

UTP Interactive WAP Announcement

by

Nurul Bahriah binti Saeman

Dissertation submitted in partial fulfillment of
the requirement for the
Bachelor of Technology (Hons)
(Information System)

(June 2004)

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CERTIFICATION OF APPROVAL

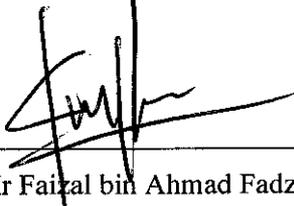
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A project dissertation submitted to the
Information System Program
Universiti Teknologi PETRONAS
in partial fulfillment of the requirement for the
BACHELOR OF TECHNOLOGY (Hons)
(INFORMATION SYSTEM)

Approved by,



(Mr Faizal bin Ahmad Fadzil)

Project Supervisor

UNIVERSITI TEKNOLOGI PETRONAS
TRONOH, PERAK

June 2004

CERTIFICATION OF ORIGINALITY

This is to certify that I am responsible for the work submitted in this project, that the original work is my own except as specified in the references and acknowledgements, and that the original work contained herein have not been undertaken or done by unspecified sources or persons.

NURUL BAHRIAH BINTI SAEMAN

ABSTRACT

UTP Interactive WAP Application is a project that will enable UTP students to retrieve information around UTP only by sending request through SMS. Currently, lecturers and administration are using UTP Website, UTP Buletin Board, E-learning, and notice board to spread out information to students such as class replacement and club events. However, due to various technical errors, students seldom log on to those websites. Therefore, this project is developed as a backup to UTP Website and E-learning, especially for high mobility students who prefer to access Internet through Mobile phone than from computers. Through their handphone, student will send request as provided in the system menu to Web Server. Then, the Web Server which hold WAP content will process the request and reply to the sender. The process is completed once the sender received the requested information. This is the manuscript which reporting the whole development of the project. To describe the study, background, problem statement, objectives and scope of the project will be imparted in Introduction Chapter. Next, in Literature Review Chapter, search and findings about the implementation and architecture of WAP and WML technology together with other components in developing the project is summarized. Next, as the framework that builds the project, the procedures that have been gone through, and the software that is implemented namely Nokia Mobile Internet Toolkit 4.0, EasyPHP, and Dreamweaver are generally described in Methodology Chapter. In Result and Discussion Chapter, The output of the first and second part of the study are imparted, displayed and discussed.

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This goes out to all friends, especially Noraien Abu Samah and Maziah Abdul Manaf who gave enduring support and significant assistances over all the doubts and troubles. As for my beloved parents, Mr. Saeman b Maat and Puan Sumiah bte Heran, it is crystal clear that the love they yield is enough for me to sense their presences.

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CHAPTER 1

INTRODUCTION

The Final Year Project (STB 5033) is a 3 credit hour course mainly on research work and simulation. The students involved are the IT and IS final year students of UNIVERSITI TEKNOLOGI PETRONAS. The title given for this project is UTP INTERACTIVE WAP ANNOUNCEMENT. The topic was proposed by a lecturer, Mr.Faizal Ahmad Fadzil, who eventually the supervisor for the project.

1.1 BACKGROUND OF STUDY

The project developed is called UTP Interactive WAP Announcement. It is based on WAP technology that stands for Wireless Application Protocol. WAP is a universal protocol based on an open technology, which connects Internet to the GSM network.

UTP Interactive WAP Announcement will be an intermediary between administration and students. It is a system that enables students who need information around UTP to get the requested information on time, from any location. They just need to send the request as provided in the system menu, and the answer will be received after a few seconds. Updated announcement will be provided by a group of respective staff to ensure that the students will get the latest and exact information.

1.2 PROBLEM STATEMENT

Referring to UTP environment, there are so many changes occur around us. Things such as club activities, security policy, and other public announcement always vary over the time. Currently, lecturers, students and administration depend so much on notice boards, E-learning and class representatives as the medium of announcement.

On the other hand, due to UTP servers' heavy duty and other technical problems, accessing Internet from computers alone is not enough reliable to spread information. Comparing to WAP technology that only need end users to SMS through their hand phone, logging on to certain website to retrieve information seems so troublesome. This kind of conditions has always been manipulated by students to as the reasons for them to be outdated.

1.3 OBJECTIVES AND SCOPE OF STUDY

1.3.1 Objectives

Upon completion of the project, some things are taken into consideration. The objectives are to be referred as a guideline to achieve the specific goal in the project. The general objectives are as below:

- i. To develop the skills and knowledge in application.
- ii. To integrate the theoretical knowledge with industrial experience.
- iii. To be trained to solve problem independently and with minimum supervision.
- iv. To enhance organization of report writing for professionalism.

As for the project, the specific objectives had been set below:

- i. To build an interactive environment in UTP. This project can be applicable to all departments in UTP such as JPSP, Security, Residential College, and Academic Center Services to spread out any announcement to students.
- ii. To build a strong backup of information integration besides E-learning, UTP Bulletin Board, and other current medium of announcement in UTP, since most students take along mobile phone everywhere they go.
- iii. To eliminate reasons of students for being outdated

1.3.2 Relevancy and Scope of Study

UTP Interactive WAP Announcement is timely, operationally, costly, and economically feasible. Since communication and updated information is important, student can really get benefits from what the system can offer. Credit will be charged upon each request. So, it is costly feasible because only those who request will pay the service. In terms of economic, this system has a potential to build joint venture relationship between UTP and any telecommunication company such as Maxis, Celcom, or Digi (M) Sdn Bhd.

The study will be on two main parts; the first one is to develop a hand phone browser of UTP Interactive WAP Application using a set of WAP simulator called Nokia Mobile Internet Toolkit 4.0. The following part is to specialize further on developing WAP announcement as a submenu of the first part. The project will be in the form of hand phone and server simulation that will be imparted further throughout this report.

CHAPTER 2

LITERATURE REVIEW AND THEORY

According to www.mobileinfo.com/WAP/what_is.htm, a mobile device such as hand phone is a small device that can be carried out easily by people anywhere. That is one of the reasons many analysts believe that within three years, more people will be accessing the Internet from mobile phones than from office or home computers. Nowadays, in some countries in Europe people are spending more on mobile data access compared to voice services. From this short statement, we can visualize huge opportunity in the development of mobile data service technology in this coming few years.

2.1 WIRELESS APPLICATION PROTOCOL (WAP)

As said by Jeffrey A. Hoffer and his colleagues in Modern System Analysis and Design, similar to the way that HTTP and HTML standards support the delivery of Internet content to desktop PC, another standard architecture is needed for emerging devices. Therefore, nowadays, we can deliver Internet application to wireless mobile devices with the accomplishment of Wireless Application Protocol (WAP) and the Wireless Markup Language (WML). WAP is actually a variation of HTTP, while WML is an XML-based markup language that was designed specifically to describe how WAP content is presented on a wireless terminal.

2.1.1 How does WAP Works

As visualized in Figure 2.1 below, adapted from “How does WAP Works” through <http://support.infinite.com>, theoretically, mobile WAP device which is attached to a mobile network (GSM, CDMA, etc) dials the modem attached to a dial-in server (Remote Access Service). This server gives the WAP device access to the protocols it needs. It is known as PPP or Point-to-Point Protocol. These protocols are used to access the next step in the chain, the WAP gateway.

The WAP gateway is the link between the wireless and the wired world. Basically it gives the WAP device access to the common internet. After the PPP provider has given

the WAP device the required protocols and assigned it an IP address, the request for the URL is sent to the gateway. The WAP gateway, now under "control" of the WAP device requests the URL with a normal HTTP request, such as GET <http://utp.edu.my/wap>.

On the Internet, there is a content server (Web Server) which holds WAP content. It now receives the request to send out the content located at the <http://utp.edu.my/wap> URL. The content server sends the requested content back to the WAP device through WAP gateway. If the contents, are in textual WML code (the human readable type), the WAP gateway compiles the textual WML into tokenized WML, or WMLC, where basically the code is "compressed" down into binary data (bytecode). This tokenized WML is then passed back to the WAP device. By the way, if the contents from the content server are already in tokenized WML format, the WAP gateway will skip this operation.

The reason for the conversion from textual WML to tokenized WML is to reduce bandwidth usage. A WAP device's WML browser can only read tokenized WML. Finally, when the WAP device received the URL in tokenized WML code, WML browser renders the contents on the WAP device's display to present a card for the user.

Therefore, to enable the implementation of UTP WAP Interactive, UTP need to have a Web Server that will hold the WAP Content, WAP Gateway as the link between the wireless and the wired world, and a RAS Server that will give WAP devices the access to Point-to-Point Protocol to enable access to the WAP Gateway.

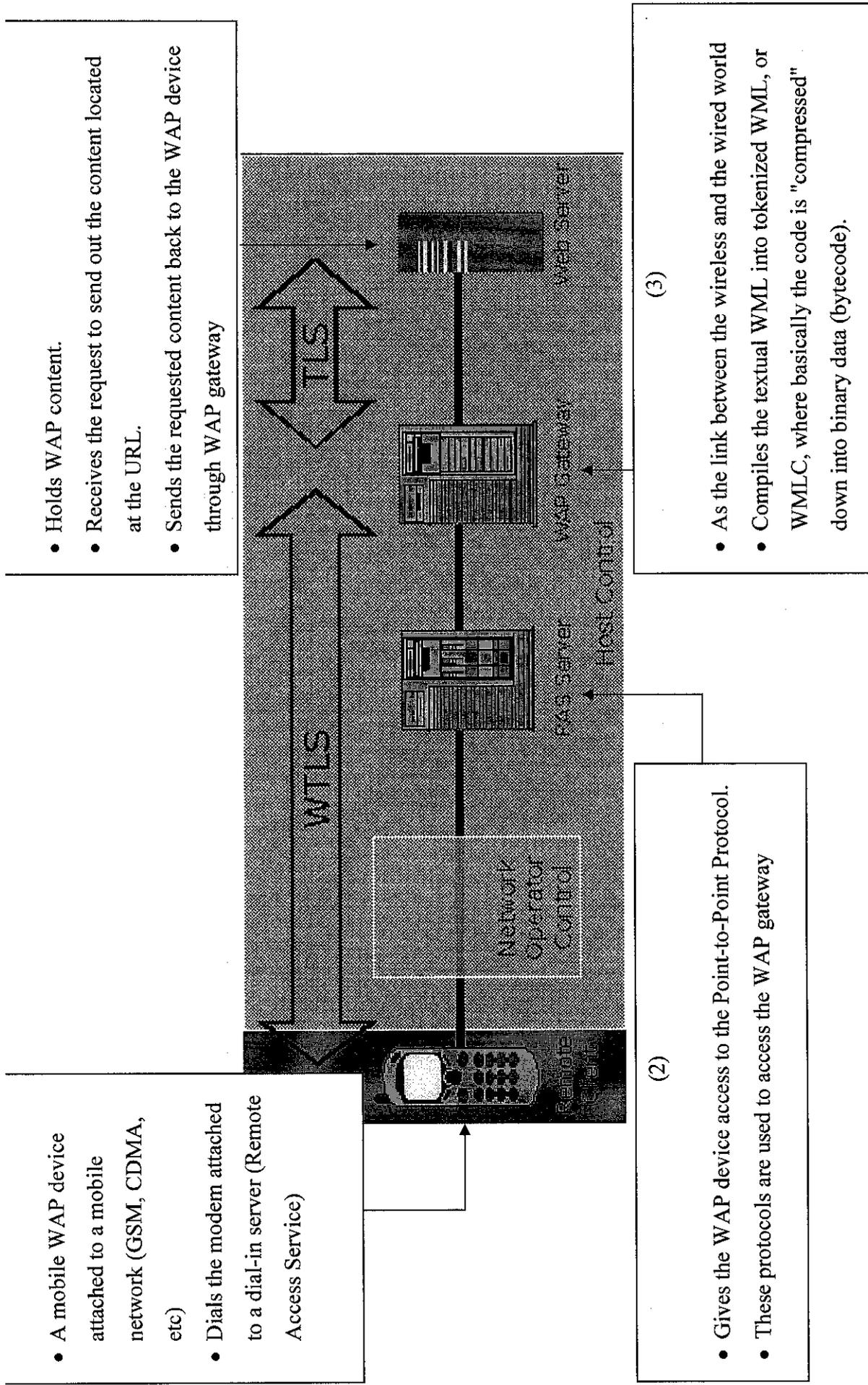


Figure 2.1 – WAP Diagram

2.2 FEATURE AND BENEFIT COMPARISON BETWEEN WAP PUSH AND SMS

The following is the summarizes of key differences between WAP Push and SMS. WAP Push is supported by Openwave™ Mobile Browser Version 5 and higher.

Feature	Benefit	WAP Push	SMS
<ul style="list-style-type: none"> Allows users to immediately interact with content / application 	<ul style="list-style-type: none"> Improves application usability and opens opportunities for interactive applications. Increase adoption and usage 	<ul style="list-style-type: none"> Yes 	<ul style="list-style-type: none"> No. There are proprietary implementations that will allow it.
<ul style="list-style-type: none"> Supports Graphics and Other WML supported content (any MIME type) 	<ul style="list-style-type: none"> Opens opportunities to develop more compelling applications that drive adoption and usage 	<ul style="list-style-type: none"> The presentation of graphics, sound or other content is dependent on the browser's capabilities and not controllable by the push framework. 	<ul style="list-style-type: none"> Text only. There are proprietary implementations over SMS that will allow it (e.g., Nokia's Smart Messaging)
<ul style="list-style-type: none"> Allows pushing to all WAP 1.2.1 Handsets 	<ul style="list-style-type: none"> Supports handsets from multiple vendors More handset options for subscribers and carriers Support more handsets in the long term 	<ul style="list-style-type: none"> Yes 	<ul style="list-style-type: none"> No (plain text SMS only)

<ul style="list-style-type: none"> • Allows pushing to SMS-only handsets (handsets that do not have WAP Push capability). 	<ul style="list-style-type: none"> • Ensures broadest coverage of handsets for Service Indication¹ and Service Load² push messages. • Simplifies application development—one interface (PAP) for delivery to all handsets. 	<ul style="list-style-type: none"> • Yes. (WAP Push is converted to plain text SMS message) 	<ul style="list-style-type: none"> • Yes
<ul style="list-style-type: none"> • Service Loading with Service Indicator: content (e.g., WML) is pushed at the same time as notification (Openwave feature) 	<ul style="list-style-type: none"> • Subscribers receive push messages faster without having to wait for content to download compared to a pull session. 	<ul style="list-style-type: none"> • Yes 	<ul style="list-style-type: none"> • N/A
<ul style="list-style-type: none"> • Session Initiation Application (a Push can auto-activate a data session, launch a browser, make a phone call) 	<ul style="list-style-type: none"> • New useful applications can be developed, such as a automated push of a sound file that provides a traffic update so the user can keep their eyes on the road • Push messages can be encrypted using a secure connection, thereby protecting privacy 	<ul style="list-style-type: none"> • Yes 	<ul style="list-style-type: none"> • No
<ul style="list-style-type: none"> • Cache Operations 	<ul style="list-style-type: none"> • Ensures that the most up-to-date information is in the handset (e.g., a news update makes a previously cached update obsolete) 	<ul style="list-style-type: none"> • Yes 	<ul style="list-style-type: none"> • No

<ul style="list-style-type: none"> • Secure Push to Handset (WTLS) 	<ul style="list-style-type: none"> • Protects privacy of push content 	<ul style="list-style-type: none"> • Yes 	<ul style="list-style-type: none"> • No
<ul style="list-style-type: none"> • Confirmed Push 	<ul style="list-style-type: none"> • Ensures successful delivery of message 	<ul style="list-style-type: none"> • Yes 	<ul style="list-style-type: none"> • No
<ul style="list-style-type: none"> • Supports Multiple Addressing 	<ul style="list-style-type: none"> • Simplifies push message submissions for developers and improves performance 	<ul style="list-style-type: none"> • Yes 	<ul style="list-style-type: none"> • Cell Broadcast
<ul style="list-style-type: none"> • Provides PI Access Control 	<ul style="list-style-type: none"> • Provides protection from unauthorized content providers (e.g., spammers) 	<ul style="list-style-type: none"> • Yes (black/white lists in addition to fine control for each content provider) 	<ul style="list-style-type: none"> • Yes. Network Access Limited
<ul style="list-style-type: none"> • Supports SSL to PI 	<ul style="list-style-type: none"> • Ensures privacy of push messages from content providers and the Push Proxy Gateway 	<ul style="list-style-type: none"> • Yes 	<ul style="list-style-type: none"> • No application level interface
<ul style="list-style-type: none"> • Provides Intelligent Routing to Client 	<ul style="list-style-type: none"> • Ensures that the push is targeted to right type of device and adapts the content and protocol accordingly. 	<ul style="list-style-type: none"> • Yes 	<ul style="list-style-type: none"> • Yes. via the network
<ul style="list-style-type: none"> • Supports Push Message Prioritization 	<ul style="list-style-type: none"> • Urgent messages are delivered first, providing a better subscriber experience for applications that require Quality of Service delivery prioritization (e.g., emergency notifications vs. news) 	<ul style="list-style-type: none"> • Yes 	<ul style="list-style-type: none"> • Yes, not under the control of message initiator.

Table 2.1: Feature and Benefit Comparison between WAP Push and SMS

From the comparison table adapted from OPENWAVE System Inc, it is shown that WAP Push technology is higher in security, quality of services and has more features to be enhanced further. It provides active content that can be used in its simplest form. By the way, it is more sophisticated in delivering the service itself.

Push technology via the Openwave Push Proxy Gateway provides the capabilities to communicate to the wider group of users, and facilitate the development of applications by providing a single, open-standard push access point. So, WAP Push message technology is chosen to be used for this project considering the chances to be enhanced further later.

2.3 EasyPHP

Adopted from www.easyphp.org, EasyPHP is a complete software package that allows the use of all power and the flexibility by offering the dynamic language PHP and the efficient use of databases. The package includes an Apache server, a MySQL database, a fully PHP execution, as well as easy development tools for creating web site or applications.

According to www.xmlone.com, Apache Server is one of the widest used pieces of software on the Internet for hosting websites. It is a popular web server available on many operating systems. A web server is a program that, using the client/server model and the World Wide Web's Hypertext Transfer Protocol (Hypertext Transfer Protocol), serves the files that form web pages to web users (whose computers contain HTTP clients that forward their requests). Every computer on the Internet that contains a web site must have a web server program. Web servers often come as part of a larger package of Internet- and intranet-related programs for serving e-mail, downloading requests for File Transfer Protocol files, and building and publishing Web pages.

Through www.monstercommerce.com, it is defined that MySQL is a relational database management system, which means it stores data in separate tables rather than putting all the data in one big area. This adds flexibility, as well as speed. The SQL part of MySQL stands for "Structured Query Language," which is the most common language used to access databases. The MySQL database server is the most popular open source database in the world. It is extremely fast and easy to customize, due to its architecture. Extensive reuse of code within the software, along with a minimalist approach to producing features with lots of functionality, gives MySQL unmatched speed, compactness, stability, and ease of deployment. Their unique separation of the core server from the storage engine makes it possible to run with very strict control, or with ultra fast disk access, whichever is more appropriate for the situation

While PHP in www.ameritech-hosting.net, is an open-source, server-side HTML embedded scripting language used to create dynamic Web pages. A dynamic Web page is a page that interacts with the user, so that each user visiting the page sees customized information. PHP is freely available and used primarily on Linux (UNIX) Web servers, and as an alternative to Microsoft's Active Server Pages (ASP) technology. As with ASP, the PHP script is embedded within a Web page along with its HTML. Before the page resolves, the Web server calls PHP to interpret and perform the operations called for in the PHP script. An HTML page with PHP script is typically given a file name suffix of ".php," ".php4," or ".phtml."

2.4 MACROMEDIA DREAMWEAVER MX

From <http://download.com>, it is described that Dreamweaver MX 2004 is a professional choice for building web sites and applications. It provides a powerful combination of visual layout tools, application development features, and code editing support. Hence, it enables developers and designers at every skill level to create visually appealing, standards-based sites and applications quickly. From leading support for CSS-based design to hand-coding features, Dreamweaver provides the tools professionals need in an integrated, streamlined environment. Developers can use Dreamweaver with the server technology of their choice to build powerful Internet applications that connect users to databases, web services, and legacy systems.

Added further in <http://downloads.builder.com>, Dreamweaver MX 2004 is the latest version of Macromedia's award-winning Web site development tool. With robust features for CSS-based design and integration, Dreamweaver enables web designers and developers to easily create and manage any website.

2.5 NOKIA MOBILE INTERNET TOOLKIT 4.0

According to Announcing Version 4.0 of Nokia's Mobile Internet Toolkit from <http://www.developer.com>, Zelos Group Senior Analyst, Seamus McAteer report highlighted integrated support for DRM as a crucial concern for developers and publishers. In the report McAteer maintained, "Basic DRM is an essential component necessary to encourage major media companies to make branded content available on wireless networks."

Version 4.0 of Nokia Mobile Internet Toolkit also gives developers several improvements in versatility and ease-of-use. These include an Update Manager that informs users when new tools, add-ons and SDKs become available through the Forum Nokia website, as well as added support for non-Latin content character encodings to create content in languages such as Chinese, Japanese, Korean and Arabic.

The Toolkit features support for a wide variety of protocols including WML, XHTML, WAP, and multimedia messaging service (MMS). MMS allows users to send messages combining text, images, graphics and sound in a single "rich" message. The toolkit offers further ease-of-use through its integrated MMS wizards, which generate MMS content in several different modes, including automatic generation from SMIL content and step-by-step part selection, streamlining the process for rapid content development. The Nokia Mobile Internet Toolkit Starter Pack offers a complete "self-contained" solution for out-of-the-box development, including a WAP gateway simulator that eliminates the need for an external server or gateway.

According to Lee Epting, vice president & general manager, Forum Nokia, "The enhancements in Mobile Internet Toolkit version 4.0 provide a compelling argument for developing and distributing mobile applications and content on Nokia devices. The increased DRM protection improves the ability to generate revenues, while all the ease-of-use features and added versatility make it very easy to begin developing."

2.6 ITERATIVE METHODOLOGY PROJECT DEVELOPMENT

In developing this project, iterative methodology is applied considering the limited duration given. This methodology basically includes:

1. Requirements Definition
2. Analysis
3. Design
4. Installation
5. Testing

This method does not allow changes to the overall design once a particular phase is reached. Changes to a design once the testing phase is reached can be very difficult. This will cause the projects to have high cost maintenance after a long initial completion. UML and the iterative design method is economical by allowing the design of systems that have low maintenance cost.

The UML process allows for designs to have **iterative** processes. It means that on each iteration, there will be some functions added to the system. Additional features or functions are added in succeeding iterations. This allows a project to become active sooner and as feedback is given, additions or modifications can be made with less effort. Each iteration will have a time limit and will have specific goals. This is called "time boxing".

Design steps are broken into iterations which are performed over and over. Each iteration includes:

1. Analysis
2. Design
3. Code + Design + Test + Integration

It is important to note that test and integration is done during each iteration. This means code is tested to the extent possible during the iteration to be sure of its quality.

Integration is done during every iteration (Except the first) to get the code from each iteration working together. If integration is left to the end of the project, it may become very difficult. Use case requirements are used to determine the development to be done during each iteration.

The idea is to schedule just enough work in each iteration to enable complete work by the end of the scheduled iteration.

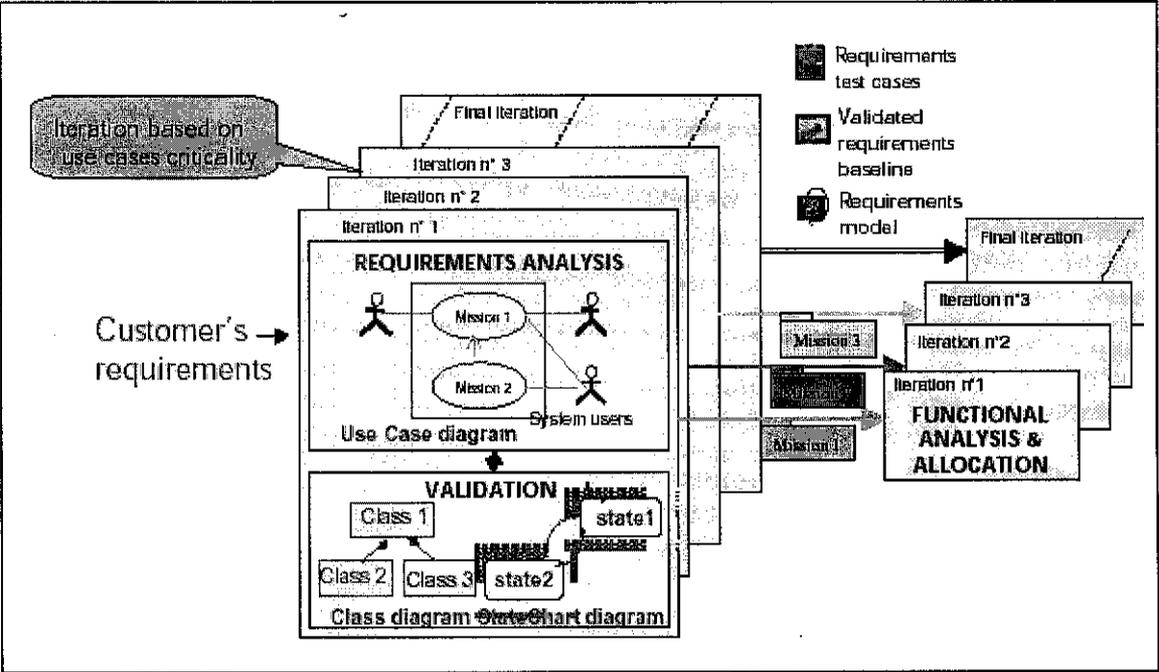


Figure 2.2 – Iterative Methodology Diagram

CHAPTER 3

METHODOLOGY/ PROJECT WORK

Iterative methodology has been chosen in developing this project. In software development, iterative is used to describe a heuristic planning and development process where an application is developed in small sections called iterations. Each iteration is reviewed and critiqued by the software team and potential end-users. The insights gained from the critique of iteration are used to determine the next step in development. Data models or sequence diagrams, which are used to map out iterations, keep track of what has been tried, approved, or discarded, and eventually serve as a kind of blueprint for the final product.

3.1 PROCEDURE IDENTIFICATION AND SELECTION

For UTP Interactive WAP Announcement, these are how the project works:

3.1.1 Establish User Requirement

Questionnaires have been distributed randomly to 20 students to find out what type of menus highly requested among students. Several interview sessions were held with selected lecturers and staffs upon their view about the current and upcoming system, and their readiness to provide and update information.

Next, the data collected from user requirement has been analyzed. It is found that 'Announcement' is highly requested among students and willingly provided by lecturers and administration.

3.1.2 Establish Technical Requirement

In terms of tools selection as technical requirements, below are the hardware, software and network that are used to build the system simulation:

3.1.2.1 Hardware

Mobile computing device –TravelMate 529TM notebook

- MS Windows XP Professional Version 2002
- Intel Pentium III Processor
- 692 MHz of speed
- 256 MB of RAM

3.1.2.2 Software

Nokia Mobile Internet Toolkit 4.0 (NMIT 4.0) is a content authoring tool that supports the creation of Mobile Internet content like XHTML, MMS and WAP. It has two other supporting components that are:

- WAP Gateway Simulator
- Browser Simulator (supported Phone SDKs)

The Nokia WAP Gateway Simulator 4.0 is an application through which browsers run on the same machine as the gateway can access both Internet and local file system.

Nokia Mobile Browser 4.0 is a mobile Internet browser with a diagnostics view. It runs on a PC platform and integrates the features of most commercially available phone browsers. It supports various mobile Internet content types, like XHTML, WML and WAP push.

Macromedia Dreamweaver MX is a professional HTML editor for designing, coding, and developing websites, web pages, and web applications. Whether you enjoy the control of hand-coding HTML or prefer to work in a visual editing environment, Dreamweaver provides you with helpful tools to enhance your web creation experience.

The visual editing features in Dreamweaver let user quickly create pages without writing a line of code. However, if user prefer to code by hand, however, Dreamweaver also includes many coding-related tools and features. Dreamweaver also helps to build dynamic database-backed web applications using server languages such as ASP, ASP.NET, ColdFusion Markup Language (CFML), JSP, and PHP.

EasyPHP allows user to develop applications on their local PC without having to upload to a server. Installing EasyPHP is a much quicker and easier solution than downloading each application (PHP, MySQL, Apache, etc.) individually and configuring them to work together.

3.1.2.3 Network

- Local PC/ Localhost

3.2 SYSTEM ANALYSIS

In a simple description, this is the Context Level Diagram of UTP Interactive WAP Application.

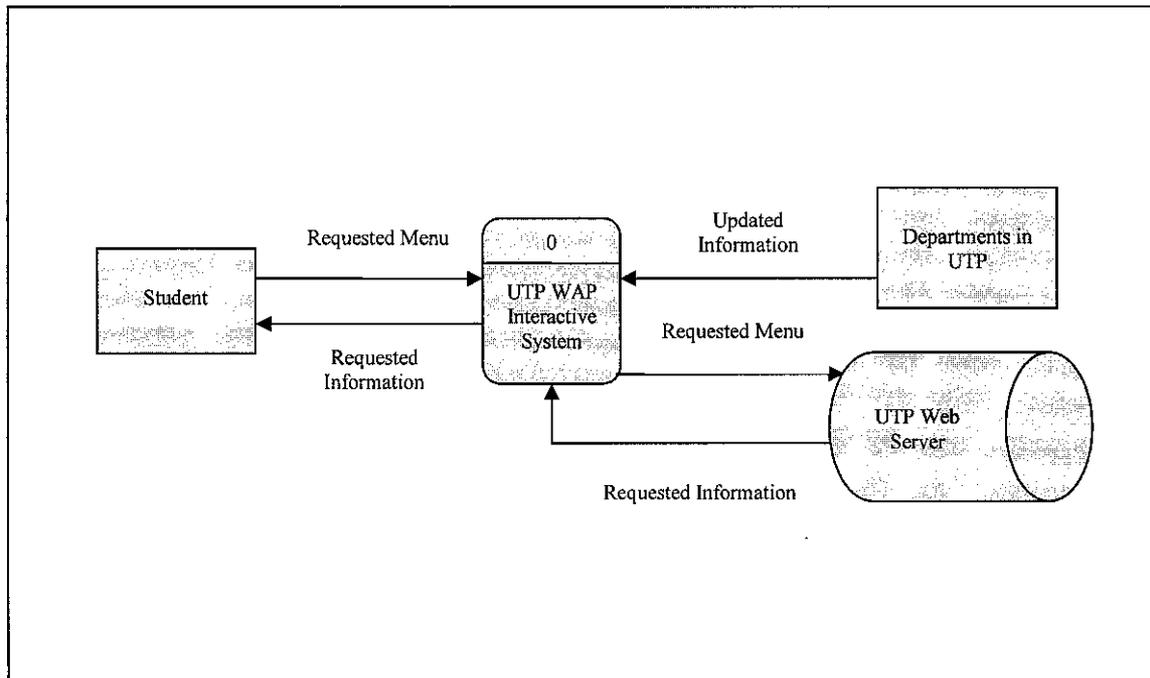


Figure 3.1 – UTP Interactive WAP Application Context Level Diagram

1. Respective staffs from each department in UTP insert/ update Announcement in a provided website
2. System Webmaster converts the announcement into WML format
3. The information is hold in the Web Server/ Content Server
4. Webmaster is fully responsible to manage the database in the Web Server
5. Students who need the information send request by sending sms to the system and the required information will be delivered in a few seconds.

3.3 CREATE DESIGN

In designing the system flow, several suggested storyboards have been drafted. Each storyboard is reviewed and critiqued by supervisor and selected lecturers and students. Feedback gained from the critique is used to determine the best storyboard to decide the system flow design. Below is how the system flow is designed:

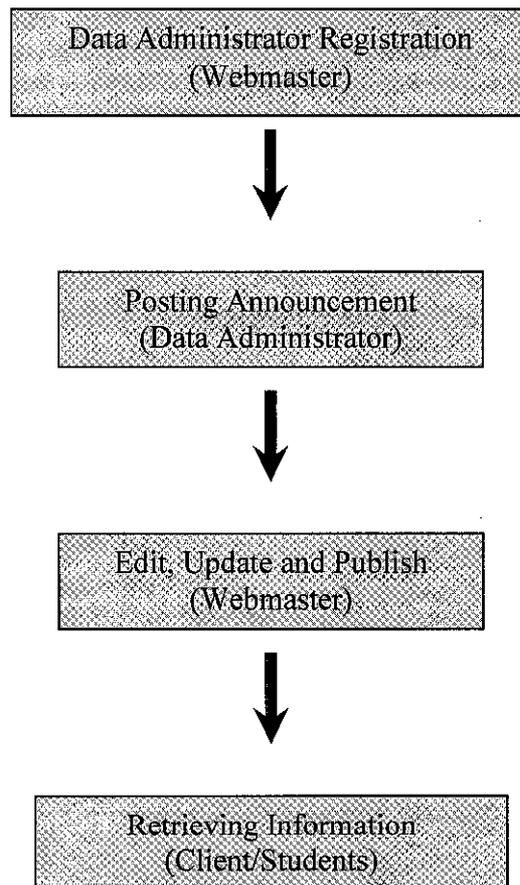


Figure 3.2 - UTP Interactive WAP Announcement System Flow

3.4 SYSTEM INSTALLATION

As stated in the scope of study, the study will be on two main parts; the first one is to develop a hand phone browser of UTP Interactive WAP Application using a set of WAP simulator called Nokia Mobile Internet Toolkit 4.0. The following part is to specialize further on developing WAP announcement as a submenu of the first part. The project will be in the form of hand phone and server simulation.

3.4.1 NMIT 4.0 Browsing Editors

The first part, which is to develop a set of hand phone browser, is constructed using NMIT Browsing Editor. NMIT Browsing editors are a set of editors used for creating and editing mobile Internet content which is XML-based defined by Document Type Definitions (DTDs). These editors employ content validation to be checked by DTD. They provide features for easily selecting elements and attributions for insertion based on current cursor position. With this features, user can customize a hand phone menu navigation according their preferences. Besides that, NMIT also provides DTD Manager through which developers can import new DTDs for use by NMIT editors.

3.4.2 EasyPHP

The second part, which need database server to store the announcement and allow user login, is done with the implementation of EasyPHP. EasyPHP enables user to develop applications on their local PC without having to upload to a server. Installing EasyPHP is a much quicker and easier solution than downloading each application (PHP, MySQL, Apache, etc.) individually and configuring them to work together.

phpMyAdmin, a component in EasyPHP, can administer a whole MySQL-server (needs a super-user) but also a single database. Currently phpMyAdmin can:

- create and drop databases
- create, copy, drop and alter tables
- delete, edit and add fields
- execute any SQL-statement, even batch-queries

- manage keys on fields
- administer multiple servers and single databases
- communicate in more than 20 different languages

3.4.3 Macromedia Dreamweaver MX

Dreamweaver provides a powerful combination of visual layout tools, application development features, and code editing support. It enables developers and designers at every skill level to create visually appealing, standards-based sites and applications quickly. From leading support for CSS-based design to hand-coding features, Dreamweaver provides the tools needed in an integrated, streamlined environment. Developers can use Dreamweaver with any preferred server technology to build powerful Internet applications that connect users to databases, web services, and legacy systems

3.5 SYSTEM TESTING

Since testing is very important, here are some techniques or guideline applied that has helped much to ensure that iterative development project creates a reliable and stable application.

- **Define a Test Strategy:**
 - Understand what is going to be tested and who is going to do the testing. The Unit tests provide good white box (structural) testing at the code level, however, these still need to be complemented by black box (functional tests) and appropriate component level testing.
 - A test plan is developed to show how the testing is addressed across the entire application. For example, by developing test plans for Functional Tests (driven by use case), User Interface Tests, Performance Tests (load, stress and performance related), Data Integrity Tests and Security Tests. These test plans are created and maintained. Peer review sessions are held to ensure their completeness. These tests must be successfully passed before being integrated.
- **Test in Layers:**
 - Quality Assurance group that is separated from the developer tests the application, particularly the system components (data integrity, security, performance tests). There are also User Acceptance group to test the application primarily from a functional and user interface perspective.
 - Let developer focus on code level testing, QA focusing on system testing and users focusing on whether the functionality meets their needs. This strategy should help identify most defects before the system moves into production.

- **Insert a Testing Buffer period between iterations:**
 - Insert a testing buffer every three iteration. Then, user acceptance testing or quality assurances regress through their own tests. This strategy is to allow the developer to catch up on all of the outstanding severity one and two defects and also avoid last minute major correction.

- **Assign a Testing Coordinator:**
 - A person to keep on top of what has been tested and what defects are outstanding. This role is usually a good one to advocate testing automation and the person in the role should be both a strong developer and well organized. In this study, the testing coordinator is my project supervisor. He is responsible to:
 - help student to understand the real state of the application
 - assess all of the defects in the defect tracker used each day.
 - work closely with the student to determine if a defect really exists or if it reflects functionality that will be built in an upcoming iteration
 - ensure that defects are well managed otherwise the defect log can become overwhelming
 - actively ensure that tests are regressed frequently throughout the lifecycle of the project.
 - ensure that tests are at least alternated between iterations, that a full regression test is applied every three iterations and that test cases are prioritized so more complex functionality is tested frequently.

Iterative software development is an effective means for creating software applications. Applying these testing techniques will help make to ensure that the software created works the way it is intended.

CHAPTER 4

RESULT AND DISCUSSION

In the previous chapter, the methodology, procedure and tools of the study have been imparted. Now, in this chapter, the result shown by the simulator will be illustrated, together with the discussion on how it represents the real WAP world.

4.1 EDITING THE MENU BROWSER

The first part, which is creating UTP Interactive WAP menu browser, a set of hand phone navigator is simulated. By linking a number of XHTML+MP and WML files, the following result has come out.

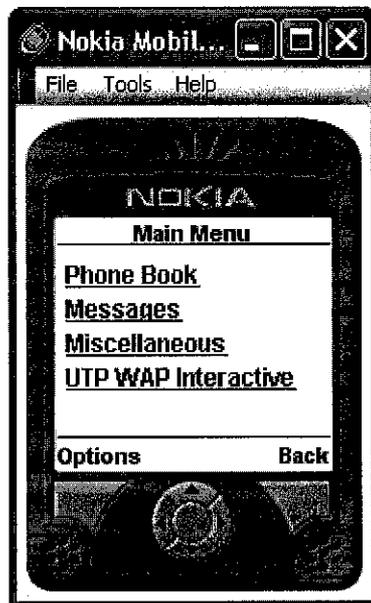


Figure 4.1- The Main Menu

Figure 4.1 is the main menu of the hand phone simulator. There are only four choices available. It is designed in such a way to provide high navigation to users.

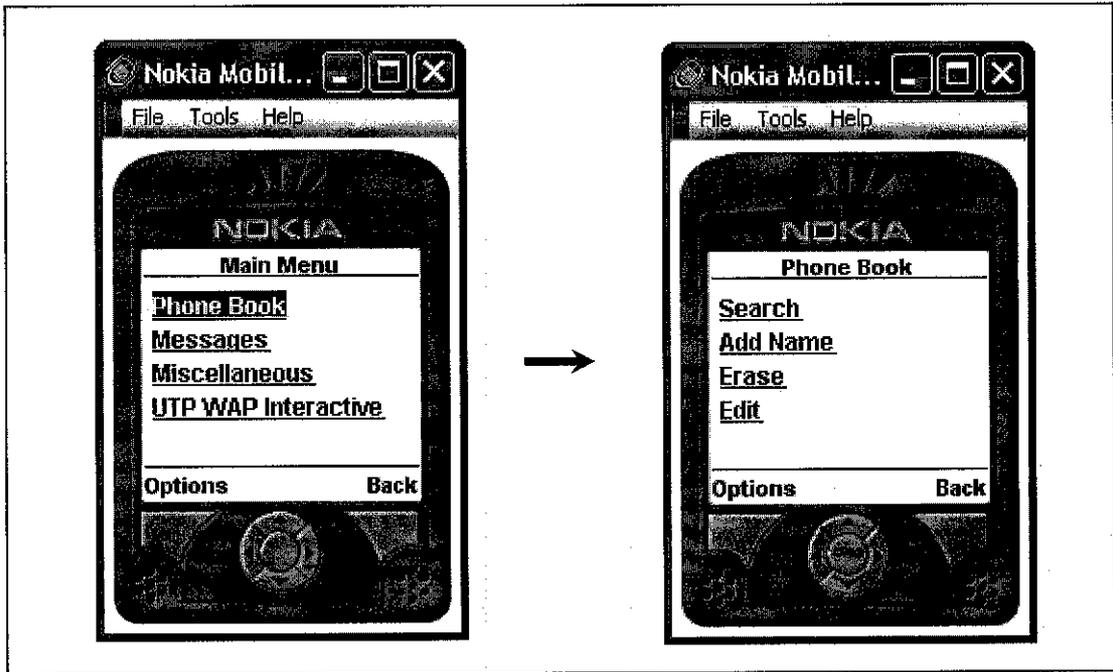


Figure 4.2 – Phone Book Menu

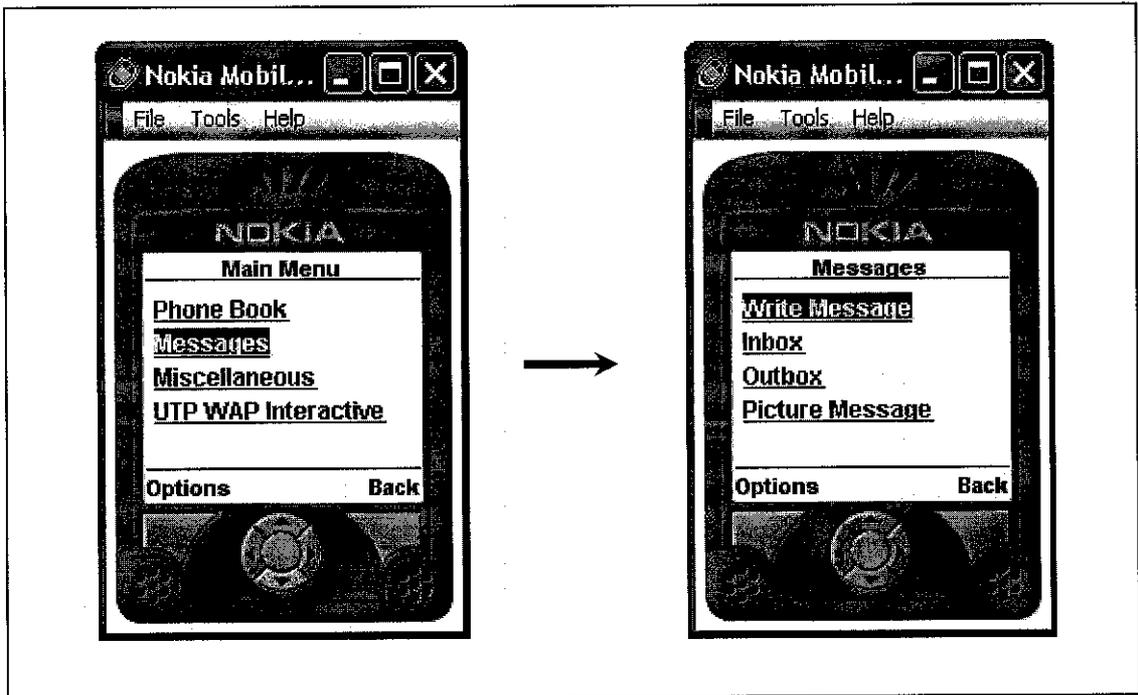


Figure 4.3 – Messages Menu

Figure 4.2 and 4.3 are just a browser simulator. The menu available at the next click does not work as the usual hand phone does.

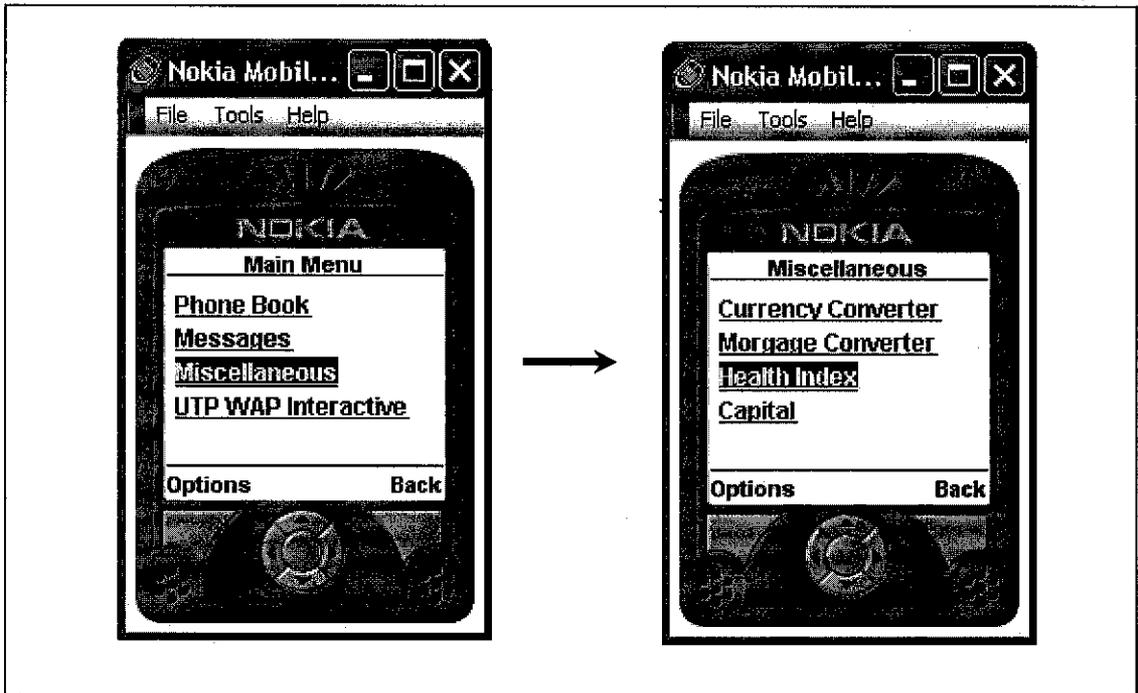


Figure 4.4 – Miscellaneous Menu

Figure 4.4 is showing one of the miscellaneous available in the phone simulator that is Health Index. Those miscellaneous menus offer many calculations and indicator programs inside. Miscellaneous Menu comes from a set of WML samples provided by MNIT that has been linked together. Below are the samples available.

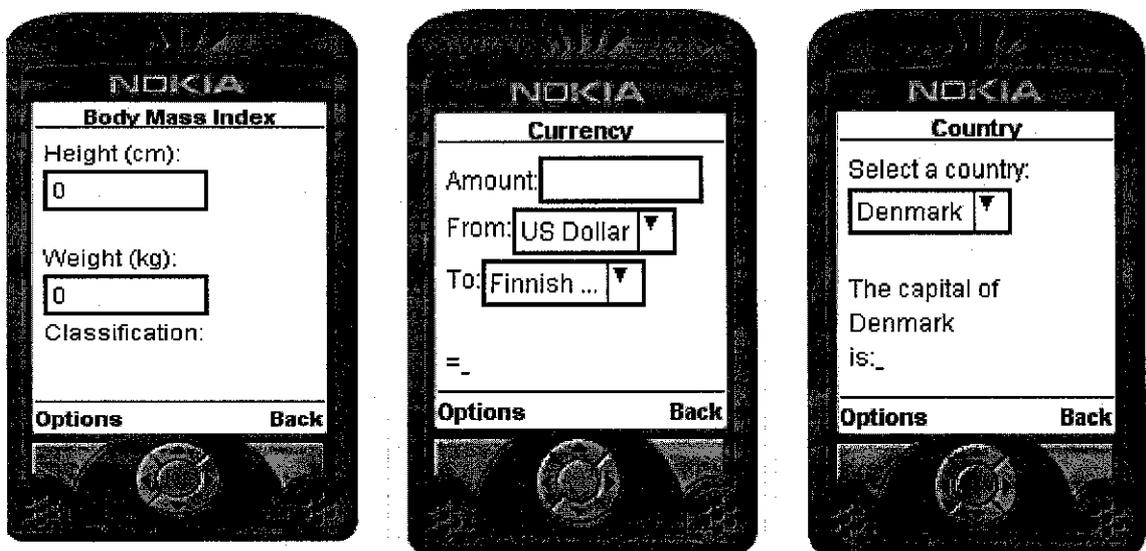


Figure 4.4.1 – Examples of menus available in Miscellaneous

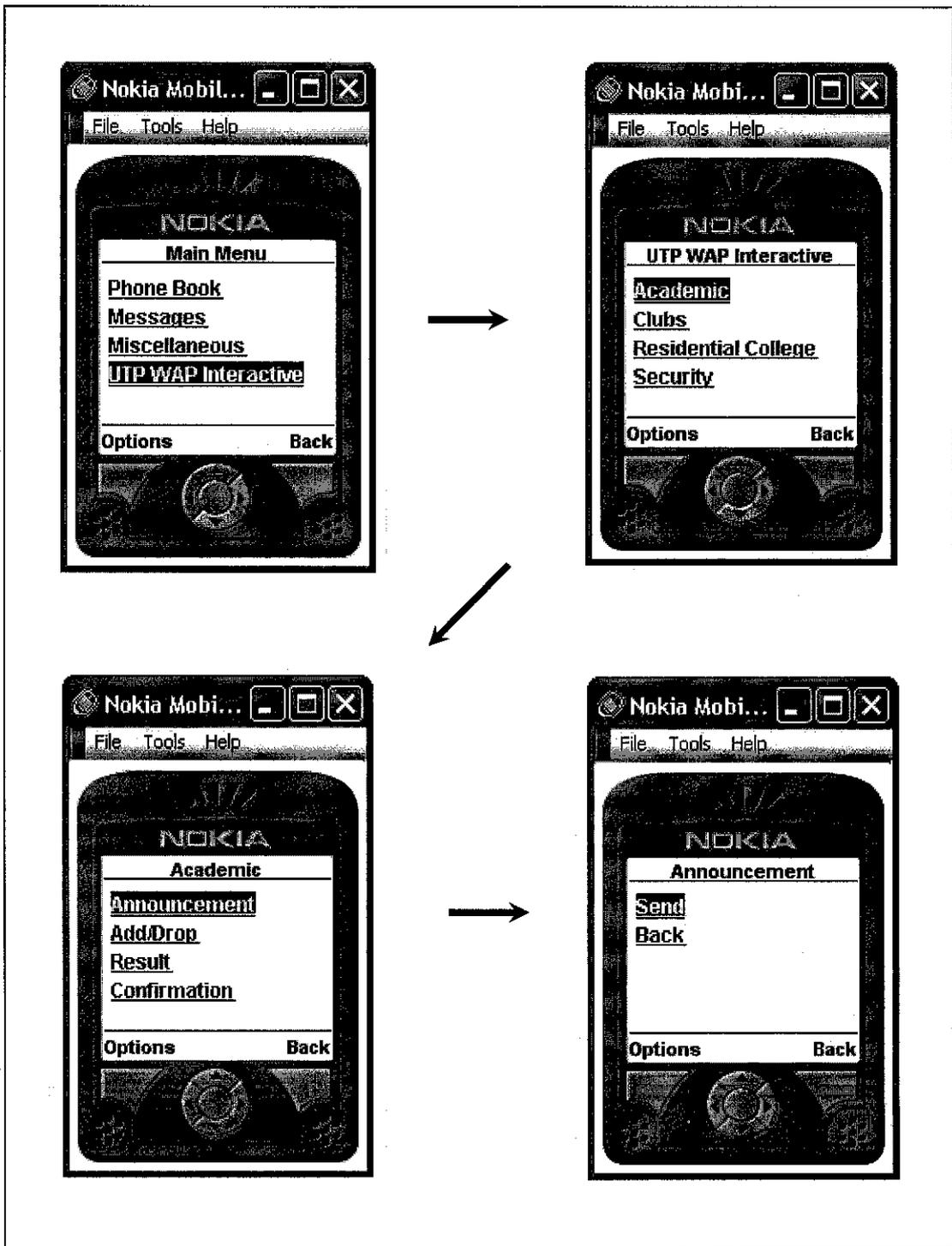


Figure 4.5 – UTP Interactive WAP Application Menu Browser

UTP Interactive WAP Announcement is the menu that is worked on in this study. The navigation shown in Figure 4.5 is one of the menus available in the project.

4.2 DEVELOPING UTP INTERACTIVE WAP ANNOUNCEMENT

For the second part, which is to develop UTP Interactive WAP Announcement, the project will be in the form of website and database server simulation. The website is built as a medium for data administrator to post and view all announcements. The database server is real place where the entire announcement is posted to, stored, maintained and published. The database server is fully controlled by a system webmaster.

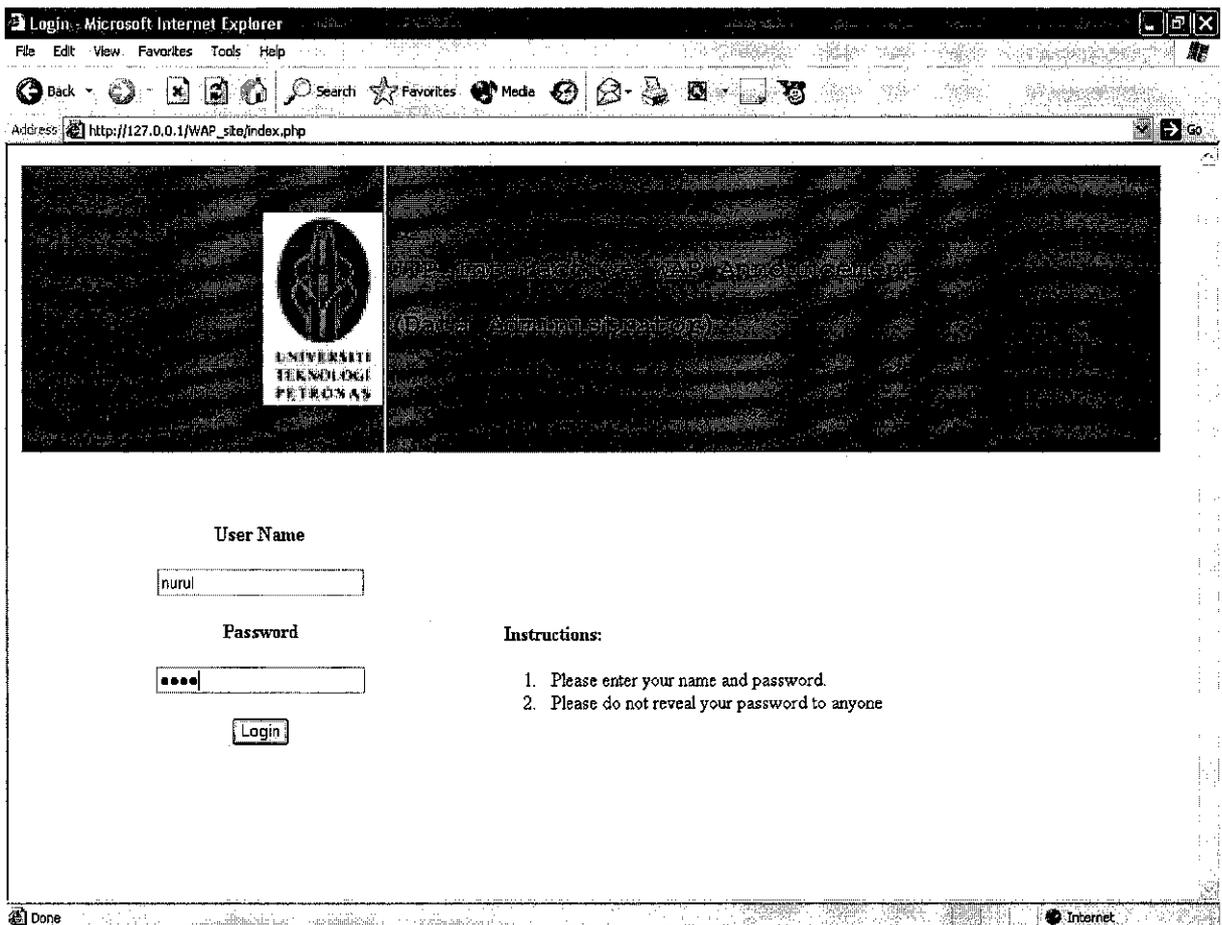


Figure 4.6 – Login page for Data Administrator

This system is fully controlled by a system webmaster. For UTP environment, it is assumed that the System Webmaster is UTP IT Department. Data Administrator is a group of people with legal authority, which is granted a user account in the system by the System Webmaster.

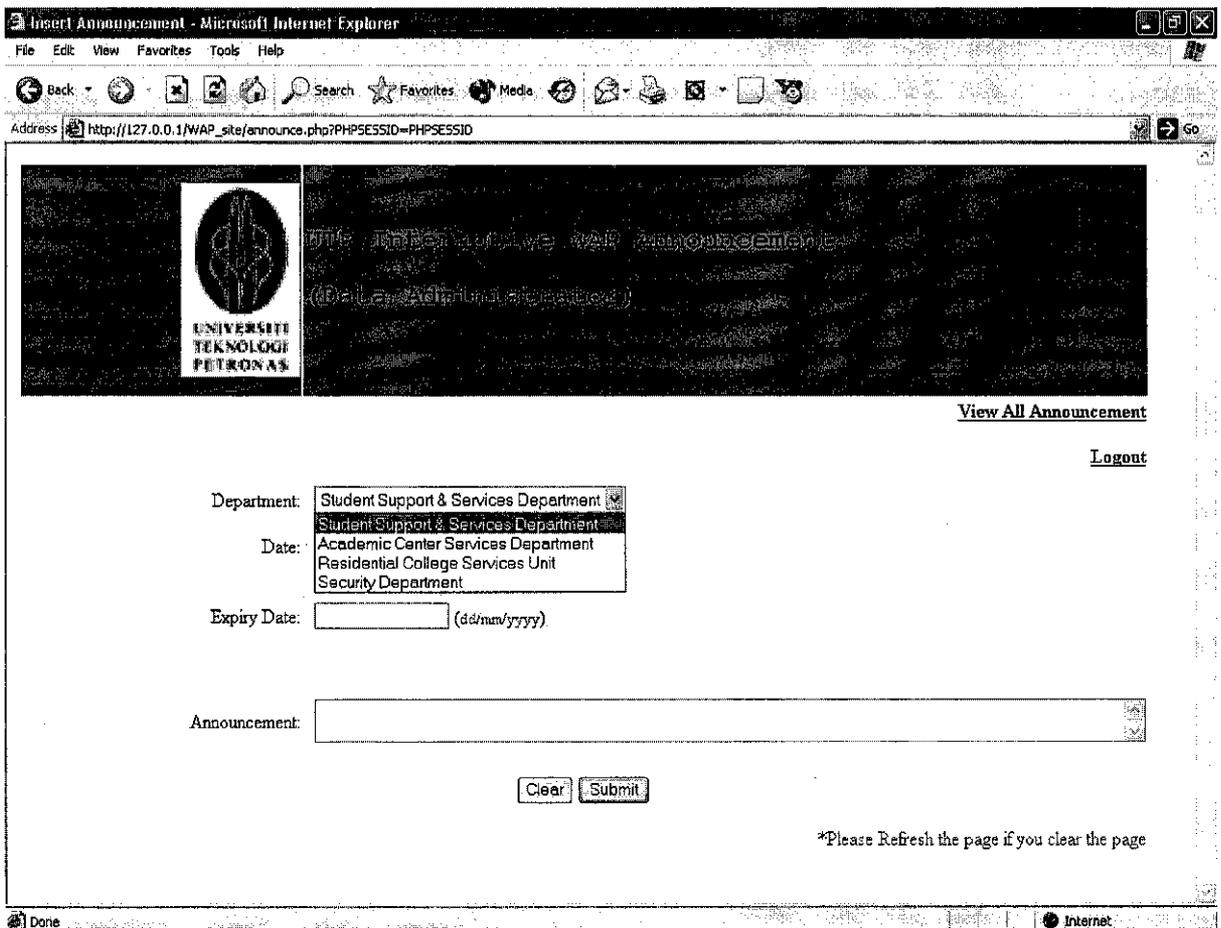


Figure 4.7 – A drop down menu of available departments

For this simulation, there are four options of departments. It means that the announcement which is going to be made is on behalf of the selected department. The department list is controlled by System Webmaster that can add or remove the option list at any time. The Data Administrator should be very aware to ensure they have selected the right department to avoid irrelevant announcement delivered to students.

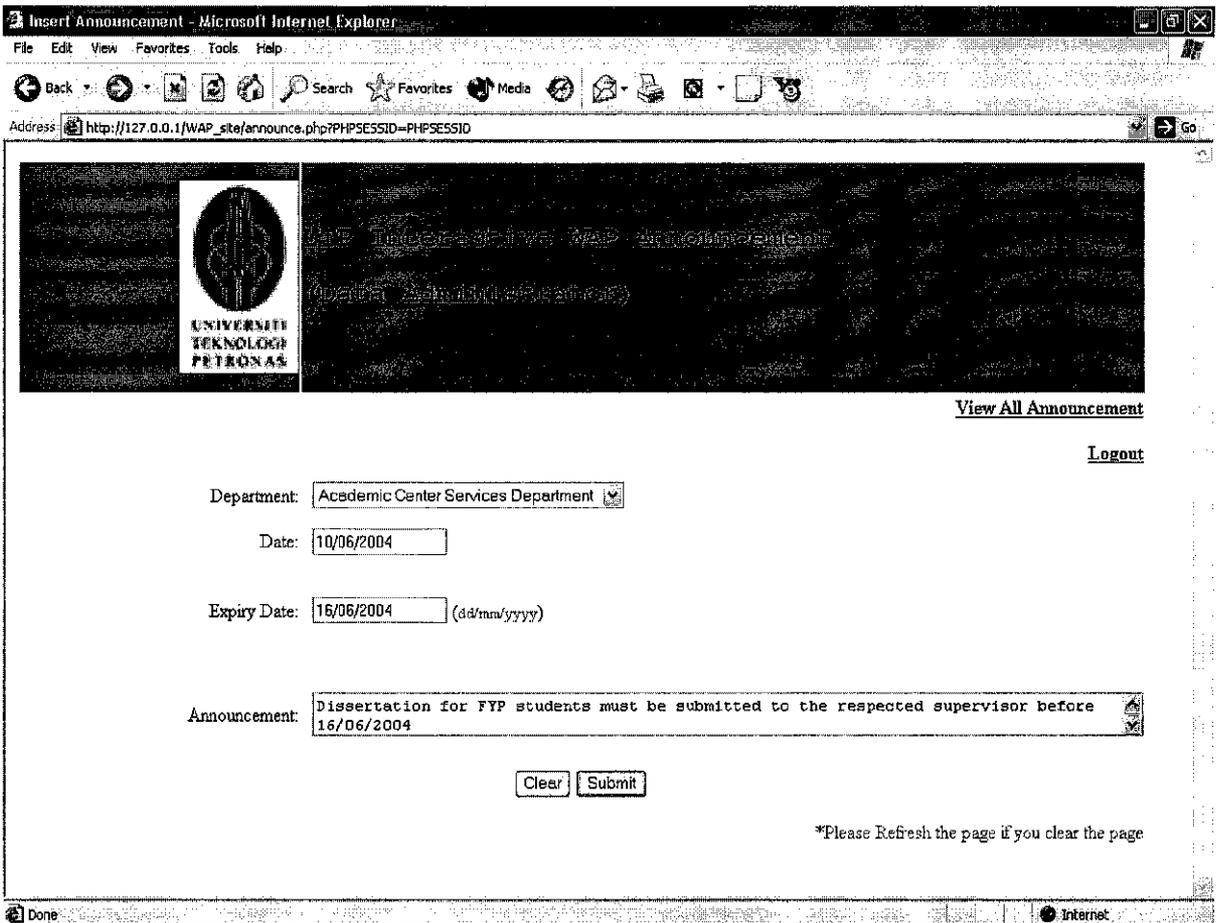


Figure 4.8 – An example of a complete data insertion

The department row indicates from what department the announcement is made. The date is auto generated according the date when the announcement is posted. The Expiry Date row is filled manually by the Data Administrator to inform Webmaster and recipients the validity duration of the announcement.

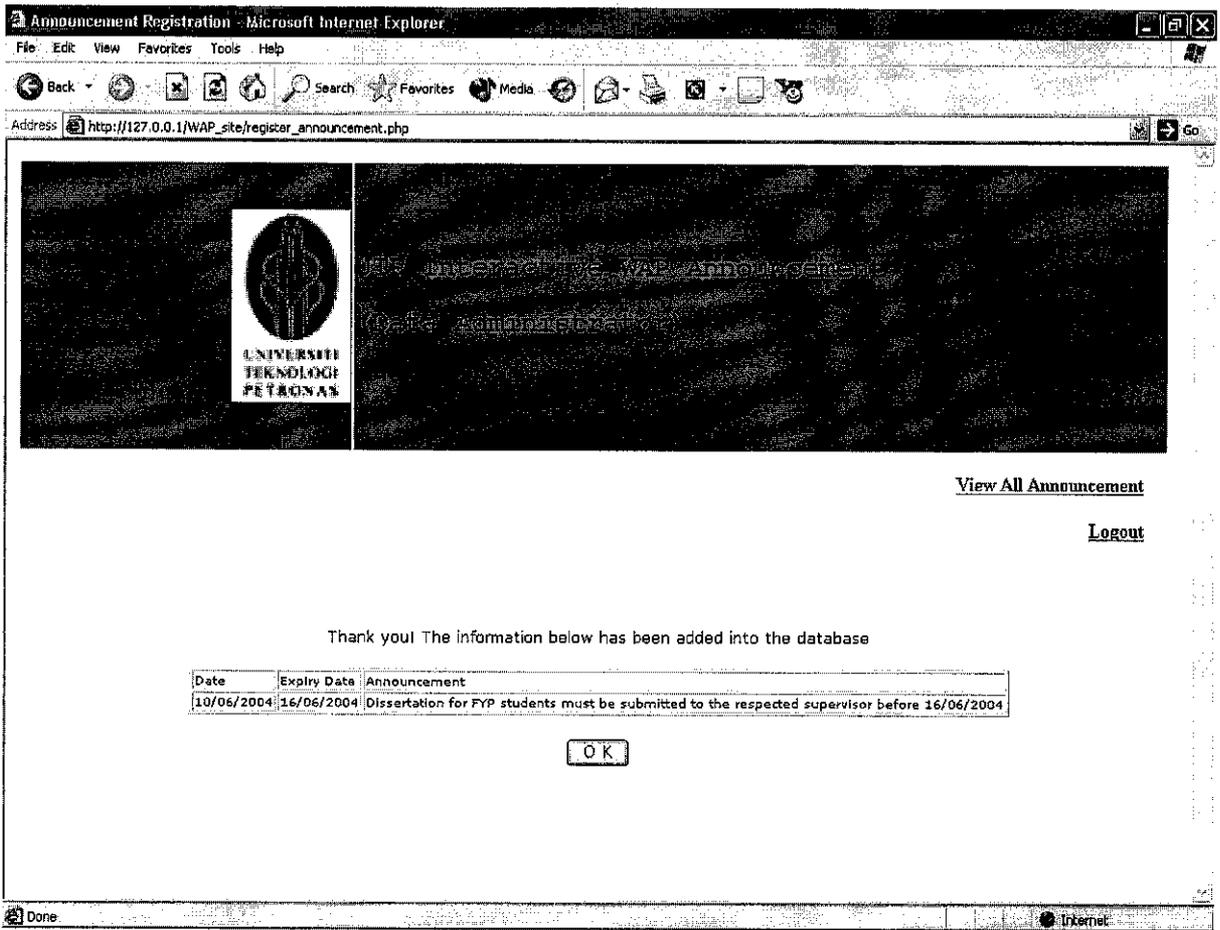


Figure 4.9 – Announcement Registration

Figure 4.9 is a pop up page as a confirmation to inform Data Administrator that the announcement made has successfully added into the database. If a blank data insertion is submitted, another confirmation page will pop up, asking the Data Administrator to resubmit a valid data entry as shown in Figure 4.10 below.

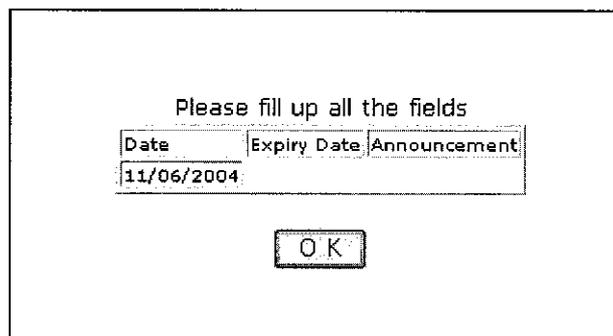


Figure 4.10 – Invalid Submission

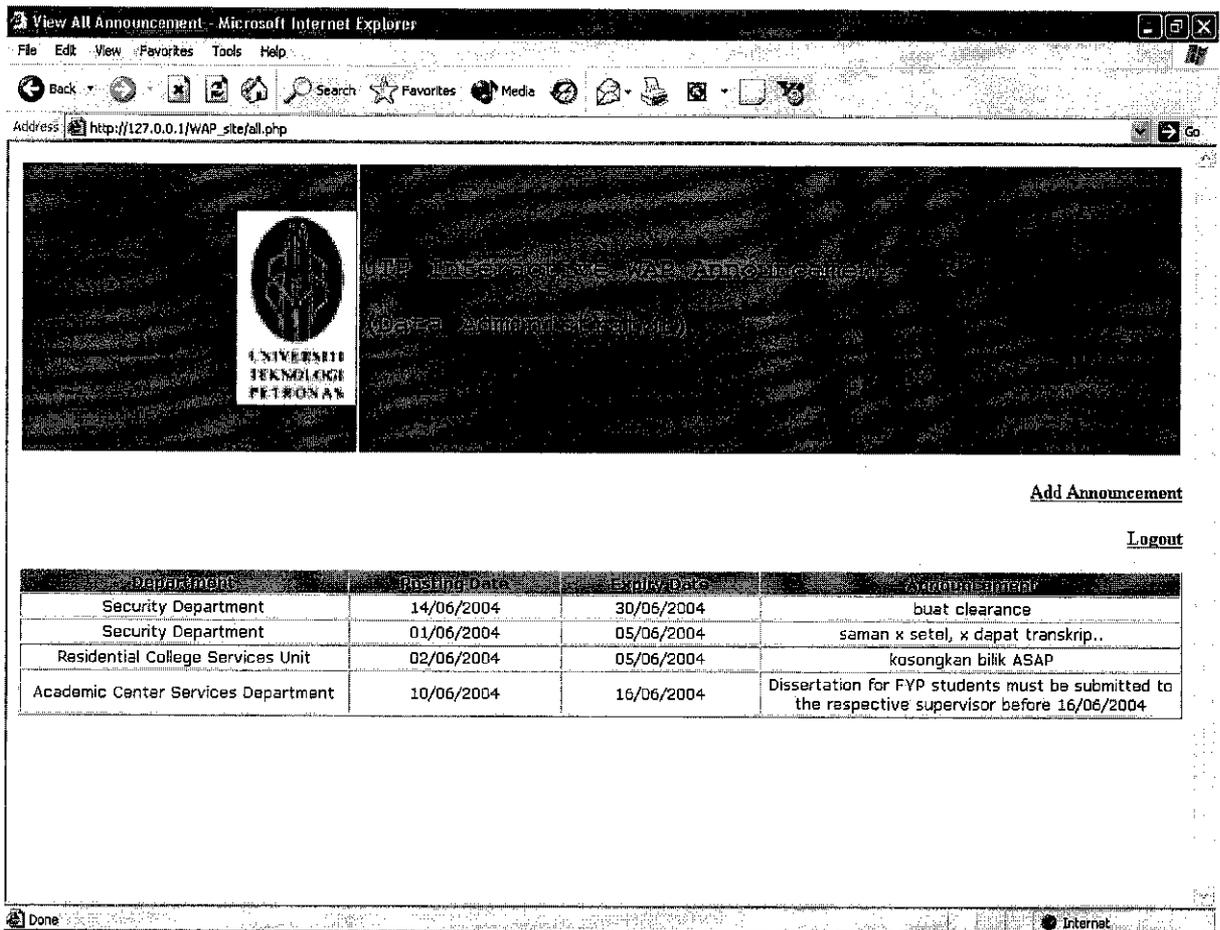


Figure 4.11 – All Announcements from Data Administrator View

Figure 4.11 is showing the All Announcement page from Data Administrator view. Considering all factors, for the beginning of system installation, Data Administrator who is considered as a medium computer literate is given less power in controlling the database. Therefore, in this system simulation, Data Administrator just can post and view all announcements. By the way, it is suggested that after an ample of time, they are given more authority by placing two additional buttons on the page that are “modify” and “delete” button.

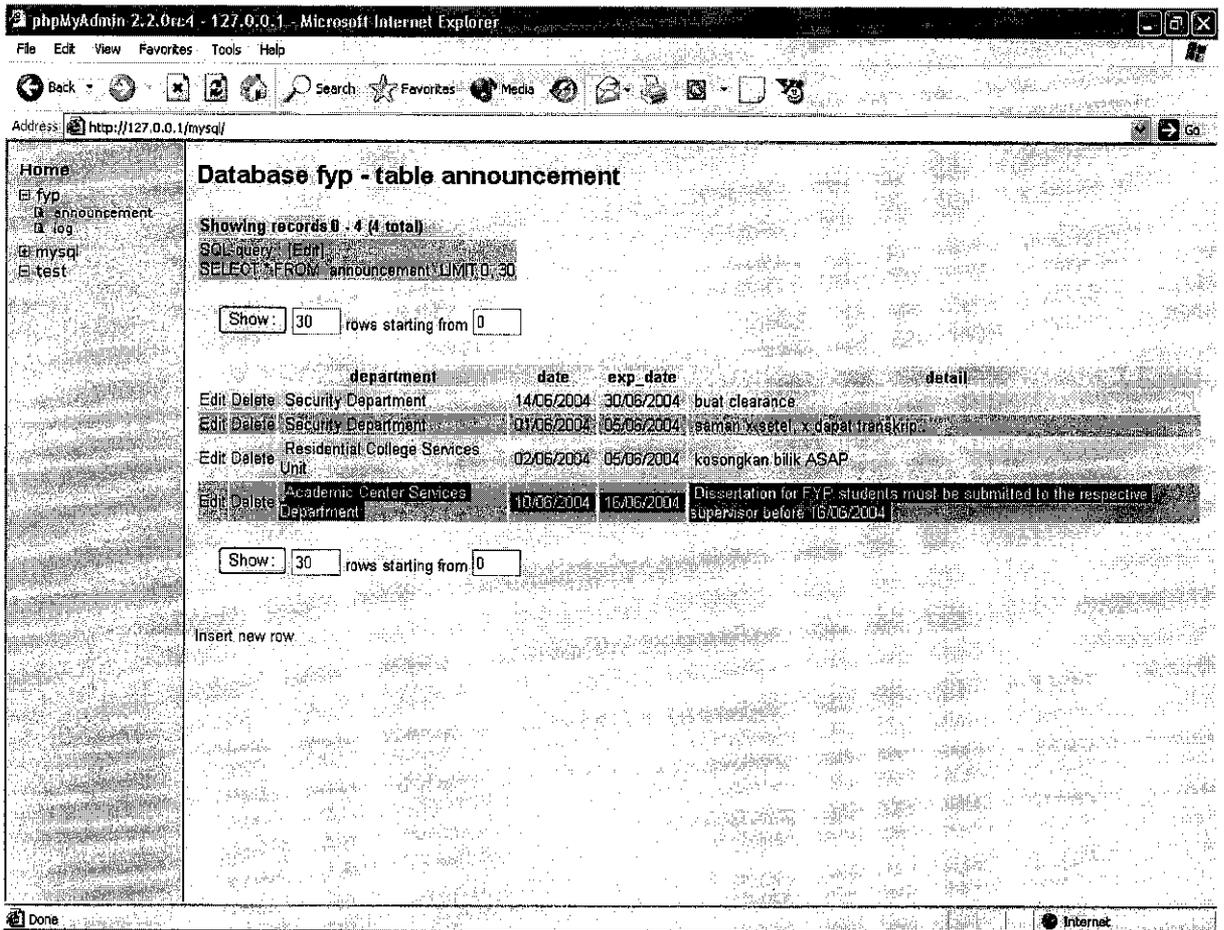


Figure 4.12 – Announcement Table from System Webmaster View

Figure 4.12 is showing Announcement database from System Webmaster view. System Webmaster has full authority in controlling the system. They can edit, delete or even insert new announcement. They are also the one who create the Data Administrator user account (see Appendix). Also shown in the figure, Webmaster is highlighting a selected row to be converted into php format.

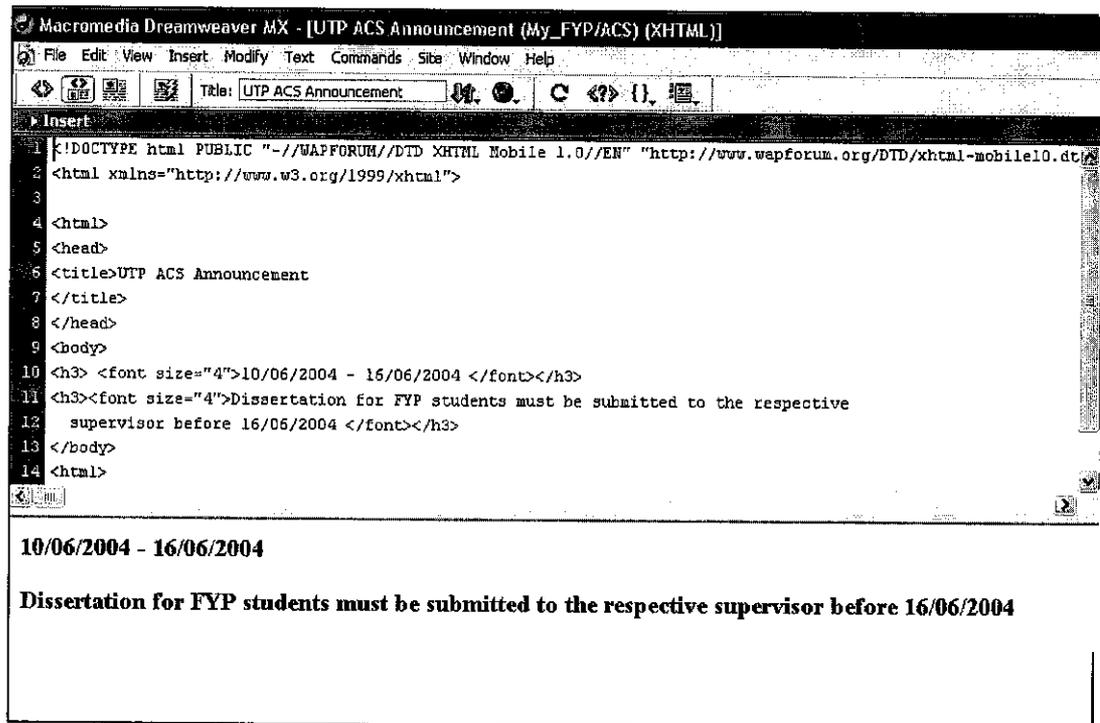


Figure 4.13 – Conversion into php format

As demonstrated in Figure 4.13, the selected row is converted into php format. System Webmaster must make sure that they insert the announcement into the right php text file, which is separated according department name. For example given above, the announcement is inserted into UTP ACS Announcement text file that is created to hold Academic Center Services' announcement only. Below is how the client/ student retrieve the data.

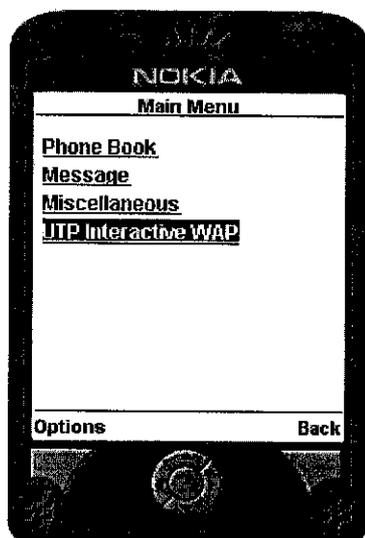


Figure 4.14 – Selecting UTP Interactive WAP from Main Menu

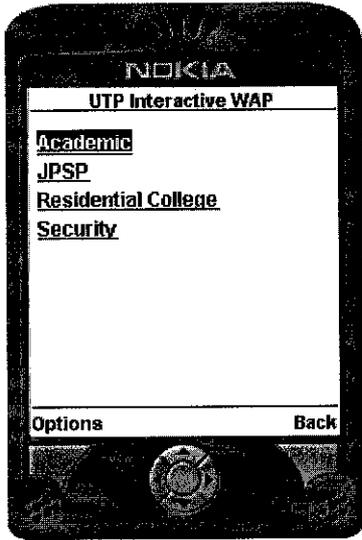


Figure 4.15 – Selecting Academic from UTP Interactive WAP Menu

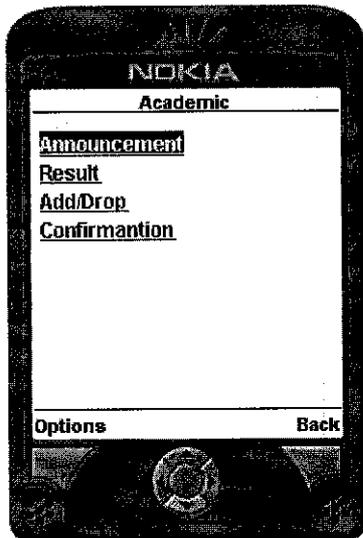


Figure 4.16 – Selecting Announcement from Academic Menu

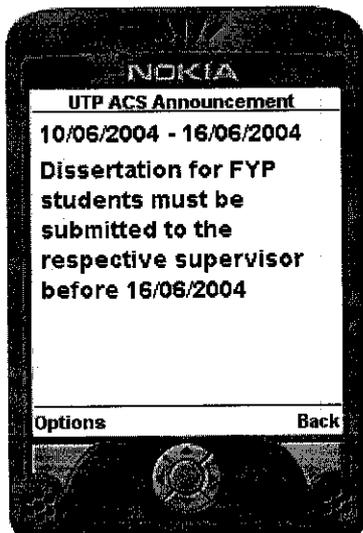


Figure 4.17 – The Announcement from Academic Department retrieved by students

CHAPTER 5

CONCLUSION AND RECOMMENDATION

5.1 CONCLUSION

The objectives are to be referred as a guideline to achieve the specific goal in the project. Throughout the completion of the project, the general objectives as stated in the earlier part of the report have been achieved.

Along the stages to develop the project, skills and knowledge in technical and non technical application are tested. The theoretical knowledge with industrial experience is integrated. Since the project is developed without any team members, students are trained to solve problem independently and with minimum supervision from supervisor. Reports that are needed to be submitted continuously has enhance the personal skills of report writing for professionalism.

As for the project, UTP Interactive WAP Application is relevant to be developed at this moment due to public preference that prefers to access the Internet from mobile phones than from office or home computers. It will be the first choice for students with high mobility and active.

It will build an interactive environment in UTP. This project can be applicable to all departments in UTP such as JPSP, Security, Residential College, and Academic Center Services to spread out any announcement to students. Therefore, a strong backup of information integration besides E-learning, UTP Bulletin Board, and other current medium of announcement in UTP is built. Since most students take along mobile phone everywhere they go, the implementation of UTP WAP Interactive will eliminate the reasons of students for being out-of-date.

5.2 RECOMMENDATION

The system that has been developed enables the student to retrieve general information provided such as Announcement and New Events where every student will get the same information. For future development, it is expected that personal information such as academic result, add/drop etc that require password and ID can also be retrieved.

About the website where Data Administrator should insert their announcement, it is expected that they can only view department that is granted to them. This means, other unrelated department to them are disabled. As time goes by, the number of department will increase to schools, subjects and clubs. If other unrelated department is disabled from a Data Administrator, the system can allow them to modify and delete data since they have no access to other department's announcement.

For further expansion, since the system is applicable to provide all kind of data, this technology can be further developed and implement by any organization that interested to. This will expand UTP business association especially from interactive world business.

As the tools implemented in developing the project can enable text, image, video, and audio to be sent through compatible hand phones, it is possible for UTP to further enhance the service offered such as multimedia event advertisement, security report, and announcement.

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- WAP Binary XML Content Format Specification
- WAP Wireless Session Protocol (WSP) Specification
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- WAP Push OTA Specification
- WAP Push Access Protocol (PAP) Specification
- WAP Push Proxy Gateway (PPG) Specification
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APPENDIX

A-1 - Questionnaires Sheet: WAP Application in UTP

A-2 - Findings of WAP Application in UTP Questionnaires Sheet

A-3 – table Log – Table of Data Administrator login account

A-4 – XHTML Coding for Main Menu

A-5 – XHTML Coding directing to php file

A-6 – Text file storing Announcement for Academic Center Services Department

A-1 - QUESTIONNAIRE SHEET: WAP APPLICATION IN UTP

Name :

Course :

Year :

WAP technology enables Internet access through mobile phones. Easy Access on Maxis Mobile is a well-known example of WAP application. What do you think of having it in UTP?

1. Do you agree if WAP technology is applied upon spreading news to students in UTP?
 - Yes
 - No

2. Do you feel that the current medium, such as UTP e-learning, and Bulletin Board help you much in delivering information to students?
 - Yes
 - No

3. How do you rate ICT services in UTP?
 - Highly reliable
 - Reliable
 - No comment
 - Unreliable
 - Useless (It never helped me in any way)

4. If WAP technology is going to be applied in UTP, Please tick your menu of preferences:

- Academic
 - Announcement
 - Timetable
 - Result
 - Add/ Drop
 - View Confirmation Registration
 - Others:

- Clubs
 - Membership
 - Events
 - Announcement
 - Others:

- Residential College Support Unit
 - Registration
 - Accommodations Placement
 - Events
 - Announcement
 - Others:

- Security
 - Fine Alert
 - Announcement
 - Others:

A-2- FINDINGS OF WAP APPLICATION IN UTP QUESTIONNAIRE SHEET

No of Respondents : 20 personnel

Gender : Male (9) Female (11)

Course : IT/IS students (5), CE, ME,EE & CVE students (15)

Year : 1st yr (3), 2nd yr (5), 3rd yr (5), 4th yr (4), 5th yr (3)

WAP technology enables Internet access through mobile phones. Easy Access on Maxis Mobile is a well-known example of WAP application. What do you think of having it in UTP?

1. Do you agree if WAP technology is applied upon spreading news around UTP?
 - Yes - 17 respondents (85%)
 - No - 3 respondents (15%)

2. Do you feel that UTP e-learning, Bulletin Board and mIRC help you much in knowing what is going on around UTP?
 - Yes - 15 respondents (75%)
 - No - 5 respondents (25%)

3. How do you rate ICT services in UTP?
 - Highly reliable -- 0 - (0%)
 - Reliable - 6 - (30%)
 - No comment - 8 - (40%)
 - Unreliable - 5 - (25%)
 - Useless (It never helped me in any way) -- 1 - (5%)

4. If WAP technology is going to be applied in UTP, Please tick your menu preferences:

- Academic

- Announcement – 19 (95%)
- Timetable - 13 (65%)
- Result - 15 (75%)
- Add/ Drop - 10 (50%)
- View Confirmation Registration - 12 (60%)
- Others:

- Clubs

- Membership - 13 (65%)
- Events - 18 (90%)
- Announcement - 17 (85%)
- Others:

- RCSU

- Registration - 15 (75%)
- Accommodations Placement – 17 (85%)
- Events - 15 (75%)
- Announcement - 19 (95%)
- Others:

- Security

- Fine Alert -16 - (80%)
- Announcement - 18 - (90%)
- Others:

A-3 – table Log – Table of Data Administrator login account

phpMyAdmin 2.2.0rc4 - 127.0.0.1 - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Search Favorites Media

Address http://127.0.0.1/mysql/

Home

- fyp
 - announcement
 - log
- mysql
- test

Database fyp - table log

Showing records 0 - 3 (3 total)

SQL-query: [Edit]
SELECT * FROM 'log' LIMIT 0, 30

Show: 30 rows starting from 0

	username	pwd	l_id
Edit Delete	aien	1234	1
Edit Delete	nurul	1234	2
Edit Delete	aaa	123	3

Show: 30 rows starting from 0

Insert new row

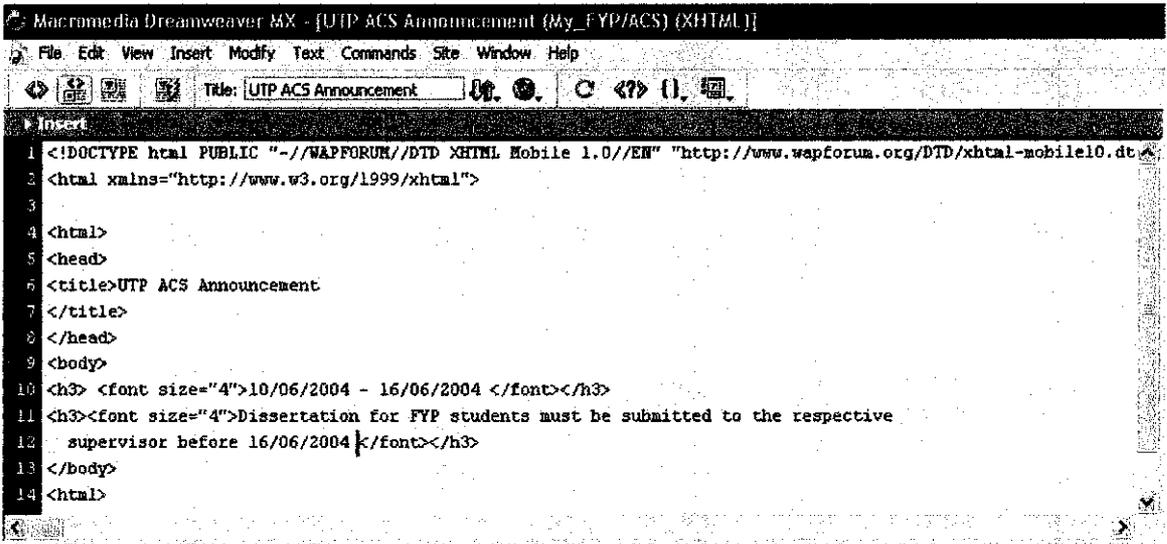
A-4 – XHTML Coding for Main Menu

```
<?xml version="1.0"?>
<!DOCTYPE html PUBLIC "-//WAPFORUM//DTD XHTML Mobile 1.0//EN"
"http://www.wapforum.org/DTD/xhtml-mobile10.dtd" >
<html xmlns="http://www.w3.org/1999/xhtml">
<head>
  <title>Main Menu</title>
</head>
<body>
  <p>
    <a href="PhoneBook.xhtml" accesskey="1">Phone Book</a><br/>
    <a href="Messages.xhtml" accesskey="2">Message</a><br/>
    <a href="Miscellaneous.wml" accesskey="3">Miscellaneous</a><br/>
    <a href="Interactive.xhtml" accesskey="4">UTP Interactive WAP</a><br/>
  </p>
</body>
</html>
```

A-5 – XHTML Coding directing to php file

```
<?xml version="1.0"?>
<!DOCTYPE html PUBLIC "-//WAPFORUM//DTD XHTML Mobile 1.0//EN"
"http://www.wapforum.org/DTD/xhtml-mobile10.dtd" >
<html xmlns="http://www.w3.org/1999/xhtml">
<head>
  <title>Academic</title>
</head>
<body>
  <p>
    <a href="ACS.php" accesskey="1">Announcement</a><br/>
    <a href="Academic.xhtml" accesskey="2">Result</a><br/>
    <a href="Academic.xhtml" accesskey="3">Add/Drop</a><br/>
    <a href="Academic.xhtml" accesskey="4">Confirmation</a><br/>
  </p>
</body>
</html>
```

A-6 – Text file storing Announcement for Academic Center Services Dept



The screenshot shows the Macromedia Dreamweaver MX interface. The title bar reads "Macromedia Dreamweaver MX - [UTP ACS Announcement (My_FYP/ACS) (XHTML)]". The menu bar includes "File", "Edit", "View", "Insert", "Modify", "Text", "Commands", "Site", "Window", and "Help". The title field contains "UTP ACS Announcement". The main workspace displays the following HTML code:

```
1 <!DOCTYPE html PUBLIC "-//WAPFORUM/DTD XHTML Mobile 1.0//EN" "http://www.wapforum.org/DTD/xhtml-mobile10.dtd">
2 <html xmlns="http://www.w3.org/1999/xhtml">
3
4 <html>
5 <head>
6 <title>UTP ACS Announcement
7 </title>
8 </head>
9 <body>
10 <h3> <font size="4">10/06/2004 - 16/06/2004 </font></h3>
11 <h3><font size="4">Dissertation for FYP students must be submitted to the respective
12 supervisor before 16/06/2004 </font></h3>
13 </body>
14 </html>
```

10/06/2004 - 16/06/2004

Dissertation for FYP students must be submitted to the respective supervisor before 16/06/2004