Video Conference in UTP Learning Activities

by

Nik Nur Faeeza binti Nik Yusoff

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

JULY 2007

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CERTIFICATION OF APPROVAL

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Business Information System Programme
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(BUSINESS INFORMATION SYSTEMS)

Approved by,

_____

(Mr. Mohd Hilmi bin Hasan)

UNIVERSITI TEKNOLOGI PETRONAS
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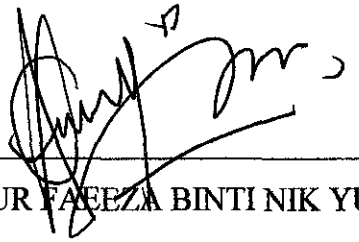
July 2007

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 originality work contained herein have not been undertaken or done by unspecified sources or persons.



NIK NUR FAEEZA BINTI NIK YUSOFF

ABSTRACT

As we are in the 21st Century, several events have dramatically changed the environment of higher education in the Malaysia, and elsewhere in the world. Video conferencing has getting more attention among educators due to its effectiveness that can be used in distance education settings. Video Conferencing is a real time communication and is designed to support two-way video and audio communication between multiple locations. This rich communications technology offers new possibilities for schools, colleges, and libraries including formal instruction (courses, lessons, and tutoring), connection with guest speakers and experts, multi-school project collaboration, professional activities such as meetings and interviews, and community events. The main objective of this final year project is to focus on developing a prototype of video conferencing which embed video and audio as well as slides in a single screen. The project also aims to provide a mobile application which allows users to download videos from mobile. In order to carry out the whole project successfully, a thorough literature review has to be done. The literature review will help a lot in understanding the entire project and the current issues regarding the video conferencing concept and implementation. This project will use DimDim, an open source software as the main platform that offers rich choice of live and on demand video conferencing functionality. Moreover, the software can be easily integrated with Moodle, current e-learning system in UTP. As an additional feature, this project also will introduce a mobile application where user can download the video from database archive via mobile. This is another flexibility that this project will put forward. Based on the literature review and the prototype of video conferencing, the efficiency of distance learning therefore can be observed. The outcome of this project may be used by Universiti Teknologi PETRONAS (UTP) as the advance learning process in campus.

ACKNOWLEDGEMENT

All praises be to Allah S.W.T., The Most Gracious, The Most Merciful for His Guidance and Blessing.

A very special acknowledgment and thanks to the following persons and parties for their involvement and assistance towards the author in ensuring the success of this project.

a) Mr. Mohd Hilmi bin Hasan, Final Year Project Supervisor, Computer and Information Sciences Department, Universiti Teknologi PETRONAS (UTP).
b) Assoc. Prof. Dr. Abas bin Md Said, Associate Professor of Computer and Information Sciences Department, Universiti Teknologi PETRONAS (UTP).
c) Dr Baharum bin Baharudin, Senior Lecturer of Computer and Information Sciences Department, Universiti Teknologi PETRONAS (UTP).
d) Puan Noreen Izza binti Arshad, Lecturer of Computer and Information Sciences Department, Universiti Teknologi PETRONAS (UTP).
e) Mr Izzatdin bin Abdul Aziz, Lecturer of Computer and Information Sciences Department, Universiti Teknologi PETRONAS (UTP).
f) Mr Abdullah Sani bin Abdul Rahman, Lecturer of Computer and Information Sciences Department, Universiti Teknologi PETRONAS (UTP).
g) Mr Low Tan Jung, Lecturer of Computer and Information Sciences Department, Universiti Teknologi PETRONAS (UTP).
h) All technicians from Computer and Information Sciences Department.
i) Family members and friends.

The author would also like to thank everyone involved directly and indirectly towards the completion of this project.

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CHAPTER 1
INTRODUCTION

Distance education is not a new phenomenon; "it has been a mode of teaching and learning for countless individuals for at least a hundred years" (Moore & Kearsley, 1996). Video conferencing technology allows two or more people at different locations to see and hear each other at the same time. The system must have audio-visual equipment (monitor, camera, microphone, and speaker) as well as a means of transmitting information between sites.

1.1 BACKGROUND OF STUDY

Video conferencing can bring an interactive communication medium. The visual connection and interaction among participants enhances understanding and helps participants feel connected to each other. It has been widely used among international universities namely, University of Aberdeen, UK, University of Idaho, Moscow and many more.

1.2 PROBLEM STATEMENT

1.2.1 Problem Identification

Complaints and Replacement Class: This project is not trying to substitute normal class with video conference. Instead, Video Conferencing is said to be a complement tool in learning activities. In addition, it is also not meant for student as a way for not attending the normal class. It is actually gives a solution for lecturers not to cancel

lectures or schedule another slot for replacement class if they are away from campus area due to emergency or other events. At the end of the day, it will reduce the number of replacement class as well as the number of student complaints.

Limited Sources: Traditionally, student does not have an opportunity to get the full content of the mis-lecture if they are absent. Video conference, however, challenged this education logic by changing the learning process into more flexible and convenient environment. In fact, it will give a better understanding since student can replay the video if they do not understand at certain topics.

Furthermore, with extra features added which is mobile application; it will create an edutainment environment as well as cultivate more users to use the video conference technology since they can download the video via mobile. Thus, it will solve the problem for the users who do not have the computer at that time.

Interface Navigation: Apparently, it is quite hard to find software that can navigate power point slides and video simultaneously. Normal video conference will have separated windows for video and slides. This feature will not giving a user friendly system since they need to have many windows in their conference session. Ideally, the author's prototype will navigate all windows in one main window and finally give a better experience in using video conference.

1.2.2 Significant of the Project

Within a university environment, Video conferencing has a number of significant uses including "enables connection with experts in other geographical locations" (Reed and Woodruff, 1995), and can provide "access to at-risk or special needs students" (Woodruff and Mosby, 1996). UTP may not see the advantages of the applications now, but this can be as preparation towards interactive learning and provides more convenient place for students to have a variety of learning sources.

1.3 OBJECTIVE AND SCOPE OF STUDY

The main objective of this project is to develop a prototype of desktop video conferencing for learning activities. The system should be able to:

a. Embed with video, audio and lecture slide in a single screen.
b. Provide downloadable videos using computer/mobile devices.

1.3.1 The Relevancy of the Project

This project gives opportunity for the student to have hands on experience in developing a prototype for video conferencing. The student will also have opportunity to familiarize with software called DimDim. Even though the project is applying a software that never been used during classes, it actually had given opportunity to gain new knowledge and abilities that will be useful in the future undertaking.

1.3.2 Feasibility of the Project within the Scope and Time Frame

This final year project is a research and prototype-based project. All information about this project can be accessed from various reference books in the Information Resource Centre (IRC) and also online journals from reliable internet sources (e-Resources). The DimDim software is an open source which can be downloaded from internet and it is free as well. The equipment to setup the video conference such as web camera and microphone are easily found in any computer hardware store. With all the resources, this project is indeed feasible to be done within the time frame given.

CHAPTER 2
LITERATURE REVIEW / THEORY

2.0 INTRODUCTION

Between 2001 and March 2005, Mike Griffith a teacher worked as a consultant for the ICT in Schools Division of the Department for Education and Skills (DfES) has manage a "Videoconferencing in the Classroom Project". From 2001 to March 2005 this DfES project has enabled 100's of schools to use videoconferencing as a resource, to add real value to lessons.

While teachers were generally unable to offer statistical evidence for performance gains, their judgments were that **video conferencing impacted upon achievement positively**. Teachers and students acknowledged powerful learning effects as a consequence of a video conferencing session. Video conferencing is, in the main, **highly motivating to students and improvements in pupil behavior** occur during video conferencing sessions.

The answer to the Video Conference effectiveness question cannot be found in a single study. Fortunately, there is a long and well-established research literature in the field which educators and can examine to make decisions for now and in the future. In 1967, Chu, and Schramm, researchers at Stanford University examined 207 studies involving 421 separate comparisons of Educational TV and conventional classroom instruction. In 308 observations (73% of the studies) they found no statistically significant difference in learning achievement.

The only difference is, the conventional way is less attractive and need physical attendees while educational TV is clearly more attractive and virtually accessible. This case is the **best analogy for video conference concept that offers attractive and virtual learning.**

Literally, not only students, but everybody would prefer an easier and more flexible way given that the content of the lectures is the same. The point here is not trying to encourage students for not attending the lectures. The implementation will only be effective through a positive usage such as long distance adjunct lecture handled by experts. When a **live visit is not possible, videoconferencing makes a face-to-face visit is possible and an ongoing relationship can take place.**

In another study of student's attitude towards virtual education in Pakistan, Hussain (2004) points out that majority of the respondents (89%) agreed with the statement that that **virtual education provides alternate opportunities to formal system at higher education level** while 94% of the students were of the opinion that **cultural values can get collaboration through virtual education.**

The majority of information absorbed by human beings is collected with our sense of vision. It seems logical that we emphasize the development of visual skills as a way of preparing for successful and satisfying lives. In this case, video conferencing is maximizing the visual elements and will result in giving a better impact compared to non-visual learning process.

According to Nixon (2003)

> Participation in global media culture shapes the way they communicate and the kinds of social identities they take on. It informs how they present themselves to others and their understandings about the social groups and communities to which they might conceivably belong.

Furthermore, Sniezek, Crede.(2002) in their papers says that the overall implications of these findings are that computer-mediated group decision-making closely approximates face-to-face. This, in turn, suggests that, for estimation tasks at least, computer-mediated decision-making can be substituted for face-to-face interactions but not to replace the conventional education process.

Again, the author is not suggesting video conference as substitution of normal class. Instead, the author is giving other sources to be used in UTP learning environment as well as maximizing the technology in providing more advance facilities. "Videoconferencing is usually easier than visiting, so communication can be more frequent, saving time and resources" (Woodruff, M and Mosby, J., 1996). Video archive will benefits those absentees and avoiding any excuses if they missed the lectures. From that observation, it is worthwhile to implement the video conference for the sake of students and lecturers as well.

2.1 BENEFITS GAIN

2.1.1 Establishes a visual connection among participants and external resources.

Since a teacher can see and hear remote learners in real time, he can use conversation and body language to enhance communication. Frequent interaction increases understanding and encourages more personalized instruction. Interactive teaching strategies such as questioning and discussion can also "help engage and motivate learners by making them active participants". (Reed, J. & Woodruff, M.,1995)

2.1.2 Increases Depth of Learning.

Videoconferencing helps set up authentic learning situations--students are working on a real-world problem or project and they are communicating with real people involved in the problem or project.

This also supports the idea of authentic assessment—"need to have accurate information before ask meaningful questions". (Woodruff, M & Mosby, J.,1996).

2.1.3 Supports use of diverse media.

Photos and color graphics look great on video and can help convey a difficult concept or simplify instructions.

CHAPTER 3
METHODOLOGY / PROJECT WORK

3.1 SYSTEMS DEVELOPMENT METHODOLOGY: RAPID APPLICATION DEVELOPMENT (RAD)

A methodology is a formalized approach to implementing System Development Life Cycle (SDLC) which consist of four fundamental phases; Planning, Analysis, Design and Implementation. There are a few methodologies can be applied and each one is unique and depends on the focus of the business. In this project, the author chooses Rapid Application Development (RAD) as the system development methodology. The author will not cover in details on SDLC since the main methodology to be explained is RAD. As the name applied, the key advantage of RAD-based methodologies have is the rapidness of getting some part of the system developed quickly into the hands of user. Below are the major steps involved in RAD methodology.

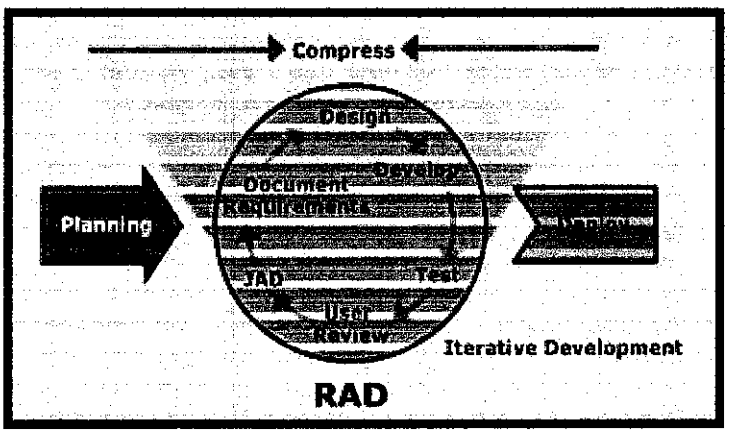

Figure 1: Rapid Application Development (RAD) Methodology

3.1.1 Requirements Analysis

Surveys and Questionnaires: Survey plays an important role in giving an accurate and precise result. Based on a thorough works and plans, this will ensure the judgments supplied meet the requirements and needs. The author has done a couple of surveys in Multimedia University, Cyberjaya and UTP itself.

Researches: Apart from on site actions, the author uses research methodology to support the surveys. Research is powerful tool to maintain concrete arguments. The main sources are books, journals, articles, newspapers and internet. However, the current releases that are the most relevant to the topics and scope of the projects will be well supporters to the author's issues and concerns.

3.1.2 Design

Design phase focuses on high level design such as, what programs are needed and how are they going to interact, low-level design (how the individual programs are going to work), interface design (what are the interfaces going to look like) and data design (what data will be required).

During these phases, the software's overall structure is defined. Design is vital in the whole development cycle. Any glitch in the design phase could be very expensive to solve in the later stage of the software development. Much care is taken during this phase. The logical system of the product is developed in this phase.

3.1.3 Implementation

Development of Web Page

In many ways, user interface design is an art. The goal is to make the interface pleasing to eye and simple to use (aesthetics), while maximizing the effort the users need to accomplish their work.

User interface design is a five-step process that is iterative which are; creating scenario development, defining the basic structure, designing interface standards, creating interface prototype and finally evaluating the interface. The author often moves back and forth between steps rather than proceeding sequentially from one step to step five.

According to the project timeline, the author should finish with designing by week two. Briefly, in this phase the author is responsible to create the interface for Web page and mobile content page based on the requirement provided by the users. The author uses XHTML as the markup language for the interface and PHP for database. Detailed explanation on web development will be covered in the following chapter under prototyping section. *(See appendix for sample user interfaces)*

Development of Mobile page

Content designed for display on a desktop browser appears very differently on the space-constrained displays that are typical of mobile devices. Also, due to limited processing power of handheld devices, graphical content can significantly influence page loading times.

As a result of these limitations, Web content that is destined for use on mobile devices is often customized (sometimes referred to as *mobile-device optimized*). The goals of optimization is to present Web page information with minimal scrolling (vertical & horizontal), improve download times, and reduce system-resource demands, while maintaining an intuitive and easy-to-use user interface. (Cotton, J., 2005).

An alternative to displaying all input fields and associated textual prompts at the same time is to display the textual prompts alone. After the user knows which field they wish to fill, they can tap the corresponding textual prompt, at which point the input field is revealed (Kaljuvee, Buyukkokten, Garcia-Molina, & Paepcke, 2001).

3.1.4 Integration and Testing

Training and User Documentation

Prior to any project testing, the user training must be carried out first. The purpose of having this training is to guide the user on how to use the Video Conference. Basically, the training will involve students and lecturers.

User documentation (user manuals, training manuals and online help systems) is designed to help the user operate the system. It is often left until the end of the project, which is a dangerous strategy. Developing good documentations takes longer than many people expect because it requires much more than simply writing a few pages. The user guideline documentation is prepared and distributed during the training session.

Testing

Briefly, the project will be tested on the integration and user acceptance of the system. Integration tests assess whether a set of classes that must work together do so without error. They ensure that the interfaces and linkages between different parts of the system work properly.

Unlike integration tests, acceptance testing is done by users with the support from the project team. The goal is to confirm that the system is complete, meets the business needs that prompted the systems to be developed, and is acceptable by the users. There are two stages of acceptance testing which are *alpha testing* and *beta testing*. Alpha testing, in which user tests the systems using made-up data while beta testing, user uses the system with real data and will be carefully monitored for errors. However, at this stage, the author will only use alpha testing as a beginning.

For the time being, the author uses temporary server (Local Area Network) for normal Web server and SaifulSham web hosting for Mobile web server. Users may access the mobile web page from their mobile with condition their mobile are connected to General Packet Radio Service (GPRS). Users may access the Web page at any location within UTP network. In order to have a real time testing, the author asked a group of Internet Programming student (which is 10 students) to use the system.

3.1.5 User Review

User Review or evaluation is a part and parcel of project testing. The evaluation will determine the performance of the project at the first time running and by having that analysis it will help the author on which corrective action should be taken in order to improve the efficiency of using video conference. (*See appendix for sample user evaluation form*).

3.2 PROJECT KEY MILESTONE

No	Details / Week	1	2	3	4	5	6	7		8	9	10	11	12	13	14
									S							
1	Start develop home page for Web								E							
									M							
2	Start develop home page for mobile								E							
									S							
3	Launch the site								T							
									E							
4	Training								R							
5	User acceptance testing and analysis								B							
									R							
6	Submission final report / dissertation								E							
									A							
									K							

Implementation Phase
Testing Phase

Table 1: Project Milestone

3.3 PROJECT OVERVIEW: SYSTEM ARCHITECTURE

DimDim server was designed for streaming media over networks that support TCP/IP. The transport protocols between client and server are TCP and HTTP which provides convenient choice of delivery method over both LAN and public networks (Internet).

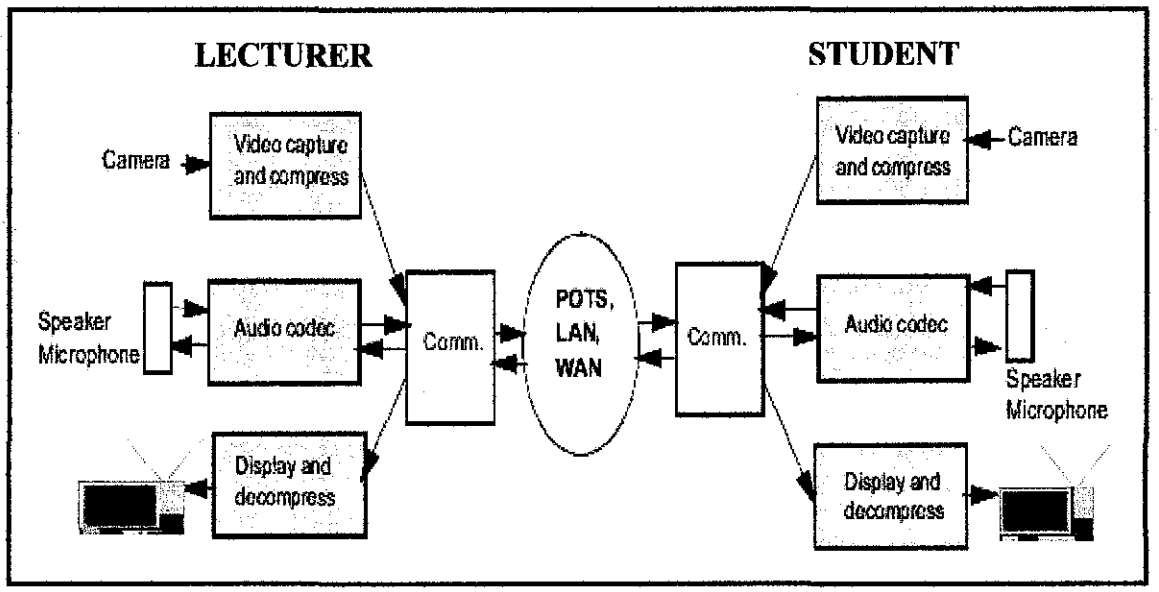

Figure 2: Network Architecture of Video Conferencing

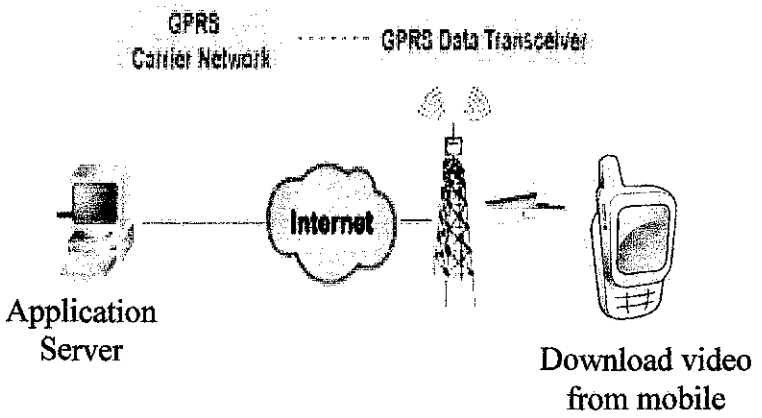

Figure 3: Architecture of Video Downloading from Mobile

3.3.1 Video streaming over the network

The system consists of two major parts which are web and mobile application. Figure 2 shows how a lecturer communicates with student using video conference. Video conference application use web browser as the platform. First we need some cameras to capture the video data from a web camera and transmit it over the wired network (Local Area Network). The client side on the other hand will open a browser and join the meeting. Student will be able to see the lecturer and use microphone in order to respond to the lecturer.

3.3.2 Download video from mobile

Like normal web browsing, mobile browsing also uses same mechanism. As shown in figure 3, user needs to open mobile browser and browse to the web page using GPRS connection in order to download the video. Users will be charged per bytes rate and rate may differs from each mobile service providers.

3.4 PROJECT SCOPE

The project is trying to build a prototype for video conferencing. The student can have a **live conference** with the lecturer. In brief, to have a live conference, the students need to browse in UTP e-learning system and login in order to enable the connection with the lecturers.

Apart from live conference, lecturer may also **upload the video to be stored as archive** in database. From the archive, student may **download from internet via computer or mobile**. Currently, the format for the video is set to be in 3GPP. However, this may change based on user request after testing phase being implemented. This project will come out with an end result of student response and will improve the system from time to time.

3.4 TOOLS / EQUIPMENT

Tools and equipments are needed in order to ensure the successful of this project. Herein the list:

3.4.1 Hardware

- Web Camera
- Microphone / Audio
- Stereo Speaker
- Mobile / Personal Data Assistance (PDA)
- Pentium Processor or greater (or equivalent on other architectures)

3.4.2 Application Software

- DimDim – Open source Web Conferencing
- Xilisoft 3GP Video Converter
- Mobile Simulator – Openwave Mobile Simulator
- Ozeki SMS Gateway

3.4.3 Web Hosting Software

- Apache HTTP server
- Web browser

3.4.4 Web Design Software

- Adobe Photoshop CS
- Macromedia Dreamweaver 8

CHAPTER 4
RESULT AND DISCUSSION

In this chapter, the author will display the qualitative result from the testing that has been conducted on students. Apart from result, the author also will attach some relevant information regarding the project.

4.1 USER ACCEPTANCE

Successful evaluation is determined by the accuracy of model that has been adopted to come out with the great analysis. Currently, there is no specific method to measure effectiveness because the characteristics in survey question might be different in every system. Thus, the most practical way is by having histogram in order to show the proportion of observations as a whole.

4.1.1 Histogram

Histograms--bar charts in which the area of the bar is proportional to the number of observations having values in the range defining the bar. It is a basic graphing tool that displays the relative frequency or occurrence of continuous data values showing which values occur most and least frequently. A histogram illustrates the shape, centering, and spread of data distribution and indicates whether there are any outliers.

From the evaluation that has been conducted, the author has come out with a histogram graph bar. Below are the results:

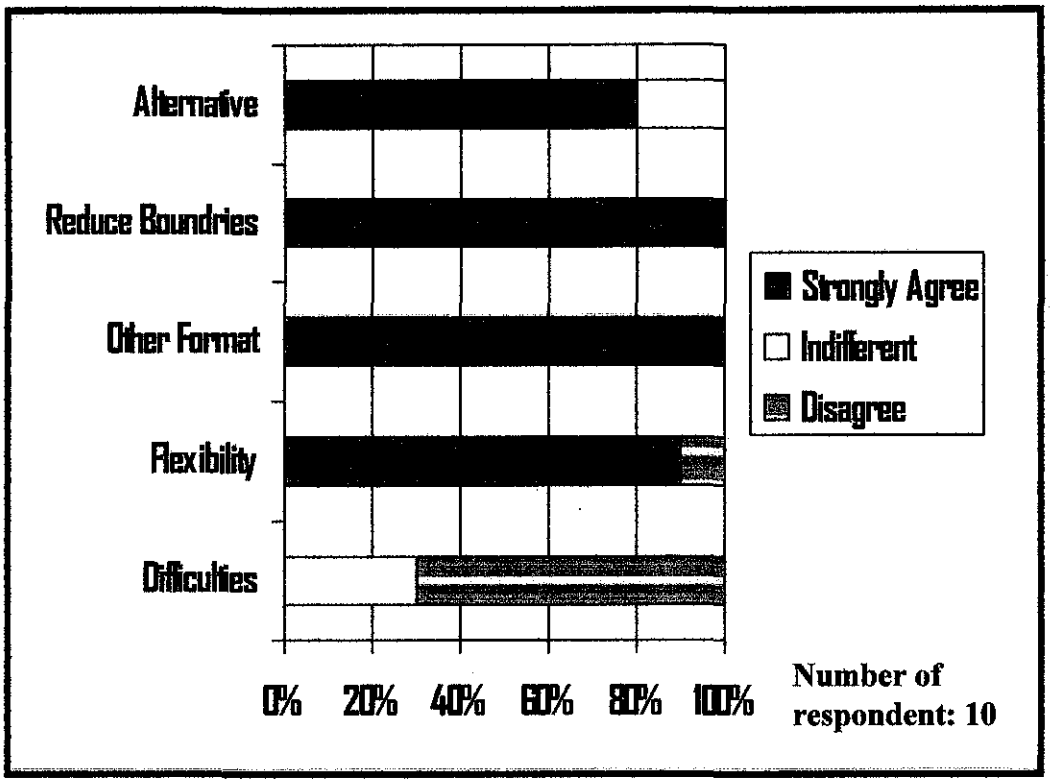

Figure 4: Evaluation Result.

Graphically, it shows that the system brings a number of advantages to the user. Some lecturer might have difficulties in conducting a lecture if they have emergency or need to do other tasks. The students also will not be happy if they need to attend a replacement class. Thus, video conference will solve this problem by giving an alternative way of having lecture. From the result, 80% strongly agreed that video conference as a complement tools in learning activities. It also says that the number of replacement class will be reduced if the lectures are replaced with video conference.

It also proved 100% agreed that video conference breaks the ice between students and lecturers which in a way give them more opportunity to actively participate during lecture. They believed that video conference give them flexibility since they can be in their room during lecture. Merely of them said that video conference brings difficulties. Only 30% says that small screen of video conference makes them hard to take notes and concentrates during lecture.

4.2 DISCUSSION: ISDN VERSUS CONVERGED IP

Since the release of IP-capable videoconferencing solutions in mid-1990s, the percentage of video calls hosted over IP networks has continue to grow. As shown in left chart below, Wainhouse Research estimates that in 2004 IP became the most common network used for hosting videoconference calls. (Weinstein, 2006)

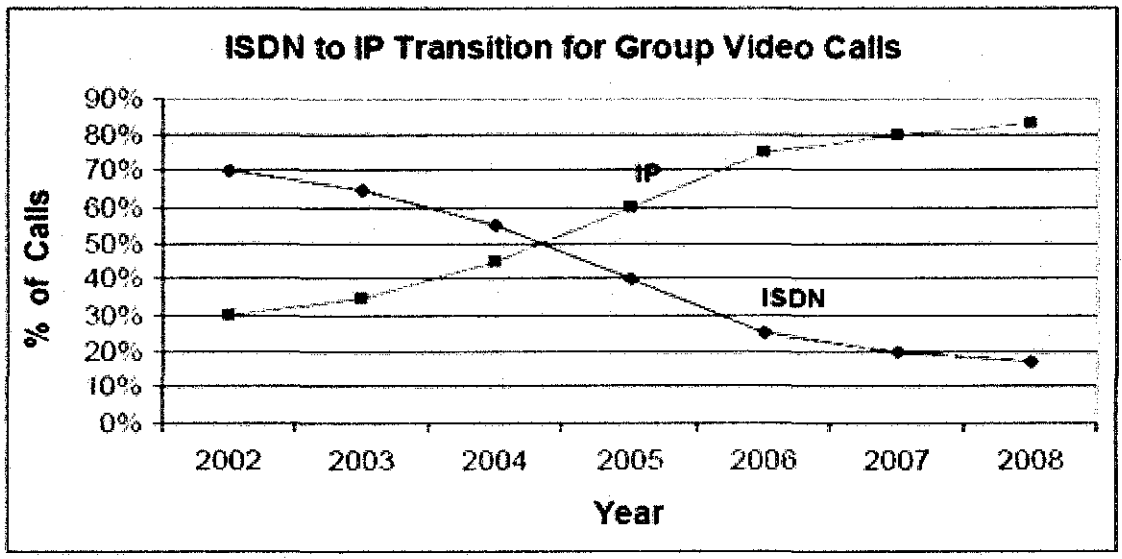

Figure 5: Percent of Video Calls using IP vs ISDN.

4.2.1 ISDN Disadvantages:

Endpoint Cost – With today's videoconferencing systems, ISDN network support is typically an option costing several thousands of dollars per endpoint.

Network Monitoring – Like the plain old telephone network, ISDN is a switch technology in which the network is only connected when calls are in progress. This means that an ISDN problem, such as a down ISDN line, will not be apparent until a call is attempted. Even commercially available video network management systems are not able to detect ISDN issues while calls unless a call us connected.

Network Efficiency and Scalability – The typical ISDN environment requires that each endpoint have its own dedicated Bandwidth, which means that even though the ISDN lines connected to a specific system may only be in use for a few hours each month, that system's ISDN bandwidth cannot be shared with other endpoints. Deploying additional endpoints will require additional ISDN lines.

Usage Cost – In most ISDN environments, every single video call whether across town, across the world, or simply between two rooms in the same building will involve per-minute ISDN transport and usage fees. Depending upon the frequency of usage, these fees can be quite high on a monthly basis and can negatively impact the adoption of videoconferencing within the enterprise.

Lack of Redundancy – In the event that one or more of an endpoint's ISDN lines experiences problems, the endpoints' ability to communicate will either be blocked or impacted. There is no alternate network to host the video traffic.

4.2.1 Converged IP Advantages

Ability to leverage infrastructure – Since the endpoints are connected to the corporate IP network, the enterprise can to leverage its existing network lines, support staff, and monitoring/management systems.

Predictable Usage Fees – While ISDN is a "metered" service with transport fees charged on a per-minute basis, IP networks typically include unlimited usage for a fixed monthly fee. This allows enterprise organizations to predict and budget for the monthly costs associated with videoconferencing.

Installation Simplicity – By using IP instead of ISDN, organization can avoid headaches often associated with the deployment of ISDN lines including the activation of long distance service.

Improved Reliability – IP endpoints and network can be monitored continuously; should a problem arise, the support team will be pro-actively notified, unlike an ISDN environment in which problems are only discovered once a call is attempted. In addition, ISDN video calls use multiple lines bonded together to form a single data pipe; a process that often causes problems during ISDN video calls.

Expanded Scalability – In an IP environment, the deployment of an additional video system does not require the activation of dedicated lines. Instead, the enterprise simply needs to connect the video system to the enterprise network. This is especially important for organizations planning to make desktop videoconferencing capabilities available to their user base as these deployments typically involve thousands endpoint.

Decrease Cost of Ownership – IP only endpoints are less expensive to purchase and do not require dedicated ISDN lines, resulting in a lower total cost of ownership.

Call Speed Flexibility – In ISDN environments, the maximum possible connection speed stems from the number of installed ISDN lines (ex: 3 ISDN lines permit a single call up to 384 kbps). In an IP environment, endpoints are usually connected to high bandwidth connection either on the LAN or WAN, and therefore higher bandwidth calls are often possible. This is especially important for multisided meetings during which the host endpoints may require additional bandwidth to host the meeting.

4.3 DISCUSSION: EXTENSIBLE HYPER TEXT MARKUP LANGUAGE (XHTML)

Support of XHTML Basic will bring a number of positive changes to the mobile browser. For mobile devices, the future of WAP lies in its close alignment with widely accepted internet standards. Most recently, the transition to XHTML Basic will strengthen the mobile browser's position within the Internet mainstream and allow for a far greater range of presentation design and formatting possibilities than previously possible. Consequently, consumers will enjoy wider arrays of services, more intuitive user interfaces, and generally more useful experiences.

According to the W3C specifications, XHTML Basic defines a document type that is rich enough to be used for content authoring and precise document layout yet can be shared across different classes of devices - desktop, PDA, TV and mobile handset. Listed below are the benefits of using XHTML.

4.3.1 Attractive Browser

For mobile devices users, the browser that is more aesthetically pleasing, easier to use and navigate, enable access to more content. (Nokia, 2001)

4.3.2 Reduced memory size of mobile browsers

By strictly following XHTML's rules, the memory size of mobile browsers can be reduced, allowing for a smaller memory footprint and greater performance efficiency, which is essential in today's mobile devices. If we look at the size of standard desktop web browser, much of the complexity comes from the ambiguities of HTML.
As the web moves toward XHTML, applications designed for mobile devices a will lead the way. (Nokia, 2001)

4.3.3 Support Cascading Style Sheet (CSS)

Through CSS, document creators can control the presentation of documents without sacrificing device independence or adding new markup language tags, as was done with WML. The use of well-know standard HTML tags will reduce content development costs by eliminating the need for developers to learn new tags, to store multiple version of content, or to master different tools.

Every aspect of the document - positioning, fonts, text attributes, borders, margin alignment, and flow - can be defined in the style sheet. A change to any aspect of the document needs to be made only once.

4.4 PROTOTYPE MODELING

Prototype is important in giving an overview of the system. The prototype will be identified after a careful research on system development has been done. There are two main modules in preparing this project which are:

4.4.1 Module 1: UTP Video Conference Homepage

In any website development, homepage is a part and parcel of them. Without homepage, the website is seen as incomplete or under construction sites. Basically the homepage will give a brief look of what the website is. Development of this specific Web page comprises of five major areas which are:

a) Download section – allow users to download videos from the server.
b) Upload section – allow users to upload a maximum of 5MB video to the server.
c) Online Documentation.
d) Search Video functions.
e) Paging function - limit the list of videos to be displayed in download section.

4.4.2 Module 2: Mobile Web Interface

In this module, the author develops a new mini site for mobile web content which is differs from normal web page. The mobile version only limited to certain functions and pages due to its small size of screen. For the mobile page, the author begins with creating the three main functions which are:

i. Download Video and paging function.
ii. Search videos based on Course ID.
iii. Contact Administrator.

For sample of screenshots of these modules, please refer to **Appendix A-1 until A-5.**

4.5 PROBLEMS AND LIMITATIONS

Using video conferencing technology does change the normal teaching environment and this can cause concern for tutors and students alike. However, by approaching the possibilities offered by video conferencing in a positive manner the learning experience can turn out to be successful for all concerned. Nevertheless, there are of course some practical drawbacks to videoconferencing.

4.5.1 Video Quality - Bandwidth

Bandwidth (or baud rate) refers to the amount of information (bits) which can be transmitted along a carrier every second. The bandwidth required depends on the application. Particularly in UTP, the local area network connection differs in every location say academic building and hostels. Thus, the differences make video streaming slower.

Sounds such as speech, contain more information than the printed word and have to be carried at the same speed as normal speech for conversation to be possible; thus a wider bandwidth is required. If moving pictures have also to be sent and real time transmission is required then we have a lot of information to send very quickly, thus a high bandwidth is required.

4.5.4 Turn Taking Difficulties

Interacting remotely through video makes it difficult or impossible for participants to: manage turn-taking no matter audio or video, control the floor through body position and eye gaze, notice motion through peripheral vision, have side conversations, point at things in each other's space or manipulate real-world objects. Of course, some of these limitations may be overcome by providing additional capabilities.

CHAPTER 5
CONCLUSION AND RECOMMENDATIONS

5.1 CONCLUSION

At the end of the day, it can be concluded that the project has solved the problem statements and objectives were fulfilled by the final product whereby it allows user to have a video conference that embed the video, audio, and slides in a single window. Apart from that, the extra features give a flexible way of downloading the video where user can download video from computer or mobile. From the discussion above, it is clearly shown why we need to have video conference in learning activities. Apart from distance learning, students may improve their performances while having this technology. The idea of using IP would greatly benefits the university since they do not have to use an expensive method like ISDN while IP able to give a better quality at lower cost. Using XHTML as the platform is very appropriate choice due to its simplicity of coding but not to forget its attractiveness.

As a conclusion, the author firmly believes that the interactive video conference is currently the richest possible tool in the long-distance education. It is a possibility that always must be considered when is needed that separated groups interact in a creative process. Video conferencing is not only an additional source of learning, in fact, it is a powerful tool to attract students to be more active and participate in class. Therefore, the upcoming prototype will be a platform for UTP to have its own Video Conferencing systems in order to stand a par with other international universities. The concrete usages offer in video conference will definitely draw UTP as a unique education environment in the future.

5.2 RECOMMENDATIONS

In bringing a video conference to a higher level of performances and security, there are a few things that need to be upgraded.

5.2.1 Video Conference via mobile / PDA

We have heard about 3G technology which allow a live video calls. This technology can be used as a platform for mobile video conferencing in the future. It will be an advantage for student and lecturer if there are away from their desktop. However, it also has its limitation where it needs a high technology of mobile that support 3G. Yet, the conference area as well must be ensured with 3G connection.

5.2.2 Compressed video transmitting.

A compression means for receiving as its input the video signal and compressing an amount of information of the video signal at a compression rate in accordance with the transmission mode indicated by the control signal. Video compression refers to reducing the quantity of data used to represent video images, and this is almost always coupled with the goal of retaining as much of the original's quality as possible. Compressed video can effectively reduce the bandwidth required to transmit digital video via terrestrial broadcast, via cable, or via satellite services.

5.2.3 Conference over secured socket layer (SSL)

Secure socket layer (SSL) is the most popular protocol used in the Internet for facilitating secure communications. SSL provides multi-layer security of data and sessions to conduct interactive meetings with even the most confidential information.

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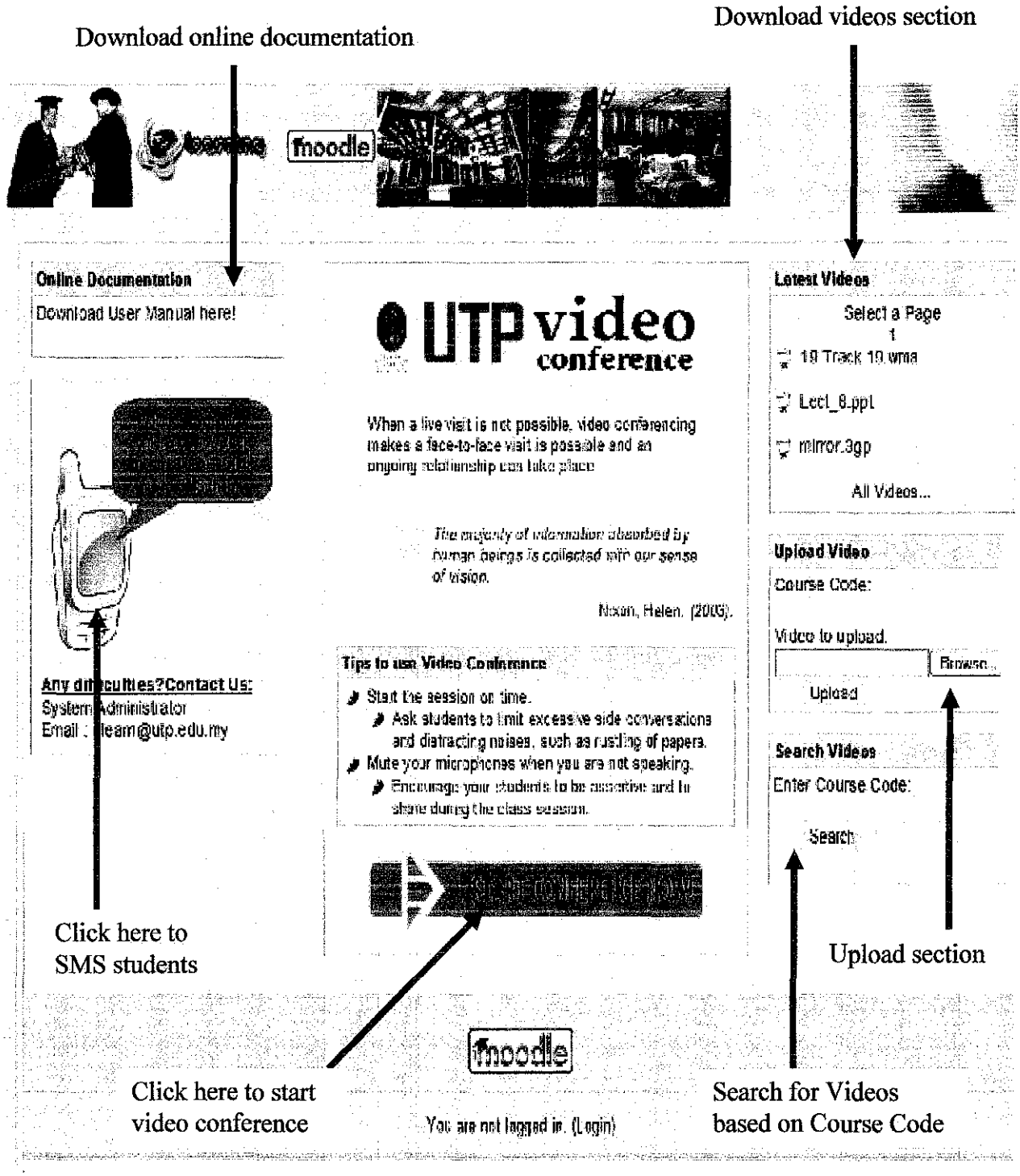
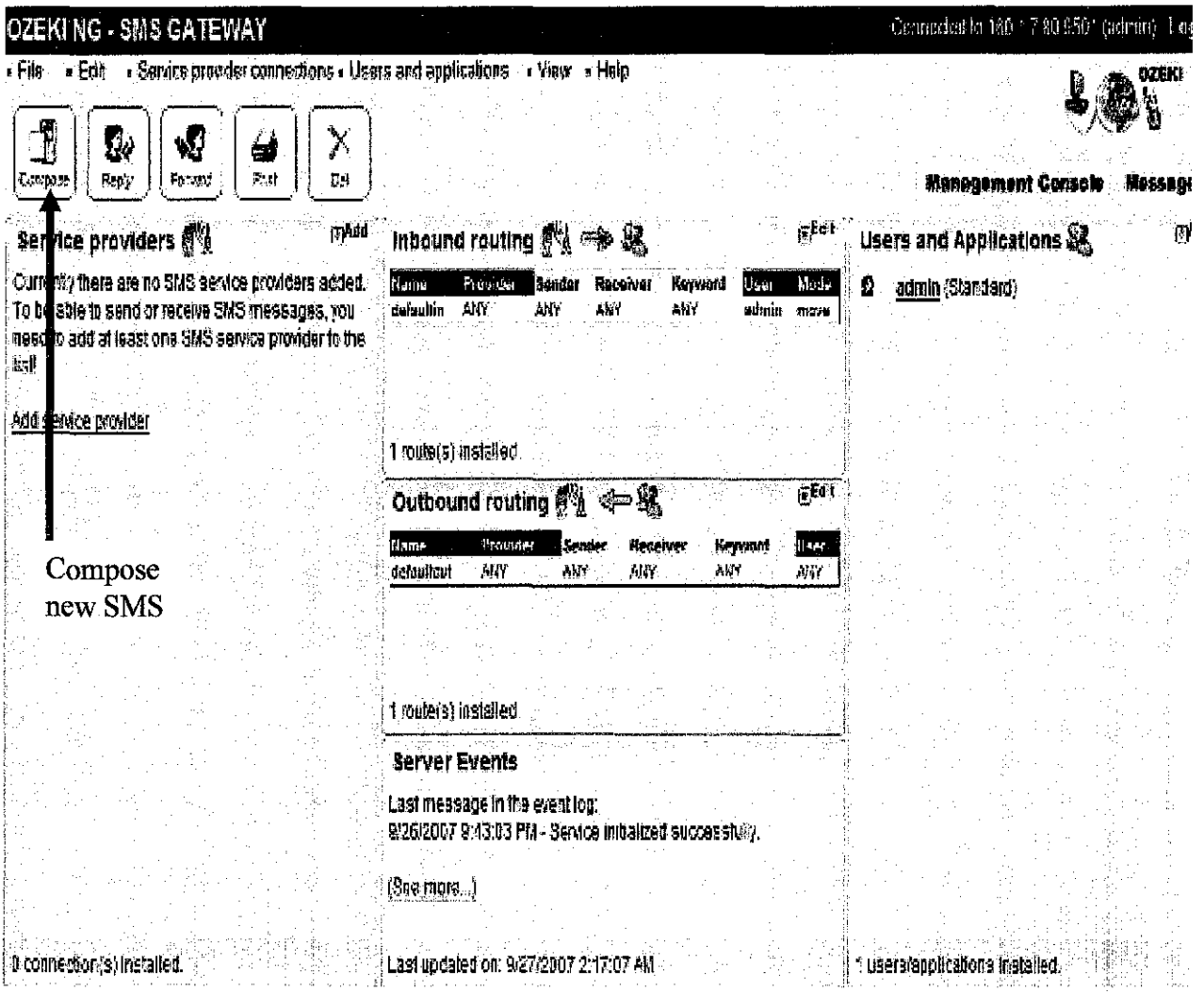
APPENDICES

APPENDIX A-1: HOMEPAGE OF UTP VIDEO CONFERENCE.



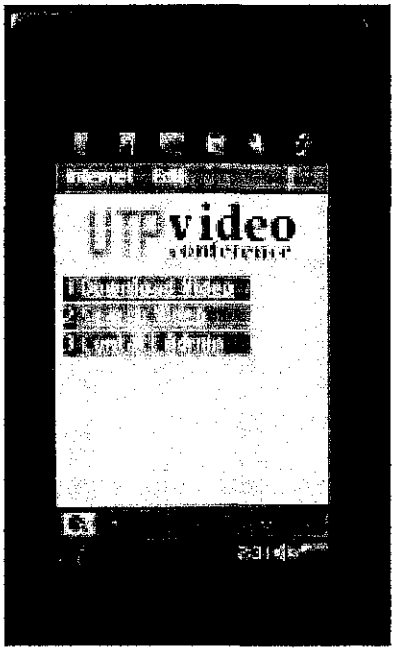
Appendix A-1 allows users to download, upload and search for videos. The page also will link to Video Conference console and SMS Gateway.

APPENDIX A-2: HOMEPAGE SMS GATEWAY.

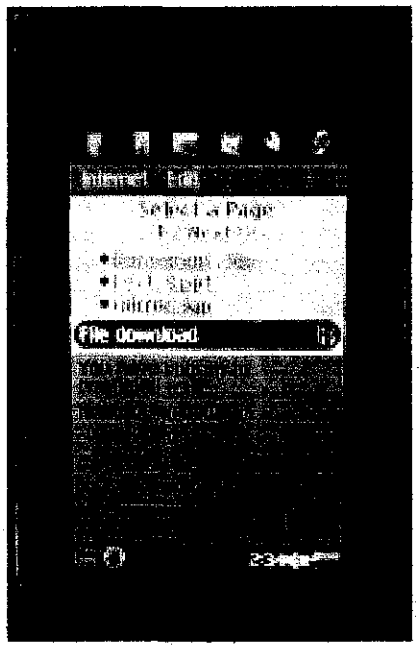


This page shows how to create new SMS using Ozeki SMS Gateway. User needs to connect to GSM modem in order to send SMS.

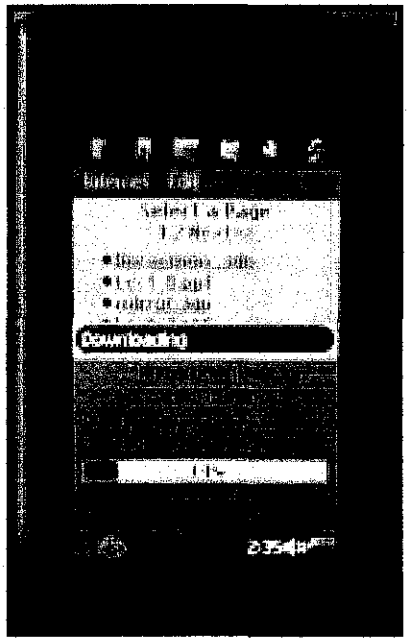
APPENDIX A-3: MOBILE WEB CONTENT.



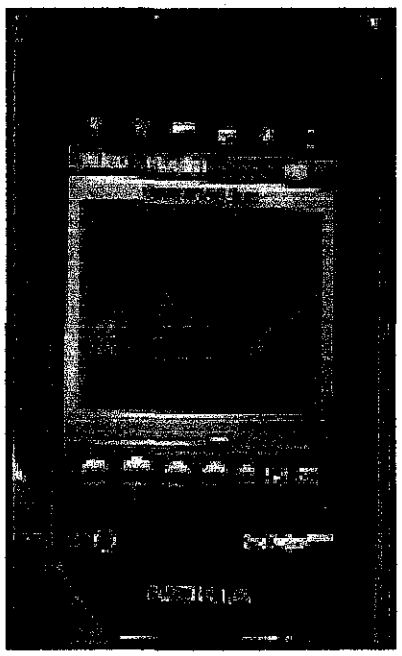
Homepage of UTP Video Conference – Mobile version



Ask confirmation from users whether they want to download the video or not.

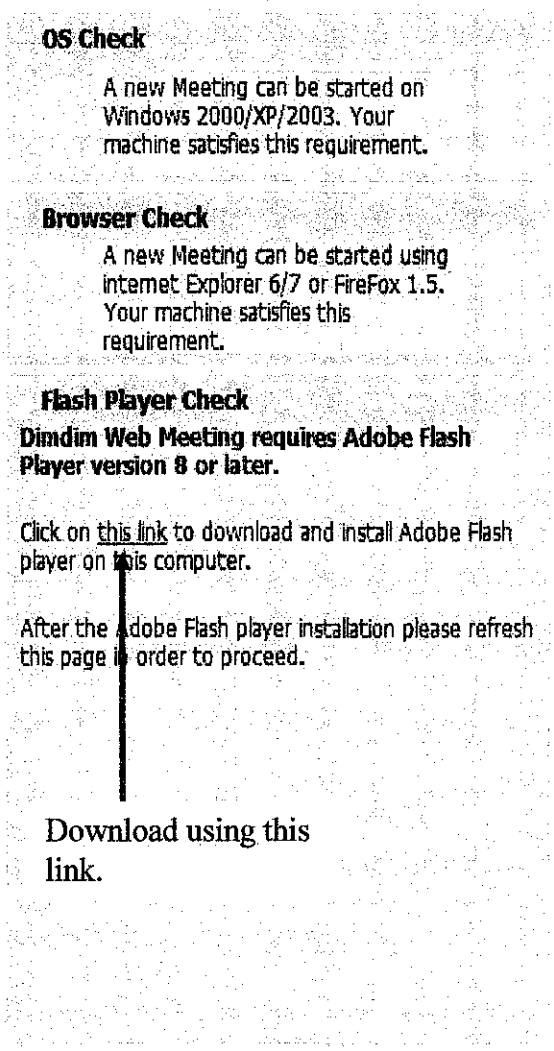


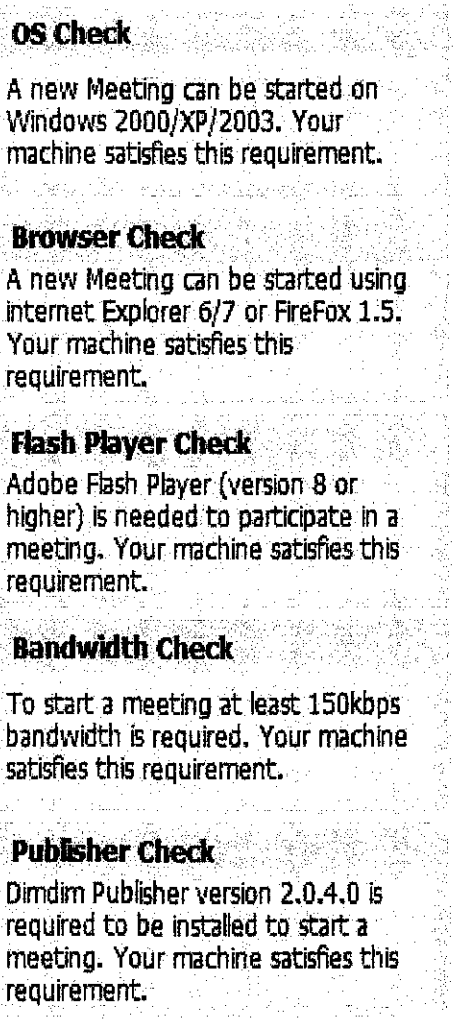
Start downloading the video.



Play the video.

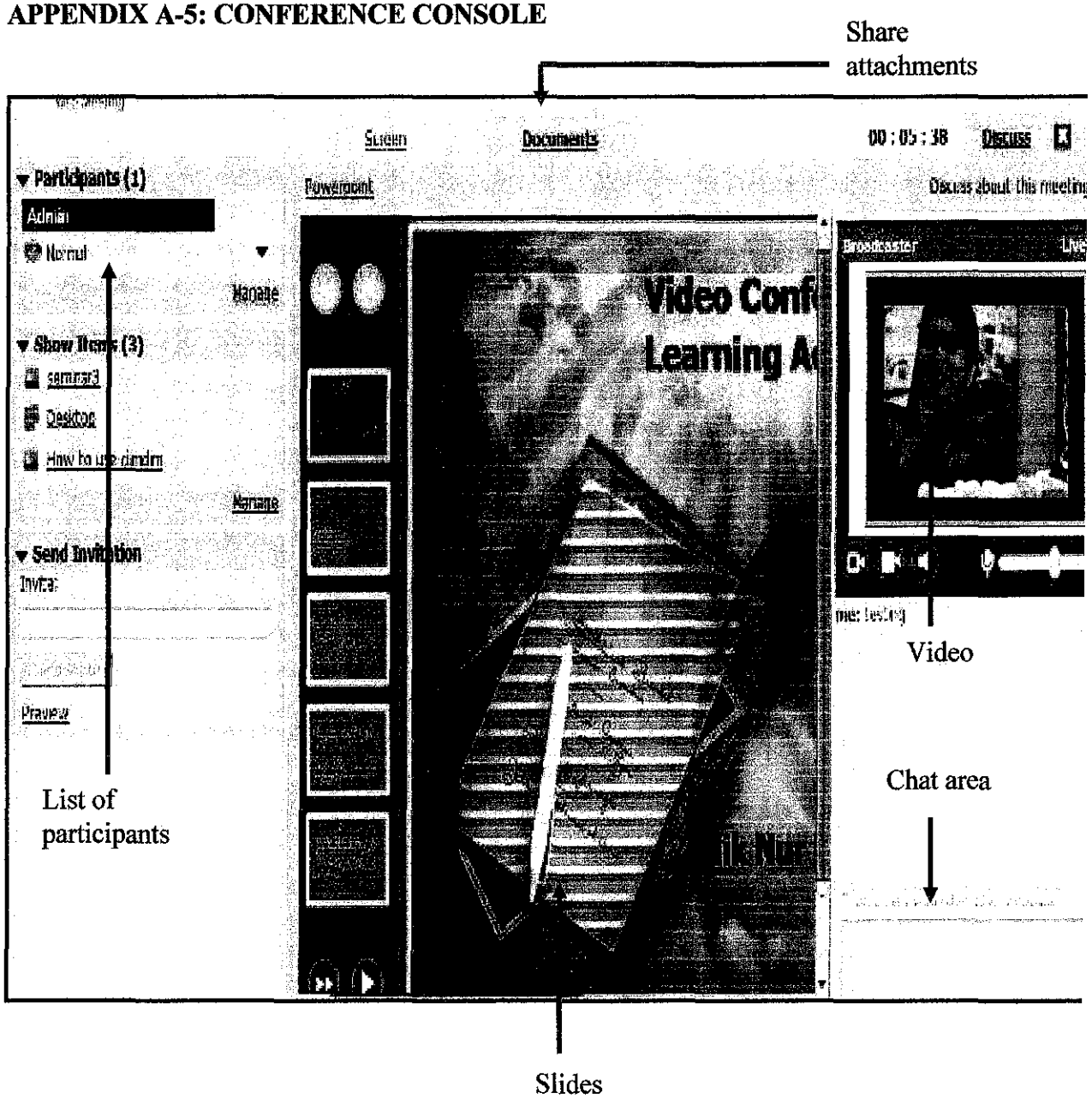
APPENDIX A-4: SYSTEM CHECKING AFTER LOGIN.





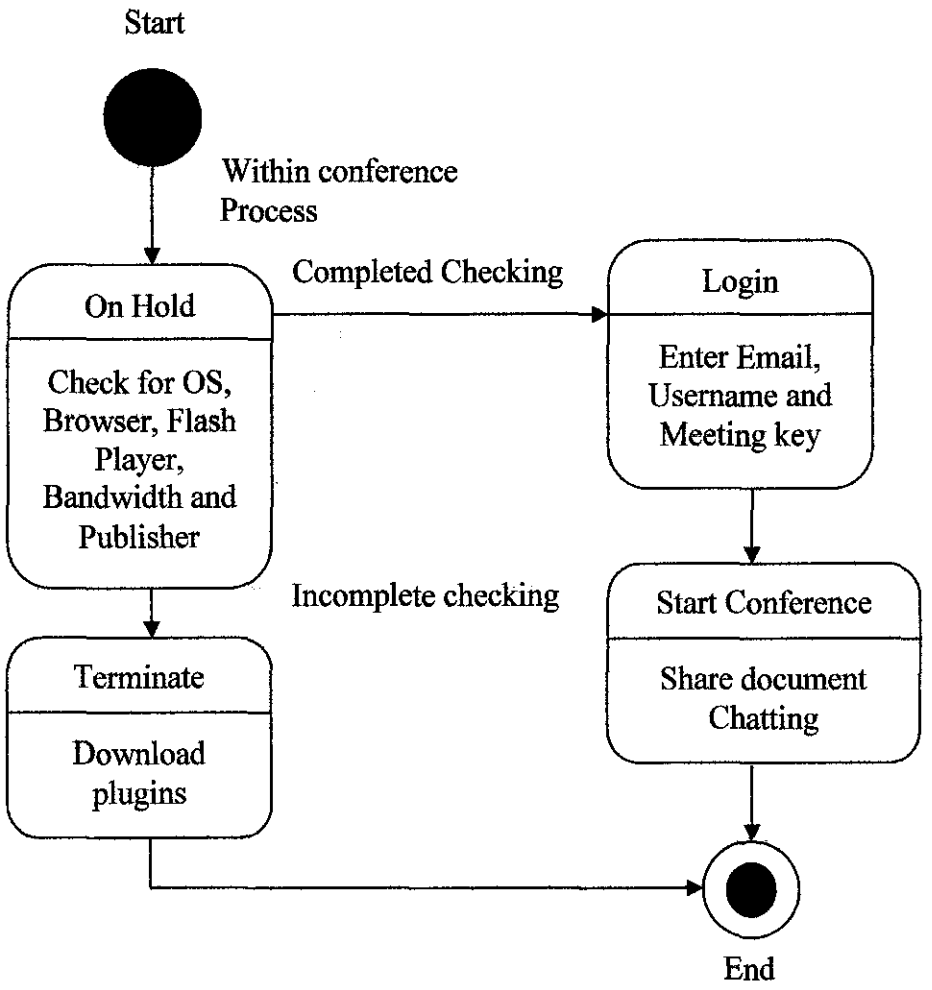
The system needs Flash player in order to stream the video. Thus, if it found the computer not yet install with flash player, it will request the user to download flash player first.

APPENDIX A-5: CONFERENCE CONSOLE



This is the video conference console. At this console, student and lecturer can have video conferencing. At the same time, student is able to see the slides and chatting with other participants. List of the participants will be placed on the top-left side of the page.

APPENDIX A-6: STATE CHART – SYSTEM FLOW



Appendix A-6 is basically explaining the process that user will go through whenever they want to do video conferencing. Before a conference can be started, the system will check for computer operating system, browser compatibility, flash player, bandwidth and Dimdim Publisher. Once these requirements are met, user will need to login by entering their email, username and meeting key. Otherwise, the programme will terminate and ask for installation of the missing plugins and the user needs to install all plugins needed and complete all the requirements. After entering the meeting key, the system will check whether the meeting key is match or not. If they meeting key is correct, then the user can start to video conference.

APPENDIX A-7: EVALUATION FORM

Video Conference Evaluation Form

- STUDENT -

Name: _____

Course: _____

Name of the subject: _____

Date of event: _____

Please BOLD the answer.

Survey Questions: Please give your response to these statements. On a scale of 1 to 5:

a. Main strength of video conferencing is the **extra flexibility** in scheduling that video conferencing has provided me.

1	2	3	4	5
strong	somewhat agree	agree	somewhat disagree	strongly disagree

b. I find that I learn as much from a video conferencing as I **learn from other formats**.

1	2	3	4	5
strong	somewhat agree	agree	somewhat disagree	strongly disagree

c. I would **always prefer** a video conferencing in comparison to normal class.

1	2	3	4	5
strong	somewhat agree	agree	somewhat disagree	strongly disagree

d. In my experience, **video conferencing are ideal for large sections** where the lecturer will spend more time lecturing.

1	2	3	4	5
strong	somewhat agree	agree	somewhat disagree	strongly disagree

e. In my opinion, I have as **much opportunity to ask questions and participate in a video conference** as I would have in a non-video conferencing course.

1	2	3	4	5
strong	somewhat agree	agree	somewhat disagree	strongly disagree

f. I find **it difficult to concentrate in a video conferencing** and my mind more frequently wanders in such courses:

1	2	3	4	5
strong	somewhat agree	agree	somewhat disagree	strongly disagree

g. I find it **more difficult to take notes in a video conferencing** and I find that I need more handouts and other aids to keep up with the material.

1	2	3	4	5
strong	somewhat agree	agree	somewhat disagree	strongly disagree

h. The **small size of the screen makes it difficult for me to see the faces and body language** of my colleagues on the other side:

1	2	3	4	5
strong	somewhat agree	agree	somewhat disagree	strongly disagree

i. I **will not, unless it is absolutely necessary, take another video conferencing.**

1	2	3	4	5
strong	somewhat agree	agree	somewhat disagree	strongly disagree

j. I **do not feel** that the video conferencing cover as much material as more traditional presented courses.

1	2	3	4	5
strong	somewhat agree	agree	somewhat disagree	strongly disagree

j. I found that the **video conferencing is an alternative for normal class.**

1	2	3	4	5
strong	somewhat agree	agree	somewhat disagree	strongly disagree