WAP-BASED UTP EVENT MANAGEMENT SYSTEM

by

Azilah Binti Madulan @ Alias

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

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CERTIFICATION OF APPROVAL

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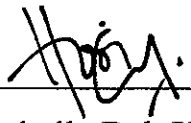
Approved by,



(Ms. Michelle Beh Hooi Ching)

UNIVERSITI TEKNOLOGI PETRONAS

TRONOH, PERAK

JAN 2005

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 the original work contained herein have not been taken or done by unspecified sources or persons.

AZILAH BINTI MADULAN @ ALIAS

ABSTRACT

WAP-Based UTP Event Management System is actually an automated system for replacing the manual paper-based system in managing and facilitating the events and activities organized by UTP and also the societies such as Residential College Support Unit (RCSU), Majlis Perwakilan Pelajar Universiti Teknologi PETRONAS (MPPUTP), Persatuan Seni Silat Cekak, and many more.

This report described the detailed analysis regarding the current situation and problems that are encountered by mostly the UTP student. The problem statement has been stated, the scope has been identified, and also the objectives have been listed out in order to be achieved in the final steps of this project. By having the WAP-based Event Management System, it is updated with the activities and events and the users will be more alert and aware with the existence of the events and activities held in UTP. This report will expose the users with the WAP technology that is widely used by the mobile phone users. This report also gives a better overview of WAP, the architecture of WAP, the advantages and also its applications which are currently applied and used by other people.

The methodology that will be used must be applicable and suitable in order that there will be no mistakes or problems arise after the system has been implemented. Thus, the most suitable methodology that might help in the system development is Waterfall Model which is one of the System Development Life Cycle (SDLC). By developing this WAP-based Event Management System, the problems encountered by the UTP students and staff can be eliminated. They can obtain updated events information on their WAP-enabled mobile phones. They can also access the information easily and quickly.

ACKNOWLEDGEMENT

Upon completing this final year project, first of all, I would like to express my gratitude to Allah the Almighty. I am indebted to the individuals who have contributed their ideas, view, encouragement and support within the length of this project. No substantial gratitude could ever measure up to the assistance, guidance and drive to keep me striving towards accomplishing the goals set.

I would like to thank my beloved parents, Madulan @ Alias Bin Ismail and Che Jah Binti Awang Hamat, who have faith and give support that I can go the distance. I would like to take this opportunity to thank to Ms. Michelle Beh Hooi Ching, as the project supervisor for her courage, support, advice, patient, help and guidance through out this project. Her cooperation and support are so much appreciated. Besides that, I would like to express the special thanks to other lecturers that give the author advice regarding the project. Special thanks to Mohd Hirmi Bin Mat Sidek, Dana Binti Zulkeefly, and Dayang Miraffiorry Abu Husain, who always been there when needed, as well as all my friends and colleagues for their great ideas, help, courage and support for me to complete this project. Thank you for all their full cooperation. Last but not least, thank you to everyone else that involve directly or indirectly in providing a big contribution and supports to this project. I owe everything to you.

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ABBREVIATION AND NOMENCLATURES

CGI	Computer Generated Image
CHTML	Compact Hypertext Markup Language
CPU	Central Procession Unit
EDGE	Extended Data for Global Environment
GPRS	General Packet Radio Service
GPS	Global Positioning System
GSM	Global System for Mobile Communication
HCI	Human-Computer Interaction
HTML	Hypertext Markup Language
HTTP	Hypertext Transfer Protocol
IP	Internet Protocol
IRC	Internet Relay Chat
MMS	Multimedia Messaging Service
MPPUTP	Majlis Perwakilan Pelajar UTP
OMA	Open Mobile Alliance
PC	Personal Computer
PDA	Personal Digital Assistant
PDU	Protocol Data Unit
PHP	Hypertext Preprocessor
RCSU	Residential College Support Unit
SMS	Short Message Service
TCP/IP	Transmission Control Protocol/Internet Protocol

TLS	Transport Layer Security
UDP	User Datagram Protocol
UTP	Universiti Teknologi PETRONAS
W-CDMA	Wireband – Code Division Multiple Access
W3C	World Wide Web Consortium
WAE	Wireless Application Environment
WAP	Wireless Application Protocol
WBXML	WAP Binary Extensible Markup Language
WDP	Wireless Datagram Protocol
WML	Wireless Markup Language
WSP	Wireless Session Protocol
WTP	Wireless Transaction Protocol
WTLS	Wireless Transport Layer Security
WWW	World Wide Web
XHTML	Extensible Hypertext Markup Language
XML	Extensible Markup Language

CHAPTER 1
INTRODUCTION

1.1 BACKGROUND OF STUDY

For years, computer users have made extensive use of the World Wide Web (WWW) to find information, send and receive electronic mail, buy and sell stocks, use e-commerce to shop, and more. To surf the WWW, users use a browser, such as the Internet Explorer and Mozilla in order to view the websites that they preferred. However, with this project, people will no longer depend on the usage of the computers, but with the other updated technology that has the ability to browse the Internet everywhere and anywhere we prefer, no matter where we are going at anytime.

For this project, it will involve more on the use of the updated technology, which is the use of the mobile phones. Currently, there are many updated and sophisticated features have been added in the mobile phones. People as over the country and places are now affordable to buy and use mobile phones. One of the updated features in mobile phone is the WAP technology. WAP is currently known as Wireless Application Protocol.

People are relying on using the Short Message Service (SMS) and Multimedia Messaging Service (MMS) services as the alternatives to exchange the ideas instead of having the conversation by talking to the other party using mobile phones. With the WAP technology, people will depend more on their mobile phone to browse the Internet to gather the information that they want without having to sit in front of the computer.

The basic function of WAP is for mobile phones to be able to communicate with a server installed in the mobile phone network. It brings together the web and the telecommunications. WAP technology makes it possible for several people to

communicate on the move using different devices. This application will be combined in the system to manage the events in Universiti Teknologi PETRONAS (UTP).

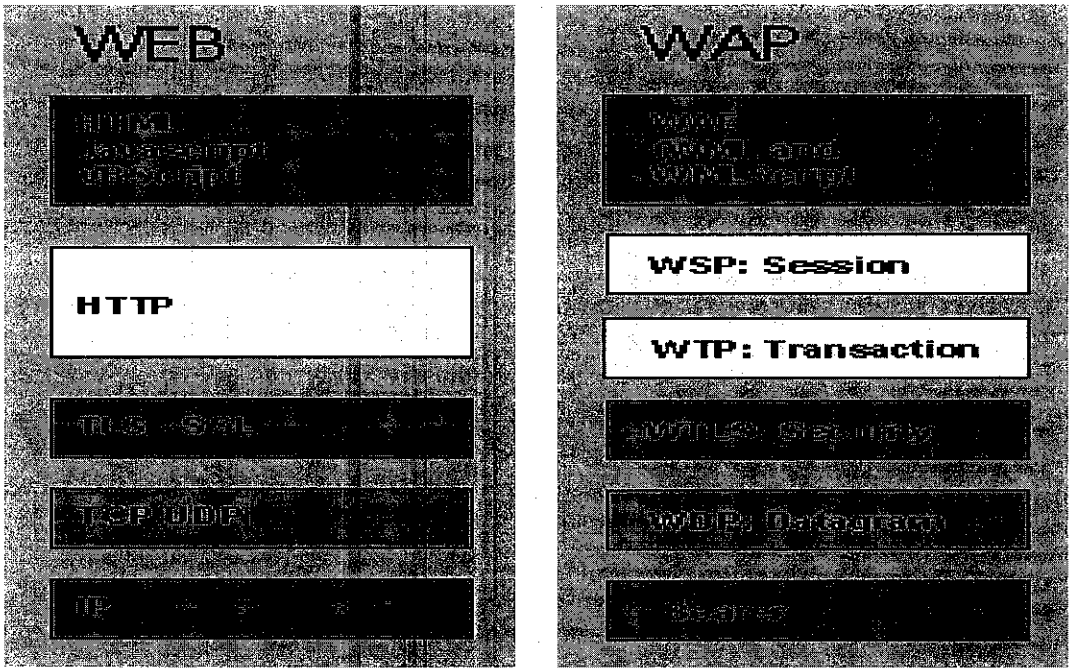
Based on the observation of the current situation in UTP, the formal system to manage the events is currently not existed yet. With the formal system, it supports the club societies such as Persatuan Seni Silat Cekak UTP, Kelab Gamelan and so on, and also the other events that managed by the Residential College Support Unit (RCSU), such as Minggu Mesra Kampus and the events that manage by the Majlis Perwakilan Pelajar UTP (MPPUTP), such as the convocation.

Basically, this system will ease the users, students, administrative and the club representatives for the particular society. The students, the lecturers, and other staff will be updated with the newsletters and events for the particular society, alerted with the existence of the events and the announcements, booked the equipment and hall to launch the events, and keep in touch with the upcoming events to ensure the student participation. This system is basically not only applicable for the students, lecturers and other UTP staff, but also the public outside the UTP. The public will be able to know about the upcoming events in UTP.

For this system, in order to access WAP services, the users, will need a WAP product such as WAP-enabled mobile phone, PDA and so on. Besides the WAP compatibility, WAP product has a large full graphic display and includes a micro-browser. It is pretty similar to surf the system on the PC with the method of surfing the system on a WAP device. The main difference is that WAP does not support fanciful graphics as WAP is written in Wireless Markup Language (WML). WAP supports real time text information and simple DOS-like graphics.

1.1.1 INTERNET MODEL AND PROTOCOL STACK OF WAP

The WAP model closely resembles the Internet model. A WWW client requests a resource stored on a web server by identifying it using a unique URL, that is, a text string constituting an address to that resource. Standard communication protocols, like Hypertext Transfer Protocol (HTTP) and Transmission Control Protocol/Internet Protocol (TCP/IP) manage these requests and transfer of data between the two ends. The content that is transferred is static either like HTML pages or dynamic like Active Server Pages (ASP), Common Gateway Interface (CGI), and Servlets. The following figure helps draw a parallel to the Internet protocols. There is how WAP extends or reuses Internet protocols to achieve mobile Internet access.

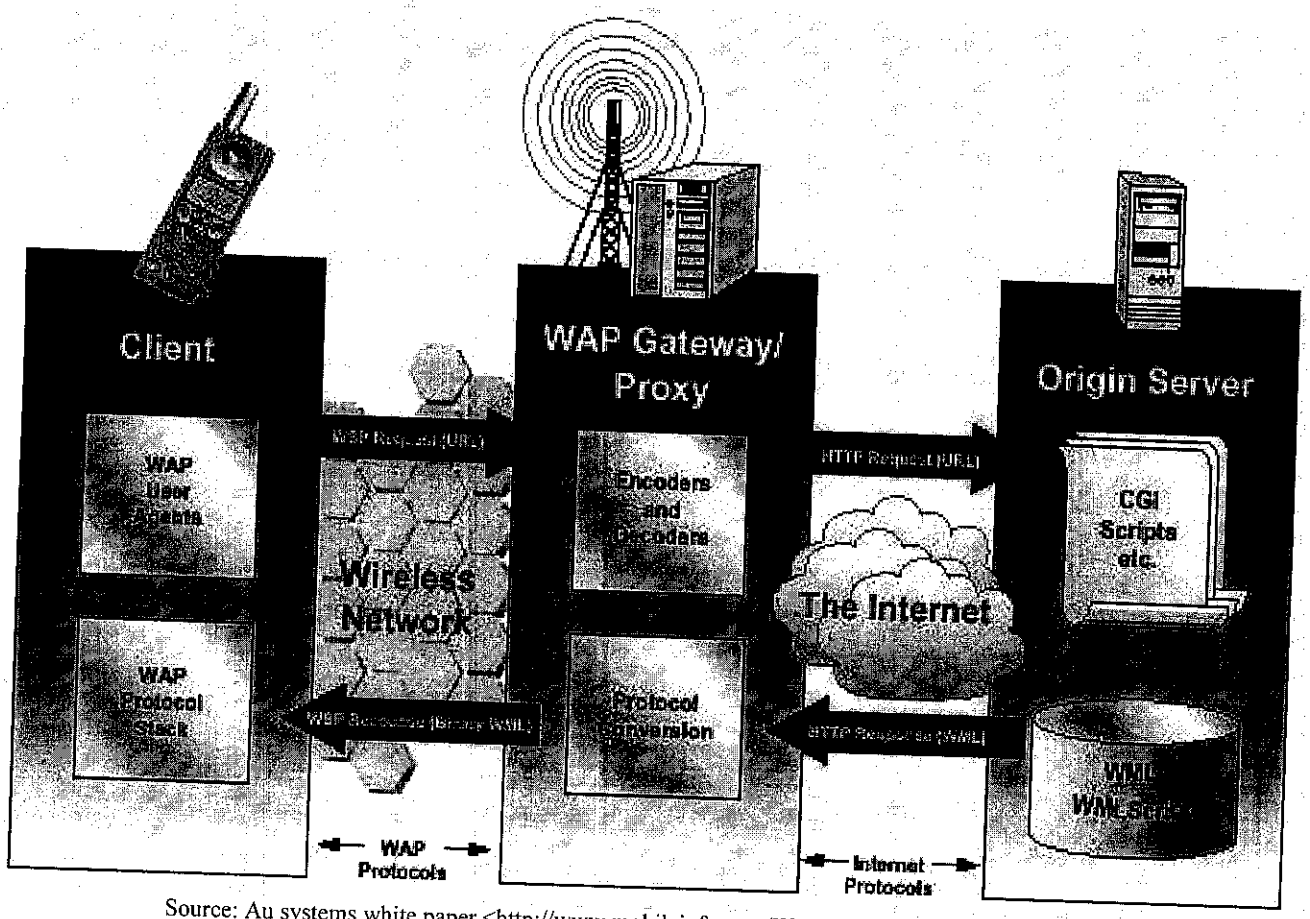


Source: Au systems white paper <http://<www.mobileinfo.com/WAP/model.htm>

Figure 1.1 *Internet protocols of Wireless Application Protocol (WAP)*

The strength of WAP (some call it the problem with WAP) lies on the fact that it very closely resembles the Internet model. In order to accommodate wireless access to the information space offered by the WWW, WAP is based on

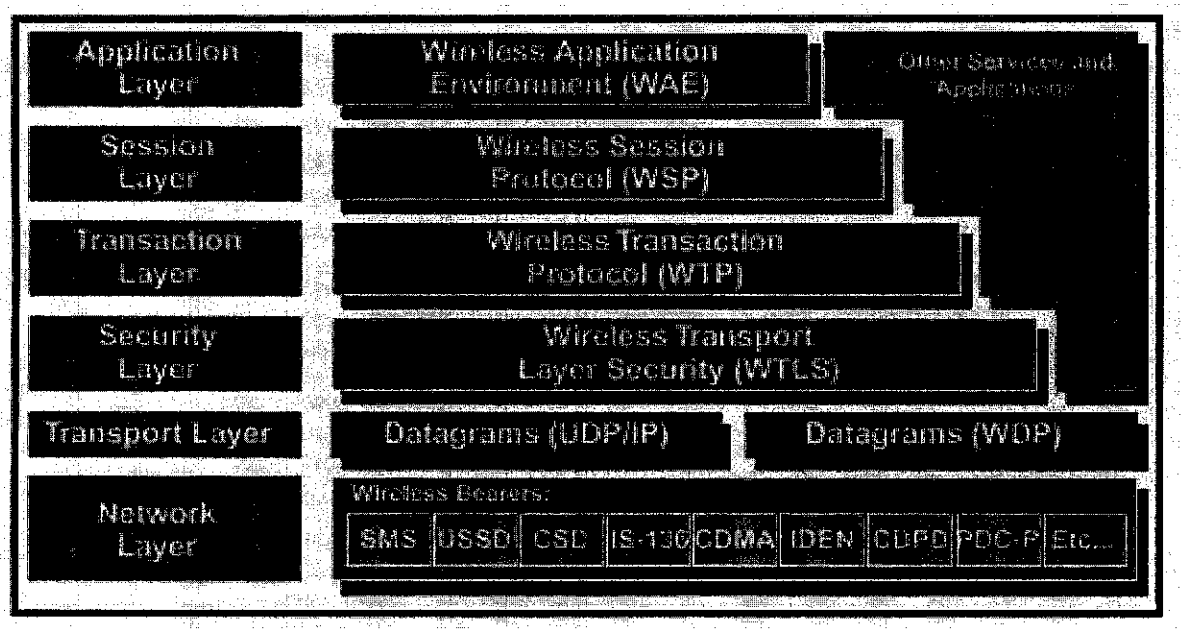
well-known Internet technology that has been optimized to meet the constraints of a wireless environment. Corresponding to Hypertext Markup Language (HTML), WAP specifies a markup language adapted to the constraints of low bandwidth available with the usual mobile data bearers and the limited display capabilities of mobile devices - the Wireless Markup Language (WML). WML offers a navigation model designed for devices with small displays and limited input facilities (no mouse and limited keyboard). WAP also provides a means for supporting more advanced tasks, comparable to those solved by using for example JavaScript in HTML. The solution in WAP is called WML Script. You will find more information about these later in the coming sections. The following figure will give a clear understanding of the WAP model.



Source: Au systems white paper <http://www.mobileinfo.com/WAP/model.htm>

Figure 1.2 *The WAP Gateway provides wireless networks with Internet access and optional content translation and filtering.*

From the WAP Model, which is shown as Figure 1.2, the process of requesting information of WAP is just like the process of requesting the information using Short Message Services (SMS). In this WAP Model, the mobile phone users will use their mobile phone to browse the current system or internet application, as will request for the particular information. Their request will then be sent to the server, by the WAP Gateway or Proxy, as an intermediary in the process of sending the request information from the server. When the server identifies the requested information by using specific source code or scripts, it will then passes the information requested via the Internet to the mobile phone users, through the WAP Gateway before reaching to the users. From the wireless network, mobile phone users will then receive the particular information that they requested.



Source: http://www.mobilecomms-technology.com/projects/wap/wap1.html

Figure 1.3 *WAP Protocol Stack*

Figure 1.3 shows the Protocol Stack of WAP. WAP incorporates a simple micro-browser, designed to work on the limited platforms of mobile handsets, with a central WAP gateway that performs the more processor-heavy operations. It defines a standard for data transmission to the handset, WDP (WAP datagram protocol), which is a variation of the internet standard transmission protocol,

HTTP (Hypertext Transport Protocol), but redesigned for wireless network characteristics. WDP mostly differs from HTTP by stripping out much of the text information, replacing it with more efficient binary information for the low-bandwidth connection. The WAP data can be sent over any available network, be it the circuit-switched connection of TDMA (Time Division Multiple Access) IS-136 or packet-switched GPRS.

Added to this core transmission protocol are several scalable layers that can be developed independently. The Wireless Transport Layer Security (WTLS) layer adds optional encryption facilities that enable secure transactions. WTP (WAP Transaction Protocol) adds transaction support, adding to the datagram service of WPD, while WSP (WAP Session Protocol) allows efficient data exchange between applications.

WAP also defines an application environment (WAE) that enables third-party developers to develop more advanced services and applications, along with the micro-browser used to access web pages on the handset itself. To access the Internet content, the user's handset sends a request to the WAP gateway, which retrieves the information in either HTML (Hypertext Markup Language) or WML (Wireless Markup Language) from the host server. WML is a variation of HTML, designed specifically to enable viewing on the limited mobile terminal platform. If the information retrieved is in HTML, a filter in the gateway will attempt to convert it to WML. The information will then be transmitted to the handset over whatever network is available, using the transmission protocols described above.

1.2 PROBLEM STATEMENT

1.2.1 Problem Identification

From the observation made, there is actually no proper management of the events in UTP. Everything is paper-based done. An Event Management

System is currently not existed yet in UTP. Students and staff are alerted with the upcoming events when they read the pamphlets or the newsletter pasted on the wall at the hostel and academic buildings.

The main problem here is students are not aware of the upcoming events. Sometimes they show poor participation for a particular event because they missed out the information regarding the events. Paper-based promotion is less effective if comparing to the web-based promotion, and also WAP-based promotion, as the students spend most of their time sitting in front of their PC and also their own mobile phone.

Actually, there is a lot of event that has been organized by the UTP staff and the student themselves. As what has been explained before, some societies is well-known by the UTP student, such as Persatuan Seni Silat Cekak, RCSU, MPPUTP and many more. They have organized a lot of activities such as Convocation Day, Minggu Mesra Kampus and so on. Those activities are required the participation from the student itself.

Students sometimes will miss out the information of those events, and sometimes they are not alerted about that. Because of this, students' participation is lesser for the certain events. Currently, students have been alerted with the other alternative, which is the use of Internet Relay Chat (IRC), the chat room for the students to get the information for the certain activities that might happen at UTP.

For the purpose of booking the equipment for a particular event, students have to go to UTP IT Media Department. When there is an event such as Convocation Day that may require the participation from outsiders, they basically have to call the responsible person.

The entire problems scenario gives the difficulties to the students and other people involved keeping up-to-date with the events at UTP and creating awareness of their participation for certain activities. Because of this problem, the new system, WAP-Based Event Management System is developed as the solution.

1.2.2 Significant of the Project

With the effective use of the system, it might help the society to ensure the participation of the students. This system will help to keep the student alertness and awareness of the events in UTP. Their participation can also be encouraged to ensure their full support for certain events. The involvement or participation from the public can also be encouraged to enhance the good image of UTP as they have more systematic system for this kind of situation.

Students can be easily updated with the newsletter or any other information when browsing to the system by using the PC or mobile phone, with the availability of WAP Technology. Even the administrator of the system can update their system and also the club representative can update their activities anywhere and at anytime that they want without worrying about the time or the office hour.

1.3 OBJECTIVE AND SCOPE OF STUDY

1.3.1 Relevancy of the Project

The objectives of the project are as follows:

a. Instead of web-based system for this Event Management System, WAP technology is used as an alternative to update people about the events

b. Give an easy, fast and comfortable access to the system from anywhere at anytime
c. To enable easy, fast delivery, and alertness of relevant information and services to mobile users
d. To replace the paper-based system for the updating and booking purpose
e. Not burden with the limit time (office hour), the club representative can update their activities or book the facilities for the event without the use of the computers at their room

1.3.2 Feasibility of the Project within the Scope and Time Frame

The scope of study covered in this project for both developing the system and the application of the system are as the following:

a. The use of the WAP technology, in searching the information and relevant services instead of application of SMS and MMS that is getting popular nowadays
b. Make a request in WML, a language derived from HTML especially from wireless network characteristics
c. This request is passed to a WAP Gateway that retrieves the information from server, which is from the system database
d. The requested information is then sent from WAP Gateway to the WAP client, who is the mobile users that accessing the system
e. Students can view this system either using their computers online or from their mobile phones
f. Check the upcoming event that will be held on certain date
g. Book the facilities or equipment
h. Update the announcement and event for future
i. Accounts for the administrator and the club representative is protected with the use of password

j. Club representatives can register their proposed events before present the proposed events to the Jabatan Perkhidmatan Sokongan Pelajar (JPSP) or also known as Student Support Services.

The scope of the project has been tailored to accommodate and fulfill the requirements of the final year project. It is also arranged and planned in such a way that it is fully operational within the time frame given.

CHAPTER 2
LITERATURE REVIEW OR THEORY

2.1 BRIEF HISTORY OF WAP

In the article, *Waiting for WAP*, Valdes (2000) has stated that WAP was created by Phone.com (formerly Unwired Planet) in 1995 and has gone through several revisions. Phone.com organized the WAP Forum, an association whose principal members include Nokia, Motorola, Ericcson, and other manufacturers. WAP membership represents 95 percent of the global handset market. Internet-enabled mobile users with WAP phones connect not to a Web server but to a WAP gateway, often operated by the mobile phone carrier that serves as an intermediary between HTTP servers serving Wireless Markup Language (WML) files and the WAP device. The WAP gateway compiles WML into a byte representation (WBXML), and uses its own airlink protocols, including security and transaction protocols, to exchange information with a WAP device.

Selby (1997-2004) noted that, in 1997, when WAP was unveiled to the world, the proposed information flow chain neatly stated that content would be provided in Wireless Markup Language (WML), converted to binary WML, sloshed through a WAP Gateway, blown out on cellular networks like GSM, and finally sucked into and displayed on mobile telephone handsets. Customers who were even able to get the first WAP phones (many models were late in rollout) complained bitterly of slow speeds, caused not just by the service but also by the devices themselves. The over-hyping of WAP, especially in Q1 2000 and Q2 2000, and subsequent disappointing offerings nearly put the nail in WAP's coffin, from a marketing standpoint.

As previously stated, WAP refers to a wide range of technologies and protocols, all related to mobile Internet functionality. This functionality has roots dating back to the mid 1990s. At that time, several vendors were working on the mobile Internet problem as mobile device sales skyrocketed, and several competing technologies emerged:

- Nokia's Narrow Band Sockets (NBS) and Tagged Text Markup Language (TTML)
- Ericsson's Intelligent Terminal Transfer Protocol (ITTP)
- Unwired Planet's Handheld Device Markup Language (HDML)

Each technology had its own purpose, but some overlapped with others in various areas. This diversity threatened to fragment the wireless industry along provider lines. In mid 1997, the WAP Forum was founded to aid in communication among the developers and to spur a common set of protocols and technologies. In the same year, the industry took another step forward with the formation of the Open Mobile Alliance (OMA), which combined several distinct development and standards bodies into one.

2.2 AN OVERVIEW OF WAP

WAP stands for Wireless Application Protocol. It is the globally recognized programming model that enables mobile phones to access the Internet. The advent of WAP means that organizations, many of whom already use Internet based information systems, can give the employees instant access to company data and applications when on the move. Smith (February 4, 2002) pointed out that, some industry observers say the growth of always-on networks could breathe new life into WAP—the technology some once thought was dead. But others remain skeptical. Wireless application protocol hasn't generated much excitement in recent months. Even stories that mentioned it relegated it to the trash can of bygone technologies. One recent worldwide news service story even called WAP a "slow speed" mobile technology. But as always-on, packet-data networks emerge around the world, some people in the industry think WAP will regain attention. Most insiders believe it will continue to exist for sometime–perhaps only in the background–but some think its role actually will grow.

He also pointed out that, among the biggest skeptics is Jane Zweig, CEO of Herschel Shosteck Associates, who says GPRS and other network upgrades will do little

to solve the fundamental problems of WAP. "GPRS is only a network," Zweig says. "That doesn't change the issue of the content availability and the way operators use it. GPRS, although packet, still has latency issues. GPRS will not save WAP." The analyst does admit that WAP may continue to exist for some time as a phone browser because it is relatively inexpensive. David Chamberlain, research director for wireless Internet services and networks for Probe Research, also is skeptical that GPRS will improve user interest in WAP. He says the GPRS networks he's tested so far have provided nothing new or compelling. "Any belief that improvement in speed, assuming there is one, is going to be a significant improvement in the user experience and bring in more customers is way overly optimistic," Chamberlain says. "It's just not that much better."

From here, we have been exposed that how Wireless Application Protocol (WAP) technology has been grown from years by years, and people are now accept the use of this kind of technology. Even at the first acceptance of this technology, it develops quite slowly. However, with the exposure, the multiple applications and implementation of this WAP technology, the use of this technology will be increased and developed. Every great journey begins with a first step. Many leaders in the telecommunications industry are convinced that the first step toward a wireless Web is a set of technical specifications called the Wireless Application Protocol, or WAP.

Bannan (October 2000) issued that in recent years the leading wireless companies have introduced data networks that allow cell phone users to pull information from the World Wide Web and display it on the phones' tiny screens. The WAP specifications would essentially standardize how the networks transmit Web documents to cell phones, pagers and other handheld devices. Wireless carriers in Europe are currently implementing the WAP standards in their data networks, and some U.S. carriers-including Sprint PCS and Nextel-promise to do so in the near future. WAP's proponents say that the transition will accelerate the growth of the wireless Web. But critics counter that the WAP specifications are inadequate because they severely limit the user's access to the Internet.

Taken from the article, *WAP is Dead-long Live Personal Mobile Communication*, by Uffe Just, WAP is a standard, designed to deliver information and interactive services to mobile telephone users. The system is similar to the traditional internet, but based on special WAP-equipped mobile phones. The development of WAP has been hailed as a landmark in the development of the mobile information society. In contrast to SMS, which is similar in many ways to e-mail, WAP provides users with the interactive advantages of the internet and the portability of a mobile telephone. Information can be found on the internet and viewed on the mobile phone. Services like news, company information, electronic trade, bank transactions, travel updates, sports results and cultural events are linked to websites on the computer-based internet. The WAP concept seemed to fulfill a real need for information independent of time and place. The technical possibilities were enormous as was the hype–but the real test had only one factor: the market.

2.2.2 Applications of WAP

Based on the articles, *Building Usable WAP Applications*, according to Passani,

> Usability is a term that indicates the degree of user-friendliness of a system. A *usable* system is one that lets its user's complete tasks in a reasonably easy way. Assessing the value of a system's user interface has become increasingly important with the growth of computer use - so much so that there is a whole field of computer science (Human-Computer Interaction, or HCI) that deals with building usable systems. (p.1)

From here, we can say that, in order for us to build and develop or create the WAP applications is basically not simple. It actually has many limitations, and the average user of a WAP application is not technically oriented. Finally, the interpretation of WML varies greatly between

devices from different vendors. However, positively, we can consider that, because of this limitation, it will create an extra challenge to build a good usability.

However, nowadays, there are a lot of applications that applied the WAP technology or services as the updated applications of their daily lives. People are now using WAP to browse the Internet, finding information about the stock exchange, e-Commerce and also the e-Business purposes. Instead of that, the wireless industry hopes that WAP devices will become popular for e-Commerce applications like online banking in the not-so-distant future. In the short term, it is more likely that useful WAP applications will simply extend the functions of telephone and allow us to answer a phone message with an email, for example. The early WAP applications have featured news feeds, stock quotes, and weather forecasts, hardly compelling content. Significant backlash against the hype and optimism surrounding WAP has certainly occurred as a result of the uncertainly about its future.

Rodhe (2000) noted that, NOKIA has partnered with IBM, Hewlett-Packard, and Nocom to develop new technology to simplify access to e-Commerce sites using mobile phones, the Finnish mobile telecommunications company announced Wednesday. With the technology, users would be able to program their WAP-enabled mobile phones to access e-Commerce sites wirelessly by simply finding appropriate Web sites with their PC, clicking on a mobile/WAP icon on the site, and typing in their mobile phone number. The settings would then be automatically programmed into the WAP-enabled phone over the air, Nokia said in a statement.

2.2.3 Advantages of WAP Technology

WAP users are not sitting in front of a PC. They are on the move, on their way to a meeting, or in a crowded train. Sometimes they're under pressure. Building usable WAP systems is not straightforward, and its goal should be as simple to use as possible. While this is true for any application, it's an absolute must in the context of WAP. WAP users are subject to many distracting events in the environment that surrounds them, and this adds to the input/output limitations of WAP phones described above.

As the advantages of WAP technology, it can be the multi-partied communication, which means that, WAP technology makes it possible for several people to communicate everywhere they are using different devices. Instant and mobile voice, text, image and position messaging capabilities make this technology an extremely powerful tool. It can also bring implications for e-business:

- Easy and fast access to the Internet.
- Large choice in mobile phones. It is because most of them nowadays support WAP.
- Can be used to download abstract data types.
- Can be built on any operating system.
- International standard.

All of these benefits and implications can be gained even though the users are far from their PC and just using the mobile phones, in order to gain the advantages of using this kind of technology. Schofield (2000) noted that, Phil Brown, managing director of Nokia UK, says: "It's unfortunate that WAP has come to dominate the debate, because the consumer offering is not WAP. It's the service the customer is after, not the technology." He thinks that people want services that are personal,

relevant and perhaps location specific, which could be anything from the football results to the address of the nearest Chinese restaurant. "If you want to deliver that, then WAP is a very attractive way of doing it." Many of the companies now using WAP, had already been using Internet based information systems successfully. The extra flexibility provided by WAP mobile access has significantly increased the value of these systems and has provided the basis for innovative applications for the future.

2.3 ISSUES OF WAP

Schofield (2000) points out that Karl Hicks, a mobile market analyst with Datamonitor, a UK-based research firm, says many of the problems have not been down to WAP at all, but the devices and networks used. The small screens on mobile phones, the difficulty of entering text, the slow connection speeds and "the inability to get on the network, because of bandwidth restrictions, are not WAP's fault, but people associate them with WAP", he says. The issues are come from the physical of the mobile phone, which is the screen is small, and have limited size of RAM and ROM. Based from the article, *WAP: Already a Thing of the Past?*, by Lefebvre stated that, WAP is not, and never will be, "everything for everybody". It is actually an (needed) addition running in tandem with the Internet as a whole.

A wireless network is considerably different to a fixed-wire network. The bandwidth of the network is typically much smaller, at least at this point in time. Reliability profiles are considerably different, particularly where users move in and out of coverage areas, disappear into tunnels, and so on. Latency may also be an issue in wireless networks. An additional factor is that there are a number of mobile network standards in place across the world, and they do not interoperate seamlessly. Some countries even have incompatible standards in different regions.

Finally, it is important to realize that the market is different where wireless applications are concerned. The types of applications that are suitable for use on mobile devices are not the same as those that are popular on fixed-wire environments. Typical users of mobile applications are likely to be a broader subset of the population than PC users. Even the context in which the applications are going to be used will be different. This highlights the most important aspect of mobile application design, which is to make the application easy to use in the context, and on the device that it will be accessed from.

2.4 AUTOMATED UTP EVENT MANAGEMENT SYSTEM

As the purpose to replace the manual event management system, the automated system for this kind of application is more applicable when using either WAP-based or web-based. From the observation, this kind of system is not widely implemented especially to the other universities and colleges around Malaysia. Generally, some institutions are more exposed with the multiple uses of SMS and MMS for their daily life.

Web-based systems have been implemented by other international universities. The students at the oversea are more adaptable with the updated technology, in order to enhance their effectiveness of studied at their own universities. Two international universities have been identified using the WAP-based system in their universities. In Berlin, stated by Kalkberner and Nebojsa in *Campus Mobil: Mobile Services for Campus Student Needs*, in the case of the Wireless Application Protocol (WAP) the consortium "Campus Mobil" was founded in order to investigate innovative services based on this technology. The consortium, which was founded for the development in this field, consists of partner from most relevant parts of the German telecommunication market. A large user group of 3 universities were included: Technische Universität Berlin (TUB), Technische Fachhochschule (TFH) and Hochschule der Künste (HDK). It provides services on .WAP-Homepage of the university, WAP-Homepage of faculties, Faculty Information, phone and address list, room locations (miniature maps / drawings),access to examination results and also information regarding history relevant places or buildings.

In National University of Singapore (NUS), they implement the ActiveWAP, where all activity management details can be accessed at one single WAP page, anytime, anywhere on mobile. The users can iron out details with friends with the mini discussion board, view organizer's picture/profile, join/unjoin, download activity-targeted discount coupons (if applicable), and so on, all on their mobile. This system will give an easy, faster and comfortable way to access the online system for particular application that related to their university anytime, and even anywhere they prefer. Hence, a WAP-based Event Management System was proposed in managing the events information in UTP.

2.5 FUTURE OF WAP

The future lies in a mobile communications platform that encompasses a long list of hardware platforms: mobile phones, digital cameras, GPS (Global Positioning System), PDA's (Personal Digital Assistant), MP3 players, and so on. These products (and their eventual merging with online services) will create the demand for an effective and easy-to-use mobile communications solution one that people will willingly pay for. Because WAP is a protocol designed to work over any mobile network, its use will continue to increase as more sophisticated data transmission technologies are introduced (for instance GPRS (General Packet Radio Service), EDGE (Extended Data for Global Evolution) and W-CDMA (Wideband-Code Division Multiple Access)). As the bandwidth available to mobile terminals and the quality of displays improve, WAP can be enhanced to provide as effective an internet viewing experience as possible on fixed terminals.

This WAP technology will be upgraded in order to give the broad choices while accessing the Internet using mobile phone especially to the mobile phone users. This kind of technology has been accepted and people are willing to use this technology during their own daily lives. People always do not want to waste time sitting long hours in front of the PC to gather the information that they want. However, this kind of tasks nowadays can be done anywhere, anytime, especially when they are far from their PCs.

However, WAP today is tied to the Web mindset in many people's minds. They see WAP as just a technology that gives mobile devices access to the Internet directly or through gateways. They find it confusing that so many new network protocols, similar but different from the Web protocols, have been developed. However, it is possible that WAP will enable a new and completely different kind of content network in the more distant future.

2.5.1 COMPETITOR OF WAP

Even though the technology of WAP has been accepted, however, WAP has been challenged with the more updated applications that minimize the problems that faced by this technology. Schofield (2000) pointed out that, i-Mode looks good because it uses color, and its CHTML (Compact HTML) language makes it easier to program, but it could have a tough time in Europe. It runs on a packet network, which does not exist in Europe. Also, while i-Mode has "thousands and thousands of applications, most of the content is written in Japanese, and most of the developers who understand CHTML are Japanese".

2.5.1.1 What is i-Mode?

i-Mode has been identified as a challenge of WAP as they have better functions compare to WAP. Taken from the report summary, *The i-Mode Ecosystem*, dated on January 22, 2005, since its introduction in 1999, i-Mode is driving the development of the mobile internet world-wide. i-Mode is the driving force behind m-Mode, e-Mocion and other i-Mode derivatives in the world. "Vodafone-Live!" originated as "J-sky" in Japan, and "J-sky" was developed in reaction to i-Mode's explosive success. Still today i-Mode is driving "Vodafone-Live!" through competitive pressure. Around 40 million Japanese subscribers use i-mode every day. i-Mode has become a completely new multi-billion dollar

business and part of the essential infrastructure of Japan, as well as driving the development of the global wireless internet revolution.

2.5.1.2 Efficiency of i-Mode

One reason for i-Mode's popularity is that development is quite easy. As with WAP, sites have to be specially produced, but only a few extra HTML tags need to be learned in order to produce the CHTML content. No WAP gateway is required, so the infrastructure is simpler. It also gives good support to retailers, as services purchased over i-Mode are billed directly to the subscriber's phone bill.

Anderson (2001) noted that, i-Mode has experienced a tremendous growth (around 20 Million users in less than two years) and one reason is that CHTML is very easy to get started with. WML, on the other hand, has been seen as bulky and cumbersome by some developers. The issue with HTML and HTML-derivatives has so far been the lack of strict rules for content description. When designing for small devices, that all have different form factors and screen sizes, it is important to be able to control the way content is presented in a more detailed way. WML is derived from the rules of XML, a generic content description framework. Now the WWW Consortium, W3C, is working on ways to apply XML rules into a revised HTML standard, XHTML. The WAP forum is working closely with W3C in this effort, and it is foreseen that WAP 2.0 will support both WML and XHTML. This ensures that content developed today will also be viewable on future devices.

CHAPTER 3
METHODOLOGY / PROJECT WORK

3.1 PROCEDURE IDENTIFICATION

In order to build WAP-based Event Management System, the phases in the system development process need to be identified. In terms of system development of WAP-based Event Management System, this system may take a few months, possibly the final year project duration time to be completed. Because of a long time maybe required to be use, every step of the system has to be completed directly on time.

A specific development methodology has to be identified, to ensure that the system can be built and developed at the stated date. The overall process includes 5 phases that derived from the waterfall model. First phase - Requirements Definition and Assumptions, which is an Analysis phase, second phase - System and Software Design, third phase - Construction, fourth phase - Implementation, Integration and Testing and final phase - Operation and Maintenance.

3.1.1 Requirements Definition and Assumptions

First of all, before going more details with the system development process, this system identifies the problems, opportunities, and objectives why this system is very important, and why it is important to change to the new system.

The problem of the current situation has been analyzed, where it is more applicable to use the automated WAP-based system to manage and facilitate the events at UTP. With the problems that have been analyzed and observe, it is an opportunity to build and develop a system that may

give an ease and effective way to update the students and create the awareness from them regarding the events that will be held at UTP itself. From here, the objectives of the system will be specified.

Basically, a few researches have been made in order to gather the required information for developing the system. For this stage, questionnaire has been created and distributed to the users of this system. The sample of the questionnaire is attached in **Appendix B**. The results for the questionnaire will be discussed in Chapter 4.

3.1.2 System and Software Design

During this phase, a specification of the hardware and software that are going to be used during the system development process have to be considered. For this system, it requires the use of PHP (Hypertext Preprocessor) and WML for the programming purpose, Apache as the server for the system, MySQL as a purpose of creating the system database. This is the software that required to be used.

3.1.2.1 Interface Design

In preparing the sample storyboard representing the sub-modules, specific care has been taken in areas involving direct interaction between user and the system. A set of human-computer interaction (HCI) rationales was applied to integrate usable interface design together with the desired functionalities of the system. Basically, the interface for WAP design is the same; however, the placement and arrangement for the options buttons and list of the options for the user to select has to be in right placement.

Diagrams and interface sketches were later transferred to the storyboard for a more enhanced and cleaner representation.

The interface design for the system is attached in **Appendix C**. At the same time, the flow of the process is described as in **Appendix D**, and the Data-Flow Diagram (DFD) has been developed in order to get the better view on the flow of the system. The diagram is attached in **Appendix E**.

3.1.3 Construction

For the construction phase, some steps have been analyzed. During this phase, the Entity-Relationship Diagram (ERD) as shown in **Appendix F** has to be developed. At the same time, the system coding has to be created. This project has actually reached this phase, but still in the process of creating the code. After that, , the unit testing will be applied, to test every single unit to find out any error, before further finalizing the system code.

3.1.4 Implementation, Integration and Testing

Before the system can be used, it must be tested first. It is less costly to detect problems before the system is signed over to users. A series of tests to pinpoint problems is run first with sample data and eventually with actual data from the current system. The tests that can be used for this system are as follows:

- **Unit Testing**

  This testing is carried out to test the subsystem of the system before combining them as an integration system.

- **Integration Testing**

  This testing carried out after the separate subsystems have been fully debugged and approved. The subsystem will then be linked as appropriate and tested working in combination as one system.

- **Usability Testing**

  The final testing for the system is to ensure the usability of the system, performed by the user. It is done as the prototyping of the system. This testing is done to ensure the ease of use of the system, and it involves the human-factoring specialist to ensure that the system is most user-friendly.

When the system testing is done, the error will be identified and fixed up with identified solutions.

3.1.5 Operation and Maintenance

In this last phase, the system will be implemented by the targeted users. It also involves training users to handle the project. Evaluation is shown as part of final phase of the project development process mostly for the sake of discussion. After the project has been implemented, the evaluation is done to know whether it is successfully operated, or have faced unexpected problems that cannot be figured out at the early stage of the system development. The real system or product will be produced right after the usability testing is done.

3.2 TOOLS REQUIRED

The tools used for construction and programming purposes are:

3.2.1 Software:

- **PHP and WML** : programming language to develop the system
- **Apache**: system server
- **MySQL** : create database for the system
- **Openwave** : as the compilers for WML and WMLScript, and it also contains an emulator to test the application

3.2.2 Hardware:

- **WAP Gateway** : as an intermediary between the server and also the mobile phone

CHAPTER 4
RESULTS AND DISCUSSION

4.1 REQUIREMENT ANALYSIS

At the early stage of the system development, some analysis methods have been applied in order to find out the satisfaction of users for the WAP-based UTP Event Management System. First method that has been done was observation, where the current system has been observed to identify the problems and the solution for those problems.

Next method, instead of doing the observation, the questionnaire has been prepared and distributed to the target users. A few days later, the questionnaires have been collected and analyzed. The results and analysis from the questionnaires are as follows:

- **Question 1**

  What do you think about the organization of the event at UTP?

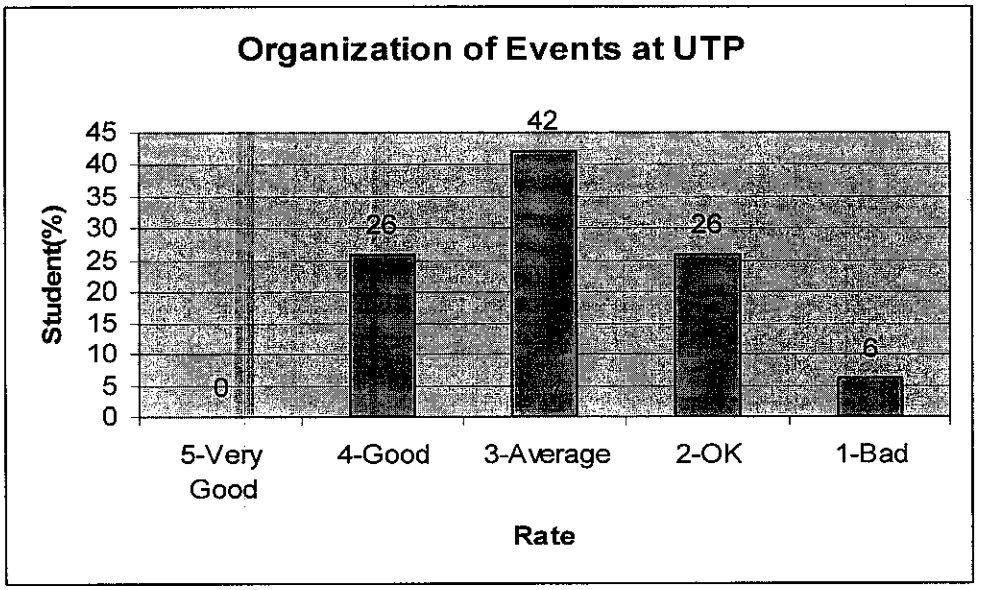


Figure 4.1 *Organization of Events at UTP*

Based on the responses for the question 1, 42% of students think that the events that organized at UTP are just average, which is considered not too good and not so bad. However, no student thinks that the organization of the events at UTP is very good. The same rates go to the rate 4-Good and 2-OK which are both with 26%, and only 6% of students think that the events organized are bad.

- **Question 2**

  Do you always miss out the information regarding the events and activities held in UTP?

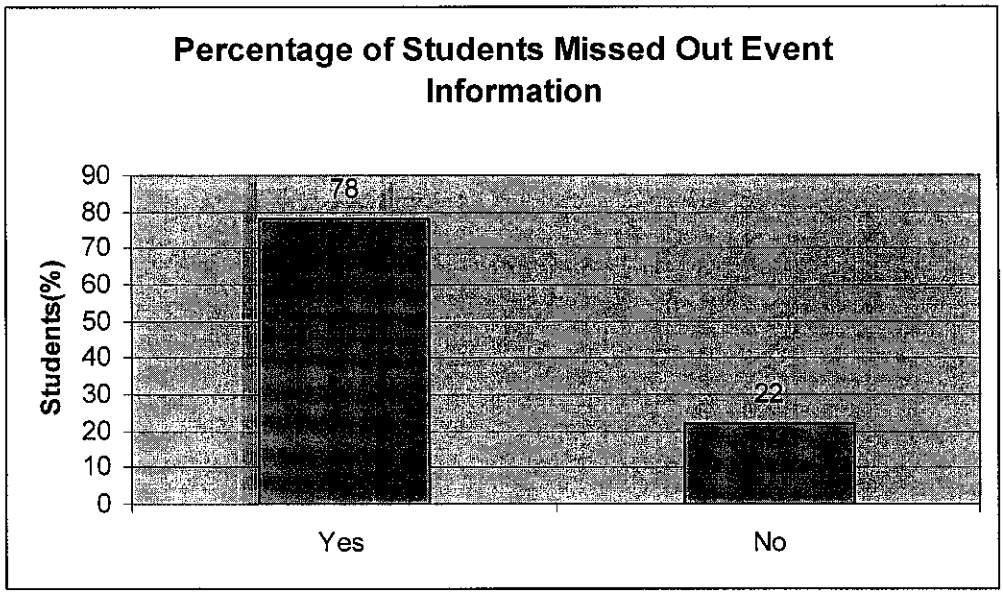


Figure 4.2 *Percentage of Students Missed Out the Event Information*

For the question 2, most respondents, which is with 78% think that they always miss out the information regarding the events and activities held at UTP? The reasons of why these things happen can be referred to Question 3 of the questionnaire. While the rest, which is 22% of them always alert and concerns with the new information regarding the events that held in UTP.

- **Question 3**

  If yes, why does that kind of thing happen?

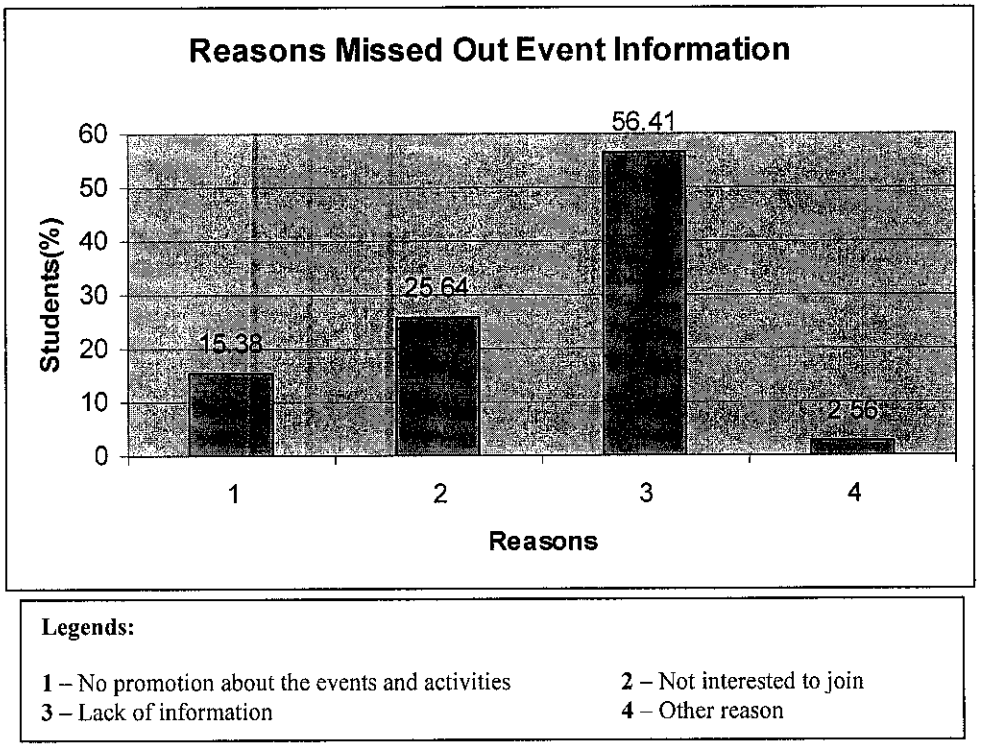


Figure 4.3 *Percentage of Reasons of Why Students Missed Out the Events Information*

By referring to Question 2, for Question 3, the 78% respondents have identified the reasons of why they miss out that information. Based on the Figure 4.3, with the reason of "No promotion about the events and activities" rated as 1 is at 15.29%, which is about at 15% respondents. About 26% respondents think that they are not interested to join the events that announced at UTP. With the highest percentage, which is about 56% respondents think that, they miss out the events because of the lack of information provided to the students. The students are interested to find out more details information about the events, who are supposed to get involved and so on. Only 2% of respondents, identified that there are not enough promotions being made, which include the use of pamphlets and banners, and they think that, both promotion methods are

dull and look not attractive. They think UTP did not promote the events in an effective manner.

- **Question 4**

  How effective the current promotion (such as posting the information regarding the events on the wall and giving out the pamphlets) for the UTP events and activities?

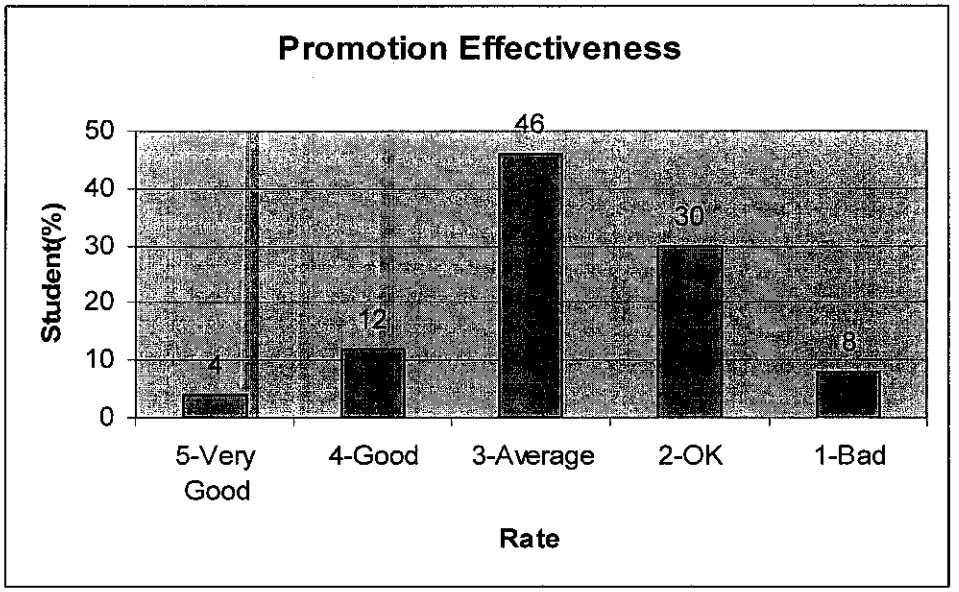


Figure 4.4 *Promotion Effectiveness*

Question 4 relies on the efficiency of the promotion method made by UTP to promote the events and attract students' involvement in those events. Currently, UTP promotes its events by posting the information of the events on the wall and/or just distributing the pamphlets. Most respondents, which is about 46% respondents think that promotion is at an average rate, not too good and not so bad. However, 4% of respondents think that the promotion used is very good, seems that they are always aware of the information. Only 8% of respondents think that the promotion is bad, maybe because they are not alerted and always missed out the information provided.

- **Question 5**

  Do you prefer any new enhancement to facilitate and organize the events and activities at UTP?

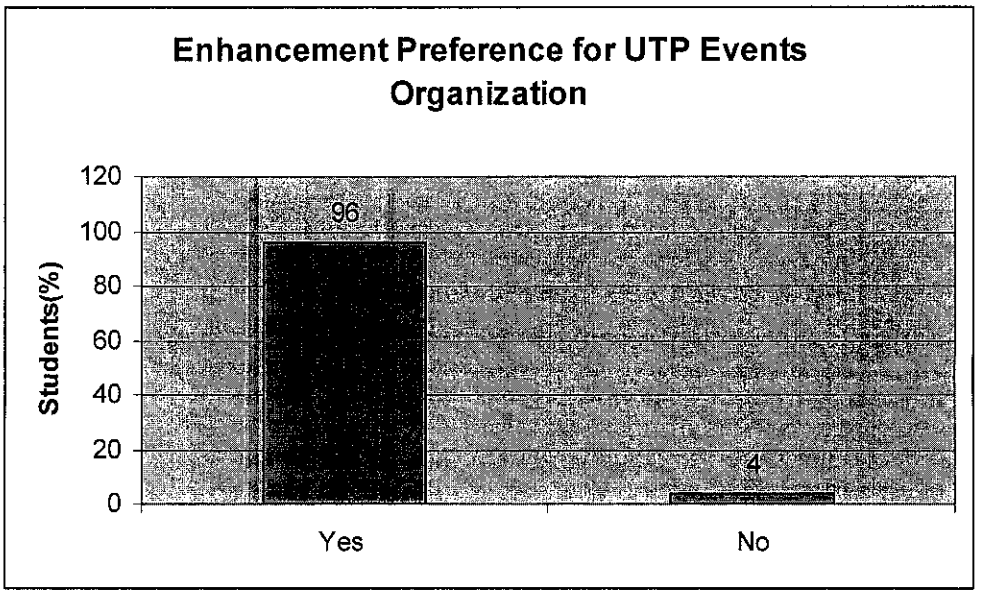


Figure 4.5 *Enhancement Preferences for UTP Events Organization*

Most of the respondents, which is 96% of them think that they prefer a new enhancement for the current system so that the events can be facilitated and organized more efficiently and effectively. However, only 4% of the respondents think that the manual system is adequate to provide the information for them.

- **Question 6**

  Do you think with an effective Web-Based and WAP-based system might help you be more alert with the upcoming events and activities at UTP?

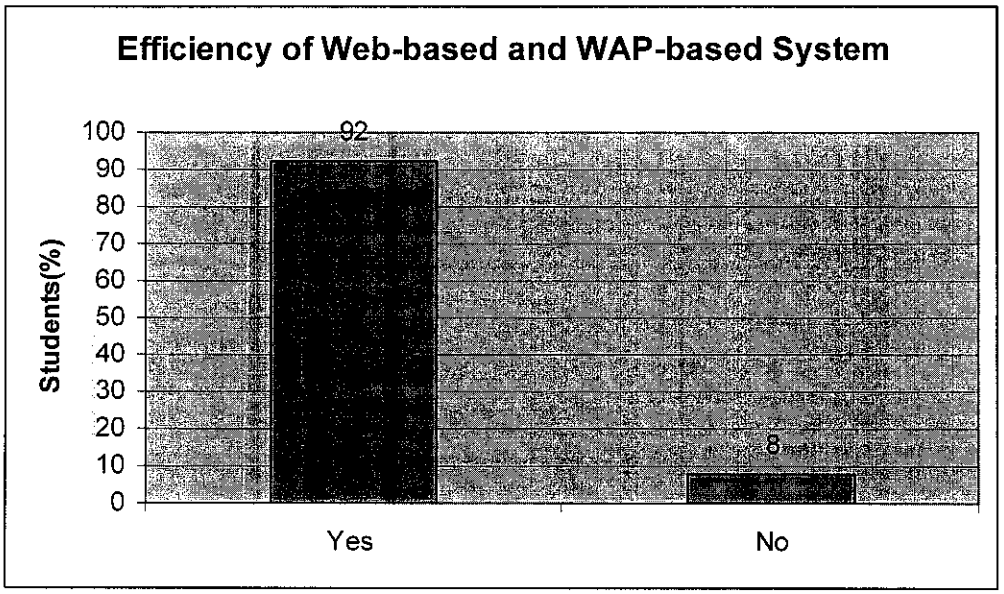


Figure 4.6 *Percentage of the Efficiency of Web0based and WAP-based System*

By referring to the chart above, 92% of respondents think that with an effective Web-Based and WAP-Based system might help them to be more alerted with the upcoming events and activities at UTP. In this case, for the new enhancement, the WAP-Based system will be introduced to the students. However, 8% of the respondents think that the use of web-based system is not efficient enough if the network is still not good. Currently, the medium that is used to provide the information other than pamphlet and posting announcements on the wall is by using the IRC (Internet Relay Chat). Sometimes, there are students who are not interested in accessing the UTP-related network service because currently the network in UTP is quite bad. With the use of WAP-Based Event Management System, the poor network is no longer a big problem for the students. This system is simply accessible using the WAP-enables mobile phone.

4.2 REQUIREMENT MODELING

4.2.1 Process Flow Chart

The process flow shows the flow of how the system is working, especially for the users, and administrative staff that manage the system. In this process flow, it involves some processes. First of all, when the users start using this WAP system, they will be directed to the menu option, where they can choose either to view the latest announcements regarding the events, and the upcoming events that will be held soon or login as an authorized user.

As the authorized users, they have to key-in their username and password as the validation to enter the next options. For invalid users, they will be directed back to the main menu option earlier. When they successfully login to the additional options, they can either update the new event; register the events to the Student Support Services (JPSP), or booking the equipment for the particular event. For the events approval options, the person in-charge from JPSP will then approve or reject the summary proposal of the events, and they need to see them for the further details and information. All the submission done will be updated in the database, which is the Event database.

The details flow of the system is attached in **Appendix D**.

4.2.2 Data Flow Diagram

In order to fulfill the requirement modeling, the Data Flow Diagram (DFD) for the system has been developed. The DFD contains the three level of DFD, which is the Level-0, describe the main process for the whole process of the system, Level-1 DFD, and describe details about the

system and the sub-process involved in that main system, and finally, Level-2 describes more details about the sub-process involved in the system.

In Level-0, the main process for the system is the WAP-Based UTP Event Management System itself. There are three entities involved, which are student, club representative, Student Support Service (JPSP), and administration. The student is responsible to find or search the information that they want using their WAP-enabled mobile phone. The student will then receive or view the information that they want and choose from the options stated in this system. The information that they get will always be updated by the club representative. The club representative responsible as the person who will update all the events and activities in UTP. This is to ensure that the students will receive the latest information of the events. They can also book the available services, such as facilities, equipments, and so on using this system. JPSP is responsible to approve or reject the registered events done by the club representatives. And finally, the administrator is responsible to collect the booking submission form from the club representative.

For Level-1 of the DFD, it shows a more detail explanation in the main process of the system. The sub-processes involved are Browse Information, where the student will choose an option to view the information regarding the upcoming events and activities at UTP. The Browse Information process will retrieve the information request by the student from the Event Database. From the database, it will send the information to the process and send it to the student via their mobile phone. The next sup-process involves the User Login, where in order for them to update, booking, register and approve the events, they have to be an authorized users to do so.

The Level-2 of DFD describes more details regarding to the sub-processes involved. There are two processes involved in the Browse Information sub-process, which are the Browse Link and Make Options process. In the User Login sub-processes, they have to enter their own User ID and password before directing to the additional options in this system. When they entered the information correctly, they are connected to the new menu and manage to update events in the update form, register the events in events registration from, and booking the equipment for the events. While for the events approval, it only can be done by the responsible people from JPSP to approve or reject the summary proposal of the events.

Next, in the Level 3 of the system, the Booking Management Process, which contains two processes, which are the Booking Services Available, which is from the club representative to request the services or equipment by submitting the booking form to the system and the Update Booking process, for the administrator to confirm the booking and at the same time update the new booking in the Booking Database. The booking information will then be updated in the database.

And finally, the sub-process of the Events Approval, it contains two sub-processes, which are the View Event Registration Form, taken or retrieved from the database for JPSP to review and directed to the Approve/Reject Event process for the events either to be approved or rejected.

The detailed flows of DFD are attached in **Appendix E**.

4.3 DATA DESIGN

4.3.1 Entity-Relationship Diagram

As for the Entity-Relationship Diagram (ERD), five entities have been identified, which are the student, events information, the club representative, the equipment, facilities of services and finally the administration.

From the diagram, as attached in **Appendix F**, the student will use their WAP-enabled mobile phone to browse and search many events information. The information can be searched by many students at the same time. The club representative will then responsible to update the information regarding the events that will be held. Every club representative will have their own account, where they have to login first before updating the information. At the same time, the club representative can book any facilities, services or equipment that they need for those events. Same process goes to the booking, where the club representative needs to enter their username and password before continuing booking the equipment. The club representative can also register new events by key-in the summary form for the proposed events. The summary proposal will then be approved by the Student Support Services (JPSP). And finally, the administration, involves the administrator who is responsible to confirm the booking requested by the club representative. Only the responsible person in the administration can confirm the equipments booked by the club representative.

4.4 TESTING

4.4.1 Unit Testing

For the unit testing, it has been done every time the deck for the system is created. It is tested as a single application before combining or link it with other deck or unit for the integration testing. With unit testing, the error that will be happened basically involved in typing the wrong code, wrong spelling, missing out the bracket or others. This kind of error is not very hard to be detected and can easily be corrected.

4.4.2 Integration Testing

When all the decks have been created, and all the unit testing have been done for every deck, the integration testing will be taken over. The integration system involved in linking every deck and their connectivity to the database to build as one system. For the time being, the problem that currently encountered is to find out the right way with the right code to connect the database with the system. This testing required some times to detect and correct the error.

4.4.3 Usability Testing

A set of questionnaire, as attached in **Appendix G**, has been prepared for the users to respond after they viewed the system. The system is not completed as expected. However, for the usability testing, the users can view the system as a prototype. This system has been uploaded on the Internet and can be viewed by using an emulator and also the WAP-enabled mobile phone at *http://www.goldenseamarine.com/fyp3/welpage.wml*. Currently, this system can be only viewed by using the emulator. There are some users who have viewed the system and answered Yes to all the questions that

have been asked. Some of them commented that this system can surely beneficial the users in updating themselves with the events at UTP. This system should be well promoted to the students and staff so that the objectives of the system will be achieved and the users can take advantage from it. The other user responded by identifying the advantages and the disadvantages of the system. Firstly, this system is basically easy to use because the functionality of keypad is similar to the standard mobile phone. Secondly, this system is simple yet convenient and accessible at any time and place. However, that user commented that this system is not interactive, plain with text only. As for the suggestion, this system should be more interactive with the color background and updated with the latest information of the events regularly.

CHAPTER 5
CONCLUSION AND RECOMMENDATIONS

Based on the research that has been made, WAP today is tied to the Web mindset in many people's minds. These people see WAP as just a technology that gives mobile devices access to the Internet directly or through gateways. They find it confusing that so many new network protocols, similar but different from the Web protocols, have been developed. However, it is possible that WAP will enable a new and completely different kind of content network in the more distant future.

As wireless devices grow in power, it is possible that someday the WAP and Web models will merge into a single standard. It is also likely the models will diverge, as the way in which we use small mobile network devices will probably always be specialized. Because WAP is based on a layered design, it should be more easily adapted to future needs. From all that have heard, read, and seen is that WAP does have a future, but a future that is largely limited to specialist transactional applications that can be performed on a WAP phone. While WAP has achieved limited success at the start of m-commerce development, the long-term outlook for WAP is very narrow, with further development limited to specialized, short transaction-oriented applications for WAP-enabled cell phones..

Currently, the WAP-Based UTP Event Management System can only be viewed by using the emulator. The reason why the system cannot be used using the WAP-enabled mobile phone is that the WML version used for the system development is not supported by the WAP-enabled mobile phone such as Nokia, Sony Ericsson and also Motorola. As for the future work, an updated WML version should be used so that the system is accessible using the WAP-enabled mobile phone. At the same time, the database connection problem can be solved and the system can be completely functioning.

In addition, as for the future enhancement, providing when the UTP network is good, the Web-Based Event Management System can be developed. Together with the combination of the UTP Event Management System, all the objectives can be achieved, whereby the users are more alert and updated with all the events information from the several societies. This will encourage their participation in the events. In conclusion, by developing this WAP-based Event Management System, the problems encountered by the UTP students and staff can be eliminated. They can obtain updated events information on their WAP-enabled mobile phones.

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APPENDICES

APPENDIX A

PROJECT SHEDULE

	Task	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1	**Project Approval**																				
2	**Preliminary Report**																				
	Project Planning																				
	Problems and objectives																				
	Questionnaire																				
3	**Submit Prelim Report**																				
4	**Project Work**																				
	Study the application use																				
	Install applications																				
	Project storyboard																				
	DFD, ERD and sys flow																				
	Design interface																				
	Develop database																				
	Develop modules																				
	Test coding																				
	Unit testing																				
	Integration testing																				
	Fix connectivity problems																				
5	**Progress Report**																				
	Prepare progress report																				
	Report submission																				
6	**Internal Exhibition**																				
	Preparation for Pre-EDX																				
7	**Final Draft**																				
	Prepare final draft																				
	Submission																				
8	**Oral Presentation**																				
9	**Project Dissertation**																				
	Submission																				

APPENDIX B

SAMPLE QUESTIONNAIRE

QUESTIONNAIRE

UTP EVENT MANAGEMENT SYSTEM

UNIVERSITI TEKNOLOGI PETRONAS

Gender : M – Male F – Female **Program:** _____ **Year:** _____

1. What do you think about the organization of the event at UTP?
   5 – Very Good 4 – Good 3 – Average 2 – OK 1 – Bad

2. Do you always miss out the information regarding the events and activities held in UTP?
   Y – Yes N – No

3. If yes, why does that kind of thing happen?
   1 – No promotion about the events and activities
   2 – Not interested to join
   3 – Lack of information
   4 – Others: _____

4. How effective the current promotion (such as posting the information regarding the events on the wall and giving out the pamphlets) for the UTP events and activities?
   5 – Very Good 4 – Good 3 – Average 2 – OK 1 – Bad

5. Do you prefer any new enhancement to facilitate and organize the events and activities at UTP?
   Y – Yes N – No, because _____

6. Do you think with an effective Web-Based and WAP-based system might help you be more alert with the upcoming events and activities at UTP?
   Y – Yes N – No, because _____

APPENDIX C

STORYBOARD

PROJECT STORYBOARDING

Event Announcement

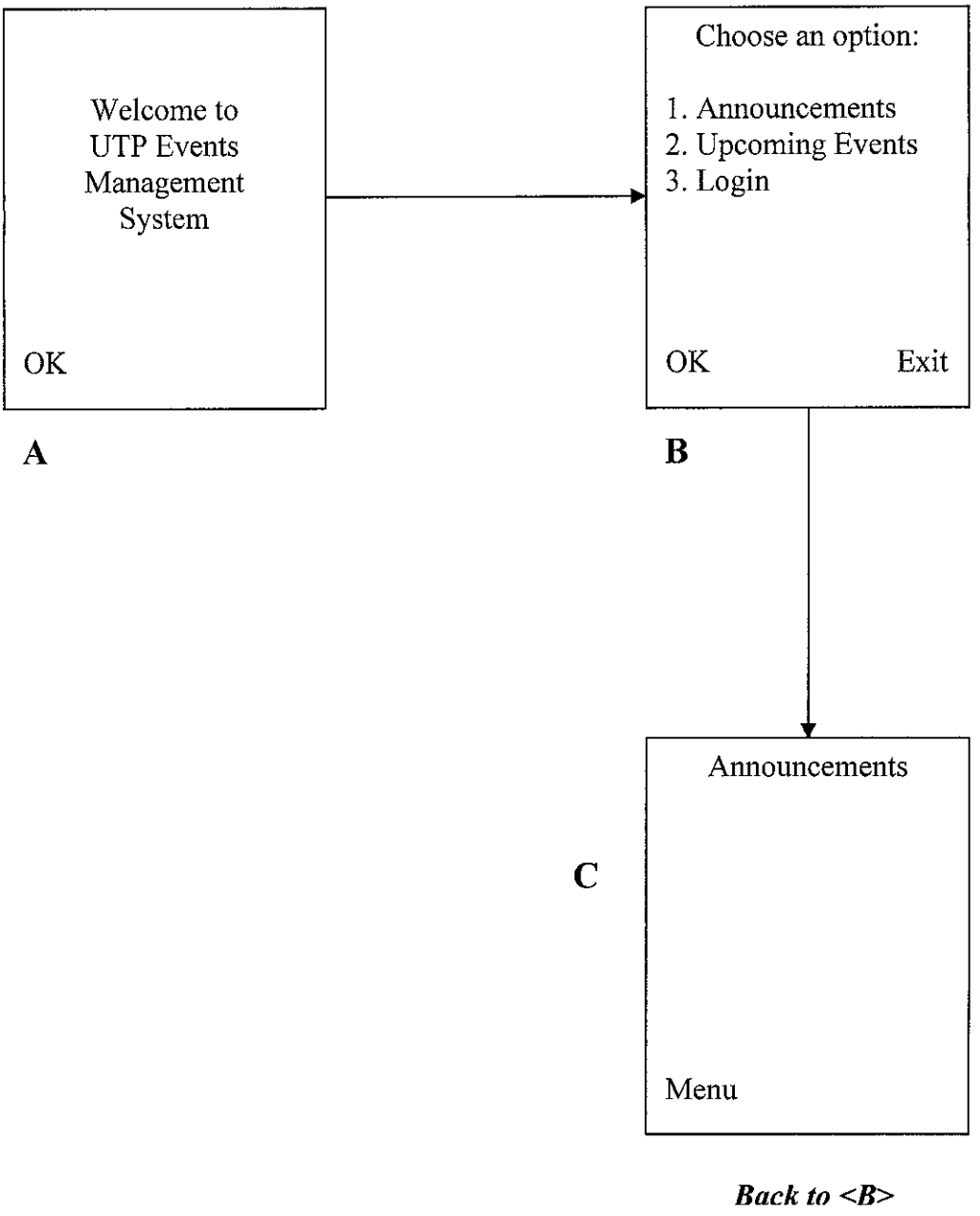

Figure C.1 *Events Announcement*

Upcoming Events

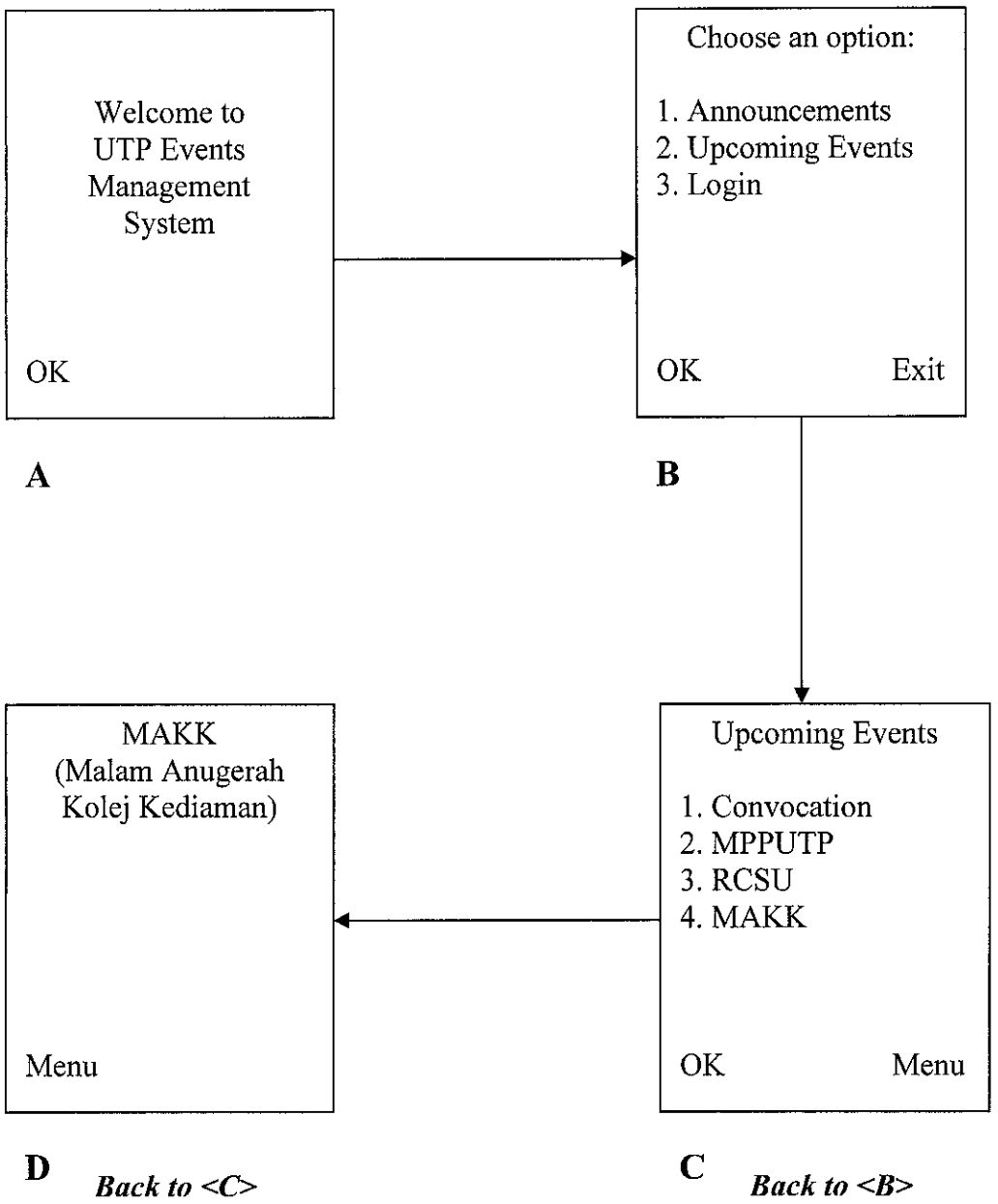

Figure C.2 *Upcoming Events*

Login

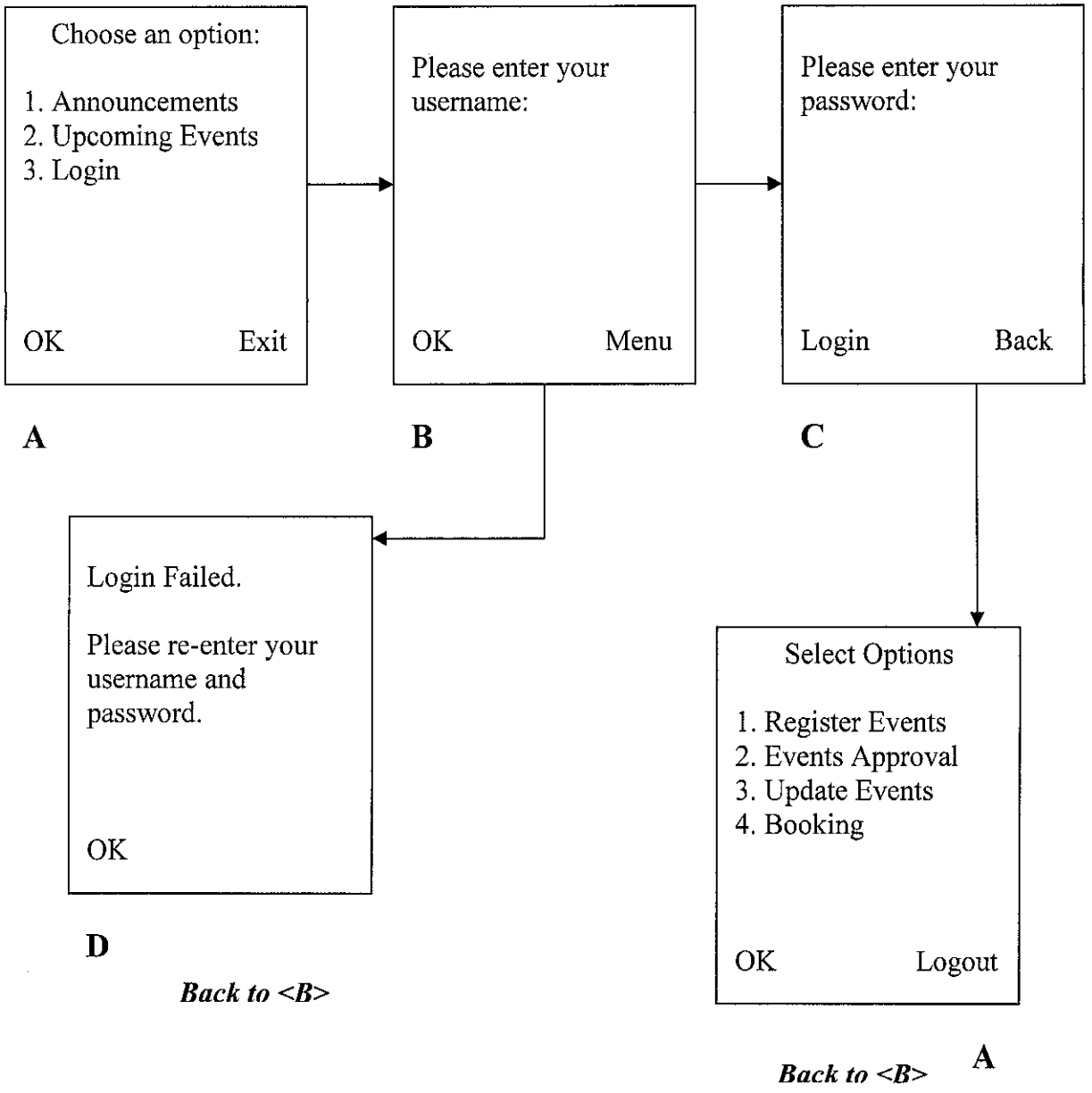

Figure C.3 *Login*

Register Events

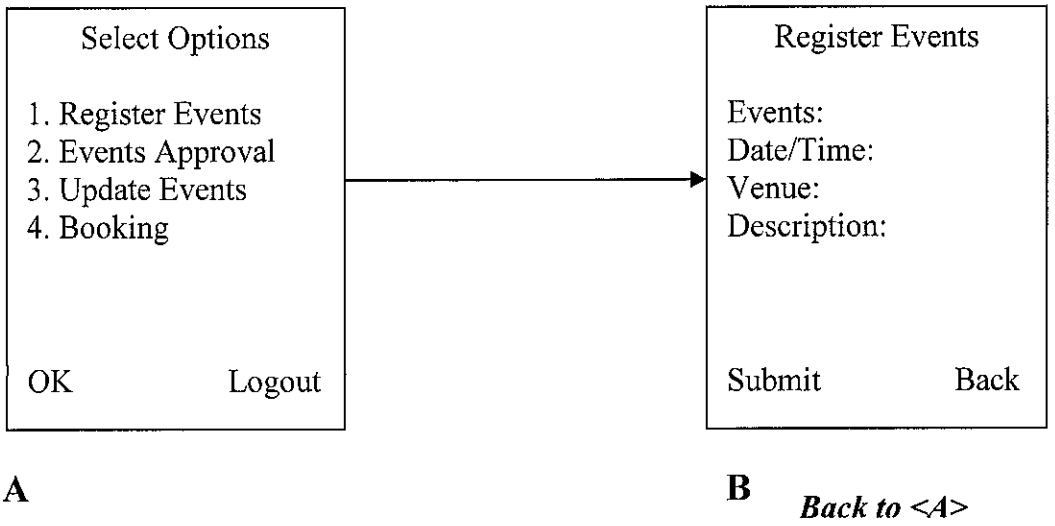

Figure C.4 *Select Options for Register Events*

Events Approval

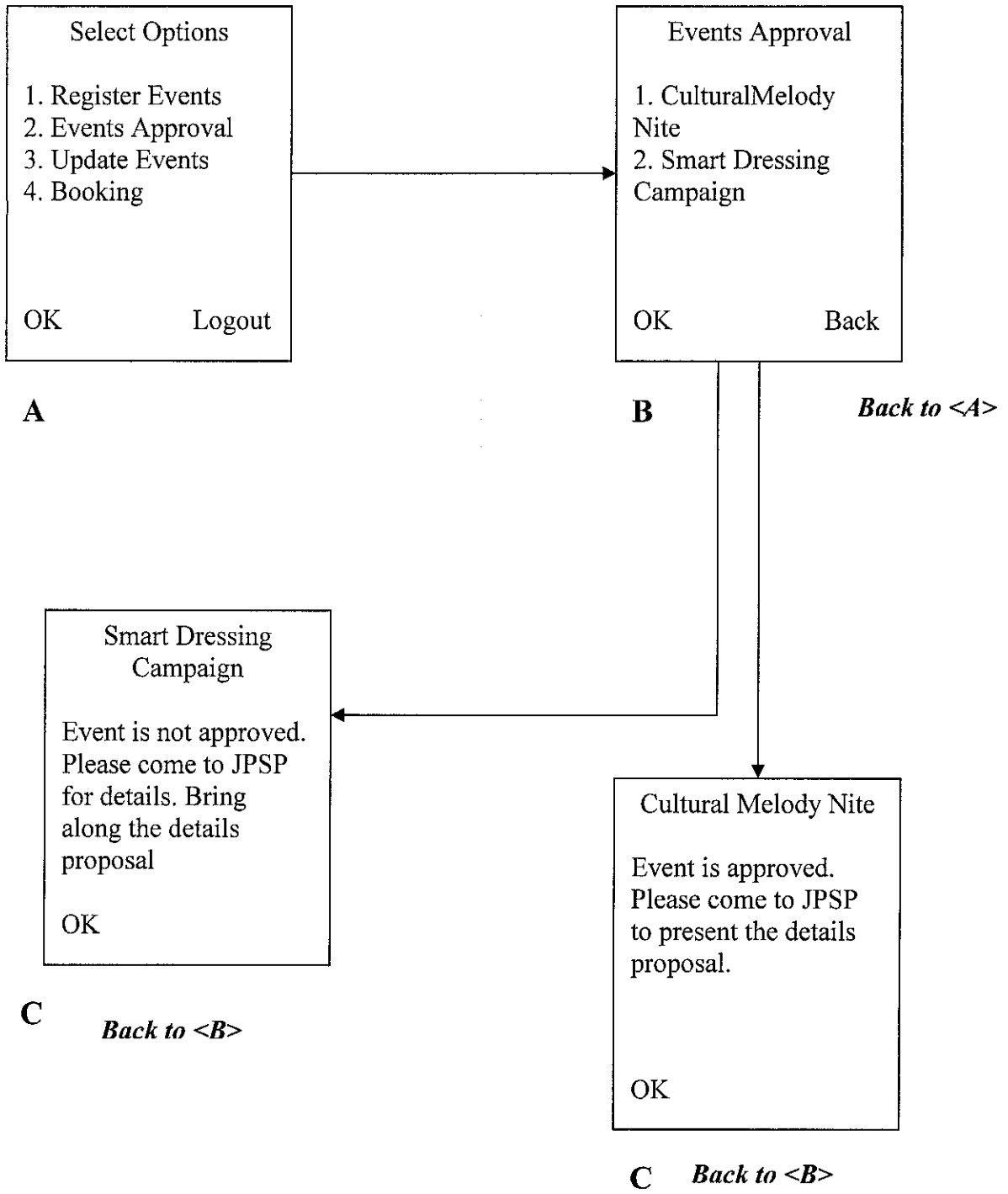

Figure C.5 *Select Options for Events Approval*

Update Events

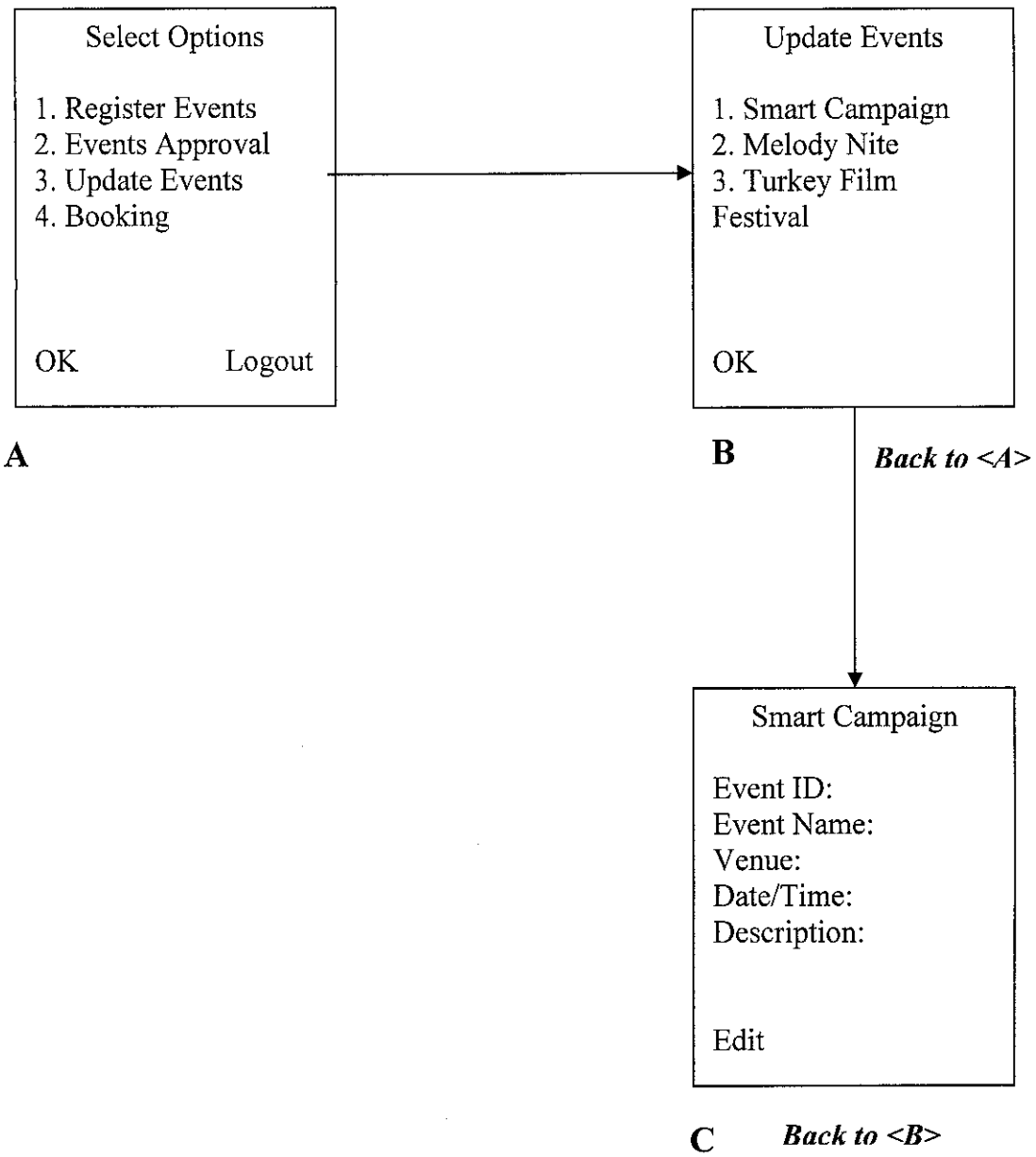

Figure C.6 *Select Options for Update Events*

Booking

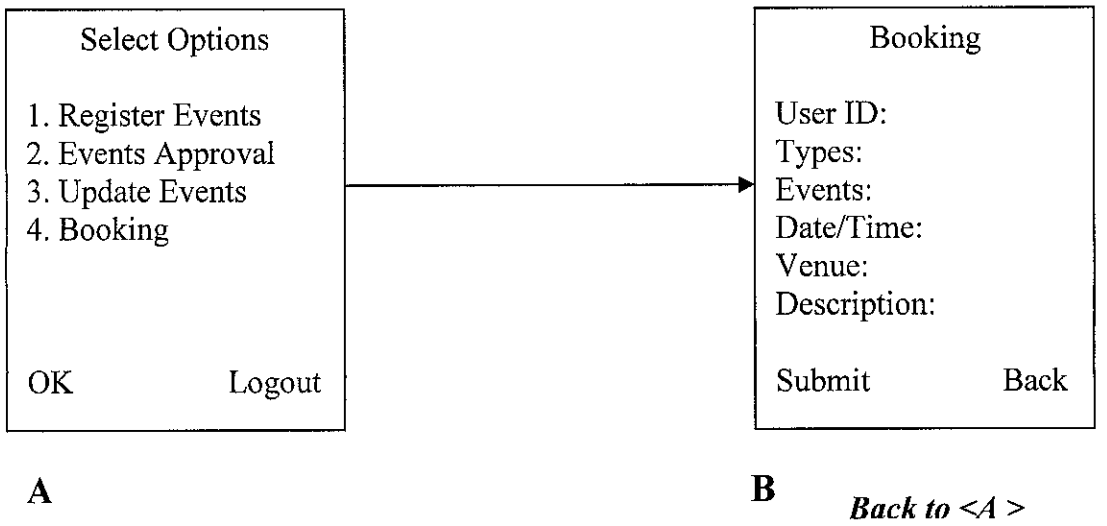

Figure C.7 *Select options for Booking*

APPENDIX D

PROCESS FLOW

PROCESS FLOW CHART

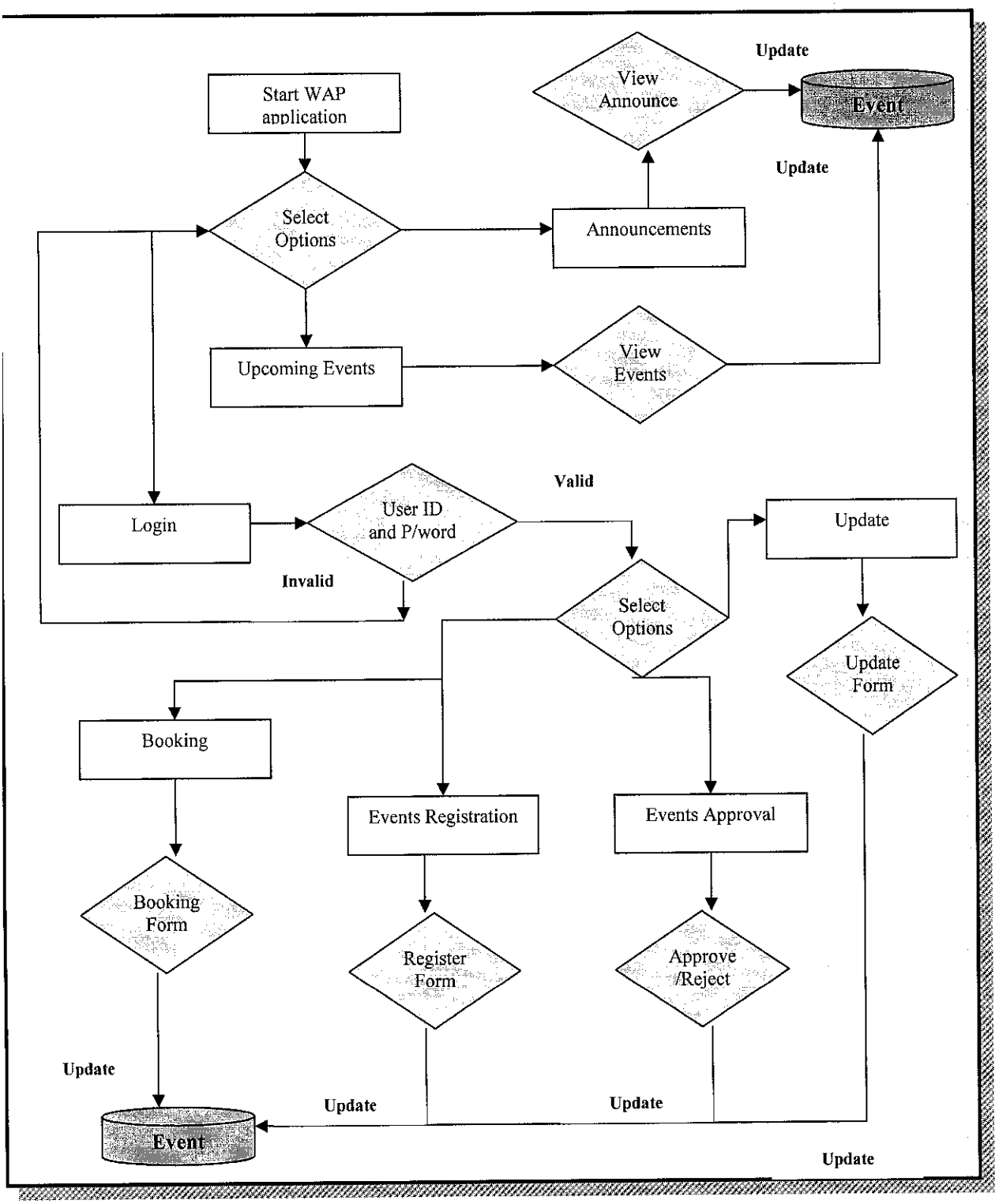

Figure D.1 *System Flow*

APPENDIX E

DATA FLOW DIAGRAM

DATA FLOW DIGRAM
(DFD)

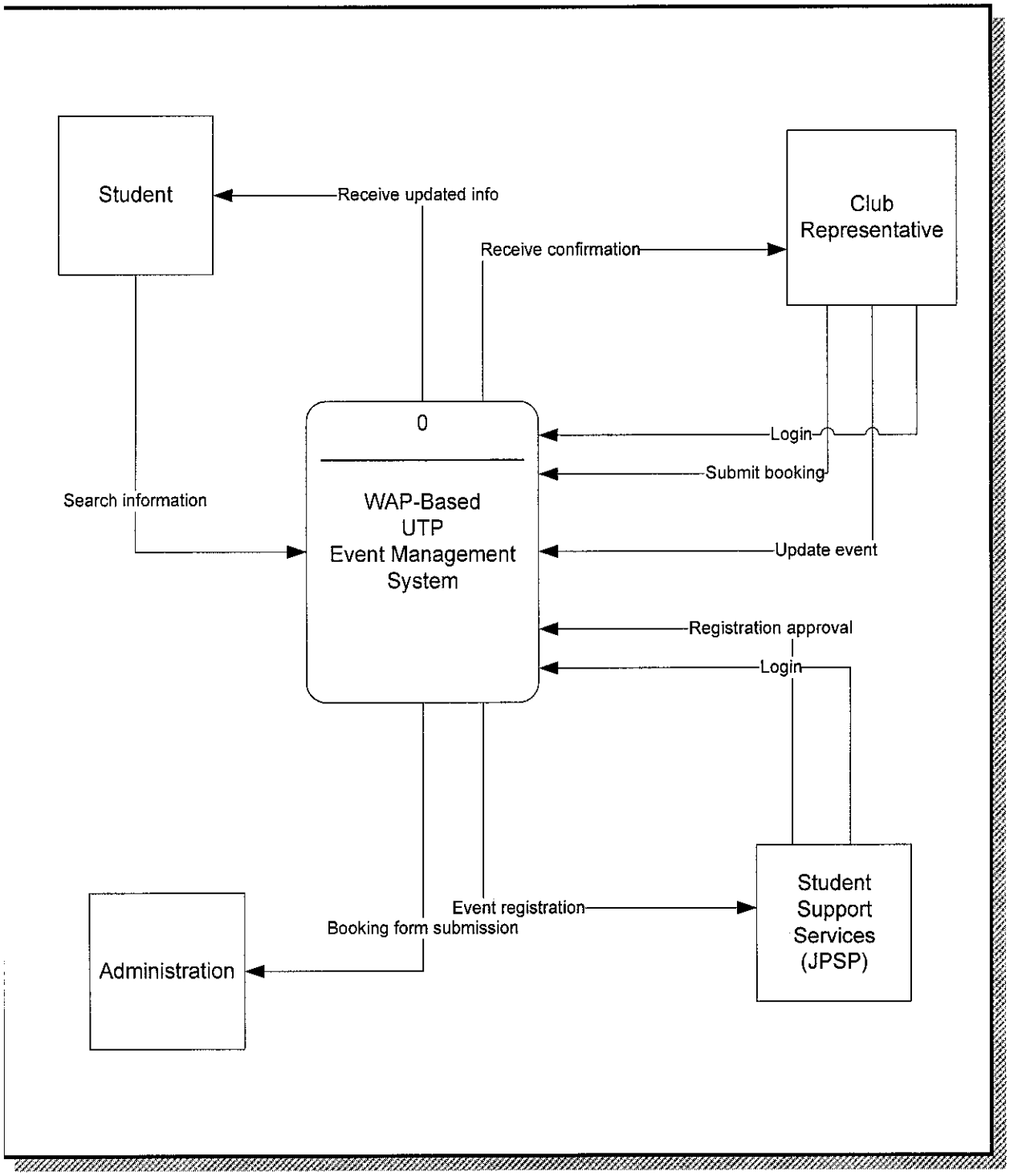

Figure E.1 *Data Flow Diagram – Level 0*

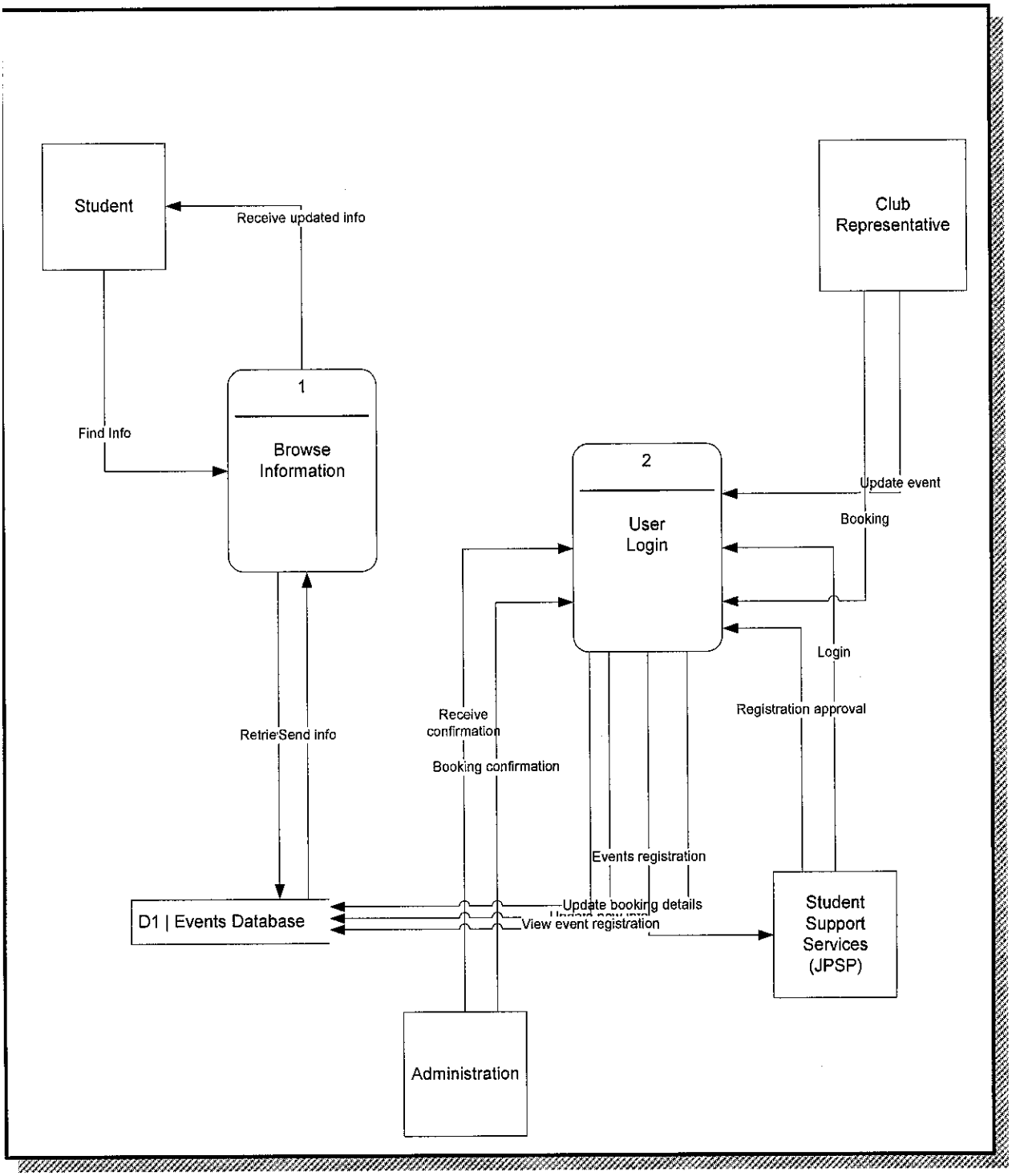

Figure E.2 *Data Flow Diagram – Level 1*

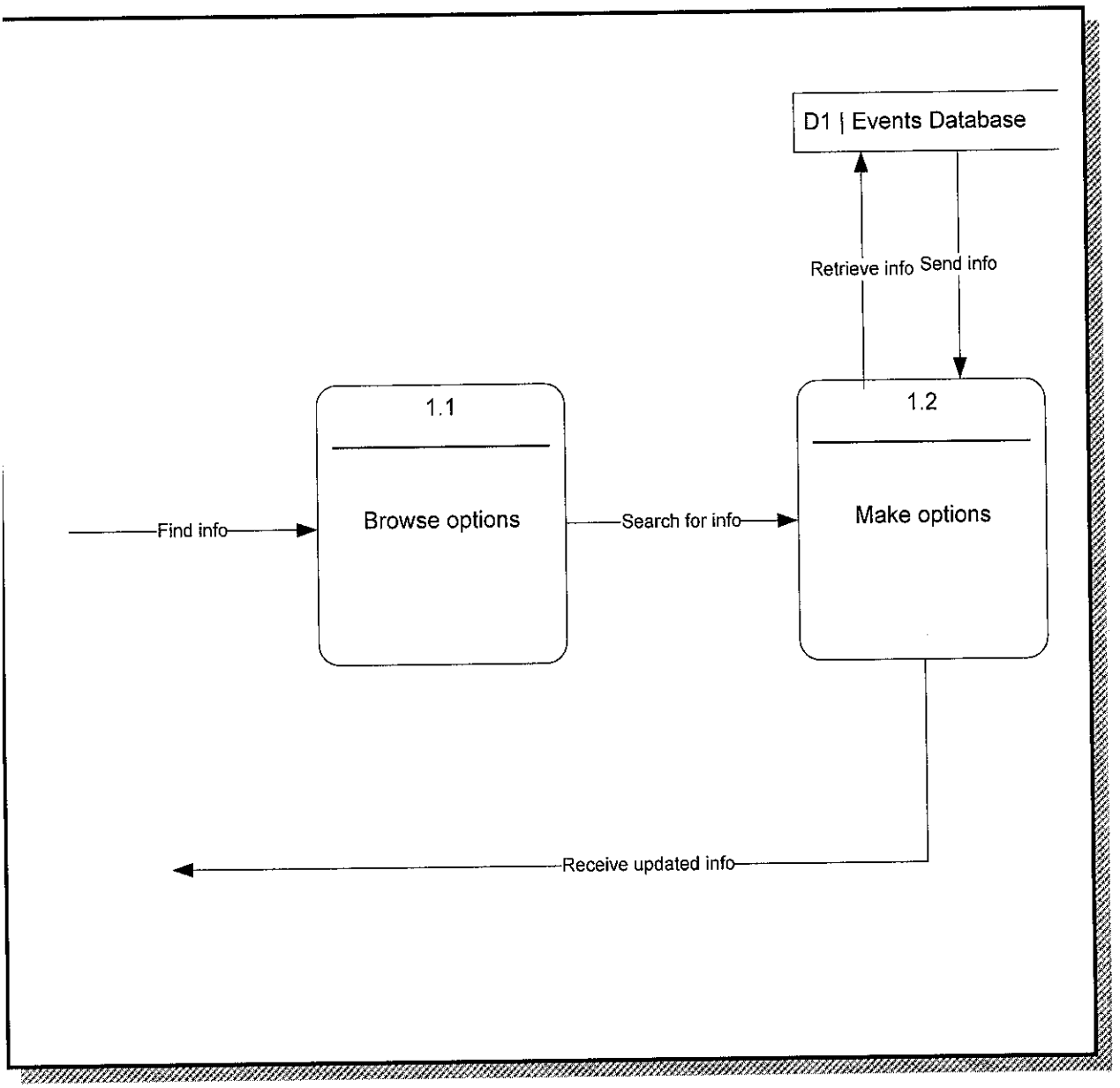

Figure E.3 *Data Flow Diagram – Level 2(Browse Info)*

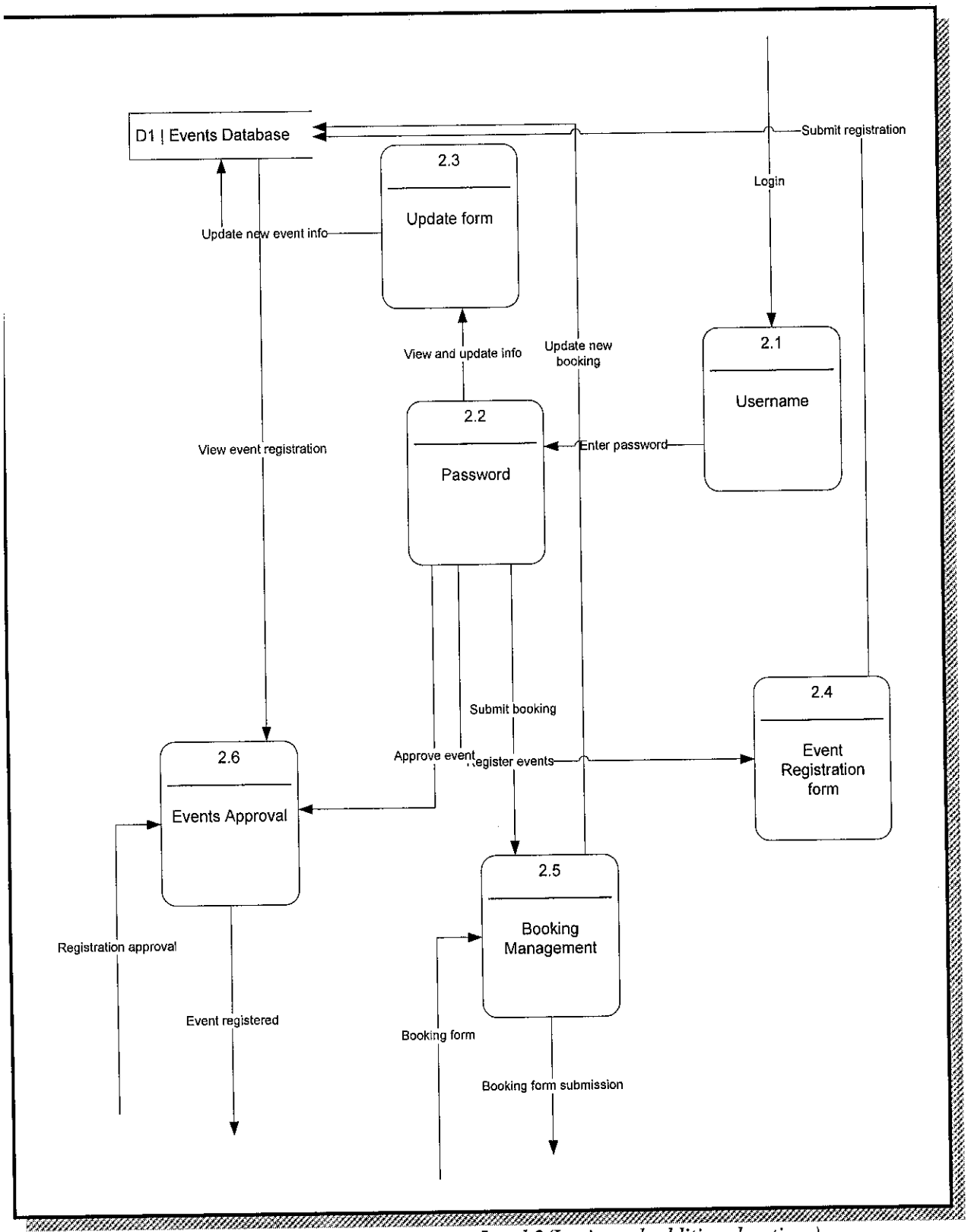

Figure E.4 *Data Flow Diagram – Level 2(Login and additional options)*

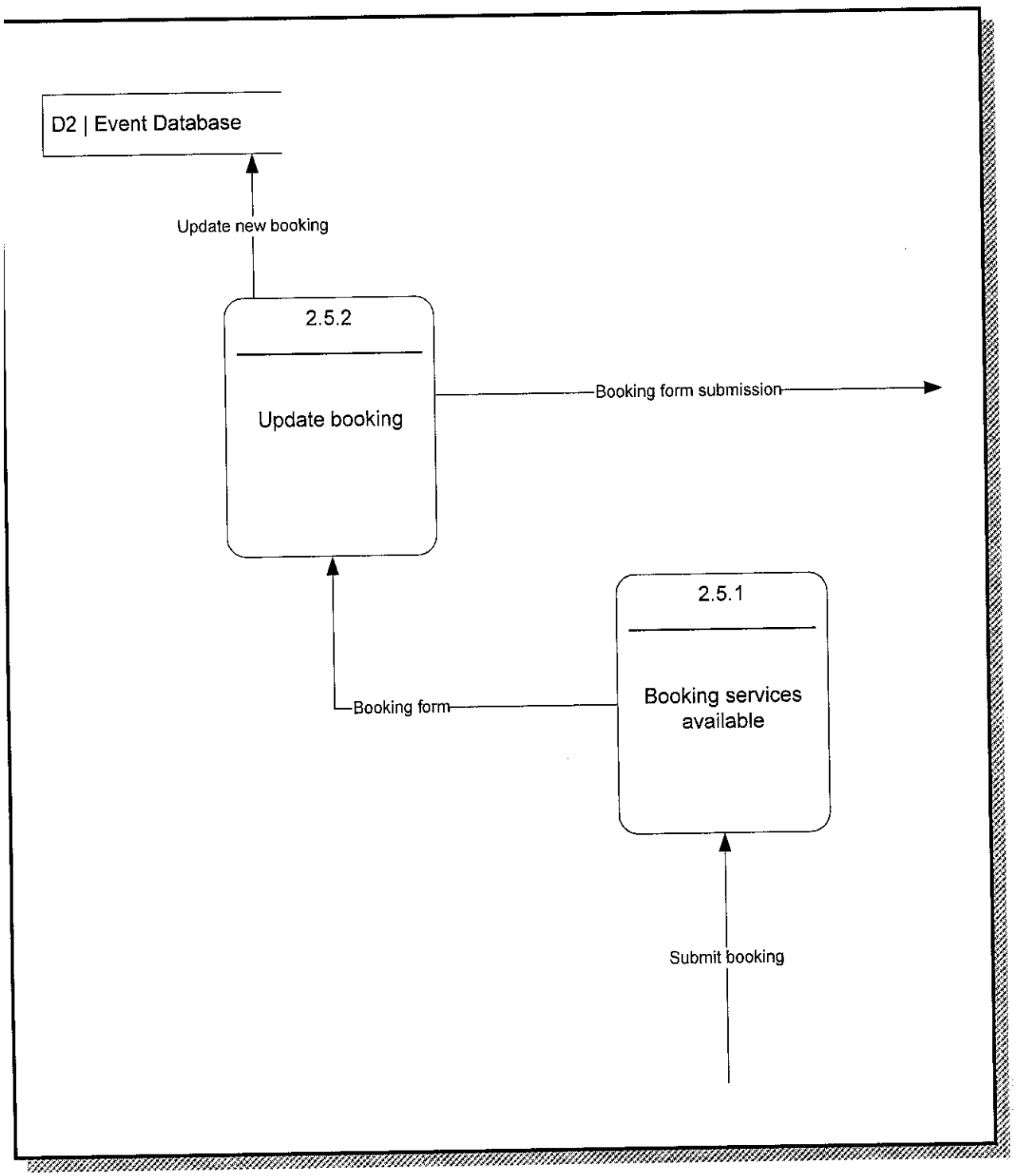

Figure E.5 *Data Flow Diagram – Level 3(Booking Management)*

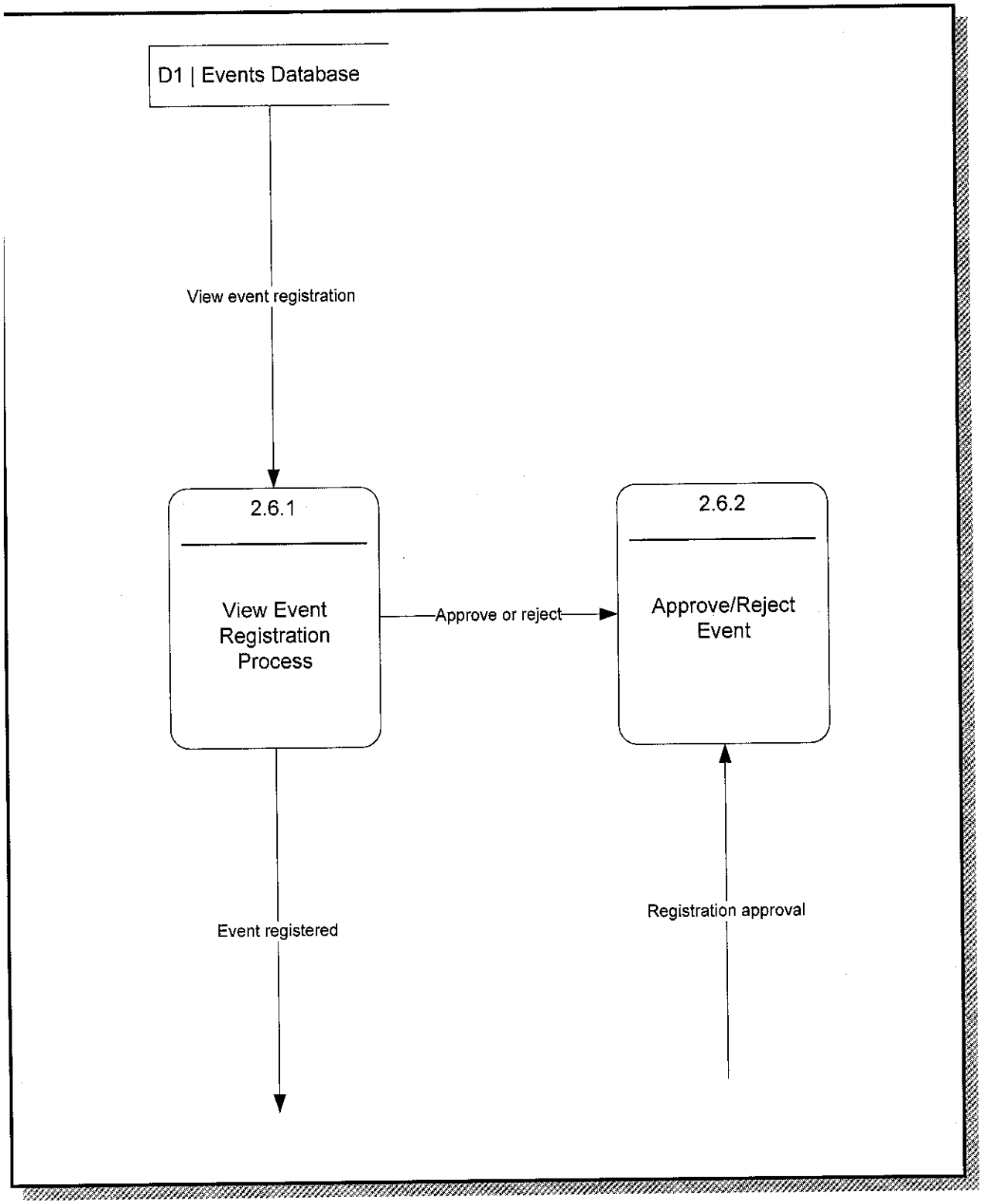

Figure E.6 *Data Flow Diagram – Level 3(Events Approval)*

APPENDIX F

ENTITY-RELATIONSHIP DIAGRAM

ENTITY-RELATIONSHIP DIAGRAM (ERD)

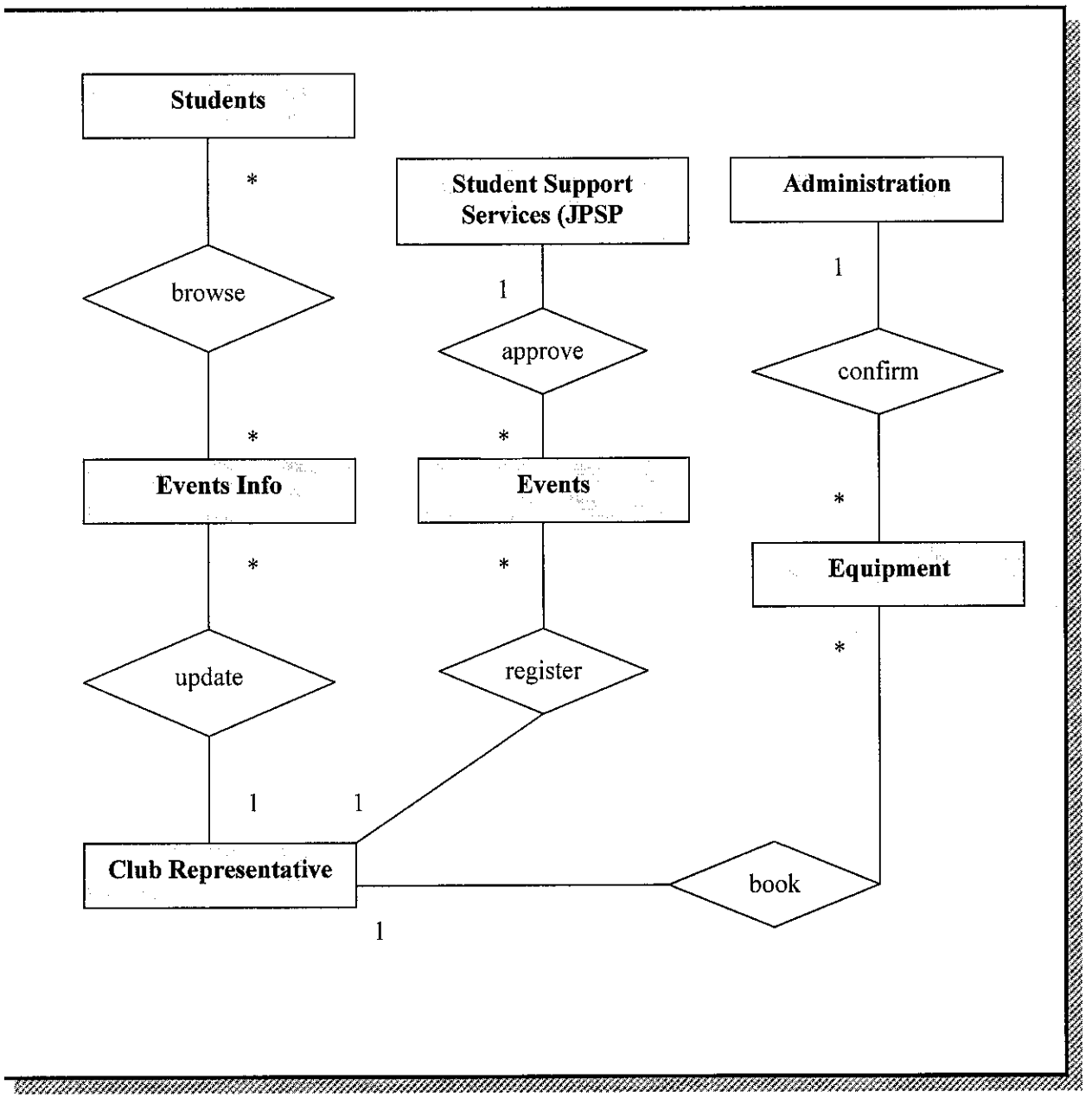

Figure F.1 *Entity-relationship diagram*

APPENDIX G

USABILITY TESTING (QUESTIONNAIRE)

QUESTIONNAIRE

UTP EVENT MANAGEMENT SYSTEM

UNIVERSITI TEKNOLOGI PETRONAS

Gender : M – Male F – Female **Program:** _____ **Year:** _____

1. WAP technology enables me a faster accomplishment of task.

   Y – Yes **N – No because** _____

2. With WAP-Based UTP Event Management System, I can always view the information regarding the events at anytime and any place.

   Y – Yes **N – No because** _____

3. With WAP-Based UTP Event Management System, I can always be alert with the information provided.

   Y – Yes **N – No because** _____

4. In order to update and booking for events, limit time of the office hours is not a burden anymore.

   Y – Yes **N – No because** _____

5. WAP-Based UTP Event Management System gives me clear contents of the events, with the easy navigation.

   Y – Yes **N – No because** _____

6. I find out that, WAP-Based UTP Event Management System is useful, user-friendly and interesting to use.

   Y – Yes **N – No because** _____

7. Comments: _____