Resources from Internet as well as advices from experienced parties have also take into consideration in helping to finalize the tools selection.

8.2.2 Lack of Knowledge during System Coding

Problem has been arisen during system coding as I was inexperienced to ASP .NET programming language and also as a first time user of Microsoft Visual Studio .NET tool.

To solve this problem, reference books and electronic resources in the Internet are referred from time to time to find for solutions. Besides that, I get advices and coaching from my team members.

8.2.3 Integration of System

There are several problems faced during the integration process. There is problem in passing the value from one module to the other module during the integration of modules in WPFS system as everyone may develop their system using different approach. Therefore, we have to ensure the approach used by others carefully in order to pass the value successfully.

Besides that, we also meet the problems where we have to change path for certain image or link in order to remain the successfulness of the system. The connection string to the database also has to be changed when we move our program from home PC to the faculty's PC.

8.2.4 No End User Evaluation

The developed WPFS system did not managed to be evaluated by the end users (the school members) due to insufficient time. Therefore, valuable feedbacks were not received although the testing has been done thoroughly in development site.

However, the functionalities for certain modules were improved in order to provide the same functionalities as in the real life school management system. Feedbacks from supervisor have been taking into consideration to improve the system.

8.3 System Strengths

8.3.1 Wide accessibility

The WPFS is a client server application. WPFS also acts as a web-based school portal system that provides wide accessibility to all the users. The users can access WPFS without geographical barrier at anytime. Client-side software only requires the installation of a web browser to access the WPFS and all web browsers are available across all platforms. Therefore, users can access WPFS from everywhere without any difficulties.

8.3.2 User Friendly and Good GUI Design

WPFS is designed based on the criteria of user friendly and good GUI design. The interface is design in such a way that is suitable to different type of users in school. The principles and techniques of good GUI design are applied when designing the interfaces for WPFS. This is to ensure that the interfaces are simple, attractive, organized and easy to use. Besides that, it also will provide an easy way for novice users to learn to use the system effectively in shortest time possible.

8.3.3 Confidentially and Integrity of Information

WPFS provides confidentiality and integrity of information to certain level of users when using the system. The system protects confidentiality and integrity of information by providing only restricted access to certain functionalities in WPFS to authoritative users. Each type of users has different level of access control to the system. For example, add new announcement can only be accessed by headmaster, teachers and school administrators but not students and PIBG.

8.3.4 Organization

WPFS reduces the hassle of organizing school events and announcements by having a set of powerful and informative tools. Announcements and events can be made public at the click of a button easily, effectively and in a faster way.

8.3.5 Support High Volume of Data

WPFS is deployed using the latest database management system that is Microsoft SQL Server 2000. SQL Server is one of the most powerful database management systems in the market. This will makes WPFS equipped to cope with large amount of data in the future.

8.4 System Limitation

8.4.1 No Encryption and Decryption

Currently there is no password encryption and decryption to enhance the security of WPFS. As a result, unauthorized access by certain parties such as hackers may be occurred. Hackers may access the data easily if they successfully hack into the system.

8.4.2 Lack of Utilities

All critical functionalities that need by different type of school members can be obtained in WPFS. However, WPFS is still lacking of utilities such as email server, chat room, uploading and downloading service, and online help in order to make WPFS more interactive and comprehensive; that is to provide a better coverage of all aspects in order to increase the system usability for users.

8.4.3 Report

WPFS did not manage to provide all type of reports that essential for user convenience. A lot of reports that need to be generated and printed for analysis and record keeping purposes for the school members especially to headmaster, school administrator and teachers in their daily works. However, WPFS just provide certain reports and do not cover all the reports that needed by the school members.

8.4.4 Language Limitation

WPFS only supports single communication language, which is English.

8.5 Future Enhancement

8.5.1 Encryption and Decryption

Password encryption and decryption can be used to enhance the security of WPFS system. User password is protected and secure because once user registered as a user in the portal, their password will be encrypted and store in database. It may be decrypted when it is retrieved. By using this method, hackers will not easily hack into the system and access the actual data easily as the data has been encrypted.

8.5.2 E-mail Server

Setting up an e-mail server and mailing option within the portal will open up a whole lot of options for all the school members. The school members will be able to contact each other easily through electronic mailing. This will provide a faster mailing option and time saving.

8.5.3 Chat Room

Chat room utility can be provided in WPFS for interactive messaging. Users can communicate with all the users that are currently online in WPFS in real time. Users can share their interests, experiences and knowledge freely. Besides that, they can post any messages or questions related to their study and get an immediate response which is not applied in forum discussion. Therefore, chat room will provide an alternative way for those users that wish to get an instant reply when posting their messages.

8.5.4 Upload/Download Notes, Examination Papers and Other Materials

WPFS can provide the capability for teachers to upload their notes, examination papers and other useful educational materials where the students can download the resources directly from the portal easily from everywhere even after school time.

8.5.5 Reports

Due to time constraint, there are only certain reports that available in WPFS. Therefore, the report module in WPFS needs to be enhanced to generate more type of reports so that users can view and print various kinds of reports according to their needs.

8.5.6 Multilanguage

The current WPFS is only limited to one language. It needs to be enhanced so that optional language such as English and Malay can be selected when user login into the system. This is will make the contents of WPFS more standardized.

Appendix A: Installation and Configuration

A1 Installation & Setup of IIS 5.0

Microsoft Internet Information Services (IIS 5.0) is available on Windows 2000 Professional, Server, Advanced Server, Windows XP and Windows NT platform. WPFS is developed under Windows 2000 Professional platform.

For development phase, it is important for QPFS to have the IIS 5.0 installed in the Windows 2000 Professional platform. To install IIS, please follow the steps below:

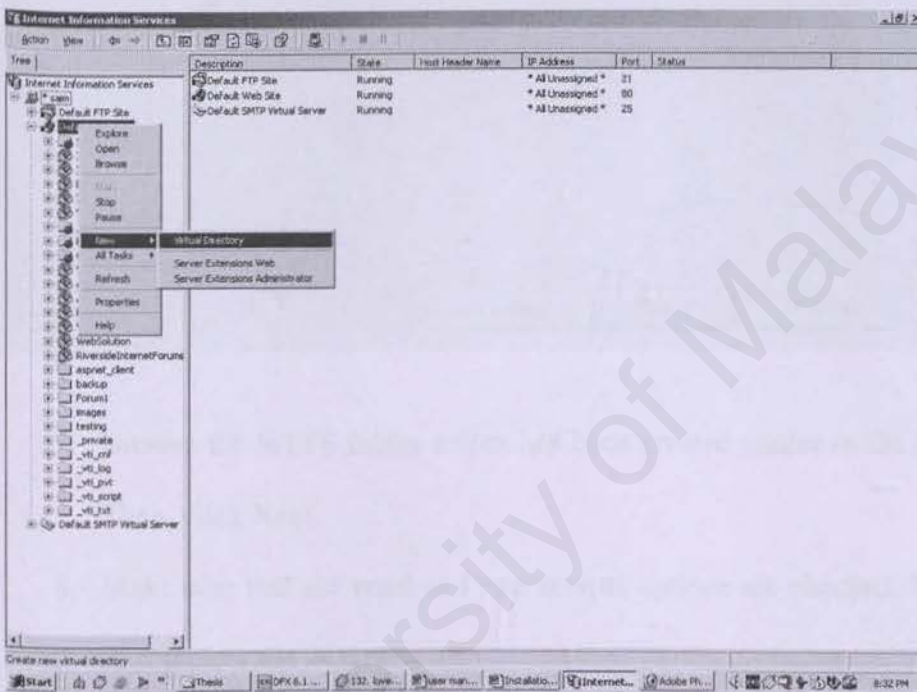
A1.1 Installation of IIS 5.0

1. First, go to **Start > Setting > Control Panel**. In Control Panel window, double click on the **Add/Remove Programs**.
2. In the **Add/Remove Programs** menu, select **Add/Remove Windows Components**. When the window of **Windows Components Wizard** pop-up, scroll down for the **IIS** and make sure to check the checkbox beside it. Then click the Next button to proceed.
3. After the **IIS** has been successfully installed, click Finish to close the **Windows Components Wizard**.

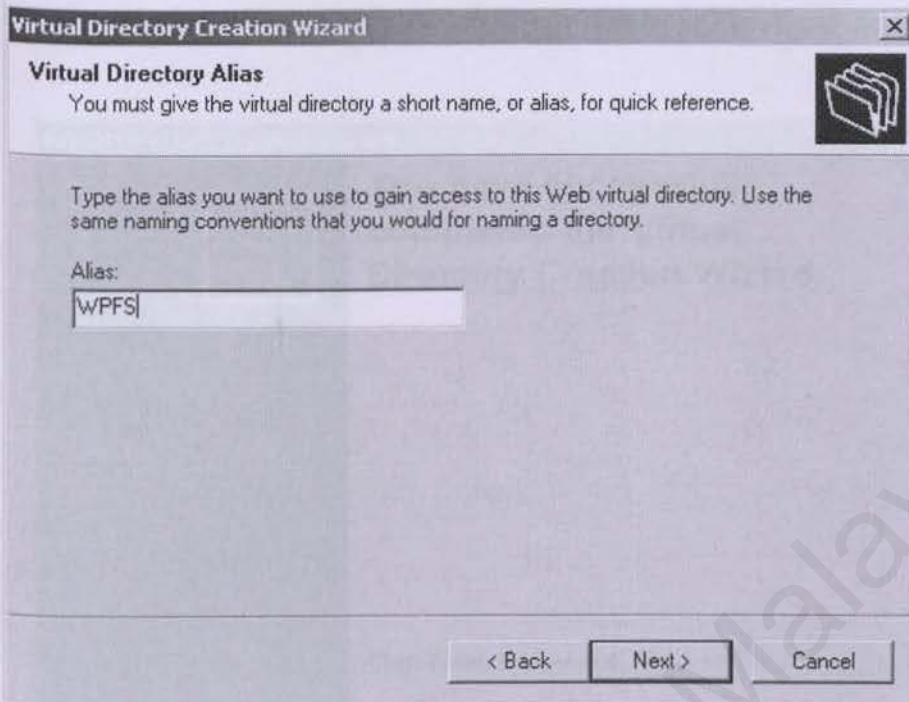
A1.2 Setting up WPFS virtual directory

1. Before the WPFS website was being set up, copy the **WPFS** folder into **\InetPub\wwwroot** at the root directory. The **WPFS** folder which includes all the application files has been created manually in the root directory.
2. In order to create a virtual directory for WPFS, go to **Start > Programs > Administrative Tools > Internet Services Manager**.

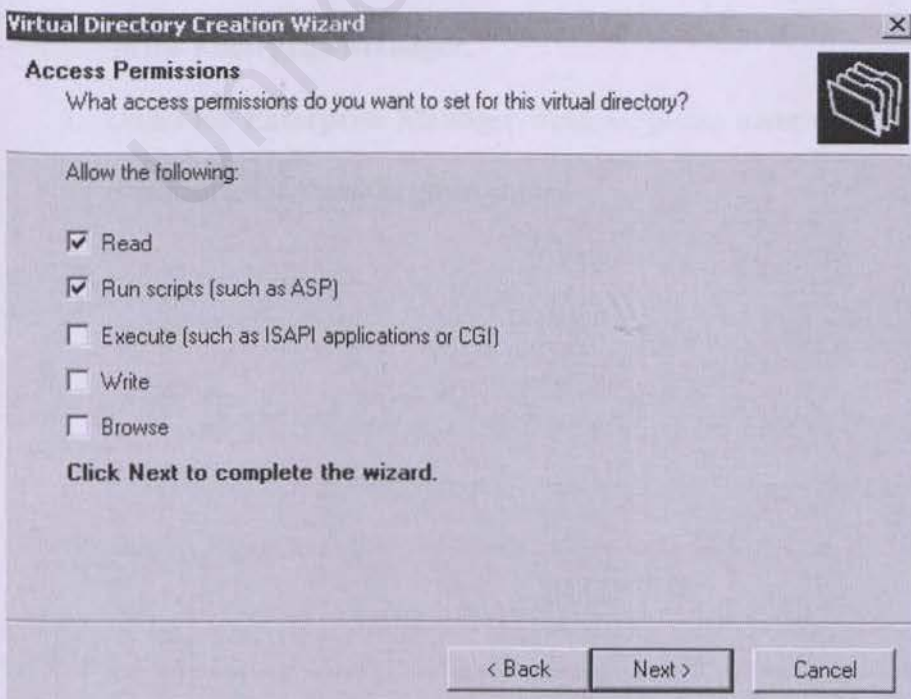
3. In the **Internet Services Manager** window, the **WPFS** folder will be seen. A virtual directory needs to be created before the contents of **WPFS** can be browsed through Internet browser.
4. In order to create a virtual directory, right click on **Default Web Site** and click on **New >Virtual Directory**.



5. Click **Next** to continue set up the virtual directory.
6. Specify the **Virtual Directory Alias** of the website URL which will be used by users to access **WPFS**. It will be named **WPFS**. Click **Next** to proceed.



7. Browse for WPFS folder which has been created earlier in the wwwroot folder. Then, click **Next**.
8. Make sure that the **read** and **run scripts** options are checked. Then, click **Next** to complete the wizard.

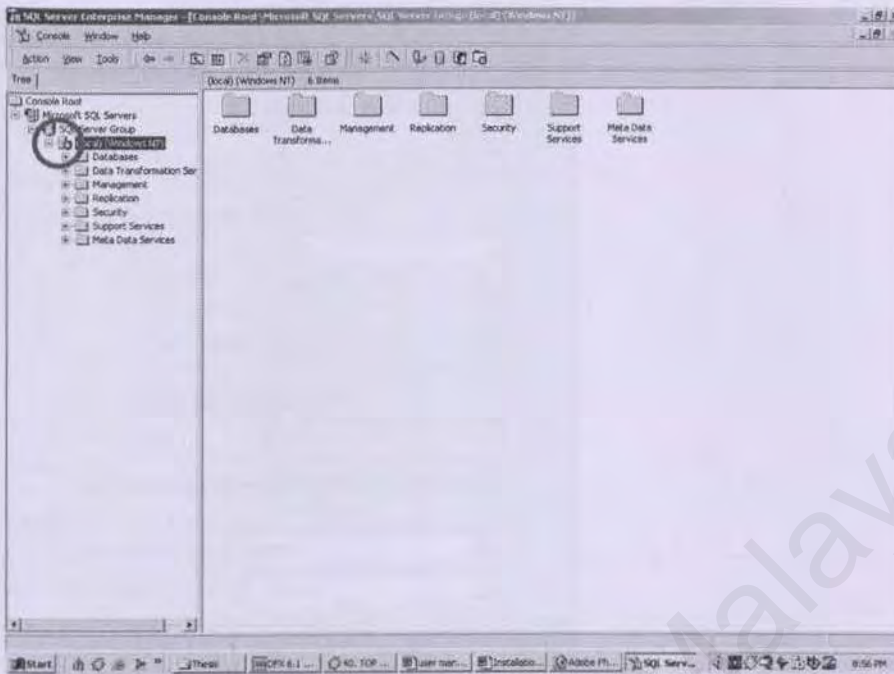


9. Finally, click **Finish** to complete the creation of the virtual directory.



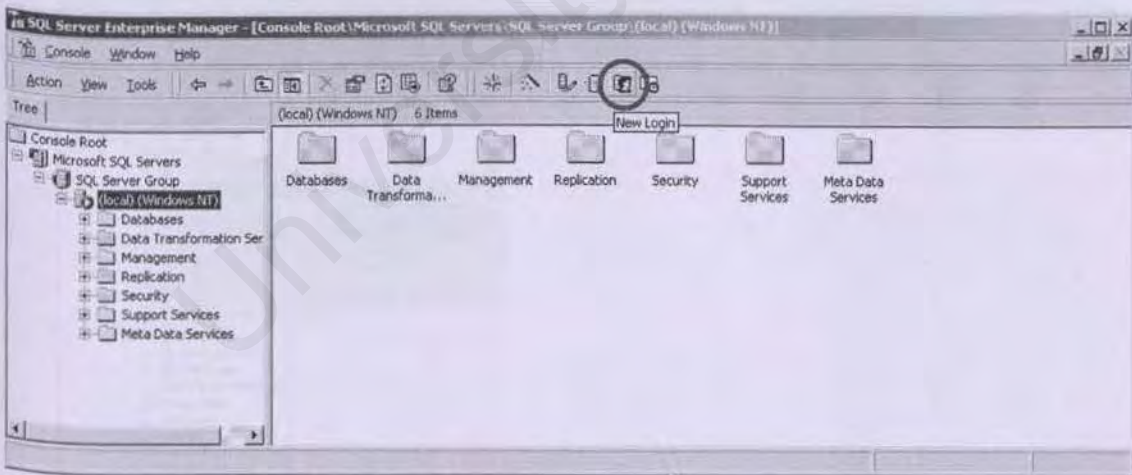
A1.3 Setting up WPFS SQL Database

1. Make sure Microsoft SQL Server 2000 Enterprise Edition has been installed.
2. Go to **Start >Programs > Microsoft SQL Server >Enterprise Manager**. Click on the **Enterprise Manager**.
3. Under the **Enterprise Manager** window, please make sure that the SQL Server is connected. (Arrow in green color).

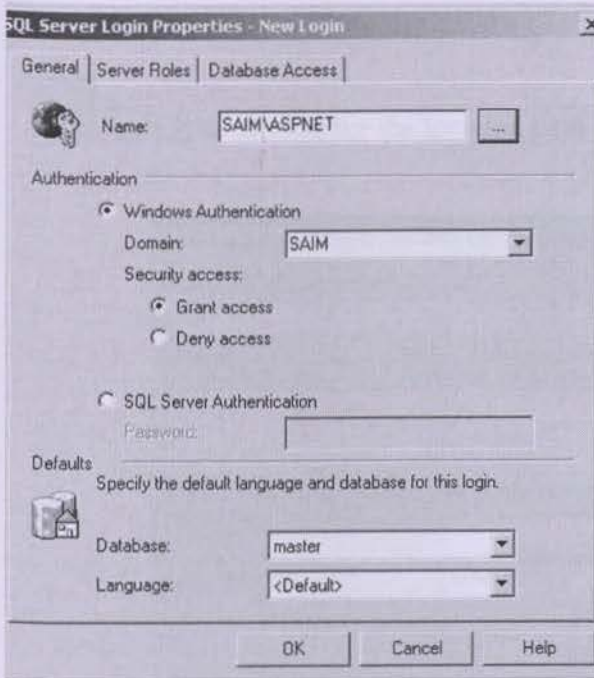


4. If not connected, right click the server and click **Connect**.
5. For the first time, click on the running SQL Server to create a new login user.

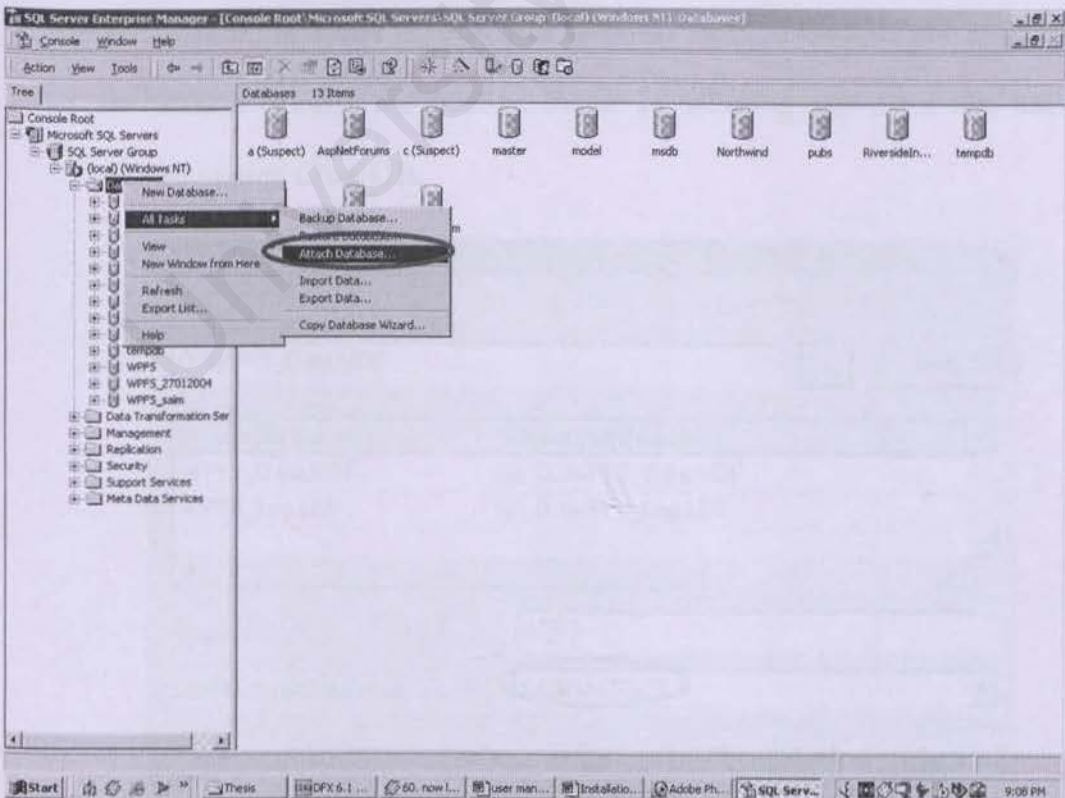
This can be done by clicking the icon **New Login**.



6. A new login window will pop up. Type in user name. Select Windows Authentication option. Select **master** as database and **default** as the language. Click **OK**.



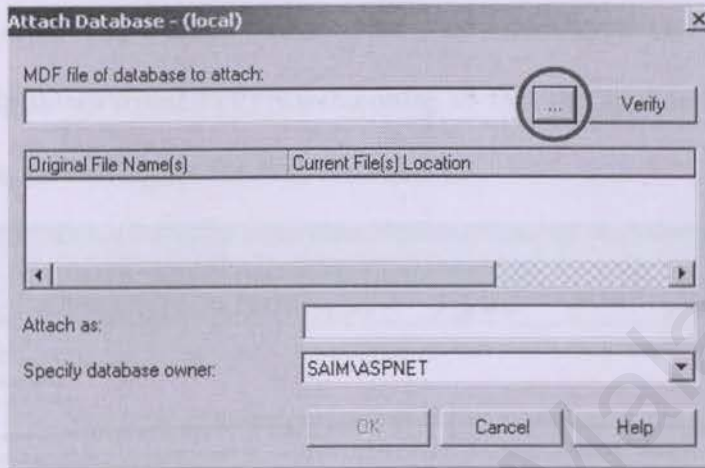
7. To set up database, click on **Databases** folder in the server. Then right click it and go to **All Tasks > Attach Database..**



8. A new window will prompt out for user to attach the database. Click

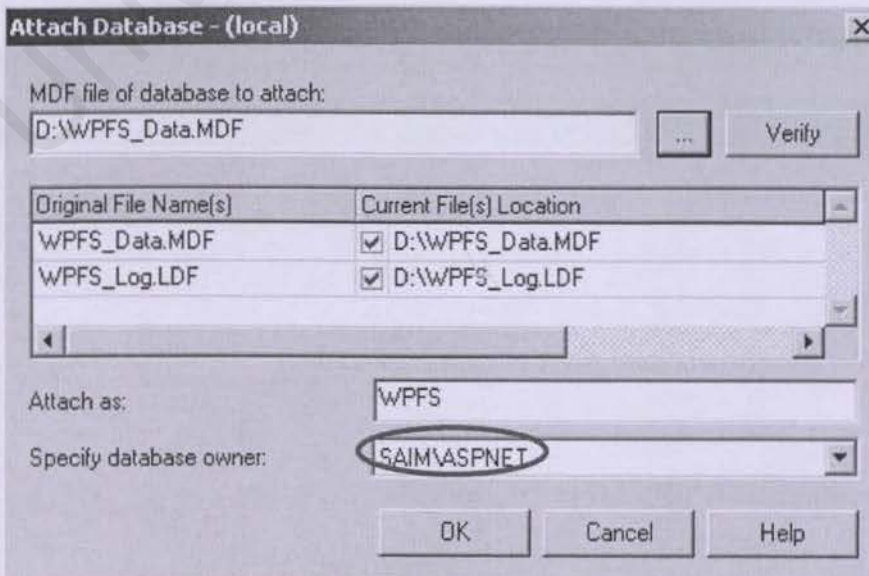


button to browse for the location path of the database file



9. Browse for the path of the database file named WPFS.mdf. Click **OK** to attach the database.

10. The **Attach Database** window will show the name of the database attached and its location. Specify the database owner by selecting user name that has been created earlier. Click **OK**.

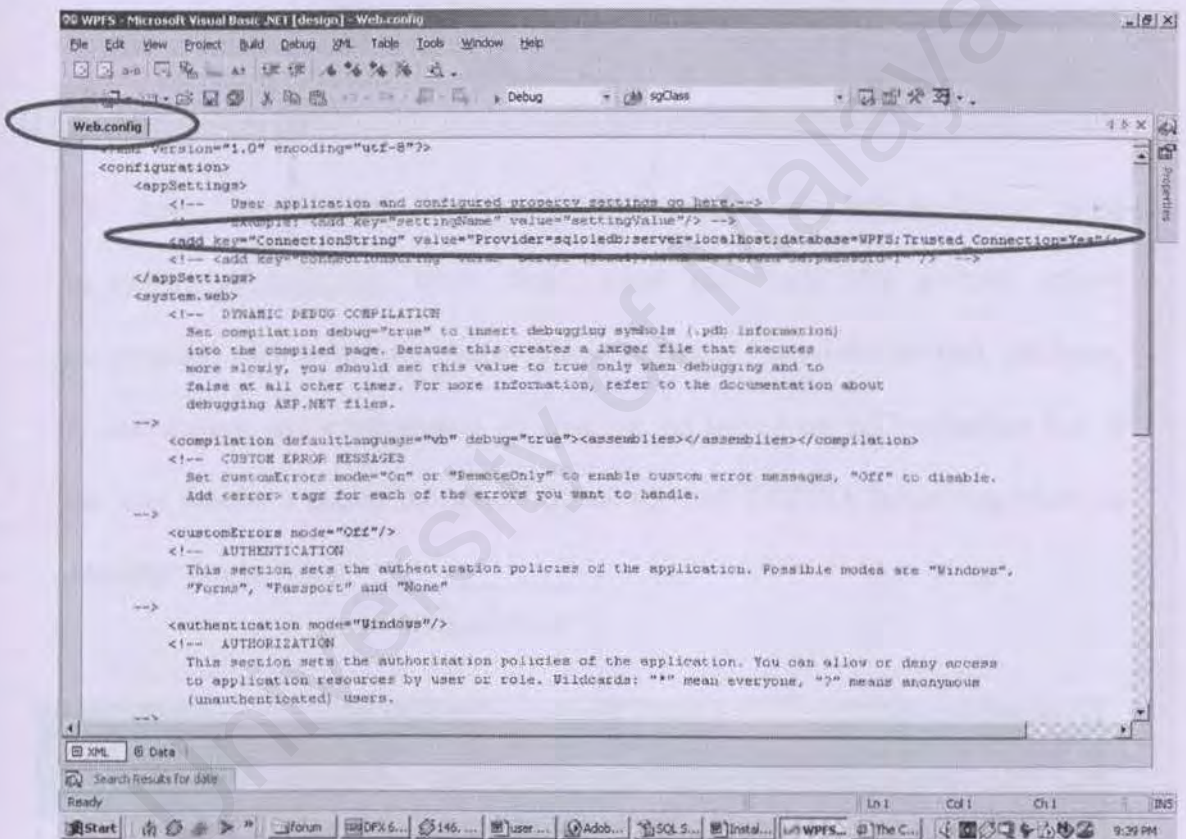


11. After the database has been successfully attached, a message will prompt out.

Click **OK** to complete the database attachment.

A1.4 Configuration of Database Connection String in ASP.NET Files

1. In order to make connection to the database successfully, edit `\inetpub\wwwroot\WPFS\web.config` so that the application setting is a valid connection string for the WPFS database.

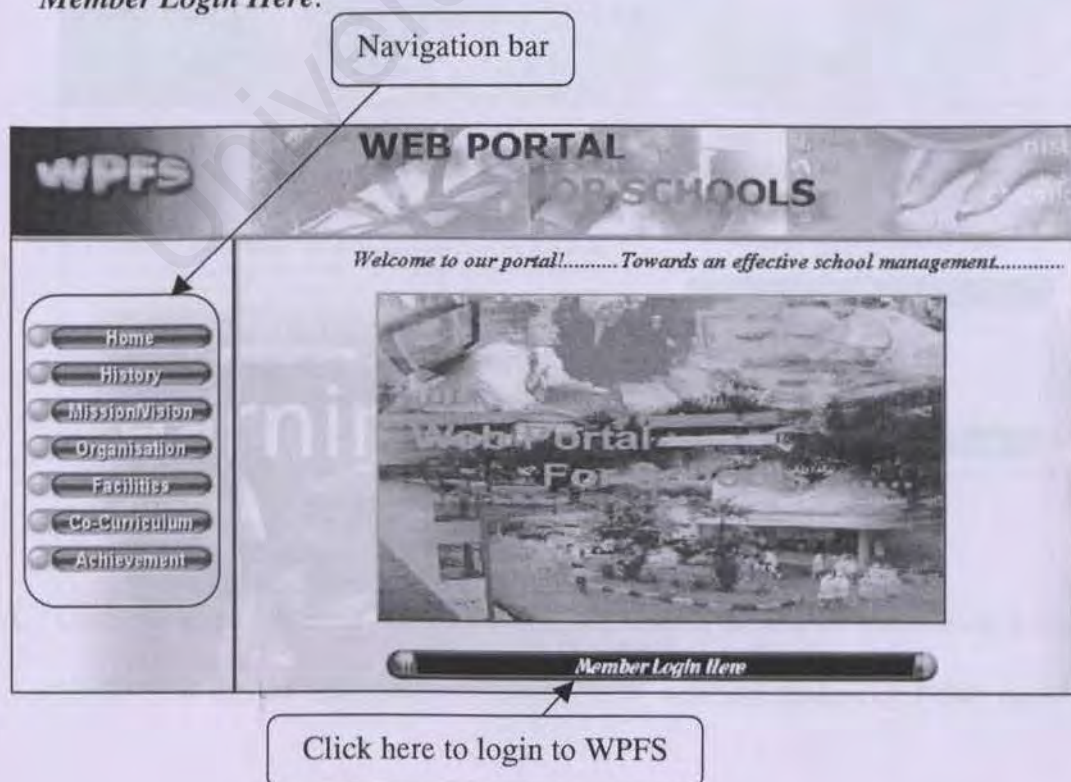


Appendix B: User Manual

WPFS is a web-based school management system that provides a platform to allow headmaster, teachers, school administrators (school clerks), PIBG members and students to accomplish their daily school activities effectively and efficiently. This user manual will provide a guide for the users to use WPFS more effectively. It is divided into five major sections that are *School Administrator Section, Headmaster Section, Teacher Section, Student Section and PIBG Section.*

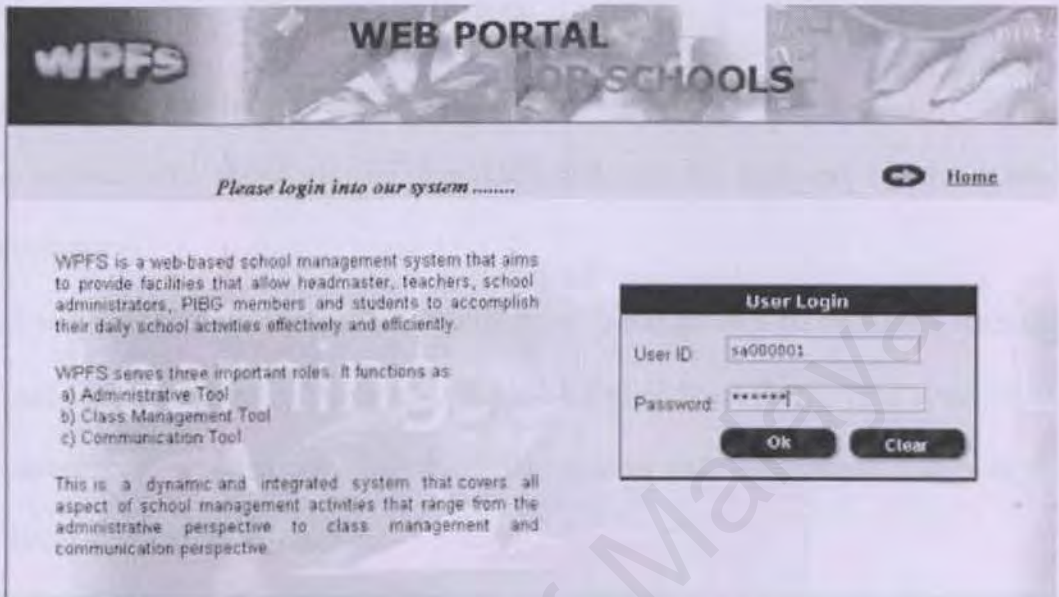
B1 Getting Started

1. To get started, go to the default page at http://<domain_name_or_ip>/wpfs/default.aspx. From here, users can view the general school information such as school history, mission/vision, organization chart, facilities, co-curriculum and achievement by clicking the button on the navigation bar. If the user wants to access the school portal services (WPFS), he/she can click on *Member Login Here*.



2. After user clicks on the *Member Login Here*, the login page will be displayed.

User will enter the User ID and password to login into WPFS system.



The screenshot shows the WPFS Web Portal login page. At the top, there is a banner with the WPFS logo and the text "WEB PORTAL FOR SCHOOLS". Below the banner, there is a navigation bar with the text "Please login into our system", a Home button, and a Home icon. The main content area contains a description of the WPFS system and its functions. On the right side, there is a "User Login" form with fields for "User ID" (containing "s4000001") and "Password" (containing "*****"), and "Ok" and "Clear" buttons.

WPFS **WEB PORTAL** **FOR SCHOOLS**

Please login into our system Home

WPFS is a web-based school management system that aims to provide facilities that allow headmaster, teachers, school administrators, PIBG members and students to accomplish their daily school activities effectively and efficiently.

WPFS serves three important roles. It functions as:

- a) Administrative Tool
- b) Class Management Tool
- c) Communication Tool

This is a dynamic and integrated system that covers all aspect of school management activities that range from the administrative perspective to class management and communication perspective.

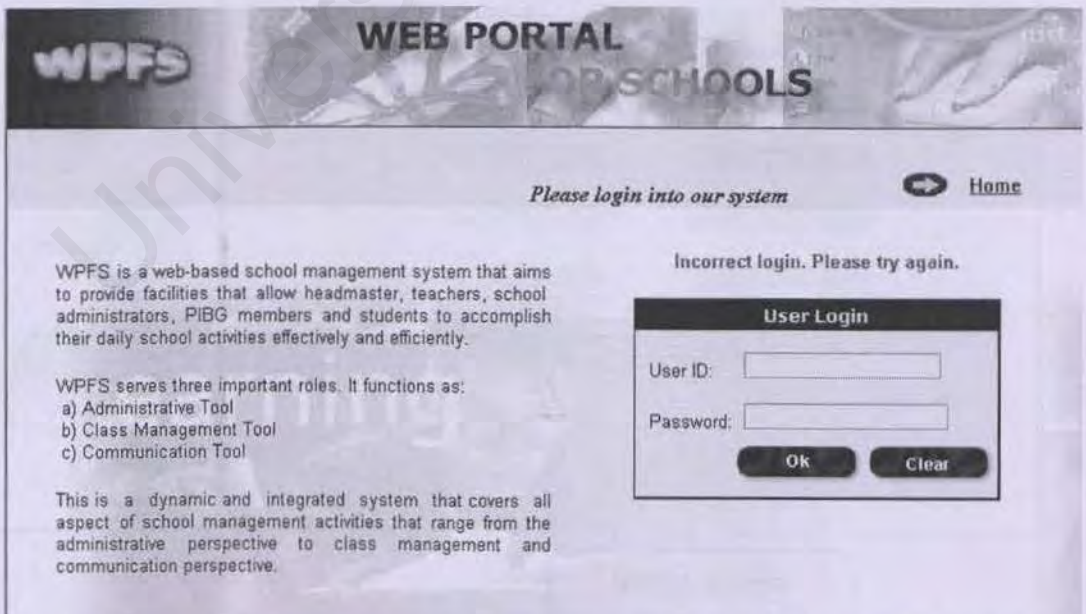
User Login

User ID: s4000001

Password: *****

Ok Clear

3. If the user fails to login into the system, a message will be shown to indicate an invalid User ID or password has been entered. Then he/she can login again.



The screenshot shows the WPFS Web Portal login page after an incorrect login attempt. The banner and navigation bar are the same as in the previous screenshot. The main content area contains the same description of the WPFS system and its functions. On the right side, there is a "User Login" form with fields for "User ID" and "Password", and "Ok" and "Clear" buttons. Above the form, there is a message: "Incorrect login. Please try again."

WPFS **WEB PORTAL** **FOR SCHOOLS**

Please login into our system Home

WPFS is a web-based school management system that aims to provide facilities that allow headmaster, teachers, school administrators, PIBG members and students to accomplish their daily school activities effectively and efficiently.

WPFS serves three important roles. It functions as:

- a) Administrative Tool
- b) Class Management Tool
- c) Communication Tool

This is a dynamic and integrated system that covers all aspect of school management activities that range from the administrative perspective to class management and communication perspective.

Incorrect login. Please try again.

User Login

User ID:

Password:

Ok Clear

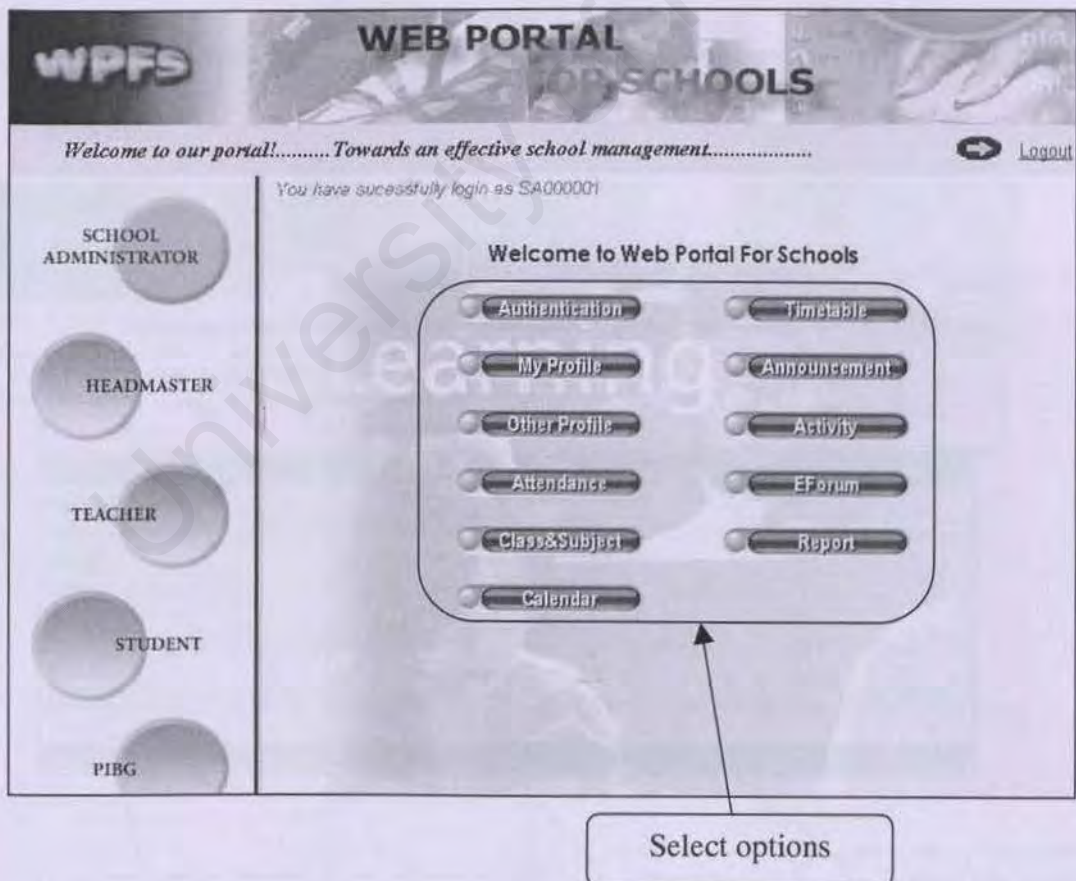
4. Once the user has been successfully login, user type will be tracked on whether he/she is a school administrator, headmaster, teacher, student or PIBG member.

From here, school administrator will direct to the *School Administrator Section*, headmaster to the *Headmaster Section*, teachers to the *Teacher Section*, students to the *Student Section* and PIBG members to the *PIBG Section*.

B2 School Administrator Section

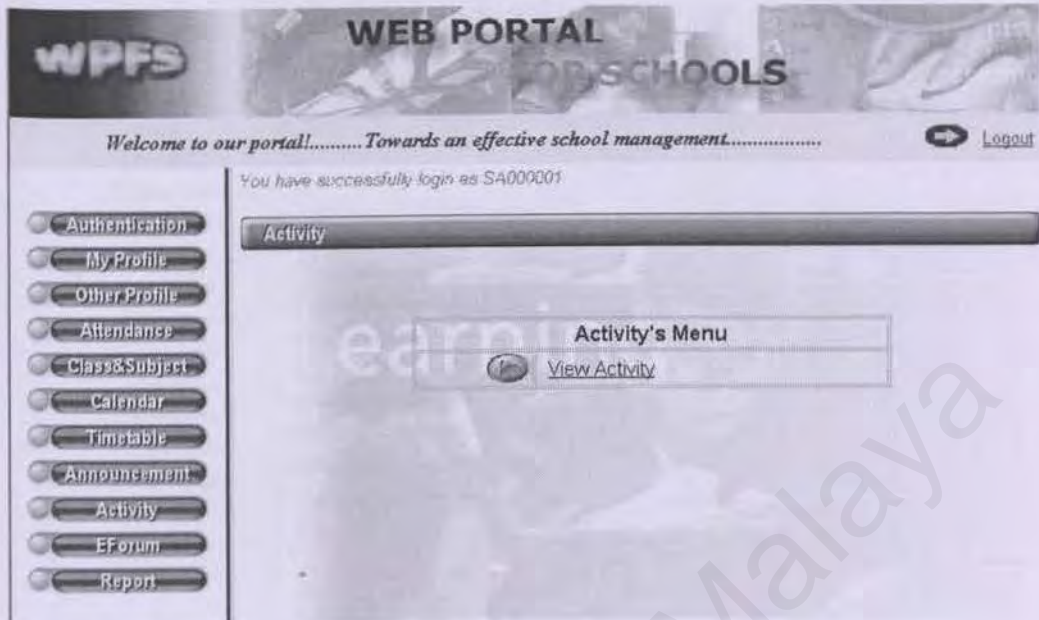
This section will show all the functions that can be accessed by the school administrators.

1. A main menu page with a list of authorized functions will be displayed once the user login as school administrator (SA). SA can click on the buttons available to access certain functions. Based on the options that SA selects, SA will be directed to specified function.



B2.1 Activity

1. If the SA clicks on the *Activity* button, a menu will be displayed.



2. If the SA clicks on the *View Activity* button, he/she can view list of school activities.

The screenshot shows the WPFS Web Portal interface displaying a list of school activities. At the top, it says "WPFS WEB PORTAL FOR SCHOOLS". Below that is a welcome message: "Welcome to our portal!.....Towards an effective school management.....". There is a "Logout" button. Below the welcome message, there are five buttons: "Club", "Society", "Sport", "Uniform Body", and "View All". A callout box points to the "View All" button with the text "Click here to view all activities list". Below these buttons is the heading "ALL ACTIVITIES". Underneath is a table with the following data:

Activity Name	Type	Admsor	President
Badminton	Sport	En. Azri	Tan
Chess	Club	En. Azri	Ng
Chinese	Society	En. Azri	Tan
English	Society	En. Azri	Lau
Football	Sport	En. Azri	Liew
IT	Club	En. Muhammad	Wong
Soccul	Uniform Body	En. Azri	Liew
Swimming	Club	En. Azri	Lim

Below the table, there are four callout boxes with arrows pointing to the "Type" column of the table:

- "Click here to view clubs" (points to "Club" type)
- "Click here to view societies" (points to "Society" type)
- "Click here to view sports" (points to "Sport" type)
- "Click here to view uniform bodies" (points to "Uniform Body" type)

3. If SA clicks on the *Activity name*, he/she can view the detail of the selected

VIEW ACTIVITY

User ID : SA00001

Type : Sport

Name : Badminton

Advisor : En. Azli

President : Tan

Wise President : Chariv

Secretary : Lee

Wise Secretary :

Treasurer : Choy

Wise Treasurer :

Committee 1 :

Committee 2 :

Committee 3 :

Committee 4 :

Committee 5 :

Content :

Ok

activity.

4. SA clicks *ok* button and follow by clicking *back to activity* button to return to menu page.

B2.2 Attendance

1. When SA clicks *Attendance* button, he/she will enter *Attendance menu page*.

WPFS **WEB PORTAL FOR SCHOOLS**

Logout

You have successfully login as SA000001

Attendance

Attendance's Menu

Delete Attendance

Authentication

My Profile

Other Profile

Attendance

Class&Subject

Calendar

Timetable

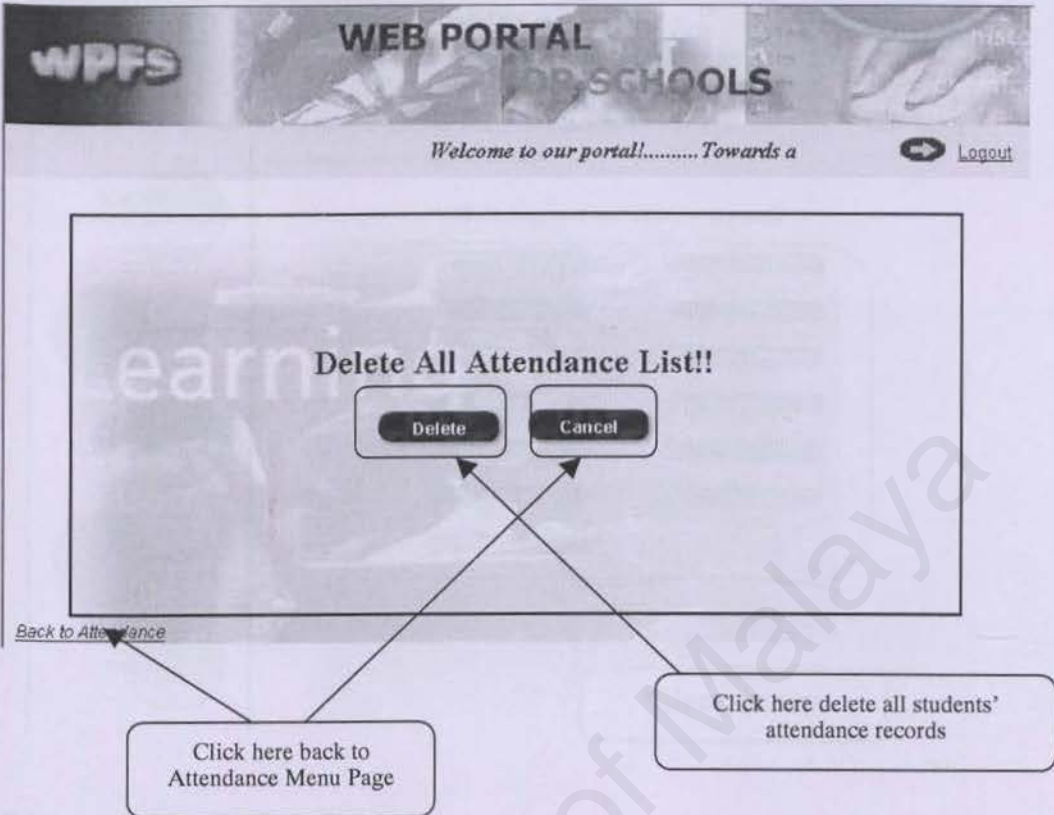
Announcement

Activity

EForum

Report

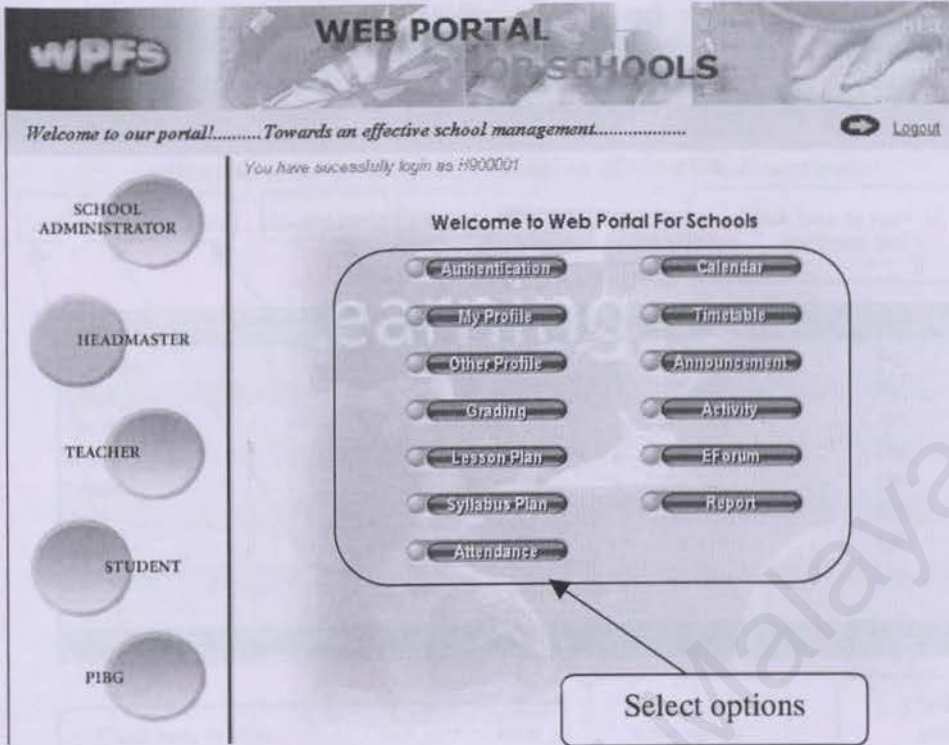
2. SA clicks on *Delete Attendance* button to enter delete attendance records page.



B3 Headmaster Section

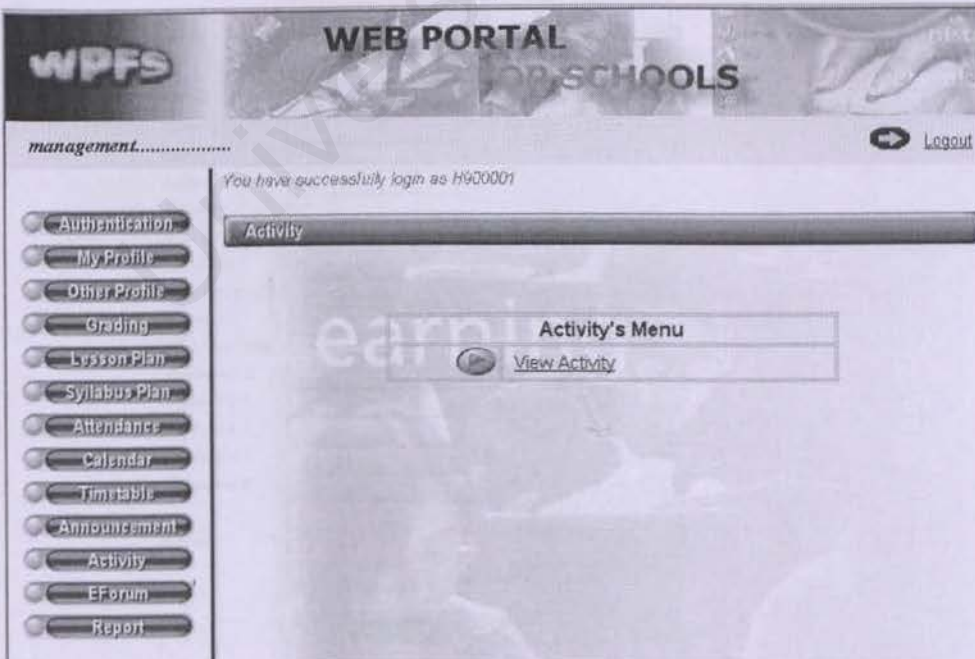
This section will show all the functions that can be accessed by the headmaster.

1. A main menu page with a list of authorized functions will be displayed once the user login as headmaster. Headmaster can click on the buttons available to access certain functions. Based on the options that headmaster selects, headmaster will be directed to specified function.



B3.1 Activity

1. If headmaster clicks on the **Activity** button, a menu page will be displayed.



2. If headmaster clicks on the **View Activity** button, he/she can view list of school activities.

WPFS WEB PORTAL FOR SCHOOLS

Welcome to our portal!.....Towards an effective school management Logout

[Club](#)
[Society](#)
[Sport](#)
[Uniform Body](#)
[View All](#)
Click here to view all activities list

ALL ACTIVITIES

Activity Name	Type	Advisor	President
Badminton	Sport	En. Azri	Tan
Chess	Club	En. Azri	Ng
Chinese	Society	En. Azri	Tan
English	Society	En. Azri	Lau
Football	Sport	En. Azri	Liew
IT	Club	En. Muhammad	Wong
Scout	Uniform Body	En. Azri	Liew
Swimming	Club	En. Azri	Lim

Click here to view clubs
Click here to view societies
Click here to view sports
Click here to view uniform bodies

3. If headmaster clicks on the **Activity name**, he/she can view the detail of the selected activity.

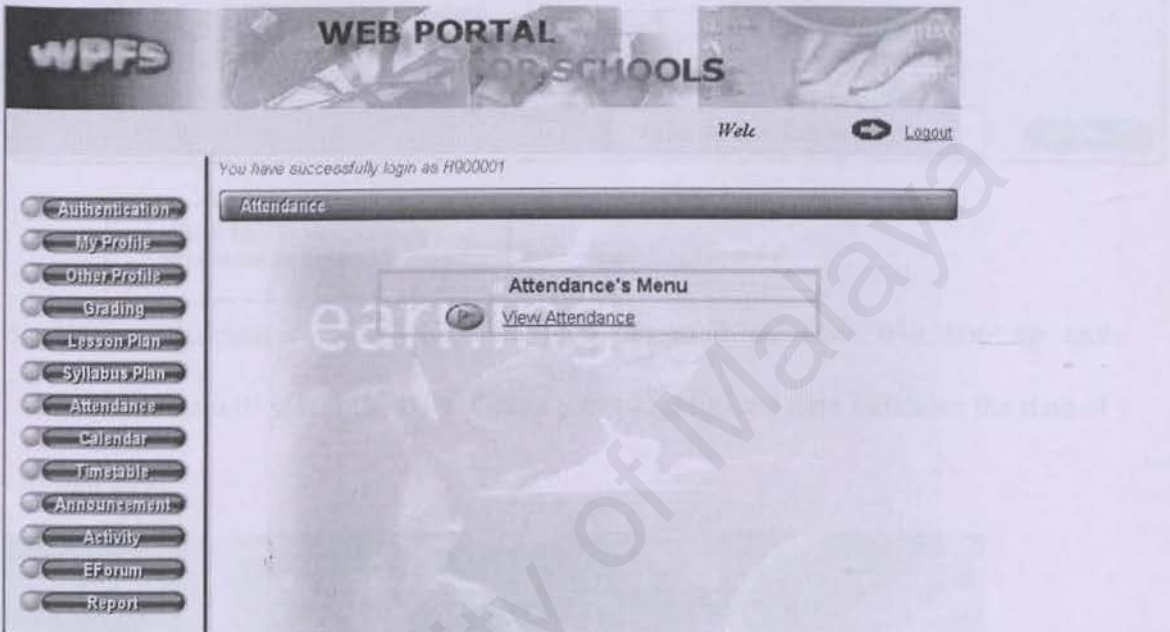
VIEW ACTIVITY

User ID :
 Type:
 Name :
 Advisor:
 President:
 Wise President:
 Secretary:
 Wise Secretary:
 Treasurer:
 Wise Treasurer:
 Committee 1:
 Committee 2:
 Committee 3:
 Committee 4:
 Committee 5:
 Content:

4. Headmaster click *ok* button and follow by clicking *back to activity* button to return to menu page

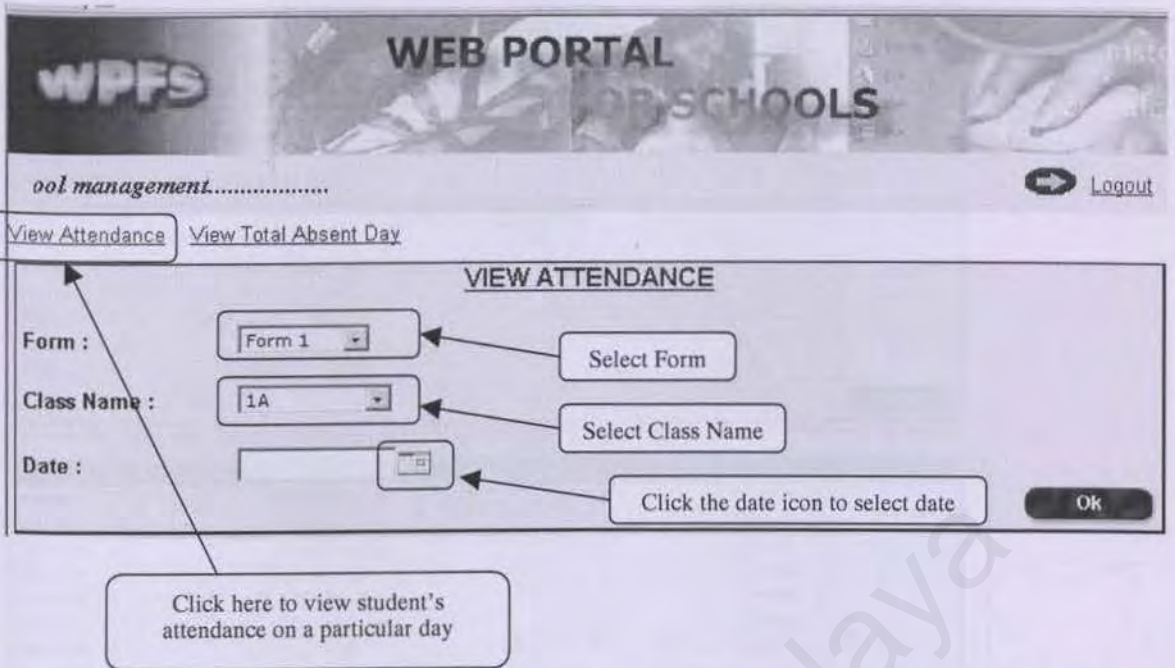
B3.2 Attendance

1. When headmaster clicks *Attendance* button, he/she will enter *Attendance menu*

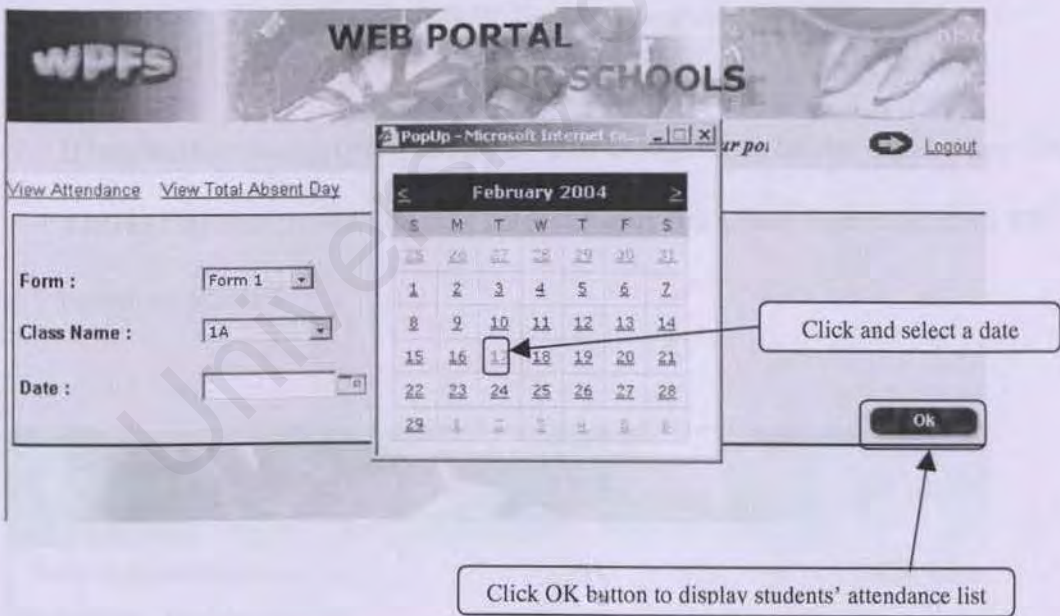


page.

2. Headmaster clicks *View Attendance* button to enter attendance section.
3. Headmaster can either choose to view students' attendance on a particular day or view students' total absent day.
4. If headmaster want to view students' attendance on a particular day, he/she clicks *View Attendance* button.



5. When headmaster clicks the date icon, a small calendar will pop up and headmaster will select the date. Green color highlighted date indicates the date of that day.



6. After select all the information, headmaster clicks *Ok* button and a list of students' attendance on that selected date will display.

[View Attendance](#) [View Total Absent Day](#)

VIEW ATTENDANCE

Form :

Class Name :

Date :

Ok

User ID	Student Name	Status
S040001	Lee Kok Chung	Absent
S040005	Fariza Hanum	Present
S040006	Chong May Ling	Present
S040007	Azline	Present
S040008	Azri Ahmad	Present
S040009	Chan Meng Keat	Present
S040010	Kathiravan	Present

Back

List of students' attendance

7. If headmaster want to view students' total absent days, he/she clicks *View Total Absent Day* button. He/She then selects *Form* and *Class Name* and click *Ok* button to proceed

[View Attendance](#) [View Total Absent Day](#)

VIEW TOTAL ADSENT DAY

Form :

Class Name :

Click OK button to display students' total absent days

Ok

8. A list of students' total absent days will display to the headmaster. The absent days counted from the beginning of the semester until that day.

WPFS WEB PORTAL FOR SCHOOLS

our portal!.....Towards an effective school management..... Logout

View Attendance View Total Absent Day

VIEW TOTAL ADSENT DAY

Form : Form 1

Class Name : 1A

Ok

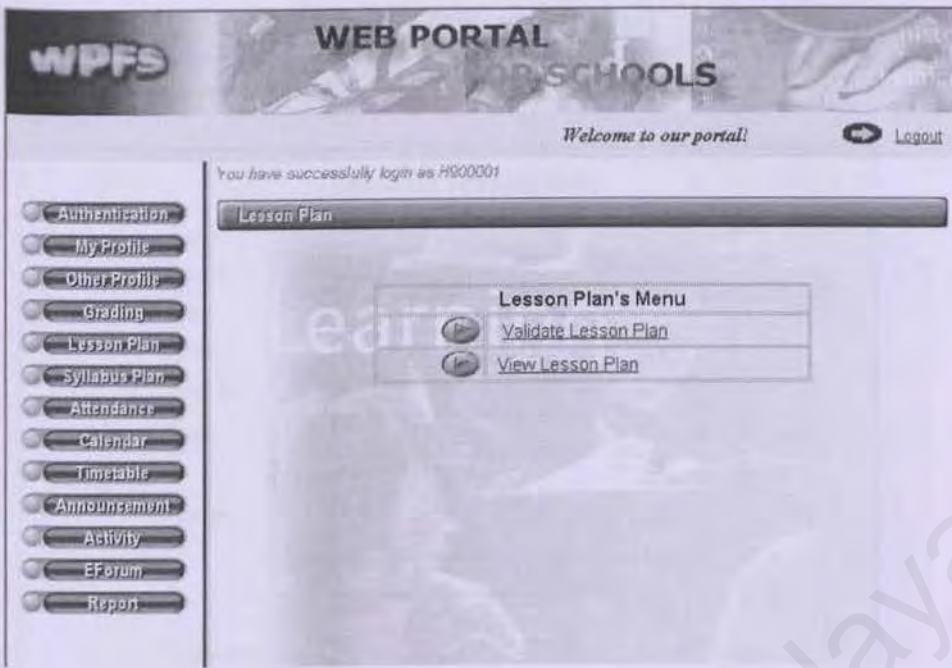
User ID	Student Name	Status	Total Absent
S040001	Lee Kok Chung	OK	1
S040005	Fariza Hanum		0
S040006	Chong May Ling		0
S040007	Azlina		0
S040008	Azri Ahmad		0
S040009	Chan Meng Keat		0
S040010	Kathiravan		0

Back

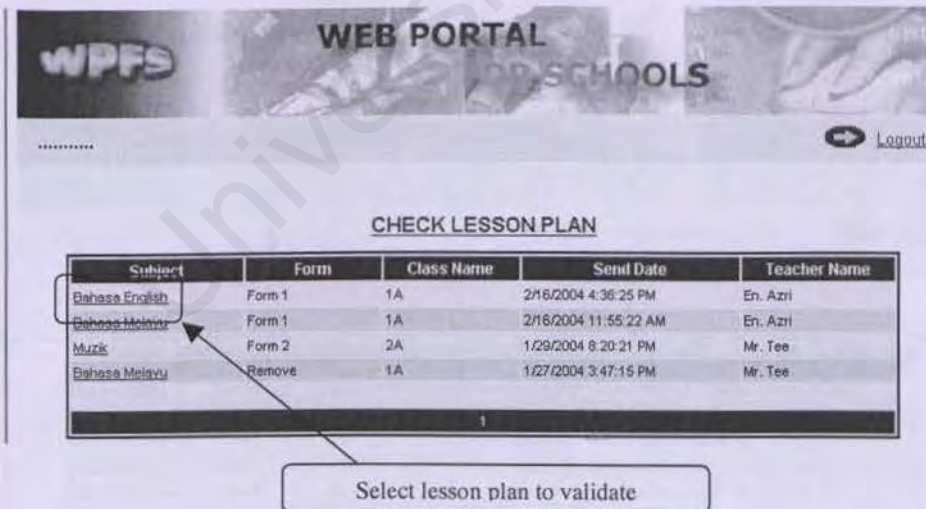
List of students' total absent days

B3.3 Lesson Plan

1. When headmaster clicks *Lesson Plan* button, he/she will enter *Lesson Plan menu page*.



- Headmaster can either choose to validate lesson plan or view lesson plan.
- If headmaster want to validate lesson plan, he/she clicks *Validate Lesson Plan* button.



- Headmaster clicks the subject that he/she wants to check and validate.
- Headmaster can post his/her comment after checking the lesson plan.

SCHOOLS

'all.....Towards an effective school management.....

Logout

VALIDATE LESSON PLAN

User ID :

Form:

Class:

Subject:

Topic:

Content:

Comment:

Comment is posted here

6. Teacher will be notified once the validation is made.
7. Headmaster can view the list of lesson plan by clicking *View Lesson Plan* button in *Lesson Plan Menu Page*.

WEB PORTAL

SCHOOLS

Welcome to our portal!.....

Logout

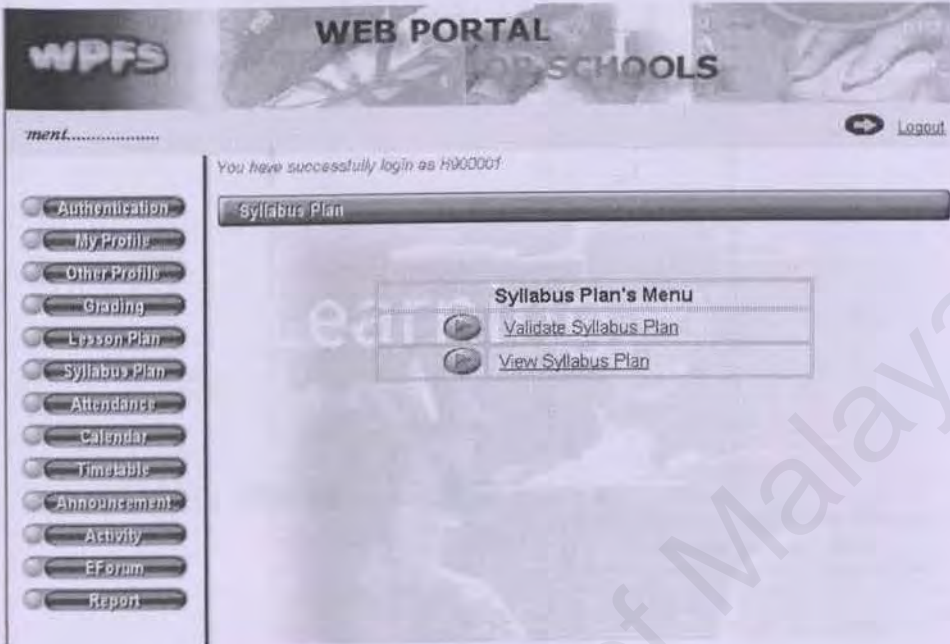
VIEW LESSON PLAN

Subject	Form	Class Name	Send Date	Check Date	Teacher Name
Bahasa English	Form 1	1A	2/16/2004 4:36:25 PM	2/17/2004 9:54:28 PM	En. Azri
Bahasa Melayu	Form 1	1A	2/16/2004 4:32:05 PM	2/16/2004 4:34:23 PM	En. Azri
Pendidikan Moral	Form 1	1A	2/16/2004 2:50:24 PM	2/16/2004 2:51:58 PM	En. Azri
Matematik	Form 1	1A	2/16/2004 2:05:31 PM	2/16/2004 2:07:40 PM	En. Azri
Kemahiran Hidup	Form 4	1A	1/29/2004 9:23:35 PM	1/29/2004 9:44:11 PM	Mr. Tee
Bahasa English	Remove	1A	1/27/2004 11:42:13 AM	1/27/2004 3:57:43 PM	Mr Lee

List of lesson plan

B3.4 Syllabus Plan

1. When headmaster clicks *Syllabus Plan* button, he/she will enter *Syllabus Plan menu page*.



2. Headmaster can either choose to validate syllabus plan or view syllabus plan.
3. If headmaster want to validate lesson plan, he clicks *Validate Syllabus Plan* button.



Subject	Form	Class Name	Send Date	Teacher Name
Bahasa Melayu	Form 1	1A	2/16/2004 11:52:44 AM	En. Azri
Bahasa Inggeris	Remove	1A	1/29/2004 11:23:13 PM	Mr. Tee
Bahasa Cina	Form 2	2A	1/29/2004 11:16:11 PM	Mr. Lee

Select syllabus plan to validate

4. Headmaster clicks the subject that he wants to check and validate.
5. Headmaster can post his comment after checking the lesson plan.

VALIDATE SYLLABUS PLAN

User ID :

Form:

Class:

Subject:

Topic:

Chapter Number:

Objective:

Content:

Comment:

Comment is posted here

6. Teacher will be notified once the validation is made.
7. Headmaster can view the list of syllabus plan by clicking *View Syllabus Plan* button in *Syllabus Plan Menu Page*.



VIEW SYLLABUS PLAN

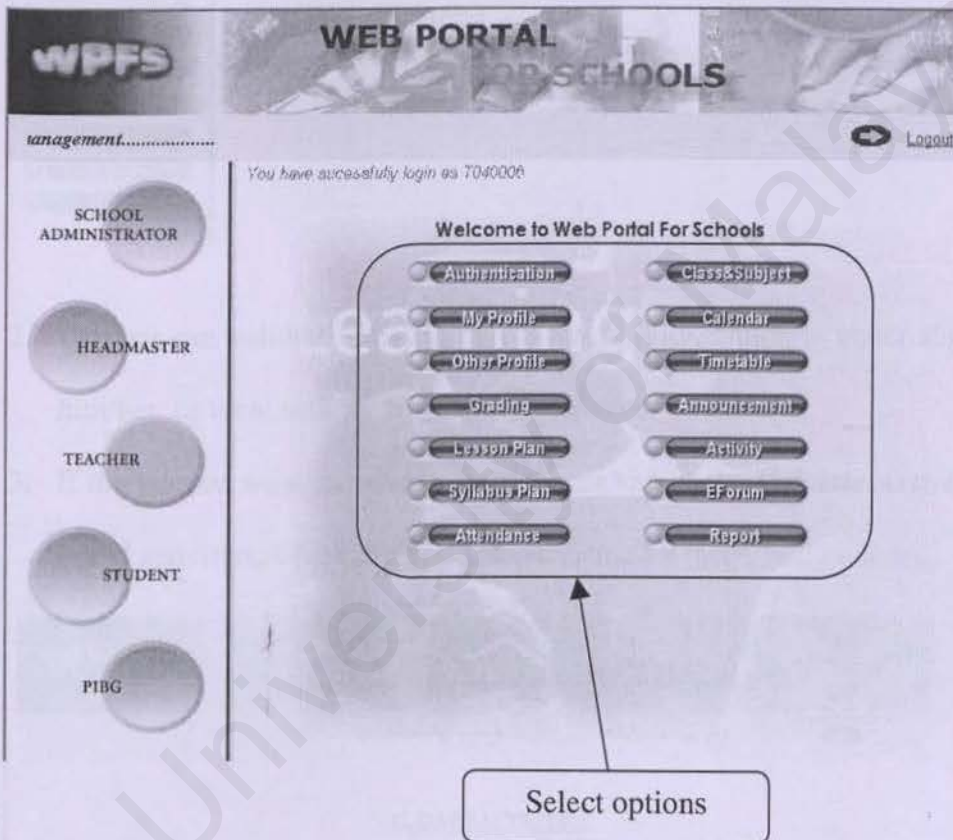
Subject	Form	Class Name	Send Date	Check Date	Teacher Name
Bahasa Melayu	Form 1	1A	2/16/2004 11:52:44 AM	2/17/2004 10:14:37 PM	En. Azri
Sejarah	Form 1	1A	2/16/2004 11:35:55 AM	2/18/2004 4:43:48 PM	En. Azri
Pendidikan Islam	Remove	1A	1/29/2004 11:23:57 PM	1/29/2004 11:24:38 PM	Mr. Tee

List of syllabus plan

B4 Teacher Section

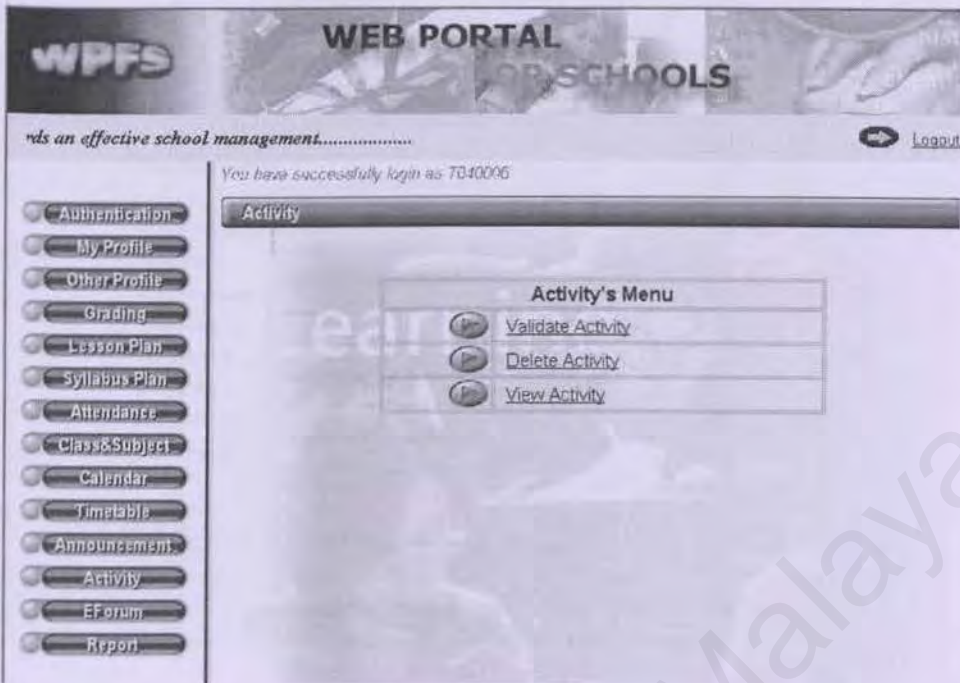
This section will show all the functions that can be accessed by the teachers.

1. A main menu page with a list of authorized functions will be displayed once the user login as teacher. Teacher can click on the buttons available to access certain functions. Based on the options that teacher selects, he/she will be directed to specified function.

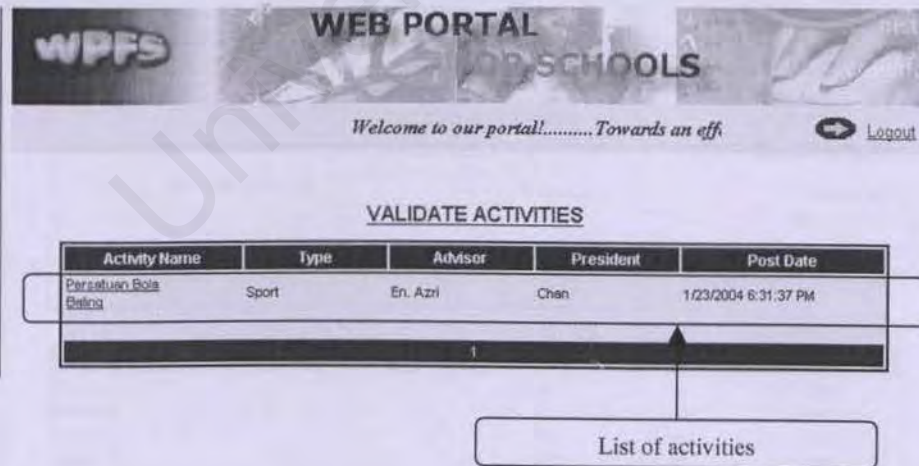


B4.1 Activity

1. If the teacher clicks on the **Activity** button, a menu page will be displayed.



2. Teacher can validate activity; delete the activity, which is under supervision by him/her, or view activity from this menu page.
3. If the teacher want to validate activity, he/she clicks **Validate Activity** button. A list of activities, which are under supervision by them, will be listed.



4. Teacher clicks **Validate** button to validate the activity after scanning through the activity details. This activity will then be posted to the activity list for all users to view.

VALIDATE ACTIVITY

User ID :

Type:

Name :

Advisor:

President:

Wise President:

Secretary:

Wise Secretary:

Treasurer:

Wise Treasurer:

Committee 1:

Committee 2:

Committee 3:

Committee 4:

Committee 5:

Content:

5. Teacher clicks *Delete Activity* button to delete the activity, which is not valid, or exist. Teacher then clicks *Search* button to search the activities. Teacher can delete the activity by clicking *Delete* in the activity list.

WEB PORTAL

...Towards an effective school management.....

Logout

DELETE ACTIVITIES

Activity Category:

Select activity category: Uniform body, Sport, Club or Society

Activity Name	Type	Advisor	President	Delete?
Chess	Club	En. Azri	Ng	Delete
Swimming	Club	En. Azri	Lim	Delete
Chinese	Society	En. Azri	Tan	Delete
English	Society	En. Azri	Lau	Delete
Badminton	Sport	En. Azri	Tan	Delete
Football	Sport	En. Azri	Liew	Delete
Persatuan Bola Baling	Sport	En. Azri	Chan	Delete
Scout	Uniform Body	En. Azri	Liew	Delete

1 page(s) found. 1

6. An alert box will pop out to confirm the deletion of the activity. If *Ok* button is clicked, the activity will be deleted from the activity list.

DELETE ACTIVITIES

Activity Category:

Microsoft Internet Explorer
Do you want to delete record?

Click OK to confirm the deletion of the selected activity

Activity Name	Type	Advisor	President	Delete?
Chess	Club	En. Azri	Ng	Delete
Swimming	Club	En. Azri	Lim	Delete
Chinese	Society	En. Azri	Tan	Delete
English	Society	En. Azri	Lau	Delete
Badminton	Sport	En. Azri	Tan	Delete
Football	Sport	En. Azri	Liew	Delete
Persatuan Bola Baling	Sport	En. Azri	Chan	Delete
Scout	Uniform Body	En. Azri	Liew	Delete

1 page(s) found.

7. If the teacher clicks on the *View Activity* button, he/she can view list of school activities.

ALL ACTIVITIES

Click here to view all activities list

Click here to view clubs

Click here to view societies

Click here to view sports

Click here to view uniform bodies

Activity Name	Type	Advisor	President
Badminton	Sport	En. Azri	Tan
Chess	Club	En. Azri	Ng
Chinese	Society	En. Azri	Tan
English	Society	En. Azri	Lau
Football	Sport	En. Azri	Liew
IT	Club	En. Muhammad	Wong
Scout	Uniform Body	En. Azri	Liew
Swimming	Club	En. Azri	Lim

8. If teacher clicks on the *Activity name*, he/she can view the detail of the selected activity.

The screenshot shows a form titled "VIEW ACTIVITY" with the following fields and values:

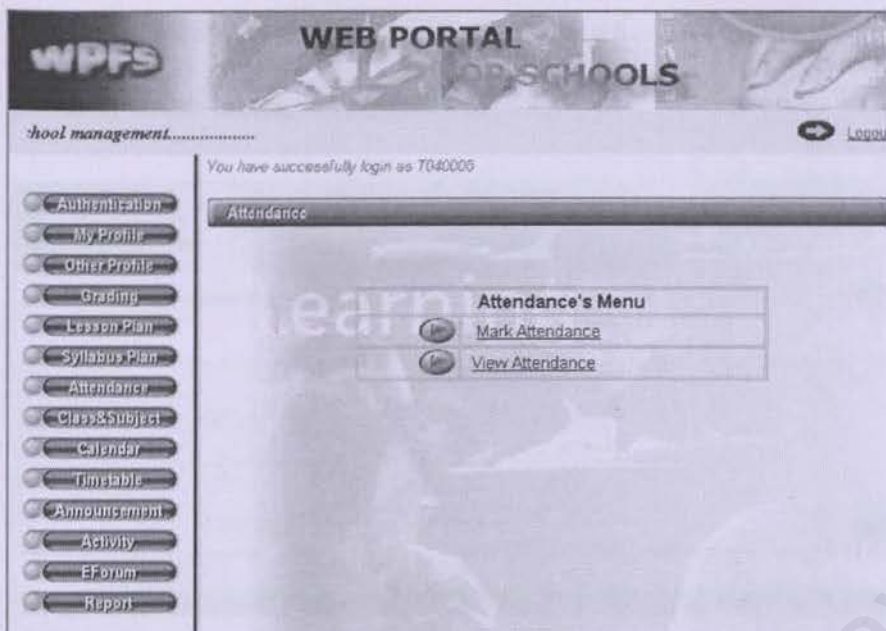
User ID :	S040001
Type:	Sport
Name :	Badminton
Advisor:	En. Azs
President:	Tan
Wise President:	Chew
Secretary:	Lee
Wise Secretary:	
Treasurer:	Chng
Wise Treasurer:	
Committee 1:	
Committee 2:	
Committee 3:	
Committee 4:	
Committee 5:	
Content:	

An "OK" button is located at the bottom center of the form.

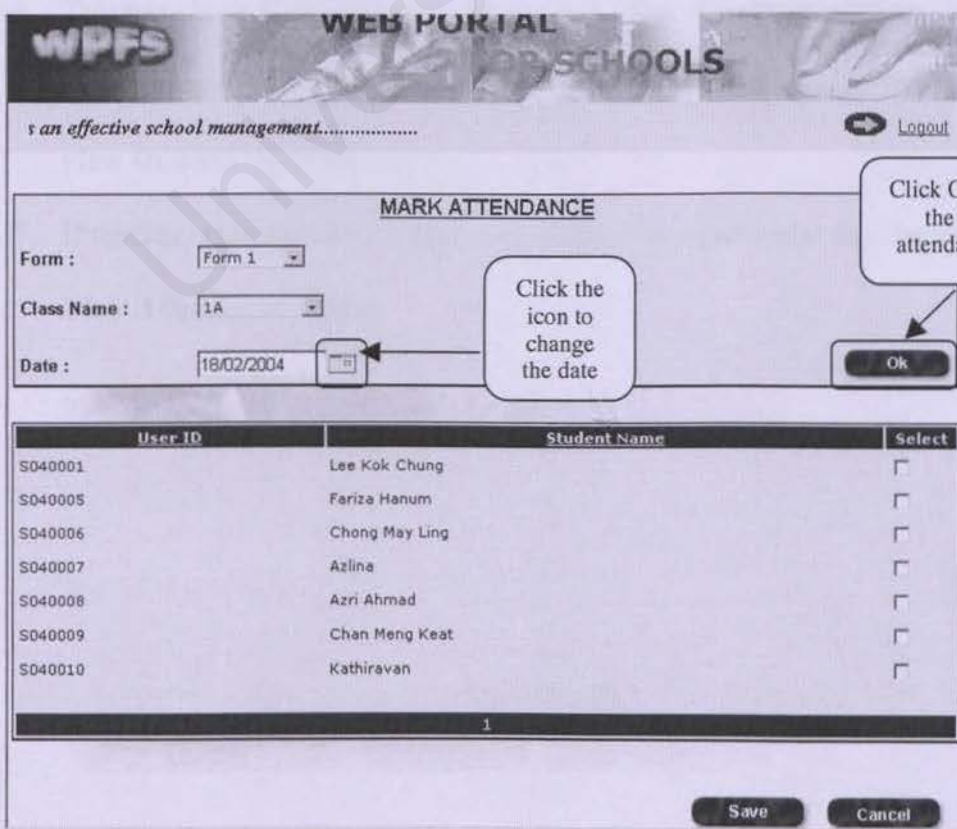
9. Teacher clicks *ok* button and follow by clicking *back to activity* button to return to menu page.

B4.2 Attendance

1. When teacher clicks *Attendance* button, he/she will enter *Attendance menu page*.



2. Teacher can choose to mark attendance or view attendance.
3. If teacher want to mark attendance, he/she clicks **Mark Attendance**. The teacher then selects the form and class name. The date is set default but the teacher can change it if he/she needs to tick previous day attendances.



4. The teacher checks the checkbox to take attendance. He/She clicks *Save* button after finish taking the attendance.

WPFS WEB PORTAL FOR SCHOOLS

wards an effective school management..... Logout

MARK ATTENDANCE

Form : Form 1

Class Name : 1A

Date : 18/02/2004 Ok

User ID	Student Name	Select
S040001	Lee Kok Chung	<input type="checkbox"/>
S040005	Fariza Hanum	<input type="checkbox"/>
S040006	Chong May Ling	<input type="checkbox"/>
S040007	Azlina	<input type="checkbox"/>
S040008	Azri Ahmad	<input type="checkbox"/>
S040009	Chan Meng Keat	<input type="checkbox"/>
S040010	Kathiravan	<input type="checkbox"/>

Save all the attendance records Save Cancel

5. Teacher clicks *View Attendance* button to enter attendance section.
6. Teacher can either choose to view students' attendance on a particular day or view students' total absent day.
7. If teacher want to view students' attendance on a particular day, he/she clicks *View Attendance* button.

[View Attendance](#) [View Total Absent Day](#)

VIEW ATTENDANCE

Form :

Class Name :

Date :

Click here to view student's attendance on a particular day

8. When teacher clicks the date icon, a small calendar will pop up and teacher will select the date. Green color highlighted date indicates the date of that day.

[View Attendance](#) [View Total Absent Day](#)

Form :

Class Name :

Date :

PopUp - Microsoft Internet Explorer

February 2004

S	M	T	W	T	F	S
25	26	27	28	29	30	31
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	1	2	3	4	5	6

Click and select a date

Ok

Click OK button to display students' attendance list

9. After select all the information, teacher clicks *Ok* button and a list of students' attendance on that selected day will display.

[View Attendance](#) [View Total Absent Day](#)

VIEW ATTENDANCE

Form :
Class Name :
Date :

Ok

User ID	Student Name	Status
S040001	Lee Kok Chung	Absent
S040005	Fariza Hanum	Present
S040006	Chong May Ling	Present
S040007	Azlina	Present
S040008	Azri Ahmad	Present
S040009	Chan Meng Keat	Present
S040010	Kathiravan	Present

Back

List of students' attendance

10. If teacher want to view students' total absent days, he/she clicks *View Total Absent Day* button. He/She then selects *Form* and *Class Name* and click *Ok* button to proceed

[View Attendance](#) [View Total Absent Day](#)

VIEW TOTAL ADSENT DAY

Form :
Class Name :

Click OK button to display students' total absent davs

Ok

11. A list of students' total absent days will display to the teacher. The absent days counted from the beginning of the semester until that day.

WPFS WEB PORTAL
SCHOOLS

our portal!.....Towards an effective school management.....

Logout

[View Attendance](#) [View Total Absent Day](#)

VIEW TOTAL ADSENT DAY

Form :

Class Name :

Ok

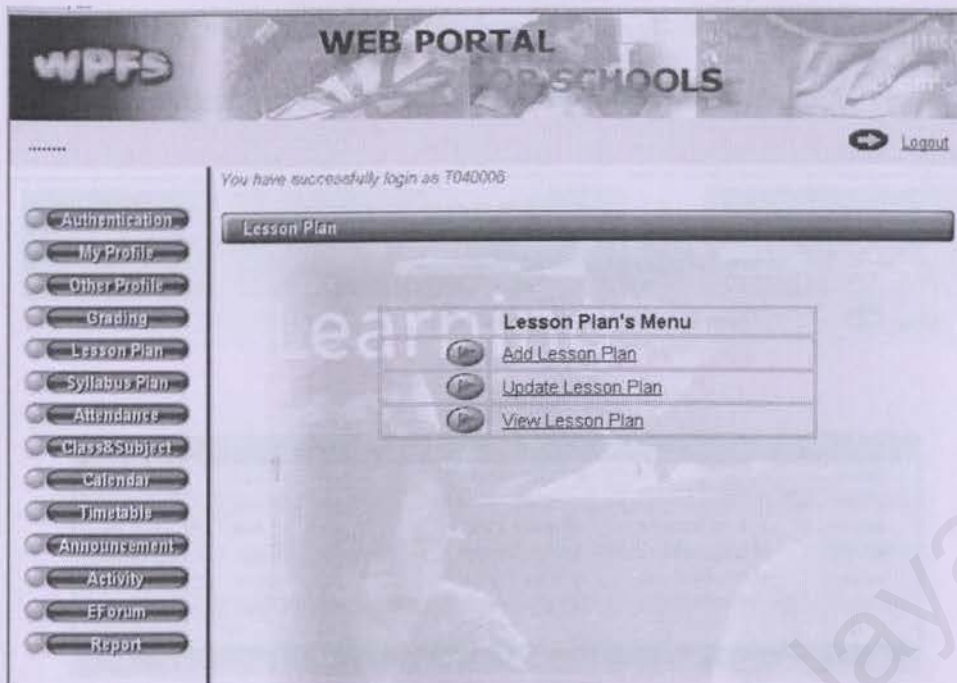
User ID	Student Name	Status	Total Absent
S040001	Lee Kok Chung	OK	1
S040005	Fariza Hanum		0
S040006	Chong May Ling		0
S040007	Azlina		0
S040008	Azri Ahmad		0
S040009	Chan Meng Keat		0
S040010	Kathiravan		0
			1

Back

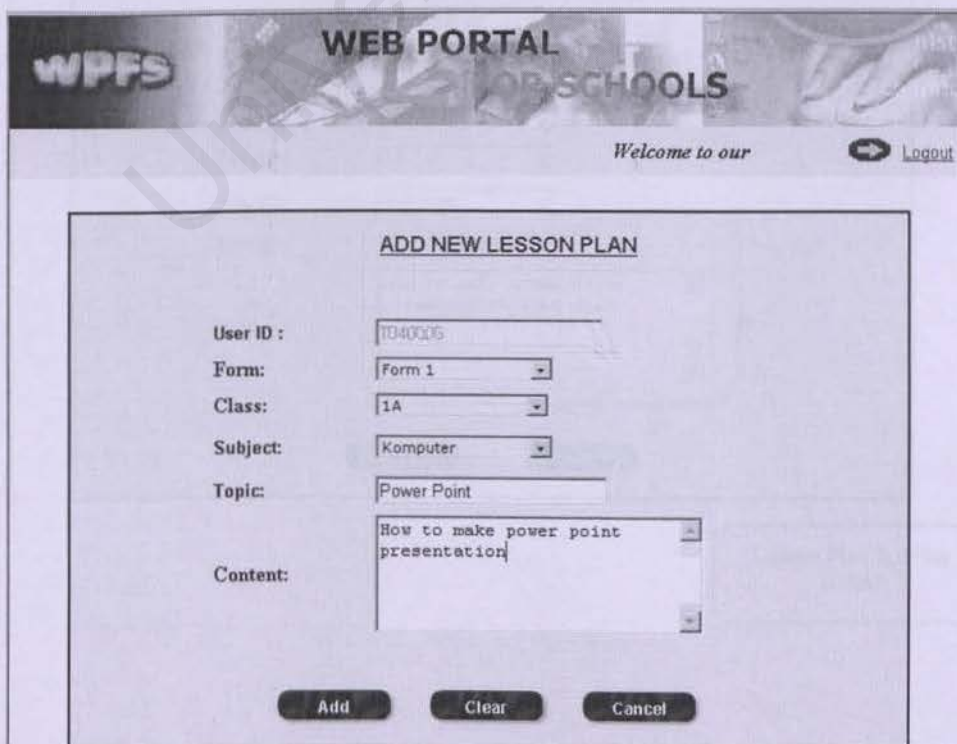
List of students' total absent days

B4.3 Lesson Plan

1. When teacher clicks *Lesson Plan* button, he/she will enter *Lesson Plan menu page*.



2. Teacher can either choose to add lesson plan, update lesson plan or view lesson plan.
3. If teacher want to add lesson plan, he/she clicks **Add Lesson Plan** button. After completing the lesson plan, he/she clicks **Add** button to send it to the master for validation.



4. If teacher want to update the lesson plan, he/she clicks *Update Lesson Plan* button. After that, they select the lesson plan that they want to update.

WPFS WEB PORTAL
 ...Towards an effective school management...
 Logout

Lesson Plan

Subject	Form	Class Name	Send Date	Check Date	Status
Bahasa Melayu	Form 1	1A	2/16/2004 11:55:22 AM		Awaiting
Komputer	Form 1	1A	2/18/2004 2:00:36 AM		Awaiting
Bahasa English	Form 1	1A	2/16/2004 4:36:25 PM	2/17/2004 9:54:28 PM	Checked
Bahasa Melayu	Form 1	1A	2/16/2004 4:32:05 PM	2/16/2004 4:34:23 PM	Checked
Pendidikan Moral	Form 1	1A	2/16/2004 2:50:24 PM	2/16/2004 2:51:58 PM	Checked
Matematik	Form 1	1A	2/16/2004 2:05:31 PM	2/16/2004 2:07:40 PM	Checked

Click the subject to update

5. Teacher can edit/update the lesson plan and send it to headmaster to validate.

WPFS WEB PORTAL
 ...Towards an effective school management...
 Logout

UPDATE LESSON PLAN

User ID : T040006
 Form: Form 1
 Class: 1A
 Subject: Komputer
 Topic: Power Point 2
 Content: How to make power point presentation look nice

Update Cancel

Lesson Plan is being edited

6. Teacher can view the list of lesson plan by clicking *View Lesson Plan* button in *Lesson Plan Menu Page*.

The screenshot shows the 'VIEW LESSON PLAN' section of the WPFS web portal. A table lists lesson plans with columns for Subject, Form, Class Name, Send Date, Check Date, and Teacher Name. An arrow points from a box labeled 'List of lesson plan' to the table.

Subject	Form	Class Name	Send Date	Check Date	Teacher Name
Bahasa English	Form 1	1A	2/16/2004 4:36:25 PM	2/17/2004 9:54:28 PM	En. Azri
Bahasa Melayu	Form 1	1A	2/16/2004 4:32:05 PM	2/16/2004 4:34:23 PM	En. Azri
Pendidikan Moral	Form 1	1A	2/16/2004 2:50:24 PM	2/16/2004 2:51:58 PM	En. Azri
Matematik	Form 1	1A	2/16/2004 2:05:31 PM	2/16/2004 2:07:40 PM	En. Azri
Kemahiran Hidup	Form 4	1A	1/29/2004 9:23:35 PM	1/29/2004 9:44:11 PM	Mr. Tee
Bahasa English	Remove	1A	1/27/2004 11:42:13 AM	1/27/2004 3:57:43 PM	Mr Lee

B4.3 Syllabus Plan

1. When teacher clicks *Syllabus Plan* button, he/she will enter *Syllabus Plan menu page*.

The screenshot shows the 'Syllabus Plan' menu page. The left sidebar contains a list of menu items, with 'Syllabus Plan' highlighted. The main content area displays the 'Syllabus Plan's Menu' with three options: 'Add Syllabus Plan', 'Update Syllabus Plan', and 'View Syllabus Plan'.

- Teacher can either choose to add syllabus plan, update syllabus plan or view syllabus plan.
- If teacher want to add syllabus plan, he/she clicks *Add Syllabus Plan* button. After completing the syllabus plan, he/she clicks *Add* button to send it to the master for validation.

The screenshot shows a web interface for a school management system. At the top, there is a header with the text "SCHOOLS" and a navigation bar with the slogan "Welcome to our portal!.....Towards an effective school management....." and a "Logout" button. The main content area is titled "ADD NEW SYLLABUS PLAN" and contains the following fields:

- User ID :
- Form:
- Class:
- Subject:
- Topic:
- Chapter Number:
- Objective:
- Content:

At the bottom of the form, there are three buttons: "Add", "Clear", and "Cancel".

- If teacher want to update the syllabus plan, he/she clicks *Update Syllabus Plan* button. After that, they select the syllabus plan that they want to update.

SYLLABUS PLAN

Subject	Form	Class Name	Send Date	Check Date	Status
Komputer	Form 1	1A	2/18/2004 2:24:55 AM		Awaiting
Bahasa Melayu	Form 1	1A	2/18/2004 11:52:44 AM	2/17/2004 10:14:37 PM	Checked
Sejarah	Form 1	1A	2/16/2004 11:35:55 AM	2/16/2004 4:43:46 PM	Checked

Click the subject to update

5. Teacher can edit/update the syllabus plan and send it to headmaster to validate.

Welcome to our portal!..... Towards an effective school management..... Logout

UPDATE SYLLABUS PLAN

User ID :

Form:

Class:

Subject:

Topic:

Chapter Number:

Objective:

Content:

Syllabus Plan is being edited

6. Teacher can view the list of syllabus plan by clicking *View Syllabus Plan* button in *Syllabus Plan Menu Page*.

SYLLABUS PLAN

Subject	Form	Class Name	Send Date	Check Date	Status
Komputer	Form 1	1A	2/19/2004 2:24:56 AM		Awaiting
Bahasa Melayu	Form 1	1A	2/16/2004 11:52:44 AM	2/17/2004 10:14:37 PM	Checked
Sejarah	Form 1	1A	2/16/2004 11:35:55 AM	2/16/2004 4:43:46 PM	Checked

List of syllabus plan

B5 Student Section

This section will show all the functions that can be accessed by the students.

1. A main menu page with a list of authorized functions will be displayed once the user login as student. Student can click on the buttons available to access certain functions. Based on the options that student selects, he/she will be directed to specified function.

WPFS WEB PORTAL FOR SCHOOLS
 portal!.....Towards an effective school management..... Logout

You have successfully login as S040001

WELCOME TO WEB PORTAL FOR SCHOOLS

- SCHOOL ADMINISTRATOR
- HEADMASTER
- TEACHER
- STUDENT
- PIBG

- Authentication
- Timetable
- My Profile
- Announcement
- Quizing
- Activity
- Calendar
- EForum

B5.1 Activity

1. If the student clicks on the **Activity** button, a menu page will be displayed.

WPFS WEB PORTAL SCHOOLS

management..... Logout

You have successfully login as S040001

Activity

Activity's Menu

- Add Activity
- Update Activity
- View Activity

2. Students who are president in a society, club, sport or uniform body will be eligible to add activity and update activity, however all the students are permitted to view activity from this menu page.
3. If the student want to add activity, he/she clicks **Add Activity** button.

ADD NEW ACTIVITY

User ID : S040001

Type: Sport

Activity Name : Ping Pong *

Advisor: En. Azri

President: Lee *

Vice President:

Secretary: Tan *

Vice Secretary:

Treasurer: Chan *

Vice Treasurer:

Committee 1:

Committee 2:

Committee 3:

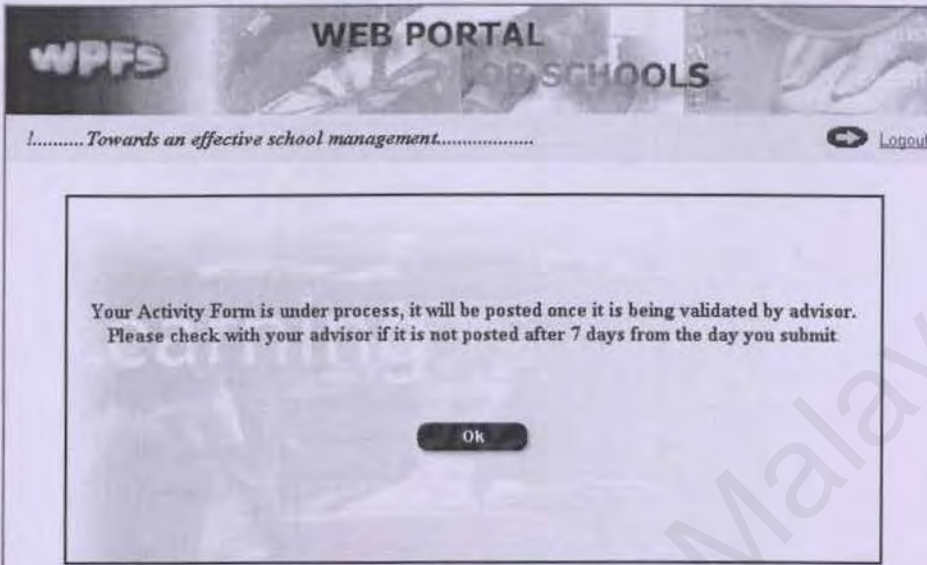
Committee 4:

Committee 5:

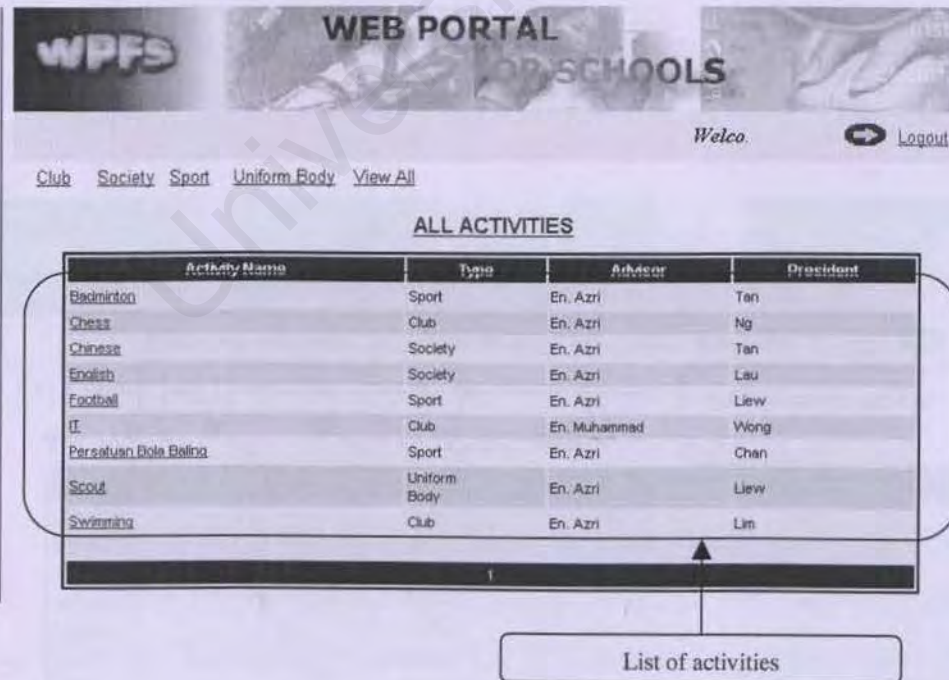
Content:

Add Cancel

4. Student clicks **Add** button to add all the information of the activity. The activity will be sent to advisor to validate before posted in the activity list for all users to view.



5. If the student wants to update the activity's detail, he/she clicks **Update Activity** button. An activity list will be listed and he/she can select the activity to update.



6. When the student clicks on the *Activity Name*, he/she will enter *Update Activity Page*, he/she can modify the information of the activity.

UPDATE ACTIVITY

User ID :

Type:

Name : *

Advisor:

President: *

Vice President:

Secretary: *

Vice Secretary:

Treasurer: *

Vice Treasurer:

Committee 1:

Committee 2:

Committee 3:

Committee 4:

Committee 5:

Content:

Activity is being edited

7. If the student clicks on the *View Activity* button, he/she can view list of school activities.

WPFS WEB PORTAL FOR SCHOOLS

Welcome to our portal!..... Towards an effective school management Logout

Click here to view all activities list

ALL ACTIVITIES

Activity Name	Type	Advisor	President
Badminton	Sport	En. Azri	Tan
Chess	Club	En. Azri	Ng
Chinese	Society	En. Azri	Tan
English	Society	En. Azri	Lau
Football	Sport	En. Azri	Liew
IT	Club	En. Muhammad	Wong
Scout	Uniform Body	En. Azri	
Swimming	Club	En. Azri	

Click here to view clubs
Click here to view societies
Click here to view sports
Click here to view uniform bodies

8. If student clicks on the *Activity name*, he/she can view the detail of the selected activity.

VIEW ACTIVITY

User ID : S040001

Type: Sport

Name : Badminton

Advisor: En. Azn

President: Tan

Wise President: Chew

Secretary: Lee

Wise Secretary:

Treasurer: Chng

Wise Treasurer:

Committee 1:

Committee 2:

Committee 3:

Committee 4:

Committee 5:

Content:

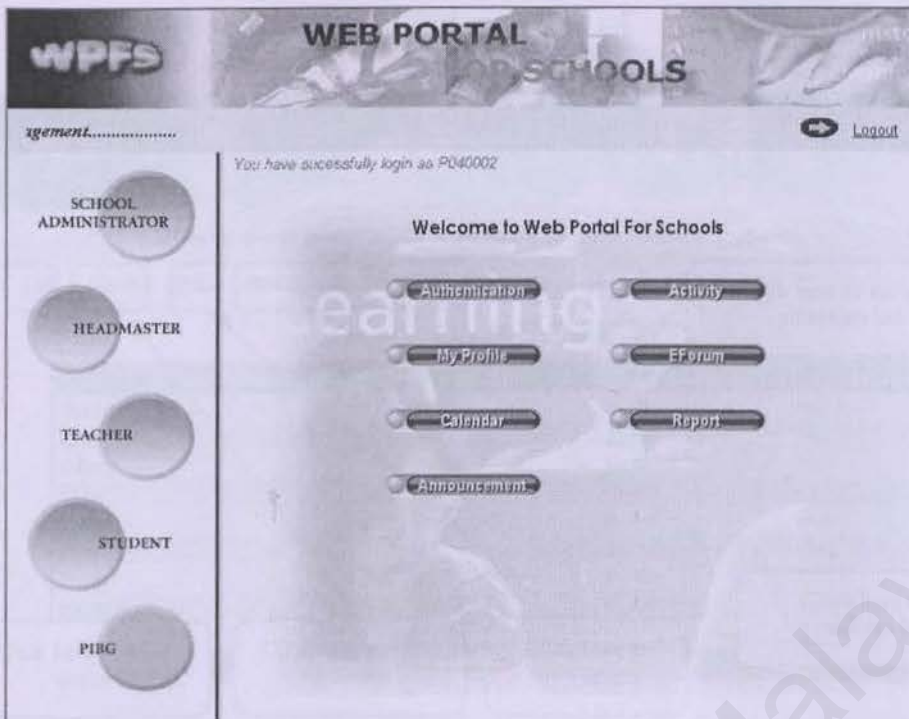
OK

9. Student clicks *ok* button and follow by clicking *back to activity* button to return to menu page.

B6 PIBG Section

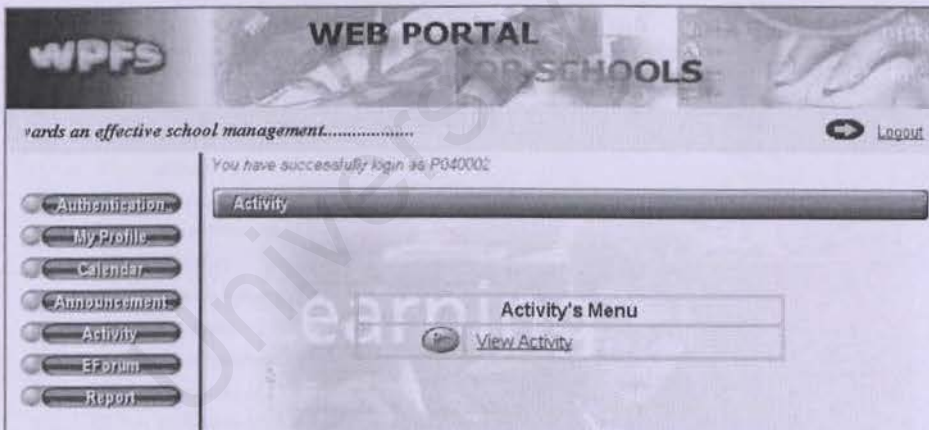
This section will show all the functions that can be accessed by the parents.

1. A main menu page with a list of authorized functions will be displayed once the user login as parent. Parent can clicks on the buttons available to access certain functions. Based on the options that parent selects, he/she will be directed to specific function.



B6.1 Activity

1. If the parent clicks on the *Activity* button, a menu will be displayed.



2. If the parent clicks on the *View Activity* button, he/she can view list of school activities.

WPFS WEB PORTAL FOR SCHOOLS

Welcome to our portal!..... Towards an effective school management [Logout](#)

[Club](#)
[Society](#)
[Sport](#)
[Uniform Body](#)
[View All](#)

Click here to view all activities list

ALL ACTIVITIES

Activity Name	Type	Advisor	President
Badminton	Sport	En. Azri	Tan
Chess	Club	En. Azri	Ng
Chinese	Society	En. Azri	Tan
English	Society	En. Azri	Lau
Football	Sport	En. Azri	Liew
I.T.	Club	En. Muhammad	Wong
Scout	Uniform Body	En. Azri	
Swimming	Club	En. Azri	

Click here to view clubs

Click here to view societies

Click here to view sports

Click here to view uniform bodies

3. If parent clicks on the **Activity name**, he/she can view the detail of the selected activity.

VIEW ACTIVITY

User ID :

Type:

Name :

Advisor:

President:

Wise President:

Secretary:

Wise Secretary:

Treasurer:

Wise Treasurer:

Committee 1:

Committee 2:

Committee 3:

Committee 4:

Committee 5:

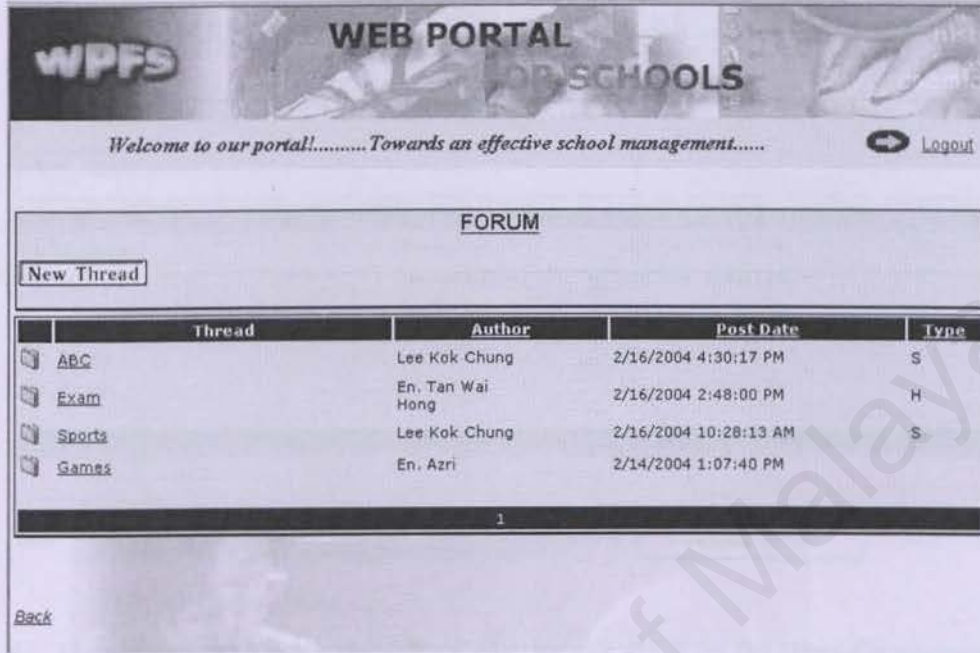
Content:

4. Parent clicks **ok** button and follow by clicking **back to activity** button to return to menu page.

B7 All Users Section

B7.1 Eforum

1. When user clicks on *Eforum* button, he/she will be directed into Eforum page.

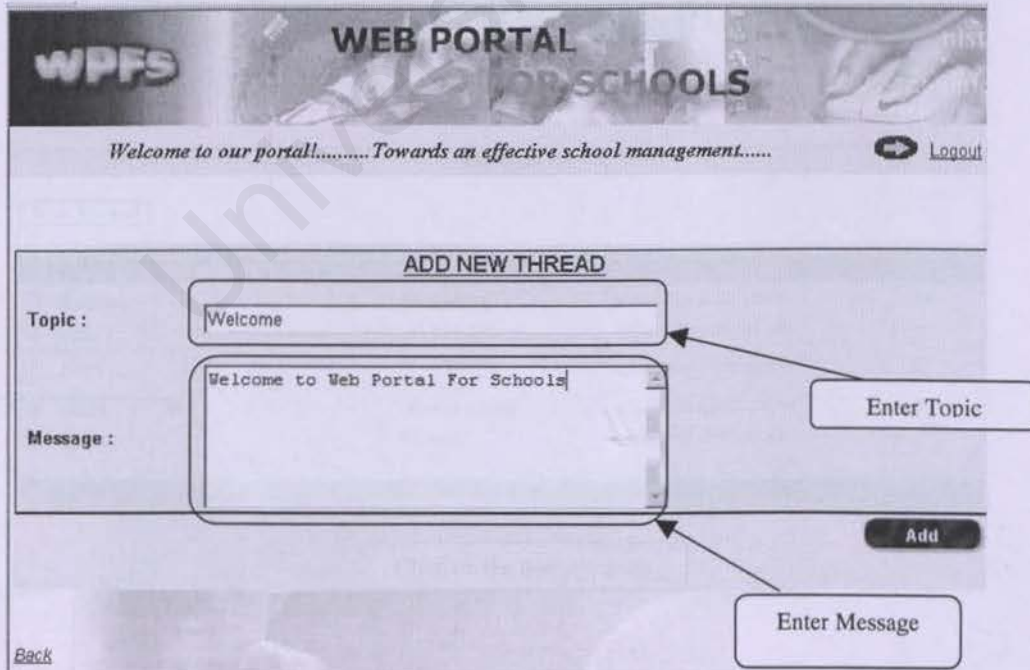


The screenshot shows the 'FORUM' section of the 'WEB PORTAL FOR SCHOOLS'. At the top, there is a banner with 'WPFS' and 'WEB PORTAL FOR SCHOOLS'. Below the banner is a welcome message: 'Welcome to our portal!..... Towards an effective school management.....' and a 'Logout' button. The main content area is titled 'FORUM' and contains a 'New Thread' button. Below this is a table listing threads:

	Thread	Author	Post Date	Type
	ABC	Lee Kok Chung	2/16/2004 4:30:17 PM	S
	Exam	En. Tan Wai Hong	2/16/2004 2:48:00 PM	H
	Sports	Lee Kok Chung	2/16/2004 10:28:13 AM	S
	Games	En. Azri	2/14/2004 1:07:40 PM	

At the bottom of the table, there is a page number '1'. A 'Back' link is located at the bottom left of the page.

2. User can choose either post new thread or reply a thread. If user wants to post new thread, he/she will click *New Thread* button.



The screenshot shows the 'ADD NEW THREAD' form. At the top, there is a banner with 'WPFS' and 'WEB PORTAL FOR SCHOOLS'. Below the banner is a welcome message: 'Welcome to our portal!..... Towards an effective school management.....' and a 'Logout' button. The main content area is titled 'ADD NEW THREAD' and contains a 'Topic' field with the text 'Welcome' and a 'Message' field with the text 'Welcome to Web Portal For Schools'. There is an 'Add' button at the bottom right. Annotations with arrows point to the 'Topic' field and the 'Message' field, with labels 'Enter Topic' and 'Enter Message' respectively.

3. User clicks **Add** button to add his thread to Eforum.

WPFS WEB PORTAL FOR SCHOOLS

Welcome to our portal!.....Towards an effect Logout

FORUM

New Thread

Thread	Author	Post Date	Type
Welcome	Sivanathan	2/17/2004 5:07:12 PM	SA
ABC	Lee Kok Chung	2/16/2004 4:30:17 PM	S
Exam	En. Tan Wai Hong	2/16/2004 2:48:00 PM	H
Sports	Lee Kok Chung	2/16/2004 10:28:13 AM	S
Games	En. Azri	2/14/2004 1:07:40 PM	

Back

Added thread

4. If user wants to see a thread's reply, he can click on the thread's name and all the thread's reply will be displayed.

WPFS WEB PORTAL FOR SCHOOLS

Welcome to our portal!.....Towards an effect Logout

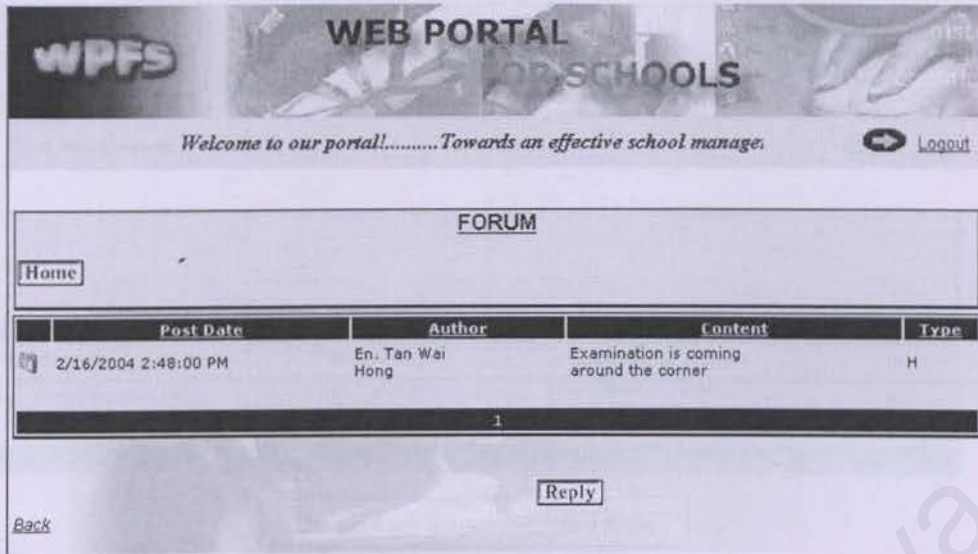
FORUM

New Thread

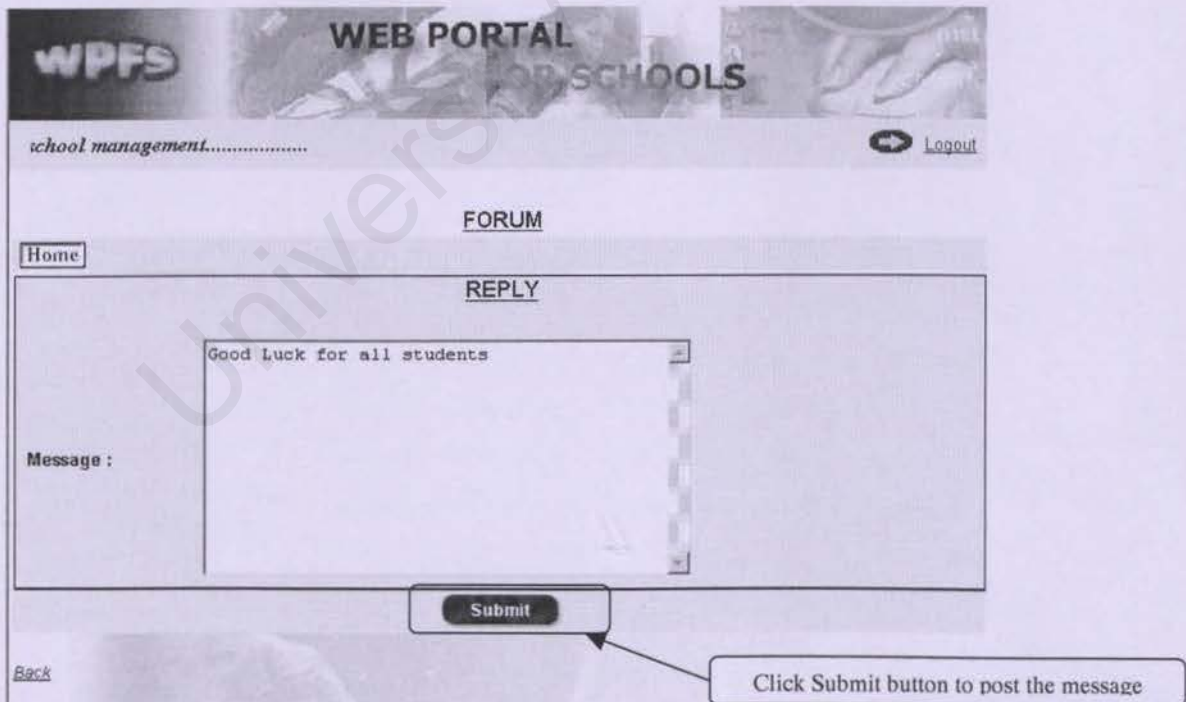
Thread	Author	Post Date	Type
Welcome	Sivanathan	2/17/2004 5:07:12 PM	SA
ABC	Lee Kok Chung	2/16/2004 4:30:17 PM	S
Exam	En. Tan Wai Hong	2/16/2004 2:48:00 PM	H
Sports	Lee Kok Chung	2/16/2004 10:28:13 AM	S
Games	En. Azri	2/14/2004 1:07:40 PM	

Back

Click on the thread's name





- 5 If user wants to reply to this thread, he needs to click *Reply* button and *Reply Form* will display. After finish typing the message, SA clicks *Submit* button to post the message into the *Reply Form*.



FORUM

[Home](#)

	Post Date	Author	Content	Type
	2/17/2004 7:27:27 PM	Sivanathan	Good Luck for all students	SA
	2/16/2004 2:48:00 PM	En. Tan Wei Hong	Examination is coming around the corner	H
1				

The message is posted in Reply Form

[Back](#)

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Reference

A. Website

1. <http://www.schoolwrite.com>
2. <http://www.mazikusa.com>
3. <http://www.thinkwave.com>
4. <http://www.rational.com/products/rup/index.jsp>
5. <http://www.microsoft.com>
6. <http://aspnet.4guysfromrolla.com>
7. <http://www.asp.net>
8. <http://www.got.net.com>
9. <http://www.codeproject.com>

B. Books

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2. Ian K. Bray (2002). *An Introduction To Requirements Engineering*. Addison-Wesley
3. Ian Sommerville (2001). *Software Engineering*. Sixth Edition. Addison-Wesley
4. Scott, Kendall. (2001). *UML Explained*. Addison-Wesley
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6. Scott Mitchell. (2003). *SAMS Teach Yourself ASP.NET in 24 hours*.
SAMS Publishing.

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