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Instant Messaging in distance education

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Abstract

Instant messaging has become widely used in many instances. The concept of synchronous communication changed the terms of communication in distance education. This paper aims to achieve a deeper understanding of the current status of communication in distance education, additionally, to explore the usability of IM features in the e-learning process. Five interviews and a questionnaire investigation have been conducted with both experienced teachers and students. The presented data illustrate that IM has become an effective approach which improves communication efficiency of distance education, but its evolution is restricted by the inherent properties of distance education. We also extended the technology acceptance model by an integration of three theories which are media richness, flow and effective communication. And this extension is utilized for evaluating the relationship between communication efficiency and four unaided IM features: instant message, VOIP, video conference and file transfer. The results show that IM features can improve the efficiency of communication in distance education. Also the results indicate the limitation of our research model, which will implicate the direction of our future study.

Keywords
Distance education, e-learning, online learning, Instant Messaging, communication

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Contents

1. Introduction 6
1.1 Background 6
1.2 Problem Area 7
1.3 Research Question 7
1.4 Purpose 8
1.5 Delimitations 8
2. Theoretical Perspectives and Framework 9
2.1 Distance education and Instant Messaging in learning 9
2.2 Communication 11
2.3 Technology Acceptance Model 13
2.4 Media Richness Theory 15
2.5 Flow Theory 16
2.6 Our Framework 17
3. Method for Investigation 19
3.1 Methodological choices 19
3.2 Data Collection 21
3.3 Data Analysis 22
3.4 Scientific Validity and Ethical Issues 23
3.5 Summary of method of investigation 25
4. Empirical Findings 26
4.1 Interviews 26
4.1.1 Interview one – GIS, Lund University 26
4.1.2 Interview two – Internet MBA, BTH 28
4.1.3 Interview three – Young MBA, Learning Lund, Lund University 31
4.1.4 Interview four – The department of Education, Lund University 33
4.1.5 Interview five – Lecturer at Malmö University 35
4.2 Questionnaire result 38
5. Discussion 46
5.1 Communication in distance learning 46
5.1.1 Communication problem in distance learning 46
5.1.2 Communication tools in distance learning 47
5.2 Instant Messaging in distance learning 47
6. Conclusion 50
Appendix A: Interview Guide 51
Appendix B: Interview transcription 52
Interview One 52
Interview Two 56
Interview Three 59
Interview Four 63
Interview Five 66
Appendix C: Questionnaire 70
Appendix D: Questionnaire result 75
Appendix E: Virtual Learning platform 79
IT's Learning 79
LUVIT 80
References 81

List of Figures

Figure 2-1: Type of education (Bullen & Janes 2006, p. ix as cited in Nichols 2008) 10
Figure 2-2: The communication process (source: Gibson 1995 as cited in Gibson, Hodgetts and Blackwell 1998) 12
Figure 2-3: Technology Acceptance Model (Davis, Bagozzi and Warshaw 1989) 14
Figure 2-4: Technology Acceptance Model (Venkatesh & Davis 1996) 14
Figure 2-5: Hierarchy of Media Richness (source: Daft, Lengel and Trevino 1987) 15
Figure 2-6: Flow theory (Koufaris 2002) 17
Figure 2-7: Our Theoretical Framework 18
Figure 3-1: Our Research Model 19
Figure 4-1: path analysis for Instant Message 42
Figure 4-2: path analysis for VOIP 43
Figure 4-3: path analysis for Video Conference 43
Figure 4-4: path analysis for File Transfer 44
Figure A: IT's Learning screen shot 79
Figure B: LUVIT screen shot 80

List of Tables

Table 2-1: Instant Messaging Features 10
Table 2-2: summary of framework and research model 18
Table 3-1: summary of method investigation 25
Table 4-1: Descriptive information of the sample 38
Table 4-2: Interested/Not interested in using IM 39
Table 4-3: The communication in e-learning are improved by the use of Instant Messaging 40
Table 4-4: Sample Population Demographics (PU) 41
Table 4-5: Sample Population Demographics (PEOU) 41
Table 4-6: Sample Population Demographics (Concentration) 42
Table 4-7: Hypotheses result 44
Table 4-8: Empirical result summary 45

1. Introduction

1.1 Background

Education can be described as a communication process where there are information interaction among instructors and learners. Almost every provider of E-Learning courses not only promotes high quality and completeness of the offered content, extensive communication possibilities for each participant is also included in the educational services (Schertler & Bodendorf 2002).

Advances in Internet and mobile technology along with global access to broadband connectivity have provided the possibility for a lot of people studying and learning through distance education (Donnelly & Turbitt 2009). Distance education in the 21st century often includes accessibility use of the Internet. The most common style of distance learning is learning that based on the Internet (Hrastinski 2007). Thus, distance learning has been considered as an important term of higher education during recent years. Distance learning is a key factor in increasing the general education level (Hrastinski 2007). Distance learning can be thought of as education or training delivered to individuals who are geographically dispersed or separated by physical distance from the instructor using computer and telecommunication facilities (Belanger & Jordan 2000). Through the electronic network of the Internet, modern technology has made possible introduction of a new learning environment to learners. This new distributed learning environment enables learners to receive individualized support and to operate on time and learning schedules separate from other learners (Huang & Cho 2008).

There are many technologies and tools that can be used to support communications in distance learning. Some are used as supplements to traditional classroom environments; others are used as complete replacements for traditional lecture-based courses (Belanger & Jordan 2000). Learners that using distance learning program have to use certain kind of communication medium to complete their course requirements. Media richness and social presence theories were proposed to explain the relative richness of communication media in supporting interactions between individuals (Daft & Lengel 1986; Walther 1995). The basic functions of the medium are to provide proper channels to facilitate the communication between the instructors and the learners. Various combinations of text, graphics, audio, video and animations can be integrated into a distance learning system (Liu et al. 2009). Media richness not only improves the communication manner in the distance learning process, but also changes the learning patterns.

There are lot of communication tools that can be used in distance learning system, and they can be divided into two groups according to the time of response (Bučko et al. n.d.). The two groups are Synchronous and Asynchronous.

Synchronous communication means that all the participants that take part in the conversation have to be present at the same time. Problems and questions can get immediate answers. This form of communication is based on text, voice and audio-video transfers, for example, Instance Messaging. Asynchronous communication does not need

all the participants to take part in the conversation at the same time. Due to this fact, participants may communicate in different time slices, for example, email and forum. (Bučko et al. n.d.)

How to improve the quality of education has always been the core issue of the distance learning process. Email and forums have been widely used in distance learning for a long time. Email and forums are all delayed means of communication (Hrastinski 2007) which means they are tools for asynchronous communication. It has been known for decades that students regarded the lack of real time or spontaneous communication as a disadvantage of distance learning (Grint 1989). The development of technology has took us from emails and simple forums, to the more efficient forms of communication which is instant messaging. Instant messaging (IM) are technologies that create the possibility of real-time text-based communication, as well as audio, video applications between two or more participants over the Internet or some form of internal network. IM, as one of the communicative medium, has been considered as an important tool used in distance learning process to facilitate the communication between the instructors and learners. These services make it easy to communicate with others who happen to be online at the same time, and can serve to provide a stronger sense of community in the solitude of asynchronous online coursework (Nicholson 2002).

1.2 Problem Area

The importance of communication tools emerges when timely asynchronous and geographical diversity are considered as the key factors that affect the communication in distance learning. According to Pan & Sullivan (2005), one of the most important reasons why e-learning is not as popular as it supposed to be is that there are some problems in the communication. Since the medium in e-learning process is significantly different from the traditional learning process, the quality in communication demands certain extent. While Instant Messaging is used as a communication tool in the distance learning (DL) program, we always try to explore the best features of the IM that fit in the DL process, not only to improve the capability of the DL system, but also to provide a practical and cozy learning environment for the participants.

1.3 Research Question

As we have already stated above, communication is essential in education process, especially in distance education, we decided to conduct our research in the field of communication in distance learning, in order to help the improvement and popularity of distance learning. Moreover, instant messaging as one of the communication tools, has become widely used in distance education, we aimed to find out the efficiency of this type of communication in distance learning and how it could support distance education.

The following are our two research questions.

- *What is the current situation of IM in distance learning?*
- *What are the IM features that influence the efficiency of communication in distance learning?*

The first question is about the current status of IM in distance education. By exploring the current situation, we can acknowledge the problems that existed in current usage of IM in learning. After that, the second question is about IM features that might affect the efficiency of communication, from which we aim to specify the different IM features' contribution to the effective communication in distance education.

1.4 Purpose

Communication has been considered as the one of the most important element in distance education. Our purpose is to explore the current status of interaction between teachers and students in distance learning based on different types of communication. Then we focus on the synchronous communication tool (Instant Messaging), to identify the features of the Instant Messaging used in distance learning that could be appropriately applied to the DL systems and the possible impact of these features on the DL process. Our purpose is to find out the relationship between IM features and effective communication, thus to help the improvement of distance education in the future.

1.5 Delimitations

The communication medium and distance learning platform are consisted of various applications. In this paper, we only focused on the instant messaging. Moreover, to identify the typical problem that might occur during the DL process can partly interpret the current situation in IM usage and the study will be focus on the communicative level.

2. Theoretical Perspectives and Framework

In this section we present the literature review based on our research questions. Theoretical perspectives and previous studies related to our research are explicated. We also described our framework for conducting the research.

2.1 Distance education and Instant Messaging in learning

Nowadays, distance learning or e-learning or online learning is more popular than last decade. The advantages of online education is that it cost less than traditional education and also helps the learners access to study anywhere and anytime. (Fayyoumi 2009)

There are many terms about distance education. According to Nichols (2008), distance learning means the education is provided through learning resources, such as, learning guides, articles, and supplementary media. In this type of learning, teachers and students are separated by time and/or space. Distance education is extremely various which ranging from traditional education to collaborative study and Internet-enhanced multimedia education. (Nichols 2008)

E-learning, eLearning or (e)learning means pedagogy that is empowered by digital technology. E-learning uses the technological tools for educational purpose which can be both online (Internet) and offline technologies (CD-Rom or DVD). It also includes computer-interfaced communication and digital resources as tools for learning. (Nichols 2008)

He noted the description of Online learning as:

> *"Pure online learning uses e-learning tools in a distance education mode. It uses technology (usually the Internet) as the sole medium for all student learning and contact. The term is often used synonymously with the terms immediately above (distance learning, e-learning); however, it is best to reserve it to describe education facilitated only through digital technology, usually the Internet. An online course typically lacks both physical learning materials and physical meetings, but the term is also used to describe the online component of an on-campus or distance education course. The term is sometimes used to refer to CD-Rom- or DVD-based courses as well as web-based ones" (Nichols 2008, p.4)*

E-learning or online learning is computer based learning. The learners and teachers use computer as a medium to study and communicate with each other. In figure 2-1, Bullen & Janes (2006) as cited in Nichols (2008) identified the type of education. They distinguished the meanings of e-learning and distance education. E-learning includes both class room and online education which uses the computer technology to support learning, while the distance education refers to the type of leaning that learners are separated from each other. Distance education fully based on Internet and also includes printed material, audiotapes and video conference.

Figure 2-1: Type of education (Bullen & Janes 2006, p. ix as cited in Nichols 2008)

Using Instant Messaging in learning process

As technology developed, the expressive power of instant messaging has expanded, from type-text only to multi-media supported (Zinman & Donath 2009). The combination of different synchronous communication applications enhanced the popularity of IM. The use of IM has grown rapidly with its features of being instant and rich in functionalities (Shih et al. 2008). Table 2-1 presented IM features with description:

Table 2-1: Instant Messaging Features

Instant Messaging Features	***Function description***
Instant messages	*Send notes back and forth with only one person who is online, it is a real time interaction*
Chat room	*Create a chat room with all the people that want to chat together. The difference between instant messaging and chat room is that chat room can have more than two people take part in the chat*
Video conference	*This feature can help to realize the face to face conversation*
Voice over IP	*This feature allows users to use their computer call the phone or call other computers that is connected with the Internet*
Emoticons	*IM provide some emoticons image for users to express their mood when they chat with other people*
File transfer	*This feature allows user to transfer and share files with their friends or co-workers.*
Display Image	*This feature allows users to display image and share it with their friends and co-workers*
Short Message Service (SMS)	*This feature allows user to use their mobile phone or IM application to sent SMS to take part in the online chat*

Many researchers are interested in studying about using Instance Message in education. Shen et al. (2008) conducted their research by using empirical test with 428 students in China to investigate the use of IM in online group project discussion. Fox et al. (2009) doing research on the topic of the how IM could affect college students' learning performance. In additional, IM has been studied in many fields: hospitality curriculum

(Newman & Brownell n.d.), Organizational communication satisfaction (Shih et al. 2008) and so on.

Bronstein & Newman (2006) mentioned that the use of Instant Messaging in learning can promote and facilitate learning, for instance, facilitate real-time learning and supplement classroom training. They also stated IM has several benefits over other communication tools for learning. For example,

Immediacy, "Unlike email, you can get an immediate response to an IM, which may increase productivity."

Presence awareness, "with instant messaging, users know who is online. Some consider this invasive but, because people can set "away messages" indicating they're not available, IMs typically are considered less intrusive than phone call."

Convenience, "An IM toolbar, showing who is online, always can be open, and instant messages are easy to send from a PC or mobile device…" (Bronstein & Newman 2006)

They also discussed IM can support e-learning, for example, send message to registered participant to ask for learning progress or send texts when the participant complete the program. These are the examples of IM's benefit in learning process.

2.2 Communication

Palta (2006) defined communication as "the process of sending information to oneself or another entity, usually via a language." There are three major dimensions of communication: content, form, and destination. The content is the acts that discloses the knowledge, experiences, advice or ask questions. All the contents can be in many forms e.g. verbal, non-verbal, body language. Content and form build the message together that sent forward to destination. In figure 2-2, Gibson, Hodgetts and Blackwell (1998, p. 278) stated that:

> *"Communication begins when an idea or message to be communicated originates in the sender's mind. This idea must be encoded, or put into words, and transmitted to a receiver. Encoding involved the organization of the sender's thoughts into a pattern of words that is accurate and sufficient to express the idea to another party….. After receiving the message, the receiver must decode it by deciding what it means. The receiver then arrives at an understanding of the meaning. The critical feedback loop occurs when the receiver indicates by action, look, word, or other sign showing that a message has been received and indicating what meaning was decoded."*

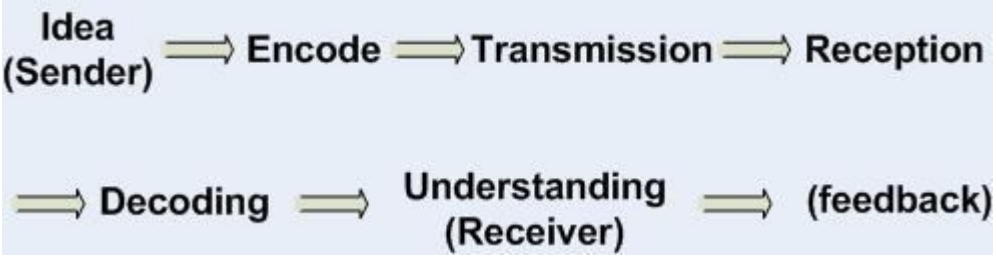


Figure 2-2: The communication process (source: Gibson 1995 as cited in Gibson, Hodgetts and Blackwell 1998)

They mentioned that not only the sender or receiver has a type of coding problem but it may take a new meaning by the elements of transmission, feedback, and noise. Communication noise may take the problem for online students especially the technical problems and the levels depend on where they do their online. (Gibson, Hodgetts and Blackwell 1998)

Online communication

Ataizi (2009) concluded in his study that most of academicians say that totally online education have some defect that does not have in traditional education. He argued that teachers can feel immediately when the students are bored or have problems and they can help the students to get rid of those problems while this is impossible in online education. From his studied, using Internet technologies in learning and teaching have many advantages such as "Unlimited discussion and reference opportunities for both the students and teachers" and "Increased research opportunities for academicians and material usage by both students and teachers" but also have some disadvantages such as "Connection problems on and off-campus".

According to Whipple (2006), Email is different from live conversation into two important aspects. "First, you cannot modify content of a message based on the visible reaction of the other party" and "Second, emails are permanent documents. Once you send it, you cannot take it back, and you lose all control over who views your words." He presents the basic important for principle clear online communication that often forgotten; understand the objective of your message, write less, set the tone, and watch your emotion. Follow these concepts would help the sender have a better sense of how their messages are interpreted by others. (Whipple 2006)

Communication in distance learning

The separation of teacher and learner in space/time, and the non-contiguous communication between students and teachers mediated by some form of technology are the hallmarks of the distance education (Sherry 1996). In the early stage of distance education, television production technology was largely used for broadcasting classes by teachers (Cambre 1991). Then, in order to improve this lack of two-way communication channel between teacher and student, sophisticated interactive communication technologies became available (Sherry 1996). With the development of computer science

and Internet, computer based communication including electronic mail, forums, and telephone-based audio conferencing and video conferencing were used more and more in distance education. The quality of the educational process relied on a sustained, two-way communication (Garrison 1990). Sherry (1996) stated that without this communication, distance learning degenerated into the old correspondence course model of independent study, who also argued:

> *"The student becomes autonomous and isolated, procrastinates, and eventually drops out. Effective distance education should not be an independent and isolated form of learning"*

As claimed by Hung & Cho (2008), dramatic advance in information and communication technology have significantly enhanced the popularity of the distance education.

Effective communication

The way people communicate has a significant impact on their abilities to achieve their goals. Being able to communicate effectively is necessary and vital for certain jobs. To achieve efficient communication usually the person who initiates it may use all possible methods to enhance it and make it finally as effective as possible (Rutkowski et al. 2003). Effective communication is vital for achieving a communication goal. As addressed in Rutkowski et al. (2003):

> *"…we define the communication efficiency as first goal of communication process literally as an intention to be understood."*

They also argued that there were several factors might affect on the effective communication. One of them is to achieve the communication goal is a choice of the protocol and set of symbols/tools that should be used (Rutkowski et al. 2003). The tools used in the communication process may affect on achieving the communication goals, thus, affect on the efficiency of the communication.

2.3 Technology Acceptance Model

The Technology Acceptance Model (TAM) is one of the most widely used research models in predicting IT adoption. TAM is a theory that models how users come to accept and use a technology which is adaptation of Theory of Reasoned Action (TRA) that was developed by Fred Davis and Richard Bagozzi by replacing with the two technology acceptance measurement; perceived ease of use and perceived usefulness. TAM addresses those user perceptions of ease of use and usefulness influence the user acceptance toward using the system.

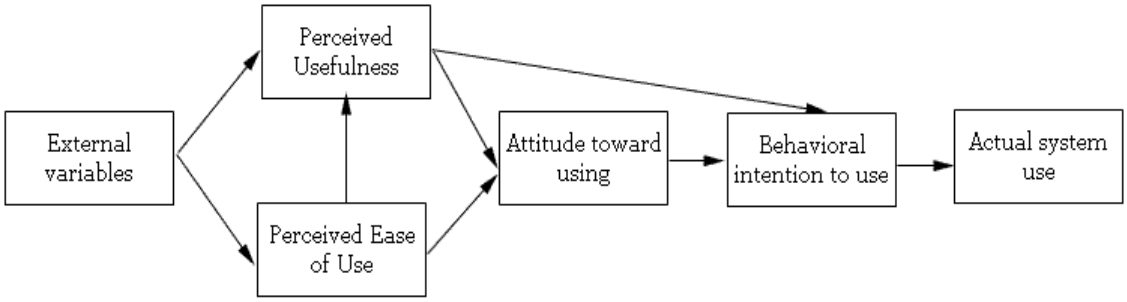


Figure 2-3: Technology Acceptance Model (Davis, Bagozzi and Warshaw 1989)

The purpose of TAM is shown in figure 2-3. There are two factors that influence to decision about how and when they will use it. Perceived usefulness (PU) - This was defined by Fred Davis as "the degree to which a person believes that using a particular system would enhance his or her job performance"(Davis 1989). Perceived ease-of-use (PEOU) - Davis defined this as "the degree to which a person believes that using a particular system would be free from effort" (Davis 1989). Further, both perceived usefulness and perceived ease of use influence the user's attitude toward using the system, and a prospective user's overall attitude toward using a given system is a major determinant of whether the user actually uses it (Davis 1993). Numbers of previous studies had proved the casual relationship of user acceptance empirically (Taylor & Todd 1995; Venkatesh & Davis 1996, 2000; Venkatesh 2000; Moon & Kim 2001)

Furthermore, Davis (1993) suggested that system design features directly influence perceived usefulness and perceived ease of use. System design features have an indirect effect on attitude toward using and actual usage behavior through their direct effect on perceived usefulness and perceived ease of use. Other previous studies had applied the TAM to evaluate the impact of system characteristics on the ease of use and usefulness (model is shown in figure 2-4). Venkatesh & Davis (1996) claimed that computer self-efficiency; a user-specific and system-independent characteristic may have a significant impact on determinants of user acceptance.

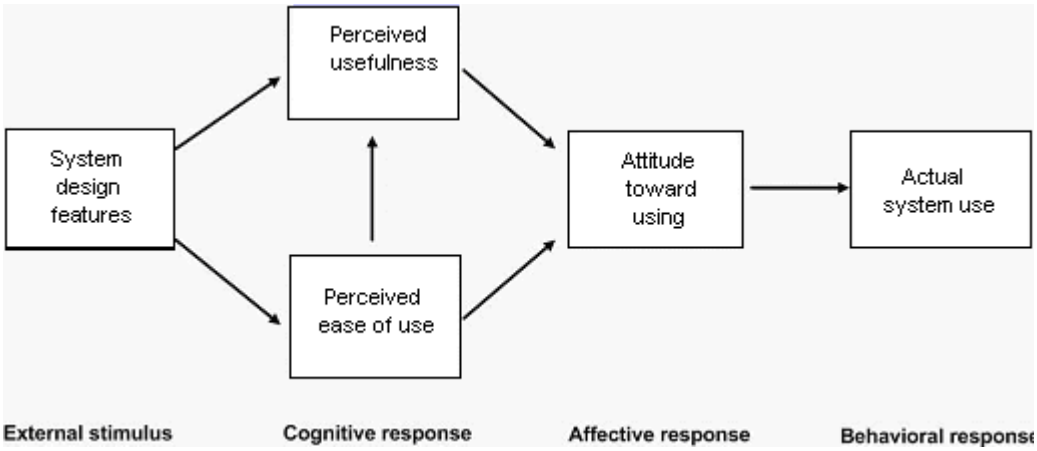


Figure 2-4: Technology Acceptance Model (Venkatesh & Davis 1996)

Previous researches applying the TAM to e-learning have provided prolific results. One of the studies, (Roca et al. 2005) suggested that users' continuance intention is determined by satisfaction, which in turn is jointly determined by perceived usefulness, perceived ease of use. PEOU was verified as a significant predictor of both attitude and intention to use a Learning Management System in the study (Ngai, Poon and Chan 2007). PU has a significant influence on perceived enjoyment and intention to use e-learning technologies (Lee et al. 2005; Van Raaij & Schepers 2008). Another study, (Liaw 2008) proposed conceptual model for understanding learners' satisfaction, behavioral intention, and effectiveness of using the e-learning system, and the results showed that perceived usefulness and perceived satisfaction both contribute to the learner's behavioral intention to use the e-learning system.

2.4 Media Richness Theory

Media Richness Theory (MRT) or sometimes referred to Information Richness was developed by Daft & Lengel (1984), a main assumption of media richness theory is to determine which technologies best reduce uncertainty and equivocality (Daft & Lengel, 1986). Information Richness is defined as "the ability of information to change understanding with a time interval." (Daft & Lengel 1986, p. 560) Communications that can overcome different frames of reference and clarify ambiguous issues to promote understanding in a timely manner are considered richer. Communications that take a longer time to convey understanding are less rich. It is stated that "Face-to-face is the richest medium because it provides immediate feedback so that interpretation can be checked" (Daft & Lengel 1986, p. 560) which it also can provide cues via body languages and tone of voice. Consequently, in accordance with the order of communication efficiency, mediums such as unaddressed documents, addressed documents, two-way radio, telephone, video conferencing, face-to-face, are sorted by the efficiency from less effective to more effective. In figure 2-5, this is show the level of media richness.

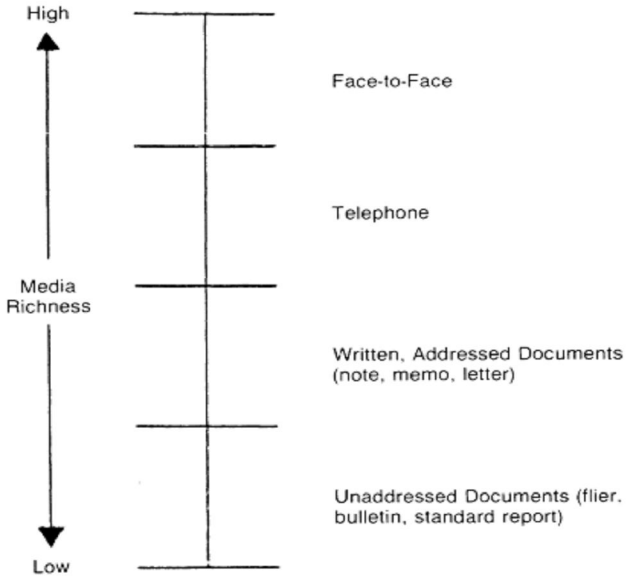


Figure 2-5: Hierarchy of Media Richness (Daft, Lengel and Trevino 1987)

Media Richness Theory is one of the most popular theories to address media choice, it is widely used in this field of research (Daft, Lengel and Trevino 1987). MRT states that each medium has different media richness level, and its own objective characteristics. When people want to choose a medium they will always choose a medium by considering the fit between its objective characteristics and the characteristics of the task at hand (Lee Z. & Lee Y. 2009). The key premise of MRT is that each communication medium has different richness characteristics with respect to information processing. Media Richness Theory refers to the ability of a medium to change human understanding, to overcome conceptual frames of reference, or to clarify equivocal issues in a timely manner (Daft & Lengel 1987). A rich medium includes characteristics such as the ability to give immediate feedback, different ways of communication, the ability to personalize the medium, and the ability to vary language (Lee Z. & Lee Y. 2009)

Impact of Media Richness on e-learning Technology acceptance

Based on the Technology Acceptance Model, to provide a theory which can study the intended use of e-learning system, Liu et al. (2009) has develop a new framework to study user's acceptance of streaming media that are used in e-learning. The research is the first to assess the influence of different media (Herein referred to as presentation types) on a user's concentration level and intention to use an e-learning system (Liu et al. 2009). It was also addressed that prior on media richness indicate that text as a presentation type might be primarily suitable for communication of factual information whereas a multimedia presentation (including the newer streaming media) could communicate both factual and equivocal information. As they claimed in the result,

> *"The concentration of the users stimulated by the course materials developed using rich media might be a critical factor in the user's acceptance of streaming media for e-learning. In general, the concentration of the users tends to be positively correlated with their intention to use the technology" (Liu et al. 2009, p.606)*

This part of the result indicated the correlation between the media richness and user's intention to use the technology, which can be used to explore the relationship between the media richness and communication efficiency.

2.5 Flow Theory

Flow theory was proposed by Csikszentmihalyi (1975), the definition of flow is described as "the holistic experience that people feel when they act with total involvement". Another description for the flow, "the state in which people are so involved in an activity that nothing else seems to matter; the experience itself is so enjoyable that people will do it even at great cost, for the sheer sake of doing it" (Buchanan 1991). The flow theory has been used to address optimal user experiences with personal computers (Finneran & Zhang 2005). Flow experience can be considered as an intrinsic motivation which refers to the desire to engage in an activity for no other reason than the process of performing it (Deci & Ryan 1985). Previous research has also verified the relationship between intrinsic motivation and user behavior and IT adoption (Agarwal & Karahanna 2000).

User concentration would be another factor which can influence both intention to use and actual use of a distance learning system. For users to be in a "flow" state, they must first concentrate on their activities (Lu et al. 2008; Koufaris 2002; Novak et al. 2000). For example, IM users that focus their attention on chatting or playing games when using IM, it is easier for them to be in a state of flow, which will positively affect their attitude toward and promote their usage of IM (Lu et al. 2008). Concentration can be measured by flow theory (Ghani 1995), and an analogous method can be found in the study of Moon & Kim (2001), which suggested that flow included perceived enjoyment, concentration and curiosity. Another study, Koufaris (2002) addressed three structs to measure flow, including perceived enjoyment, perceived control, and concentration. Figure 2-6 shows the flow theory used in Koufaris (2002)

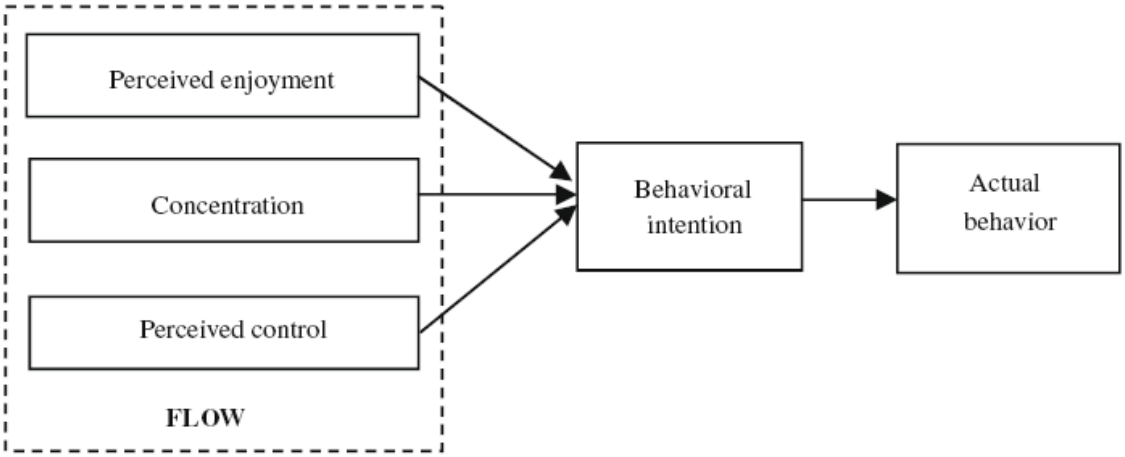


Figure 2-6: Flow theory (Lu et al. 2002)

The integration of the flow theory and the TAM from an e-learning perspective has been studied by Liu et al. (2009). They suggested that concentration level is positively correlated with the intention to use e-learning technology. Similar result can be found in Lu et al. (2008).

2.6 Our Framework

As shown in figure 2-7, our research framework is consisted of two parts. One is based on the researches on the distance education and instance messaging, which is used to support our research question 1, and the other is founded on the previous studies related to the technology acceptance model, flow theory, communication theory and media richness theory to support our research question 2. Based on the Technology Acceptance Model, we acknowledge the influence of IM features on the distance learning process. Using media richness theory as a support, we divide the IM features as different levels of medium in communication. Further, media richness levels are related to the user concentration, and we use flow theory to define the user concentration during the learning process, and construct the correlation with perceived usefulness, perceived ease of use,

and intention to use. We expect to notarize the different IM features are related to the concentration levels, then user's attitude to the IM features should perceive value in the intention of use and subsequently we import the communication rules to verify the influence of intention to use to the efficiency of the communication.

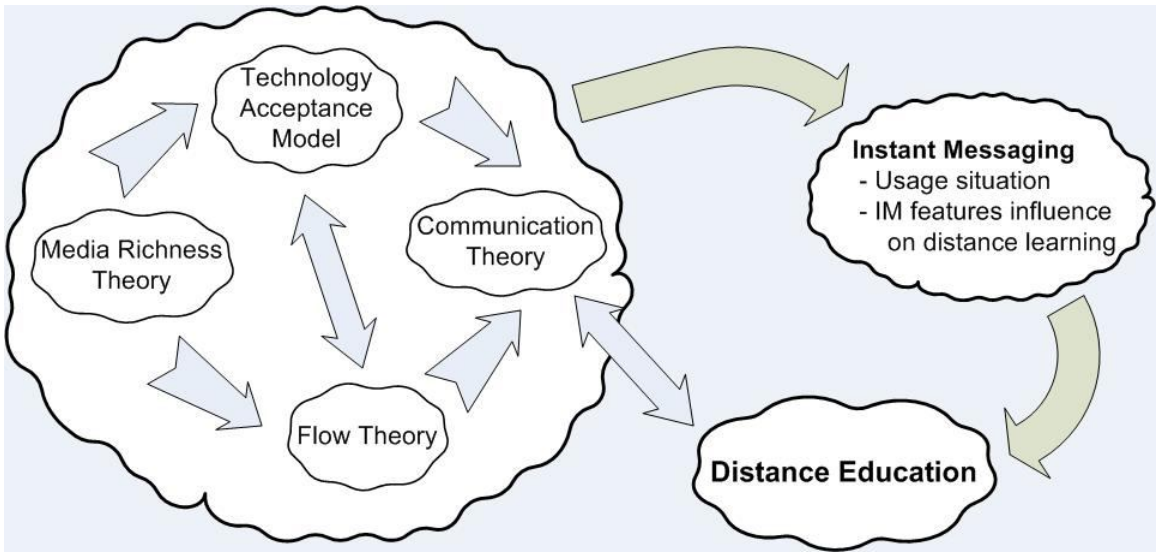


Figure 2-7: Our Theoretical Framework

In Table 2-2 we present the summary of theoretical framework related to research model

Table 2-2: summary of framework and research model

Research Questions	***Framework***
1. IM situation in DL	• *Communication in Distance Learning* • *The use of IM in Distance Learning*
2. Effective IM Feature in DL	• *TAM* - *PU and PEOU related to intention to use* • *MRT* - *IM feature related to PU and PEOU* - *Media richness related to concentration* • *Flow Theory* - *Concentration related to intention to use* • *Communication* - *Intention to use related to efficiency*

3. Method for Investigation

In this chapter we present our research approaches as well as methods and empirical tools for supporting the data collection and analysis. We also describe our research model for the study. Moreover, we discuss the scientific validity and ethical issue related to research quality. The entire chapter provides the interpretation about our research process in collecting and analyzing data.

3.1 Methodological choices

We choose both qualitative method and quantitative method for the study depending upon our research questions. As referred in Creswell (2007), qualitative research involves an interpretive, naturalistic approach to the world, the purpose of a qualitative research is to study things in their natural settings, attempt to make sense of, or interpret, phenomena in terms of the meanings people bring to them, which indicates that qualitative research might be appropriate for us to identify the current situation of using IM in distance learning (see 1.3 Research Question).

On the other hand, generalization in quantitative survey research is based on choosing representative samples and using ideas about probability and chance to estimate the likelihood of events occurring in similar cases outside the sample Seale (1999). Since we also focus on the influence of IM features on the efficiency of communication in distance learning (see 1.3 Research Question), the generalization in quantitative is needed. Seale (1999) has claimed that one of the most important factors to define a successful research in qualitative social research is to identify that the research does use numbers. To validate the reliability of our research result, quantitative method is imported during the qualitative research process. In order to specify the individual IM feature's influence on efficiency in e-learning, we proposed thirteen hypotheses based on our research model (see Figure 3-1). Numbers and figures that generate from the qualitative inquiries are used to analyze to support our hypothesis.

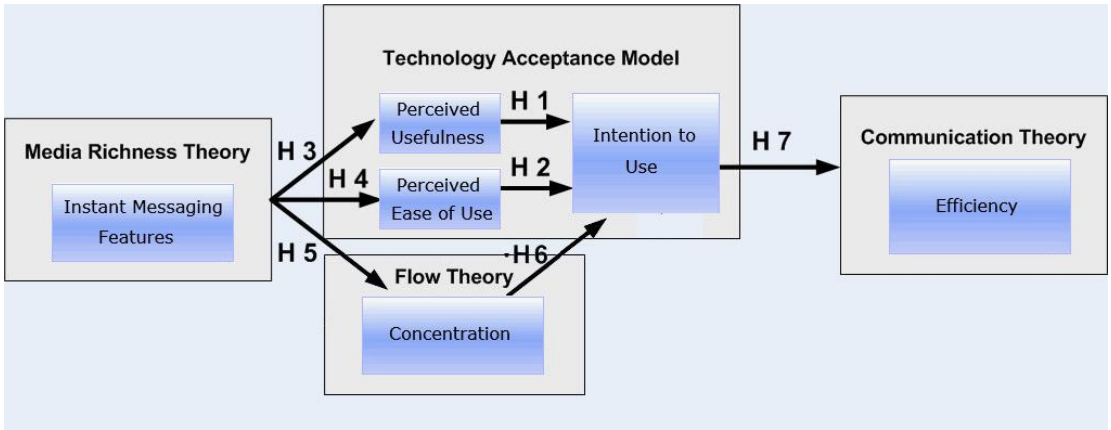


Figure 3-1: Our Research Model

Based on our framework, the empirical research model is shown in Figure 3-1. The core of the model is the technology acceptance model (TAM), our purpose was to assess the influence of Instant Messaging (IM) features on perceived usefulness, perceived ease of use, and intention to use the technology. Specially, in this paper, we only analysed four unaided IM features, which are instant message, VOIP, video conference, and file transfer. Each of these features stood for a separate synchronous communication application. Therefore, according to the original study by Davis (1989), the following hypotheses are formulated to be tested:

H1a: Perceived usefulness is positive related to the intentions to use Instant Message
H1b: Perceived usefulness is positive related to the intentions to use VOIP
H1c: Perceived usefulness is positive related to the intentions to use VC
H1d: Perceived usefulness is positive related to the intentions to use File Transfer

H2a: Perceived ease of use is positive related to the intentions to use Instant Message
H2b: Perceived ease of use is positive related to the intentions to use VOIP
H2c: Perceived ease of use is positive related to the intentions to use VC
H2d: Perceived ease of use is positive related to the intentions to use File Transfer

We then extended the TAM by integrating the Media Richness Model which is used to define the different richness levels of each IM features. In order to explore the relationship between different media and perceived usefulness (PU), perceived ease of use (PEOU), and user concentration, based on the Liu et al. (2009), following hypotheses are tested:

H3: IM features are related to the perceived usefulness of technology.
H4: IM features are related to the perceived easy to use of technology.
H5: IM features are related to the user's concentration levels.

Whereafter, we used Flow Theory to identify the relationship of PU, PEOU, intention to use, and user concentration. Since Liu et al. (2009) claimed that a user's high concentration level will have a positive impact on the intention to use e-learning technology, besides, the integration of the flow theory and the TAM shows that PU and PEOU will have a influence on the user concentration. Therefore, the following hypotheses are tested:

H6: Concentration level is positive associated with intention to use the technology

Finally, we integrate the Communication Theory into the model, which can help us to explore the connection of user behaviour and communication efficiency. The integration of the Communication Theory with TAM and Flow Theory has not been studied empirically, we are expecting that high level of user concentration and intention to use is positive related to the communication efficiency. The following hypotheses are tested:

H7: Intention to use the technology is positive related to the efficiency of communication

3.2 Data Collection

Data collection offers one more instance for assessing research design within each approach to inquiry (Creswell 2007). Also, Creswell's data collection circle provides a value point of view on the data collection process. All the data collection process will be followed by the compendium of data collection approaches in qualitative research (Creswell 2007). There are numbers of data collection methods in scientific research. Interview/questionnaires are the main practical methods used when we collected the empirical data. Qualitative research interview can produce scientific knowledge in the meaning of methodologically secured new and systematic knowledge (Kvale 1996). In addition, questionnaires are considered as method to find out how people react to the world about them, or how they might react to changes one might wish to make (Sinclair 1975). As our research subject is the communication tools, the end users should be both instructors and learners. Although the two groups of end users are using the same tools, they have different perspectives on the application. Consequently, the thematizing and designing procedure of constructing the interview and questionnaire will be separate due to the different purposes of the investigation.

Interviews

Considering that most instructors we are contacting are somehow geographical reachable, the interviews for instructors could be conducted as a traditional qualitative interview which based on the face to face conversation. Moreover, this face to face interview will help us to provide a flexible communication to easily interact with interviewees. Therefore, we have conducted our interviews with program coordinators and lecturers who have the experiences in distance learning. We also tried to choose participants who are familiar with Instant Messaging as well as those who have less experience with IM to gather insights from different perspectives. A general interview guide (see Appendix A) has been developed to guide us throughout the interview session (Kvale 1996). Also, for each interviewee, we made a little oriented change about the interview questions based on the interview guide according to their experiences with IM.

As claimed by Kvale (1999), the openness and emotions are two unavoidable factors in interview studies, the interviews will be run under a comfortable and objective circumstance, followed by the seven stages of interview research (Kvale 1999). We raised the questions based on three dimensions, communication in e-learning, communication tools used in e-learning, and opinions about instant messaging. Also, during the interview, we were open to start an open discussion about related topics as an extension of our interview guide. Each interview took approximately 30 minutes and was conducted in interviewee's office. The quality of the interview is evaluated by the six quality criteria for an interview (Kvale 1999) both for the interviews and interviewers to validate the report. We started the interview by explaining our research purpose and asking inform of consent from the participants to record the interview and use their relevant personal information in our report. All interviews have been recorded by digital audio recorders, and after that been transcribed into a written text (see Appendix B) for later analysis and verification.

Questionnaires

On the other hand, most learners those taking the distance learning course are in different geography location, questionnaires are used as an alternative way for the gathering information from the learners. According to Murray (1999), the data from questionnaire can be converted into measures of the variable under investigation, and can be used to test the research questions or hypothesis. Therefore, based on our hypotheses we formulated the questionnaire guide (see Appendix C) for collecting data from the students who have experience in distance learning, followed the questionnaire design structure (Sinclair 1975).

We divided the questionnaire into three main parts, which are background information, using IM in e-learning, and the effectiveness of using IM in e-learning. At the beginning of each part, we explain our purpose of designing those questions to let the students get better understanding of our research objective. The questionnaire is used both for qualitative analysis to identify the IM using situation (see Chapter 1.3), and quantitative analysis to verify the hypotheses for supporting the research question two (see Chapter 1.3). Our subjects are the students mainly from the distance learning program that we have interviewed, and the questionnaire was distributed as on online survey with the help from the interviewees. The online survey was open for nine days before coming to the conclusion. Afterwards, we started to generate data from the results, restructured and loaded the data into SPSS for data analysis.

3.3 Data Analysis

Data Analysis in Qualitative Research

Data analysis in qualitative research consists of preparing and organizing the data for analysis, then reducing the data into themes through a process of coding and condensing the codes, and finally representing the data in figures, tables, or a discussion (Creswell 2007).

Data Analysis for interview

Specifically, the information gained from interview can be treated as narrative data. The data collected in a narrative study need to be analyzed for the story they have to tell, a chronology of unfolding events, and turning points or epiphanies (Creswell 2007). Once the record is transcribed into written text, we read through the text, made margin notes, form initial codes, then we identified the factors that the interviewees address in the data, organize the data into categories or clusters to make sure that all the useful information is classified. We mainly used the Three-dimensional space approach proposed by Clandinin & Connelly (2000, cited in Creswell 2007) which involved analyzing the data for three elements: *interaction*, which indicates the personal information of the instructors and learners, and social background of the interviewees; *continuity*, which indicates the development of the IM and communication technologies; *situation*, which explains the current usage of the IM in the distance learning program that we are studying. By using

this approach, we can retell the stories based on narrative elements, and rewrite the stories into a chronological sequence, and incorporating the setting of the participants' experiences (Creswell 2007).

Data Analysis of Quantitative Data

Quantitative data are analyzed by statistical methods. With the statistical results, the insights are provided to present the problem solution and decision-making (Anderson et al. 2009). Figures and graphs are presented to help describing the situation of IM used in distance learning (see 1.3, research question). Also, hypothesis testing is used to test the alternative hypothesis. Hypothesis testing is a statistical procedure that uses sample data to test whether a statement about the value of population parameter should or should not be rejected (Anderson et al. 2009).

During the analysis, two kinds of linear regression have been used to verify our hypotheses. One is simple linear regression, the other one is multiple linear regression. In order to prove the relationship between perceived usefulness of IM features and intentions to use the technology of IM features, simple linear regression is used. Multiple linear regression has been used to exam the connection between user's concentration and intention to use the technology, perceived usefulness and perceived ease of use. Further, we imported sample test to prove the positive relationship between IM features and other factors, such as PU, PEOU. Also, path analysis is used to evaluate the correlations among the factors.

3.4 Scientific Validity and Ethical Issues

Scientific Validity

For all the data sources, we affirmed the authenticity and reliability before we started to use. According to Creswell (2007), the credibility of the findings and interpretations can be ensured by the member checking before the inquiry process. Therefore, for the interview participants, we made sure that they are suitable for our cases and trustworthy to generate information from them before we wrote request letter to make the appointment.

Further, to decide what is salient to the study, relevant to the purpose of the study, and of interest for focus, the data collection is conducted by using the triangulation thinking. In triangulation, researchers make use of multiple and different sources, methods, investigator, and theories to provide corroborating evidence (Ely et al. 1991). We used both interviews and questionnaires to collect data from both teachers and students from different distance learning program and courses.

All the theoretical method and conceptions are supported by providing literature reviews which are cited from formal scientific resources. Peer review or debriefing provides an external check of the research process (Creswell 2007). Hypothesis that we made during the research were proved by valid quantitative methods. During the data analysis, we

managed to be faithful to the original data, eliminate all outliers and exceptions, and avoid bias and human error.

Besides, external audits allow an external consultant, the auditor, to examine both the process and the product of the account, assessing their accuracy (Creswell 2007). Thus, to validate the accuracy of the research and insure that the whole research work is in the right way, we asked the supervisor to evaluate our work in every phase.

Ethical Issues

Ethics is another issue which will be running through the whole research process. Since our research topic is not relevant to human beings, society or medical, biomedical area, the ethical issue would be easier to control. Nevertheless, we managed to guard against any possible ethical problems that might occur during our research process.

Beauchamp & Childress (1994, p.4) as cited in Israel & Hay (2006) present the word of Ethics as "a generic term for various ways of understanding and examining the moral life" or it can say that it is related to the perspectives on right and proper conduct. The following are the ethical topics we mainly focus for our research.

Informed consent - most ethical research guideline require all participants to agree to research before it commences. If the participant did not understand the objective or the process of the research, it can lead to meet many of problems between researcher and participants. Israel & Hay (2006) present that consent should be both informed and voluntary. For our research, we always informed our interviewees and questionnaire participants about our study such as objective, the main purpose, etc. Before each interview, the appointments were made by emails to ask the interviewees' opinions about our research topics and their permissions to conduct a relevant interview. For questionnaire, the participants have the right to refuse to answer our questionnaire any time.

Confidentiality - The participants should consent that the information obtained about them will be used only by the researchers and only in particular ways. Israel & Hay (2006) concluded that every research participant may be want to be offered or even warrant receiving assurances of confidentiality. Therefore, it is crucial to respect the privacy and autonomy of participants. At the end of each interview, we inquired for the agreement to record their personal information, such as names, working place in our thesis.

Furthermore, in order to maintain the research integrity, we also aware of that anything may cause research misconduct, such as fabrication, falsification and plagiarism, should be resolutely rejected. Guidelines for neutralize the accusation of research misconduct and authorship (Israel & Hay, 2006) was followed when encountering relevant problems.

3.5 Summary of method of investigation

In table 3-1 show the summary of the method of investigation related to the research questions and hypotheses.

Table 3-1: summary of method investigation

Methodologies	***Research Questions***	
	IM Usage situation in distance learning	*Effect of IM features on distance learning*
Interview Guide	*How the teachers communicate with students and how students communicate with each other* *Whether there are some tools for communication in their distance learning system* *IM have been used in distance learning system or not, why* *What are the missing features of IM*	*Which communication tools in you opinion is the most efficient one* *IM can improve or solve the existing problem or not* *Which IM features are useful and which are missing in your opinion* *Which IM features can help most in improving the efficiency* *What are the IM features that should be improved*
Questionnaire	*The background information about the user, for example age and previous experience of distance learning* *The most popular choice of IM in daily life and distance learning* *Users' favourite IM feature and which features are missed* *The reasons for not interested and not interested in using IM* *Whether satisfy with the current communication distance learning*	*Users' opinions about how different IM features can help them more concentrate, improve the efficiency and enhance the communication during the distance leaning process* *Which IM features the users want to include in distance learning system* *Which IM features in the users' opinion is useful in distance learning system* *What aspects are improved by introducing IM in distance learning*
Hypothesis	-	*H1, H2: PU and PEOU related to intentions of use* *H3,H4: IM features related to PU and PEOU* *H5: IM features related to concentration* *H6: Concentration related to intention to use* *H7: Intention to use related to efficiency*

4. Empirical Findings

In this section we present our empirical results from the interviews and questionnaire.

4.1 Interviews

There are five interviews for this study. All of them are the university lecturers in Sweden. They have a lot of teaching experience in distance learning courses in several fields like Business, Education, and Technology. (see interview transcription from Appendix B)

4.1.1 Interview one – GIS, Lund University

Description

One of the English master programs at Lund University called LUMA GIS is totally based on Internet. We went to GIS centre and asked for an interview opportunity with Petter Pilesjö, who is the director of the GIS Centre (Geographical Information Systems), Lund University. He has an over 20 years teaching and research experience at both international and domestic level. The interview was conducted a few days later in his office at GIS centre.

Interview Analysis

We started the interview by explaining our purpose of research and asking for audio record permission. The interview with Petter Pilesjö provided us deeper understanding about the communication in distance learning. His views are very valuable for our study.

At first, he provided us with some background information about the program. LUMA GIS is an international master program which has more than 1500 registered students. All the courses in the program are completely Internet based. When we asked his opinion about the role of communication in distance learning, he suggested, communication was extremely important in distance learning, teachers and students need communicating with each other throughout the whole learning process. Students could ask questions and teachers could answer them and also give feedback on exercises.

We asked what the communication problem in distance learning was, Petter replayed that the main problem was that the students were in different locations and they did not feel like in a group:

> *"...It is not like class where you have classmates, that we call it, the learning community. In e-learning, they are not a part of a learning community automatically. If you are in a classroom, you are automatically in a learning community... if you are doing e-learning, you are spread out...to increase the feeling of being a member of a group, we have to make it easy for students to communicate with each other..."*

He explained that one of the problems was time zone. For example, some students were awake while the teachers in other places were still sleeping. However, this might not be an issue because this program had many students from all over the world. Those students who were in the same time zone or the area which was not too far away, they can communicate. While for some other small program, it might be a problem.

Petter mentioned that technology was also a problem. The program had registered students from both developed countries and developing countries, sometimes students might have some technical problems when communicate each other.

Petter also explained the way of communication between teacher and student. Email was the first choice for a lot of teachers. As for email, time is flexible. Teachers can write email when they were free. SKYPE and phone were other tools that they used to communicate. Petter said this program provided e-mail and forum for students to communicate and he also planed to develop the virtual community like Second life in this program, so that participants could talk to each other and even share the computer screen.

We continued to ask him which communication tools he thought was the most efficiency, he replied:

> *"E-mail, at least for us as a teacher, because I am a busy man, it's very difficult for me, if there are a thousand students or a hundred students, and they all want to see you or meet you on second life or something, I don't have time. So, this is impossible for me. I have limit time, so I have to be efficient, and it's much more efficient to answer e-mails for me than being using SKYPE…"*

Petter mentioned that Instant Messaging was very useful in distance learning as they used SKYPE as one of communication tools in this program. Students can Chat or Talk via SKYPE when they had some specific problem to discuss. We added the question about whether Instant Messaging could solve the communication problem in distance learning or not. He agreed that IM had this ability. The important thing he suggested was that teachers should give students alternative choices for choosing any kind of tool to communicate because all students were from different cultures and religions.

We discussed with Petter about study in distance learning might make students feel separate or lonely and we asked him whether he think Instant Messaging can solve the problem or not as IM had some features like video conference, voice conference and so on. He relayed that:

> *"Maybe not solve it, but it can make thing better. So I think … "yes" definitely it can make student feel more like, learning community, community study group. But still we have to keep in mind that all the students, they don't have those possibility. If you are student from Uganda and you are going to Internet café, maybe no camera, maybe the Internet connection too weak for voice messaging…"*

Petter was asked which Instant Messaging feature that he thought can improve the efficiency in communication. He thought that all of the features were good, but in his opinion written messaging was the most efficiency as one could always look back and read the records:

We also asked him about the satisfaction of SKYPE as the program use it for communicating. He thought it is really good but since SKYPE is originally not developed for distance education, some features are useful but some are not.

Petter mentioned many times during the interview that he thought all technology and communication tools are good but this depends on the person and available sources for each person. To give students a choice for choosing the technology which they can use and make the communication better is the most important.

4.1.2 Interview two – Internet MBA, BTH

Description
We met Mr. Anders Hederstierna, the Pro Dean of Blekinge Institute of Technology, at his office in BTH. Anders had just left the Internet MBA program as the program director a couple of days before we had this interview, however, as he said, he was still clear about everything in the program. After we explained our purpose of doing this interview, Anders gave us some background information about the program and the participants, including students and tutors. Then we started to talk about his experience within this course and his viewpoint about current situation of communication in e-learning.

Interview Analysis
The interview provided us some insights about communications in e-learning, current e-learning system, and instant messaging used in e-learning system and process. We started the interview by asking the number of students and instructors of the program. According to Anders, this is not a huge program, which has a total of 250 students, divided equally between the part-time and full-time students, and there are more than 20 teachers in the program.

After that, we asked his opinion about the role of communication in e-learning, he replied:

> *"It's vital. I realize that the students assess the quality that how quick and how qualified the communication or responses from the teachers .So it's a quality factor for the students."*

He also mentioned that for the students, their original idea was to have a many-to-many mass-collaborated learning in the program, in which the students could not only learn from the teachers, but also learn from other students. For the quality aspects of the communication, he stated that:

> *"Synchronous communication is important for the quality of this mass-collaborated learning, and more asynchronous communications like forum and e-mails, is better for reflective learning."*

In response to our question about the communication problems in e-learning, he told us that one of the problems was that it was difficult to find a time for all the students online at the same time to communicate with each other. The program had students from all over the world, so that they had different time zone and their own business that was why it was difficult to have a quick communication between the teachers and students. Another problem he mentioned was that the students think that it's only the teacher who knows something, so the network became one to one communication instead of many-to- many communications, because the students didn't trust each other.

As the distance learning programs usually have the students from different geographical locations, those who therefore may be in different time zones. Furthermore, the flexibility of the program allows the students to arrange their studies by their own preference. All these factors are blocking the successful of the idea of mass-collaborated communication in e-learning.

In continuation we asked about the communication tools that used in the e-learning system. When we asked how the teachers communicate with students and students communicate with each other, he told us that they were using a Learning Management System (LMS) called "IT"S LEARNING", which had an internal message service within the system. Teachers usually communicated with students by using this LMS, and then he talked about the communications between the students:

> *"We suggest the students that if they want to have visual course, they want to talk, they can use other products, like SKYPE,MSN, because they are more used to them, and more professional."*

He also mentioned that they had a video conference system, Maratech, which was developed by university of Luleå, and he thought it was very easy to use. He added that SKYPE was easier, but SKYPE was limited in this video conference function"

When we asked him to name the most efficient one he thought out of all these communication tools they used in the e-learning system, he addressed that it should depends on what was the needs. If people wanted to have more reflective answers, he thought email was the most efficient one. In his opinion forum was also an efficient tool as it was fit for longer discussion. But if students wanted to have quick answers, he thought video was the best, because it had some eye contact with the process.

In talking about whether the students were satisfied with the communication with current LMS, and Anders told us that for the tools for sharing information he thought students were satisfied, but not for communication. He continued with the reason that why student were not satisfied with the communication:

> *"First, there is no video function in the system. Second, students sent information to the teacher (through the LMS), but teacher didn't check, (they were) expecting questions sent to emails, which cause the delay the communication. Third, studying progress is slower than normal lecture based process; students do lots of self-studying themselves. However, they are not satisfied with the intensity of the communication."*

It represents that the current LMS they are using is working without any problem in giving lecture and sharing information, but when it comes to communication, the insufficient of the instant feedback applications affects the quality of the communication.

As they were demanding this instant communication in the e-learning process, further, Anders provided us some insights about the instant messaging used in e-learning. He introduced one example about them using the instant messaging before in their program, which was the online exam. They thought video image could help teachers identify the student's status during the exam.

In discussion about whether IM could improve the communication in e-learning, he seemed not having the faith to it. In his opinion IM might solve the communication problems, but there should be specific space where the teachers sit together to make it a more fun job for them. While now teacher tend not to be online much one reason was that it was becoming too boring since there were thousands of questions every time they login.

As he described, instant messaging had not been widely used in current e-learning systems. Even though the e-learning process demanded the instant communication applications, the exertion of the IM still had its flaws to fulfil the requirements of the communication in e-learning.

Anders also pointed out that he thought the video application was the most efficient feature among all the features of IM as the main problem with long-distance education was the loss of eye contact or face contact. He thought video could improve the communication enormously and it was vital for the students' perception of quality.

He provided us his thoughts about the IM features that would fit the e-learning system:

> *"It's important to see who's online. One probably doesn't want to send a message to a person who's not online…it's not a new feature, but in some system, it doesn't exist."*

He also suggested another combination of the e-learning system with mobile because he thought nowadays people had better access to mobiles than to the Internet. SMS might help reach more students. But he hadn't seen this application anywhere yet.

At the end, Anders proposed some application that should be improved in the future, such as video message and message categorization for dealing with messages. He suggested

that in the future, a video message should be tailored for the e-learning system because sometimes it's difficult to explain the question in short message but easier to ask in video.

He continued:

> *"One possible solution is to (have an application to) categorize the messages…so to have some kind of structures (question template) of the messages to make them clearer."*

4.1.3 Interview three – Young MBA, Learning Lund, Lund University

Description

We were suggested to visit Birgitta Nordén, who was the head of Educational Development, and also running the Young Master Program (YMP). YMP is an online learning program started by IIIEE (the International Institute for Industrial Environmental Economics), which was established by the Swedish Parliament in 1994 at Lund University. The program has already been founded for about 10 years. So far, there are no less than 10,000 students take part in the program, who are mainly secondary school students from all over the world. Also, the number of the teachers is considerable, which is around 300 to 500 in total. Basically, all the courses are schooling through the Internet, besides, there is also a face to face convention every second year. Therefore, the YMP is considered as a half distance educated program. All the teaching and learning processes are carrying through by communicating with teachers in Lund University. At the mean time, there are also some mentor teachers locally for supervising.

Interview Analysis

After explaining our research purpose and asking her permission to record, we started by asking her opinion about the role of communication in e-learning. She told us she believed that to have a good quality communication was essential to e-learning because the course content and feedbacks from knowledge and information were important to communicate about.

As been in the program for several years, Birgitta also sees some communication problems in distance learning. When we talked about this, she stated:

> "*It can easily be a lot of communication problems, because some of the participants may consider that they are alone and don't experience that they are a team working together online, and there could be a lot of communication problems because there are language skills and also time zones problem* "

In discussion about how's the communication going on within the participants, she explained that the students usually had their courses and discuss their assignments using the global classroom online. When the students needed to do group work, they often used forum or online chatting within the learning platform to communicate with each other. But there were also other communication tools been used. She mentioned that sometimes students said that they contact with each other by using MSN, phone call, SMS and so on.

As we showed our interests in that which was the most efficient communication tool in her mind, she suggested that it depended on the purpose of the communication. If it was just a quick exchange of information, instance messaging perhaps was the best choice. On the other hand, if we wanted to present something, video conference and web camera were needed.

She also mentioned that though they had provided communication tools like LMS and forums, and most students were satisfied with the current system, however, the students were encouraged to be innovative to choose their favourite tools to use by themselves, such as instance messaging, web cameras and so on.

Then we asked whether they were using Instant Messaging as the medium in their distance learning program. She said that there was a quick message function in LUVIT system, and she thought it was easy to use and she used it often. They also had the voice speaking application in the system. But the problem was when they had more and more participants, it was really hard for the teachers to use it. She explained:

> "*When we have about 1000 to 2000 participants, then there is a little bit limitation. Because if I go into a course as a teacher, I might have some tasks that I need to do, so that I would rather like to be invisible.*"

They were also planning to start to place the video function in the community since two year ago. In conclusion she said that she thought it was good to use it sometimes, but it depended on how much time you have to be in contact.

According to Birgitta, the teacher in this program preferred to use instant text messaging other than advanced functions such as audio and video conference partly because of the shortage of the resources, which also made it difficult for them to have every individual contacts with all the students.

As she said earlier she thought there were some communication problems in distance learning. Then we asked her whether she thought IM can improve or solve existing communication problems in online learning. She stated that IM could help if they were building the learning activity on one to one communication as IM can be used quickly and directly.

In talking about the missing features of IM in her opinion, she told us that she believed that IM was really good to be developed, but if the program could provide some introduction about how to use IM, and all the features of IM, that would be even better.

Since their program has touched only lightly on the Instant Messaging, on the other hand, it shows that they have this instant communication demand in the learning process, so at last we asked her about their future plans for considering IM in e-learning, she replied:

> "*Yes, we are going to take a further step, but we have to focus on other things, because we have a big volume for the moment.*"

4.1.4 Interview four – The department of Education, Lund University

Description
Viveka Jerndorf is a teacher at the Department of Education (Pedagogiska Institutionen), Lund University. Her name was given to us by The Students' Union of Social Science. She is running two distance courses and there are around 25-30 active students in each courses. Also, she wasn't in charge of these online courses until recently, so as she introduced herself, she was totally new to the distance education area. We contacted her for an interview opportunity by e-mail, including our purpose description in the message. We met Viveka Jerndorf at her office in Department of Education after we made an appointment with her. We introduced ourselves and explained our purpose and research questions to her.

Interview analysis
The interview with Viveka Jerndorf provided us with very useful information for communication in distance learning. She told a lot of problems that occurred in online education. These courses do not provide many Instant Messaging applications as communication tools, but there is a certain Chat feature in the learning platform which they are using in these courses.

We asked her opinion about the role of communication in distance learning. She thought that role of communication was obviously paramount.

> *"I mean all you have is basic communication."* and she continued:
>
> *"…my plan was to expand by using audio, video, Skype or some source of video program because the learning management system that we use, allow for that. But since I was completely new to e-learning when I started…I have been doing is basically communicating to written communication and usually not instant messaging."*

Further, we proposed the question about how she ran for these courses, since she didn't get use to the platform. According to Viveka, she was running these courses on a basic level by using the forums to initiate information and knowledge. She said she used a lot of group discussions and forums. We asked her what kind of forum that she used. She told us, the forum was like other Internet forums. Student and teacher could start discussion, post and commented to each other. This forum was embedded in the platform call LUVIT that the teacher could create different things in that course such as forum, chat room, and divided student into groups. Teachers could decide what they want in LUVIT system.

We then asked whether the students were using other kind of communication applications besides the forums. She told us that some groups use forums but she also gave them the opportunity to be innovative, such as using Chat room in LUVIT. It was depended on the students themselves. And some students also used other applications like Skype, E-mail,

MSN and so on. She also said that one group use some video conference technology which was outside LUVIT.

After that, she described more about the problems when using Chat room or Instant Messaging. IM is a synchronous communication that requires both participants should be online at the same time, while it was become unmanageable when the number of participants was grow up.

We continued with the question of communication problem in distance learning. She immediately replied that she had lots of problems in distance learning. First, teachers were used to teaching in a traditional classroom, where the student sat in front of the teacher and learning. In that way teacher could get instant message from student whenever they didn't understand. But in the distance learning, it was different:

> *"...Here is always delay and it takes a while actually to learn as a teacher how you need to express yourself to make sure that the students actually know what you mean and you never know at which point everybody has taken part of what you trying to say..."*

On the other hand, from the students' perspective, they sometimes easier to misunderstand each other in written test than campus course. This was one reason that she preferred to use video conference as a communication in distance learning.

Another problem she mentioned as is that she don't like to let her students wait for the answer that they need. So she tend to be online eighteen hours a day, but sometimes it is really hard for her.

We have been interested to know about what kind of communication tools that she thought is the most efficiency. She explained it depends on what is the way of the assignment built. For hers she thought it is the forum while she added that but that doesn't mean forum is better than anything else.

However, Viveka thought that it depended on what you were trying to achieve, she continued:

> *"...to have some source of video conference system to discuss full instant to have two groups in a seminar and that would be impossible in a forum that you need another type of technology, so it's difficult to say which is more effective..."*

In discussion about the student's satisfaction on the current using learning platform in her courses, we got an affirmative answer from her. As it was a part-time course, most students did not like to have to be online at certain time as they also had to work.

When we were talking about the Instant Messaging, Viveka showed a great interest in MSN, which was not only the communication tool that she used most often, but also the one she was expecting to use in her courses. She believed the interaction between

students was very important in distance learning. She did not want her students be separated or feeling alone when studying her courses. As she said:

> *"…I would like to create more between the student to make sure that all students actually have contact with other students because I believe that the important an education, some many people in course distance … get of isolated with the course work. It's not a good thing, you need input from other, you need other take on different part of the course lecture and so on."*

We also discussed with her about the feature of Instant Messaging as there were many features that useful for distance learning and which one she thought was most efficiency. She mentioned that this was depended on what you want to achieve as she had said before.

Viveka had mentioned that she preferred to answer her students quickly. We added one question about whether Instant Messaging could solve this problem or not. She thought IM could help for this situation but there were some limitations and accessible, for example, the period of time to be online to communicate with them.

> *"It depends…you could end up with the situation when you actually begin expected to be online all the time accessible all the time with obviously you can never be because I mean I have another courses to teach while need to do other thing. On the other hand, if you use widely you could say that …Ok I will be on the Chat room from nine to ten on Monday, Wednesday, and Friday.... if you have questions, log in and ask them that would be a smart way…I think you need to be very clear on the limitation on accessibility…"*

Finally, we discussed about using Instant Messaging like MSN in distance learning as it was the only one that Viveka familiar with. She thought MSN was very practical, many people used it, free and easy to use. We had talked about if MSN provided some more features like one to many video conference (many people participate in different location in the same time), she suggested that this function would be useful in e-learning:

"…yes I think so, I am really think so, particularly and in distance courses where have no physical meeting at all or many organization today for their on the job training, the global organization they need to have a lot of people from around of the world to participate in the same program and of course that would make sense to have some source of video conferencing system build in obviously."

4.1.5 Interview five – Lecturer at Malmö University

Description

We met Mr. Farid Naisan from Malmö University. Farid has been in Malmö University as a full time lecturer since 2001. He started his distance course around 2002. His experiences in distance education impressed us a lot, and therefore we decided to have

him as our interviewee for our research. The interview was conducted in Farid's office in Malmö.

Interview Analysis

After introducing ourselves and our purpose for this interview, we started by asking about his thought on the role of communication in e-learning. He said it was a must as for teachers, they may have no chance to see the students so that there must be a way to communicate with them.

Then he described some communication problems he had in the education process. According to him, one of the most important issues was the network. He stated that there should be some ways for communication, e.g. forums and mail. But if the network didn't work or system service was down, all these ways could not be relized.

In talking about the communication tunnels between the teachers and students, he introduced us their educational platform, IT'S LEARNING. He said that teachers usually communicate with students through this platform, e.g. answering questions, handing out assignments. Also, the students could publish their assignments on the platform. When we asked him to describe more detailed about this communication process, he explained it was a message inside the platform. The message was like a mail function; users could write a message and upload it. Usually he encouraged the students to put up their questions on the forum then he would also give personal or individual help through mail.

He provided us the information that besides the forums and mails, the students also had other alternatives to communicate with each other, like SKYPE and MSN. There were also similar chat functions in the "IT'S LEARNING", however, due to the functionality limit that the students could not use it unless the teachers were online, so this was not working very well.

Farid expressed a general satisfaction about the performance of the course. On the other hand, he also pointed out the disadvantage of the system. Although their courses were running well with the current platform, the shortage of the functionality was shown when it came to certain needs, like the requirement of instant feedbacks, direct communications, etc.

After that, we were in a detailed discussion about the communication tools that used to assist the learning process. The platforms, emails were the basic things that they use to communicate, and further sometimes also the telephone, the students just call each other.

In discussion about the efficiency of these tools, he stated:

> *"The most efficient one is of course the communication tools inside of the platform, which is the forum. And also mails are working well, but I cannot say they are the best ones, because I do wish to have better ones."*

He explained that forums were available for everyone participating in, and they were easy for sharing information, proposing threads for discussions. Students in the course were satisfied with the platform. However, even if the forums were very effective, not all the students would be active there, which would be a problem for the quality of the mass-collaborated communication.

In continue, we asked his opinions about instant messaging used in e-learning. First, we explained the current IM features that were or would be available for the e-learning system. Then we proceeded our question by asking whether they were using IM in their courses, he stated:

> *"Not really…I tried it once, but I have not been used these application successfully…it did not work very well. So I don't think this is the thing that works right now, but on the other hand, it should be a good application."*

When we asked him if he was going to adopt IM as a medium in the program in future, he replied that right now they didn't have this plan because it was not very practical for large number of students.

Furthermore, Farid had pointed out the most important IM feature in his mind:

> *"I think it should be audio and video, especially audio, so that we could talk and instead of just reading and writing. Audio feature will be very nice and maybe also video, because it would be very nice to see the students face to face."*

As a result, we asked him which features he would like to have in the system and he replied that he thought it was audio, text messaging and then video.

At the end, he gave his overall opinion about the IM, which also provided us an insight about new application for the future IM in e-learning:

> *"I think IM should work for groups of students, it must be able to work for a large number of students…Also maybe it should have some features to provide for group work…students can talk to each other but also can work at the same time without causing any inconvenience in communication and the network…We should have something like a project room that is like a chat room"*

4.2 Questionnaire result

In this section, we present our findings from the questionnaire feedbacks. SPSS is used as analysis tools for the study.

Quantitative data

Table 4-1 shows the descriptive information of the participants. Most of our subjects are between 16 and 35, and at least have got a bachelor's degree. Over half of them are just experiencing their first distance learning program. The results also show that MSN has been used widely in the e-learning process, and embedded IM tools have accounted for a large proportion as well. Moreover, there are a few participants mentioned about using Google talk in e-learning.

According to the result (see Appendix D), over 80% of the subjects rated IM as important and very important in communication in e-learning process. Of all the IM features we proposed, instant message and chat/chat room are the most popular two, which got 29.3% and 21.6% votes respectively while discussing about which features they prefer during studying, and followed by video conference and VOIP, got 16.4% and 12.1% votes. Further, together there were nearly 40% of the subjects claimed that the features of video conference and VOIP were not exist in their current learning system.

Table 4-1: Descriptive information of the sample

	Option	***Our sample***	
		Count	*Percentage (%)*
Age	*16-25*	*26*	*57.8*
	26-35	*18*	*40.0*
	36-45	*1*	*2.2*
Gender	*Male*	*24*	*53.3*
	Female	*21*	*46.7*
Education	*Bachelor*	*25*	*55.6*
	Master	*17*	*37.8*
	PhD	*3*	*6.7*
Experience in e-learning (/programs)	*One*	*28*	*62.2*
	Two	*7*	*15.6*
	Three	*7*	*15.6*
	More than three	*3*	*6.6*
IM used in e-learning system	*MSN*	*18*	*31.0*
	SKYPE	*10*	*17.2*
	Yahoo messenger	*1*	*1.7*
	QQ	*10*	*17.2*
	Embedded	*16*	*27.9*
	Other	*3*	*5.2*

Table 4-2: Interested/Not interested in using IM

Not interested in using IM				***Interested in using IM***		
Option	*Count*	*Percentage*		*Option*	*Count*	*Percentage*
Difficult to use	*3*	*4.5*		*Easy to use*	*26*	*23.9*
Lack of experience	*7*	*10.6*		*Have experience before*	*15*	*13.8*
Easy to misunderstand	*11*	*16.7*		*Reduce confusion*	*10*	*9.2*
Time zone difference	*25*	*37.9*		*Make communication efficient*	*14*	*12.8*
Busy and prefer to use others	*16*	*24.2*		*Easier to communicate than others*	*12*	*11.0*
Other	*4*	*6.1*		*Other*	*5*	*4.6*

We present the reasons that why students are interested/NOT interested in using IM in e-learning in table 4-2. The biggest problem for preventing the IM usage is the time zone problem, followed by another problem concerning with time, which says that the users are too busy to be involve in an instant communication. On the other hand, nearly a quarter of the participants showed their interest in using IM because they thought IM is easy to use. The results also indicated there were other positive reasons for supporting using IM in e-learning, e.g. they thought that IM can make communication efficient, and they had no difficulty in using IM in e-learning because they had such experience before, etc.

From the feedbacks of discussing satisfaction in using IM (see Appendix D), we acknowledged that over 65% were satisfied with using IM in e-learning process. As one of them addressed:

> *"I think IM reduces the sense of isolation among students. Besides, this is a channel that most students are familiar with; they don't need to learn new technology in order to communicate with their colleagues."*

However, there a still more than 30% of participants believed that their experiences of using IM in e-learning are not content enough.

Table 4-3: The communication in e-learning are improved by the use of Instant Messaging

	Strongly Disagree		*Disagree*		*Neutral*		*Agree*		*Strongly Agree*	
	Count	*Percentage*	*Count*	*Percentage*	*Count*	*Percentage*	*Count*	*Percentage*	*Count*	*Percentage*
Better understanding with the lecture of the teachers					*14*	*32.6%*	*19*	*44.2%*	*10*	*23.3%*
Better understanding with classmates when discuss	*1*	*2.3%*			*2*	*4.5%*	*25*	*56.8%*	*16*	*36.4%*
Saving time when doing the group work	*1*	*2.3%*			*5*	*11.4%*	*20*	*45.5%*	*18*	*40.9%*
Saving time when discuss with teacher/classmate			*2*	*4.5%*	*6*	*13.6%*	*21*	*37.7%*	*15*	*34.1%*
Better concentrate when the teacher is doing the lecture			*4*	*9.3%*	*17*	*39.5%*	*13*	*30.2%*	*9*	*20.9%*
Better concentrate when have group discussion with classmates			*2*	*4.5%*	*11*	*25.0%*	*21*	*47.7%*	*10*	*22.7%*
Not feel been separated, has the feeling of real classroom			*7*	*15.9%*	*17*	*38.6%*	*12*	*27.3%*	*8*	*18.2%*

The figures in table 4-3 illustrated that there were significant support for the statement that IM leads to better understanding in the learning process, IM can save working time, as well as for IM can help to concentrate on the work. When in discussion about whether IM can change the feeling of the participants while doing the distance learning, there shows a balanced opinion. Half of the students believed that using IM made them feel like learning in a real classroom, while others claimed they didn't have the same feelings for that.

Hypotheses

We present our findings related to hypotheses 3, 4 in Table 4-4 and Table 4-5. All IM features been considered as certain type of technology, have the influence on the perceived usefulness and perceived easy to use. These factors are analyzed by the one sample T test. Table 4-4 and 4-5 show that with the confidence level of 95%, all sample mean are greater than 3, which is the measurement of the positive related. The p-values are smaller than 0.05 and both the value of lower limit and upper limit are positive. We can conclude that all the four IM features are positive related to the perceived usefulness and perceived easy to use. Therefore, hypothesis 3 and hypothesis 4 are supported.

Table 4-4: Sample Population Demographics (PU)

Demographics	*Mean*	*Std. Deviation*	*Test Value=3*		
				95% Confidence Interval of the Difference	
			p-value (2-tailed)	*Lower*	*Upper*
Useful_IM	*4.59*	*.913*	*.000*	*.74*	*1.3*
Useful_VOIP	*3.98*	*.841*	*.000*	*.63*	*1.14*
Useful_VC	*3.89*	*.799*	*.000*	*.82*	*1.32*
Useful_File	*4.13*	*.727*	*.000*	*1.05*	*1.49*

Table 4-5: Sample Population Demographics (PEOU)

Demographics	*Mean*	*Std. Deviation*	*Test Value=3*		
				95% Confidence Interval of the Difference	
			p-value (2-tailed)	*Lower*	*Upper*
Easy to use IM	*4.59*	*.658*	*.000*	*1.39*	*1.79*
Easy to use VOIP	*3.98*	*.762*	*.000*	*.75*	*1.21*
Easy to use VC	*3.89*	*.945*	*.000*	*.60*	*1.17*
Easy to use File	*4.13*	*.757*	*.000*	*.91*	*1.36*

We ran another one sample T test to verify the relationship of IM features and concentration levels, which is link to our hypothesis 5. The result is shown in Table 4-6. According to the media richness theory (Daft, Lengel and Trevino 1987), the levels of media richness was defined as from the higher level to lower level of richness, which are face to face, telephone, written, addressed document and unaddressed documents. Associate with the IM features, the four IM features we addressed can be ordered following by the richness levels: Video Conference, VOIP, Instant Message, and File Transfer. The results showed that the four features are all positive related to the user concentration (p-value < 0.05). Compare the mean value of each features, we can see that the actual order from the result is VC, VOIP, File Transfer, and Instant Message, which means that hypothesis 5 is partially supported. File Transfer has a higher level compare to Instant Message.

Table 4-6: Sample Population Demographics (Concentration)

Demographics	*Mean*	*Std. Deviation*	*Test Value=3*		
				95% Confidence Interval of the Difference	
			p-value (2-tailed)	*Lower*	*Upper*
Concentrate more when using IM	*3.378*	*0.860*	*.000*	*3.12*	*3.64*
Concentrate more when using VOIP	*4.068*	*.759*	*.000*	*3.84*	*4.30*
Concentrate more when using VC	*4.273*	*.845*	*.000*	*4.02*	*4.53*
Concentrate more when using FT	*4.022*	*.783*	*.000*	*3.79*	*4.26*

We report separate analysis for the four different features. The results for the data are shown in figure 4-1, 4-2, 4-3 and 4-4. We only present the significant paths. R square value indicated the goodness of the regression model, p-value decided whether the hypothesis is supported or not, and beta values to describe the coefficient.

For the feature of Instant Message, as shown in figure 4-1, Multiple Linear Regression is used to test the hypothesis H1a, H2a and H6. Based on our analysis of the data, perceived easy to use, perceived usefulness are positive related to the intention to use, H1a, H2a and H6 were supported. In addition, perceived usefulness, perceived easy to use, and concentration levels are positive related to intention to use the technology (p-value <0.05). As hypothesized, the efficiency of the communication is associated with intention to use the technology, with the p-value <0.05, H7 was supported, although R square value was .294, suggesting that factors not included in this model might be more important in explaining the variance for communication efficiency

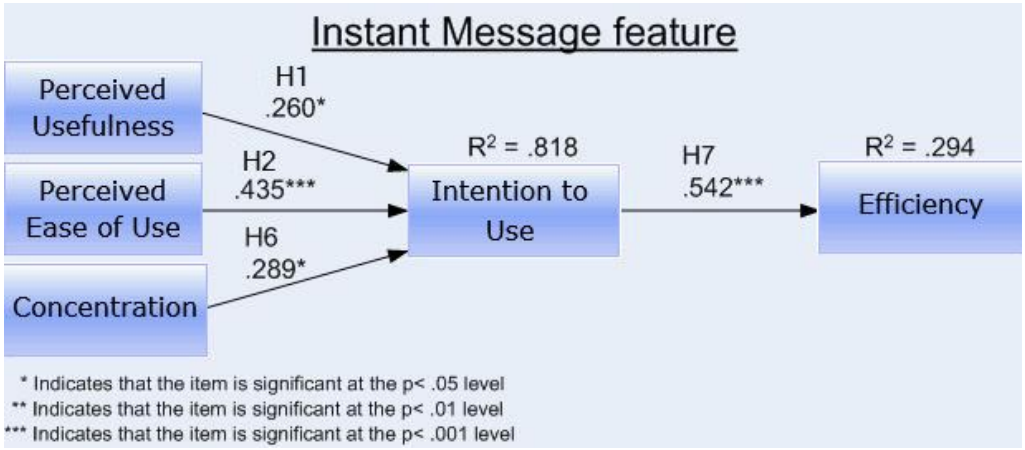


Figure 4-1: path analysis for Instant Message

By the same token, we can get results from Figure 4-2, 4-3 and 4-4, which were explaining data paths for features of VOIP, VC and File Transfer respectively. As the data shown in the figures, H1b, H1c, H2b, H2c ware supported. On the other hand, according to the result, perceived easy to use and perceived usefulness were not related to the intention to use the File Transfer, H1d and H2d were not supported.

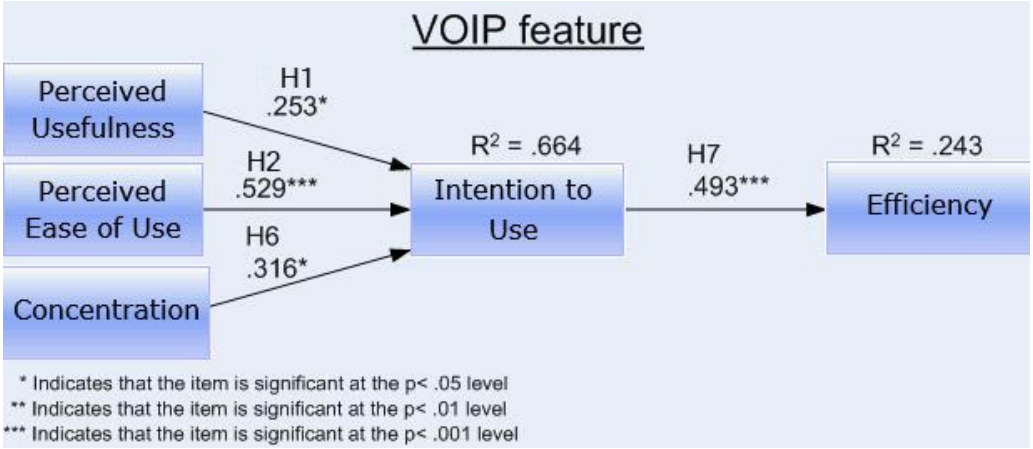


Figure 4-2: path analysis for VOIP

Furthermore, H6 was supported with all three features. However, the hypothesis that intention to use is positive related to communication efficiency was partially supported (H7). H7 was supported both in model for VOIP and File Transfer, but surprisingly was not supported in the model for VC, with the p-value greater than 0.05.

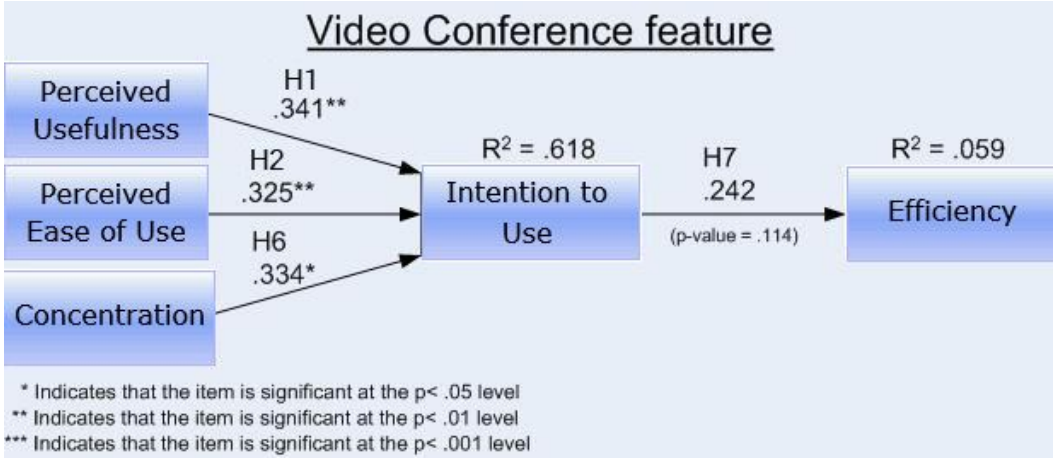


Figure 4-3: path analysis for Video Conference

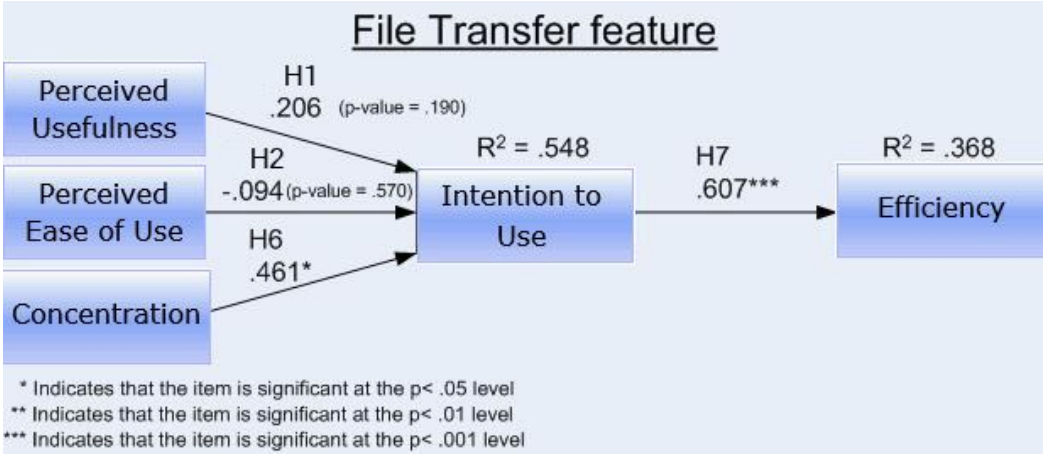


Figure 4-4: path analysis for File Transfer

The results of the hypotheses are listed in table 4-7

Table 4-7: Hypotheses result

Hypotheses Result		
H1a	*Perceived usefulness is positive related to the intentions to use Instant Message*	*Supported*
H1b	*Perceived usefulness is positive related to the intentions to use VOIP*	*Supported*
H1c	*Perceived usefulness is positive related to the intentions to use VC*	*Supported*
H1d	*Perceived usefulness is positive related to the intentions to use File Transfer*	*Not Supported*
H2a	*Perceived ease of use is positive related to the intentions to use Instant Message*	*Supported*
H2b	*Perceived ease of use is positive related to the intentions to use VOIP*	*Supported*
H2c	*Perceived ease of use is positive related to the intentions to use VC*	*Supported*
H2d	*Perceived ease of use is positive related to the intentions to use File Transfer*	*Not Supported*
H3	*IM features are related to the perceived usefulness of technology.*	*Supported*
H4	*IM features are related to the perceived easy to use of technology.*	*Supported*
H5	*IM features are related to the user's concentration levels.*	*Partially Supported*
H6	*Concentration level is positive associated with intention to use the technology*	*Supported*
H7	*Intention to use the technology is positive related to the efficiency of communication*	*Partially Supported*

The summary of empirical result is present in Table 4-8.

Table 4-8: Empirical result summary

Effect of IM in Distance Learning	*Empirical Result (Interview + Questionnaire)*
Communication problem in DL	• *Time Zone* • *Available Technology* • *Not feel like a group (lonely feeling)* • *Network problem* • *Delay answer* • *Misunderstand in written style rather than campus course*
Effective communication tools in DL	• *Email – For teacher who are very busy* • *Forum – Longer discussion, Everyone can participate* • *Instant Messaging – Quickly exchange information* • *Video Conference – Best for presentation*
Satisfied the current tools in DL	• *All satisfied* • *Student can choose alternative tools*
IM useful in DL	• *Know who are online/offline* • *Easy to use* • *Have experienced*
IM improve communication in DL	• *Quickly* • *Directly* • *Student feel more like learning community*
IM feature should be improve/add	• *Video Conference* • *Group work feature* • *Feature to categorize message*
IM problem	• *Online time (time zone)* • *Unmanageable when one online teacher with ton of online students*
Effective IM feature for DL	• *VOIP* • *File transfer* • *Instant Message*

5. Discussion

In this section, we discuss the results from both qualitative study and quantitative study. The discussion is divided into two parts related to our research. We first described the current status of communication in distance learning, and then based on our empirical findings we present the analysis for our research questions.

5.1 Communication in distance learning

5.1.1 Communication problem in distance learning

Communication is very important in distance learning. From the results of both questionnaire and interview, most online courses have the same big problem, which is the time zones (see 4.1.1, 4.1.2, and 4.1.3). One of the characteristics of distance education is that it can help the learners study in any place and at anytime (see 2.1), so that the students are able to study all over the world. Thus, it becomes even more difficult for students and teachers to meet online at the same time and have the synchronous communication with each other. One of our interviewees suggested that those students who were in the same or near time zone can work with each other, which required a large number of students in the same program. While another interviewee thought it might not solve the problem properly even with this type of group as some students only trust their teachers but not their classmates (see 4.2). It makes the online communication even more difficult than traditional campus study.

Another very common problem in distance education is the limitations in technology (see 4.1.1 and 4.1.5). The students who participate in the online courses are living in both developed countries and developing countries. The restriction of technologies can be the barrier for communication. According to Liu et al. (2009) (see 2.4) the level of media richness is affected the effectiveness of communication. Some students can not access to some advanced communication technologies like web camera or voice conference. Consequently, suitable communication tools depend on the available technology that the students can use to communicate and share information. Sometimes the students may have the problems in network connection, the server might be down when they are using the learning system. It has been considered as one important problem that would break the communication in distance learning. (Gibson, Hodgetts and Blackwell 1998)

The lack of language skills and lonely feeling are also problems in online learning. Since the students come from all over the world, they have different cultures and languages. By only using the text message may cause misunderstanding (see 4.1.4). Students often feel lonely and less responsible than normal campus classroom (see 4.1.1 and 4.1.3). In additional the lack of face to face interaction can also be a problem, Ataizi (2009) mentioned that teacher can know immediately if student feels bored or does not understand in the traditional class room (see 2.2).

5.1.2 Communication tools in distance learning

According to section 4.1, almost all of the interviewees agreed that there were no communication tools can satisfy all the needs of distance learning. The choice of using which tools depended on the user's purpose in the education process. For example, E-mail is an efficient communication tool when users are busy or need longer time to think (see 4.1.1). Forum is suitable for discussion that everyone can participate in (see 4.1.2 and 4.1.5). If the participants need instant feedback, IM is a suitable tool for quick exchange of information (see 4.1.3). For presentation, video and audio conferences are best choice (see 4.1.2, 4.1.3 and 4.1.4).

From the feedbacks of our interviews, almost all e-learning programs had their own e-learning systems, for example, LUVIT and IT'S LEARNING. According to our interviewees, the e-learning course owners were satisfied with their systems. However, the communication tools that embedded in their learning system cannot satisfy all their needs; for example, some systems do not have the function of video conference (see 4.1.2). Sometimes, people prefer to use other applications such as SKYPE or telephone to communicate with each other (see 4.1.1 and 4.1.5).

5.2 Instant Messaging in distance learning

Nowadays Instant Messaging has become very popular in the cyber space. Many distance programs use Instant Messaging, not only adopted the current free IM software in the market such as MSN, SKYPE, and Yahoo Messenger, they also developed some instant text feature in the e-learning platform such as IT'S LEARNING and LUVIT. As IM has many useful features, the teachers and students always use IM as one tool to communicate each other.

Bronstein & Newman (2006) mentioned that IM can promote and facilitate learning (see 2.1). From the result of our interview, all interviewees suggested that IM was very useful for distance learning, such as, user can know who were online or offline (see 4.1.2). This Presence awareness is one benefit of IM over other communication tools (Bronstein & Newman 2006). Most the survey participants agreed that they are interested to use IM as a communication tool in their course because IM was easy to use and most of them have had experience in using IM in their daily life (see 4.2).

On the other hand, IM can not solve all the problems, for instance, the time zones problem. According to the results of surveys and interviews, it was difficult to schedule for all the users in different time zones to be online at the same time. Another problem mentioned by some interviewees was that when there were a lot of students wanted to have private conversation with the teacher at the same time, it could be a problem (see 4.1). For example, it was extremely difficult for the teacher to answer all questions for 1,000 or 2,000 online students at the same time (see 4.1.3, 4.1.4 and 4.1.5).

Interestingly, some survey participants and interviewees preferred to use other communication tools rather than IM since they are always busy. IM is a real time

communication tool and it can make the communication in distance learning more efficiency (see 4.2) but the participants have to be always online if they want to be active. This was difficult for them to stay online all the time.

Although using IM cannot solve all problems in distance learning, IM has its unique attribute that can improve the efficiency of communication in distance learning. One characteristics of IM is synchronous, teachers and students can get quick response and send instant message to the target person (see 4.1.3). One of problems in distance education is that students are easily feeling separately and lonely compare to campus education. IM can not really solve this problem but it can help to make students feel better (see 4.1.1). IM has some features that could help students feel like study in the real classroom, such as, Chat room and Video conference. However, it depends on the available technologies, if some learners are in developing countries they may have the limitation to access the advanced technology.

Most teachers (interviewees) and students (survey participants) suggested that text message and chat room are the most preferred features (see 4.1 and 4.2). By using the text message, the participants can always look back the written record when they are not clear about some information. Students and teachers usually communicate over the Internet by using tools like e-mail, forum, and etc. This makes it impossible for them to meet face to face. The features of video/audio conferences (high level of media richness, see 2.4) are the efficient communication tools in distance learning to improve this sense of communication (see 4.1). The teachers and students can use body language such as eye contact to communicate (see 4.1.2 and 4.1.5). There are some spaces for features to be improved. One of our interviewee suggested that it would be useful if there was a function that can help to categories the messages from all the participants. This expected feature will help to analyse the messages and group the message according to the same categorize. Another expected of IM features is video conference which could allow participates to make a video meeting with many participants at the same time. Some video conference software has already developed this function but for most of popular free IM applications, they still do not have this feature.

As shown in chapter 4, based on our analysis, most of our hypotheses were supported. The results showed that most IM features are positive related to the perceived usefulness and ease of use (H3 and H4). IM features are also positive related to the user's concentration levels (H5). Since we imported the media richness theory (see chapter 2) to categorize our IM features, hypothesis 5 actually present the results that media richness levels are positive related to user concentration levels, which means the higher of media richness level, the higher of the concentration level. Note that H5 was partially supported, the feature of File Transfer had a higher concentration level than Instant Message, this was a little against the result from the research of Liu et al. (2009). However, except this, other features had followed the results form Liu et al. (2009). Considering the limitation of our sample size, we think the discrepancy of our results and previous studies was acceptable.

Our separate paths analyses for each feature have generated consistent results on the rest hypotheses. For most features, perceived usefulness and perceived ease of use were positive related to intention to use (H1 and H2), the result confirms the previous research results on the TAM (Bagozzi et al. 1992; Davis et al. 1989; Lee et al. 2005, Van Raaij & Schepers 2008; Liaw 2008). However, the feature of File Transfer had an unexpected result which was against the TAM. We think the reason for this is because even the participants believed that File Transfer is useful and easy to use (see chapter 4, results for hypotheses 3 and 4), they didn't want to use the file transfer function within the IM for sharing their information since the file transfer function of IM has its limitations to reserve the files. Further, the results indicated that user concentration was proved positive related to the intention to use (H6), which has the same result with Liu et al. (2009), that higher concentration levels leaded to higher intention to use the technology.

As hypothesized, intention to used the technology should have a positive influence on the communication efficiency, and we can see the analysis from chapter 4, hypothesis 7 was partially supported, the intention to use Instant Message, VOIP and File Transfer are positive associated with the communication efficiency, but the hypothesis for Video Conference was not supported. However, even for the hypotheses that have been supported, the R square values were not strong enough to perfectly supported current model, which indicated that there were other important factors affect the communication efficiency outside of this model. In conclusion, the feature of Instant Message, VOIP, and File Transfer can improve the efficiency of communication in e-learning, which provided the answers to our research question two (see 1.3). The result suggested that the feature of Video Conference was not positive related to the communication efficiency in e-learning, which was against the results from our interview analysis (see chapter 4 and 5).

6. Conclusion

The conclusion is followed by our research questions:

- What is the current situation of IM in distance learning?
- What are the IM features that influence the efficiency of communication in distance learning?

We believe that using IM in distance education can improve the communication more efficiency. However, there are some reasons that make IM is not the best tools in distance learning. The problem of time zone is the important issue as it is impossible to change the truth of nature. One solution suggested is to encourage the students to have the discussion with other students who are in the same time zone. The necessary action will be to make the students trust in each other, not only their teacher. IM is a real time communication which has many benefits over other communication tools. The participants can know who are online or offline and they can sent/receive with the instant feedback. In this study, all of the distance learning courses have their own learning management system which include all necessary functions such as courses management and communication tools. IM is the one application that most of them adopted in their system. From the students' perspectives, IM has been widely used in distance learning because it makes them more easily to have group discussion or get quick information. On the other hand, the teachers prefer to use other tools such as email or forum rather than IM. The reason is this one-to-many instant communication brings them overwhelming workload when they appear online.

Our research contributed to the extension of the research on the developed TAM (Liu et al. 2009) by importing the communication theory to validate the influence of intention to use the technology on the efficiency of communication. The findings have supported previous studies, moreover, it supported that specific IM features are positive related to the efficiency of the communication. The results of the study supported that different media richness levels and user concentration levels were positive related. Furthermore, user concentration levels were positive related to the intention to use. Notice that due to the limitations of our sample size, although there was an insignificant discrepancy with the previous studies, we can address that our study has consistent results with the studies before. Within the TAM, the relationship of perceived usefulness, perceived easy to use and intention to use has also been verified. The current distance learning system has its flaws to integrate IM features suitable for distance education. That's why we got unexpected feedbacks for the feature of File Transfer used in e-learning from the TAM result. The study also has explored the relationship between intention to use and efficiency of communication. For most of features, the two factors were positive related. We had a conflict results for the feature of video conference. From the interview analysis, all interviewees were affirmed this positive relationship, while the results from the questionnaire suggested different. We can draw to the conclusion that the following IM features: Instant Message, VOIP, and File Transfer can improve the efficiency of communication in distance learning. However, according to our empirical data, the effect of these features on communication efficiency was not significant.

Appendix A: Interview Guide

Introduction

1. How many students and teachers participate in this program?
2. How do you think about the role of communication in e-learning?
3. Do you think there are some communication problems in e-learning? Could you describe the problems for us? (Scenarios)

Communication tools

4. How do the teachers communicate with students? For example, delivery of the assignment, answer the questions of the students.
5. How do students communicate with each other? For example, when students need to do group work, how they communicate with each other?
6. Do you have communication tools for sharing information? If yes, what kind of communication tool?
7. What kind of communication tools do you think is the most efficient one?
8. Are students satisfied with the communication tools? Why?

IM as Communication tools in online learning

9. Do you use Instant Messaging as the medium in online learning?
    - If "Yes", what kind of IM software (Free or In-house) do you use in online learning?
        i. Do you think the current IM application used in your programme is compatible?
        ii. What kind of applications do you think are the most efficient ones? Why?

    - If "No", Do you have any plan to use IM in Y your programme or not?
        i. What kind of IM applications do you prefer to be imported in your programme (Free or In-house)?

10. Do you think IM can improve or solve existing communication problems in online learning?
11. What is the IM's feature that you think is most important for efficiency?
12. What are the missing IM's features do you think should be included in the communication in e-learning?
13. What else IM applications do you think are needed for e-learning.
14. What are the IM features that should be improved? Are you satisfied with current IM application, any suggestions for improvement?

Appendix B: Interview transcription

Interview One

Interviewee Name: *Petter Pilesjö*
Interview Date/Time: *3 April 2009, 13.00 at GIS centre*
Interview type: *Face to face*

Question 1: how many students and teachers participate in this master program of geography information system?

"This program is called LUMA GIS Lund University Master program in GIS. It is an international master program and it is Internet based and based on e-learning completely. We have more than 1500 registered students."

Question 2: That is for one year?

"No, it is a two year master program. But the students are studying in their own studying tamp. So some of them study this program in ten years, so that is why there are so many students because they are accumulated. They are not studying full time; they study part time, so there are becoming more and more students. We have intake about 200 students every year. And also among this 1500, some of them are master students and taken the master program but some of them are just taking individual courses, so they just take one smaller part just in half or one semester and then they stop. So these 1500 students are including program students and students taking individual courses. And these students come form 104 countries. So it is a lot of different nationalities."

Question 3: And they also located in different places, right?

"Yes. None of them are in Lund. They are speared and connect with Internet. So we have students from Africa, Asian, and South America and everywhere. And about how many teachers, I think 15 teachers, but again, they are not working full time in this program, they do other jobs. They have campus teaching and they do research. This is the way it work, I mean, that you are not working only with one thing as a teacher at Lund University, I mean you have many different things. These teacher only work in this university, but they do administration, they do research, campus teaching and they also do e-learning that we are talking about. Otherwise, you will feel boring with only one thing."

Question 4: Yes, the other question is about how do you think about the role of communication in e-learning?

"E-learning is about communication, so it is extremely important. I think that it is the only important thing."

Question 5: Do you think there are some communication problems in e-learning?

"You mean the communication between students or teachers? (Researcher: "Maybe both") I think we have doing research on this topic. And we can see, if we go back to the second question that is the role of communication. Of course it is really important that the teachers can communicate with the students. That the students can ask questions and the teachers can answer them. That the students can get feedback on exercises, so that is why communication is that important. That we also know the communication between students and students is very important. That the main problem in e-learning is that

students are in different places, that they don't feel like a group. It is not like class where you have classmates, that we call it the learning community. In e-learning, they are not a part of a learning community automatically. If you are in a classroom, you are automatically in a learning community, because you are a group. If you are doing e-learning, you are spited up. To increase the feeling of a member of a group, we have to make it easy to communicate, to make student can communicate with other students. So that is something that we think in our LUMA GIS students communicate with other students so that they are getting better, they get better results, high them up than students only communicate with teachers. Of course, it is obvious that there is problem in this communication. Because these students are coming from different parts of the world, so it is different time zones. For example we have students form? or new Zealand, when they are awake, we are sleeping. So that is one problem we have, then it is ok, because we know that we have so many students, so that they can always find some students form the same part of the world to communicate. If it is only a small program, it will be a big problem, if it is a big program with a lot of students, it will be easier. Then of course, technology, it is another problem, if we are talking about communication. An local course, that it in Europe and in the States, that they are designed for that they have very good network, very good Internet connection. But most of our students are from developing countries, so they are maybe from Uganda, India and so on, they have weak connection. So sometimes, it is more difficult for them to communicate, because of technical problem. That we are trying to make LUMA GIS for all types of students, even if they only have an Internet café, they should be able to communicate. Of course it is more limited, but it should be work. That is one problem that we meet. Time, that our students study in different time zones, this is one problem, technology, that is another problem that is not impossible to solve."

Question 6: How do the teachers communicate with students?

"In principle, we have four different ways, I think. The normal way to communicate with students, that's email communication. We prefer the e-mail, because then you can do it when you have spare time. Then we are also using SKYPE, so if the students need more, if the students have problem, and need the solution immediately, then they can SKYPE. Then, some students, they don't have SKYPE, or they don't understand it, so of course they can use the phone to make a call. So, that's the other possibility. Then we have this new tool, forum, to share the screen, even to share the computers, we can take over the computer of the students', which is really good, if they have technical problems, for example (Second Life). We are trying to develop more things like second life where you can meet and talk to the students in a virtually environment, and also advanced software where you can share the computers."

Question 7: How do the students communicate with each other when they are doing a group work?

"Normally, they are using e-mails and forum, so if they use the forum, it's the immediately communication. But also, we give the choice to the students, the students are creative, they know the Internet world very well, they start their communities, maybe they are using like facebook, etc. They find their own ways to create the groups. We offer like e-mails and forums, but quite often they students have their own choices, so this is not problem for us."

Question 8: Is the SKYPE used as part of the e-learning system?

"Yeah, it links to (Learning system), we are using (Learning system) as the e-learning platform, or you can call it learning management system. You can link other software to

this (Learning system), like SKYPE, so the students reach SKYPE from the (Learning system)."

Question 9: Which kind of communication tool do you think is the most efficient one?

"E-mail, at least for us as a teacher, because I am a busy man, it's very difficult for me, if there are a thousand students or a hundred students, and they all want to see you or meet you on second life or something, I don't have time. So, this is impossible for me. I have limit time, so I have to be efficient, and it's much more efficient to answer e-mails for me than being using SKYPE or being on the second life or something, so for me, it would be e-mail. For the students, I don't know, I think it's not e-mail, I think it's much more easier for them to use alternative communication tolls, I'm not sure, but I think so."

Question 10: Do you think that students are satisfied with the application that the current systems have provided for them?

"Yes, I think so. They don't complain, because they want written feedback. If they send the exercise, they want something telling that this is ok, you've passed, and if you talk to them, or meet them in the virtual environment, that's not enough. I think they are happy, because like I said, they are allowed to whatever they want, but for us, I heard no complains, so I think they are satisfied."

Question 11: Do you think instant Messaging is useful?

"Yes, we have. We are suing SKYPE, and chat on SKYPE, you don't have to talk on SKYPE, and you can chat on SKYPE, that's another Instant Messaging. So, yes, it's very useful, if they have specific problem."

Question 12: Do you use Instant Messaging as the medium in online learning? What kind of applications do you think are the most efficiency ones? Why?

"That depends on the purpose. If you want to do the group work, maybe it's better to have a chatroom when you have many users, if you're just one to one, maybe it's better to use chat on SKYPE, if you have a technique problem on exercise, computer exercise, of course then you have to share computers and you have to share screens to teach them how to program. So it's different for different purpose and tasks."

Question 13: Do you think IM can improve or solving the communication problem in online learning?

"Absolutely, I think it very important but not only the thing is that we have to give alternative. A lot of people when they study e-learning. They are not flexible enough, I mean we have to give alternative solution. It's not the same for all of us. Maybe you like this immediate communication and maybe you prefer to take it easy and think and write email. We are all difference. So I think when we are developing e-learning courses, we have to keep in mind that student are different. This can be…just because we are different or maybe cultural different which all religion different. So we have to open minded and think that we give them alternative. If they prefer that source of communication, fine. If they don't and prefer that one, fine. We accepted. Certainly, I think it's very important to give them the possibility for this Instant Messaging, it is one very important part but it's not the only important part."

Question 14: The pervious paper described about e-learning, sometime they mention about like student sit in one room and no kind of learning environment. So they feel like lonely separate that is one of the problem to stop e-learning became more efficiency or more popular.

"Of course, we were discussing that before, I think that is the main problem as e-learning student feel many time lonely, you feel many alone. So that why we to give the student the tools or the possibility to meet other student on Internet."

Question 15: Now, instant messaging, they have a lot of feature for example, video conference, voice conference. What do you think these kinds of features can solve the problem of lonely feeling?

"Maybe not solve it, but it can make thing better. So I think ... "yes" definitely it can make student feel more like learning community, community study group. But still we have to keep in mind that all the students, they don't have those possibility. If you are student from Uganda and you are going to Internet café, maybe no camera, maybe the Internet connection too weak for voice messaging. I think nowadays it almost…always good for voice but they are different technical possibility but yes I think it's very good. But not only...not only. Give an alternative."

Question 14: Which one of feature that you think important one that improve the efficiency?

"Umm...I cant give you…I think…ah that the tough question, I think Chat, Chatting, written messaging is the most efficacy one because then you can go back and you can see what happen but it is very difficult question because I think all of them are good, video and voice are very good and even virtual reality you are person and you are walking around, it also good but if I have to pick one I pick the Text message because I think it not a game it academic work then I think most of the student they want to be serious and is easy to be serious in if you are written text."

Question 15: Now we are talking about this program including Skype in e-learning system. Do you think you satisfy with this Skype?

"Really, I think it is really good. Yes."

Question 16: There are some improvements or should be improve in Skype, IM?

"I am not a person to judge that. I mean all of these programs are developing all the time. I think it good, technical development is good. I am not a person to judge this is good or bad or... I can't. I am sorry."

Question 17: The developing of Skype, the purpose is not for e-learning. Some of features are not so needed for e-learning and some of features maybe include in this

"No. I think that you have e-learning platform. They are develop for e-learning. You don't have to include things in Skype. Skype is develop for communication and communication is one part of e-learning. We can use one software for that and Skype for that and another software for that. It doesn't has to be one program, it can be five different. That's fine. I think it good."

Question 18: When you use Skype include in e-leraning, from the beginning?

"I don't know…maybe two years ago."

Question 19: Do you think it improve the communication?

"Yes, definitely"

Question 20: For which part?

"No, I mean that all technical development make e-learning better for the student. The more you have the best it a limit, if you have fifty or one hundred communication tools. It

does not matter. If you have two and you get another one number three and it make better. And you have get number four which is different and make better. So, yes, it better now because you have possibility to communicate."

Question 21: Have the teacher ever try video conference function for group discussion to discuss with the student?

"Yes, we have small group because all of our lectures. They are recorded to video. It is one way communication but seem we have people from different part of the world. It is possible to give a video lecture for all of student because it midnight there and midday that. And a lot of our student, they are working also not fulltime. They working during day and they study during night, so it not possible for us to give a comment, a general lecture. So we are doing it for group of student if they want to discuss the specific topic or something, maybe six students, yes we have tried that and it is good. But it excludes some student because they don't have Internet connection. So this is...we can never design it to complete the exclude, we have to give alternative. I said these many times. You have to give alternative. Technology is good but we have to give alternative."

Interview Two

Interviewee Name: *Anders Hederstierna*
Interview Date/Time: *17 April 2009, 11.00 at Gräsvik Campus, BTH*
Interview type: *Face to face*

Question 1: How many teachers and students in the program?

"250 students in the program, divided equally between the part-time and full-time. So 125 each. 7 courses including the thesis course, and 2 teachers in each courses. 7 number of supervisors in thesis course."

Question 2: How do you think about the role of communication in e-learning?

"It's vital. I realize that the students assess the quality that how quick and how qualified the communication or responses from the teacher from the university. So it's a quality factor to the students. Also, between the students, our original idea is to have a lot of the students in the program, to have them mass-collaborate, and many-to-many learning, or many-to-many communication, which means the larger the program, the larger number of students, the better the program. Also, synchronous communication is important for this quality aspect, and more asynchronous communications like forum and e-mails, is better for reflective learning, to think about the answer to the question. But the chat type of communication is more for solving easy problems."

Question 3: Do you think there are some communication problems in e-learning?

"Yes. One of the problems we have is that the students expect the teacher to answer in five minutes, but that is not possible in anytime. And, we attracted a lot of students from the world, and they have different time-zones, so that becomes a problem. It is difficult to have that quick communication. And also, the main problem of the communication is that

this idea having many students communicating with many students, to have a large network on people who know stuff, it doesn't work, because students they think that it's only the teacher who knows something, the network become one to one communication instead of many to many communication. Because the students don't trust each other."

Question 4: Is there any way to solve this problem?

"Actually, I gave the responsibility to run the forum to the students, some students were asked to supervise and also bring in the students to discuss in the forums between each others, and that works fine. But it doesn't work all the time. In our program, the students want to use the flexibility which is in the program, so they may not even work with the course for a week, so it is a little bit against the idea to have all the students participate at the same time."

Question 5: How do teachers communicate with students?

"Learning Management System. There is an internal message service in the system. the system LUVIT, it's not intuitive. We suggest the students that if they want to have visual course, they want to talk, they can use other products, like skype, msn. Because they are more used with them, and more professional. ...We have the VC application from university of Luleå, maratech ...easy to use"

Question 6: Do you have communication tools for sharing information? If yes, what kind of communication tool?

"Folders for different files. Also Working group – so they can share document and stuff."

Question 7: What kind of communication tools do you think is the most efficient one?

"Depending on what u need. For more reflective answer: mailing list – tend to have longer discussions.If u wanna quick answer to solve problem – video conversation: eye contacts."

Question 8: Are students satisfied with the communication tools? Why?

"For the tools for sharing information (yes, but for) communication, don't think so. (No video function in the system, Student sent info, teacher didn't check, expecting questions sent to email, Studying progress is slower than normal lecture based process. Students do lots of self-studying themselves. But not satisfied with the intensity of the communication."

Question 9: Do you use Instant Messaging as the medium in online learning?

"Not as the medium, as one. In online exam: they want instant answers to questions about exams. Other than that, no need for instant answers."

(in online exams, do u use text or video?)

"When started from 2004, decided to use text based exam, for there were students without broadband connection. Even when we thought at first video image can help us identify the student's identity during exam, however they may still cheat as hiding behind the camera. Hence the decision falls to text based system for exams. Questions available from 3, answers submitted before 6 (during which teachers are online to take IM questions, or students can call for enquiries). Because of this identity issue, students are

required to attend one comprehensive on-campus exam at least once, can be all courses (any course). Physical-controlled."
(So there is still campus involved in this e-learning).
"One campus, yes, in the system, yes. In some cases, we have students called up the professor; they have to pay for the connection. So they call instead, instead of using IMs."
(are the satisfied with online exam?)
"yes, much cheaper than having to come every time."

Question 10: Do you think IM can improve or solve existing communication problems in online learning?

"I don't really think so. Maybe. Teachers don't come to classroom but office & home instead most of the times. Becoming boring. IM can solve the communication problems, but there should be specific space where the teacher can sit together to make it a more fun job. Now teachers tend not to be online much one reason is it is becoming too boring. (thousands of questions everytime you log on)"

Question 11: What is the IM's feature that you think is most important for efficiency?

"Video. The main probe with long-distance education is the loss of eye contact or face contact… so video can improve a lot…Mix of long distance video streaming and some on-campus activity. Need to find when to have the on-line exam. Not too late or too early – time difference all across the globe….Regulations of the exams: not allowed to publish the exam at different time. Has to be at the same time."
(Course quality can be improved?)
"Definitely. We tend to have the text based communication shorter and shorter (similar to sms). If that's the trend, they u need something more lengthy, extensive."

Question 12: What are the missing IM's features do you think should be included in the communication in e-learning? (What else IM applications do you think are needed for e-learning?)

"Important to see who's online. One probably don't wanna send a message to a person who's not online. (In that I remember you can see who's online ,but in this… it's a bit hard to see who's online) it's not a new feature though. But in some system it doesn't exist. We have better access to mobiles than to Internet. SMS can help reach more student. (haven't seen this anywhere yet). – broadcasting SMS"

Question 13: What are the IM features that should be improved? Are you satisfied with current IM application, any suggestions for improvement?

"Apart from what we talked about? Yes? …er….. (1min)… well
Main difficult when u receive a msg: it's hard to understand what they mean. They tend to write quickly without thinking it through, or compose it properly, to let teacher fully understand what he is asking for (spelling check). It's difficult to explain the question in short msg. easier to ask in video. – solve the problem via video. One possible solution: category the message. So if you know your question is about exam, use the exam question template. So to have some kind of structures of the messages to make them clearer (supply background info). Other than that, working fine I guess. I haven't thought about it much."

Interview Three

Interviewee Name: Birgitta Nordén
Interview Date/Time: *22 April 2009, 16.15 at Learning Lund office*
Interview type: *Face to face*

Question 1: How many students and teachers participate in this program?

"It has been ongoing since 1999, so it has been ongoing for 10 years. And in this case it starts a new branch. Originally it starts since 1999, and over one year old, you can see from this report, more about that. And the second time we give the second young master program on line. It was the year 2001 and 2002 and had a convention in Italy and later we went to Egypt, and in the year of 2004, we had a course there ahead that and had a parallel one to China. And then continue with a course in Dubai convention in 2006. Between 2006 and 2008, we have had four branches that heading for convention taking place in November 2009 in Beijing. So this course has been given within this program many times. Already the first time we have over 500 participants from 103 countries. But in totally, we say that over 10000 up secondary school students in the age group between 18 and 14 that has been participating in this out reach activity. The teachers that often there are between 3 and 5 students in a group, that could be mentored by teacher, so the teacher only be facilitated taking place and can have one group consisting of 3 to 5 students or many groups. So exactly how many teachers that has been within this program, I am really not sure but that could be quite many perhaps up to, I should give a guess, 300 to 500 perhaps."

(And they also located in different countries, right?)

"Yes, of course, exactly as where the students are. So we now have more than 110 countries presented in this program."

(So it is quite a huge program.)

"Yes, and there is always a teacher leading the group locally and it is also applying leading his or her group to going online with global classroom from young master's program."

Question 2: How do you think about the role of communication in e-learning?

"I think it is essential with communication, and I think it is possible to have good quality communication in e-learning if you design your e-learning program in a certain way and if you have resources you can stimulated the direction and also can see that there are feedback opportunities where you can get feedback from the knowledge and information. The content I think it is very important to communicate about."

Question 3: Do you think there are some communication problems in e-learning? Could you describe the problems for us?

"It can easily be a lot of communication problems, because some of the participants may consider that they are alone and don't experience that they are a team working together online, and there could be a lot of communication problems because there are language skills, there could be missing in some companies, that could be less probity and there also could be a lot of other communication problem, I would also recommend you to see here what I have found out, my earlier research because you can see that I have what are pros and cons when it come to different things within this course of learning online. So there are quite a lot of things that can be hard to handle, it can be time zones, it can be physical things but it can also be skills and knowledge based."

Question 4: How do the teachers communicate with students? For example, delivery of the assignment, answer the questions of the students.

"What is special with young master program is that there are ordinary teachers back home and in their school and works with them locally mainly, and stimulate and encourage students to do their tasks and assignments, and the students get their tasks and do some investigation locally in his or her village and they give answer together as a group to the global classroom online. The teacher is facilitated locally and can go to a course online but doesn't have an active role as being a teacher there. There are instead our tutors from Lund University from IIIEE, this institute. So there could be master students who have taking this course and know about the concept, and also other teachers and professors giving feedback, experts. And about how to communicate with students locally, it is hard to say, because I don't know exactly."

(But if we understood it right, it is like there are a lot of teachers locally, but here is the center, and they will communicate with the teachers here, right?)

"No, this program is mainly aiming to stimulate the students, the teenager, the high school students take part in the program, and do the tasks and the work that are provided online, so it is not the teachers that are in Greece and in Philippians and the States, they could go into the online courses and the classroom to see what are the students writing, but they seldom do and they hardly never comment, so they are very silent online and they do not talk with one another often. The teachers can go in and they have a like teacher's café where they can discuss subjects, or some sort of tasks like how to do them and so on carry them out, but it happens very seldom."

(So that is mean that when the students have done with their assignments, they have to hand in to the center here in Lund, right?)

"Yes."

(But how they do it? They use email or something?)

"It is like a platform, where there are like 30 classroom often, and in each classroom, there could enter between 5 to 15 different nationalities group consisting of 3 to 5 students. They meet and they can read other people's contribution on the same tasks. They give their assignment and they read other people's answers, comment and raise questions. They supposed to react with this community or within this forum. You know like an ordinary forum where you add your contribution, and sometimes, someone add comments. So it is not like mail based, and mainly between individual teachers. It based on small group, sending comments and answers to a global classroom consisting of perhaps 10 different groups from different countries. Not entering all the 30 classrooms but mainly go to some, so it is like an ordinary school but online."

Question 5: How do students communicate with each other? For example, when students need to do group work, how they communicate with each other?

"They can communicate either use the forum, they can also communicate by chatting online within the platform. Now we are using the LUVT sometimes. We have also try to use LOTUS learning space that work out everywhere. For the moment we have designed another platform, also the same, so they can communicate in that way. Sometimes they say that they contact with each other by using MSN, so they can send instant messages with each other or chat in different ways. Or else they can use web camera, but this has not been asked by the program. They can call one another of course, send SMS. I know that some Chinese students and some Polish students are very interested in getting close private contact and discuss something and they even call one another. Nowadays there are a lot of ways like Skype, they can contact with each other in different ways. In which way is depended on students themselves."

Question 6: Do you have communication tools for sharing information? If yes, what kind of communication tool?

"There are a lot of like headings, there are different modules for different tasks. There are 18 modules, and within the modules, there are tasks, and of course that is where students do their assignments, but expect for that, they also have like student meeting forum, where they can also start different subjects and discussions. But expect for that, they can also chat or email within the system or wherever they prefer, of course, it depends on how innovate they are and how interested they are."

Question 7: What kind of communication tools do you think is the most efficient one?

"It depends on what is the purpose. How do you think is the most efficient one, when you just want to exchange quick information or if you want to present something. Because if you want to present something, some small research or some investigation that you have done, perhaps you need a video conference, web camera whatever. Also you want to show some diagram, you want to see other people's face and get reactions, so it depends on the purpose I think, and they vary a lot. It is could be very valuable when it can be very direct communication, synchronously almost, but it depends, of course."

Question 8: Are students satisfied with the communication tools? Why?

"They have not complained so far and the evaluation we do after the first eight modules and also after the 10 remaining, we ask a lot about that, but I think they many different ways of communication, so if it is not efficient for what been given by the course, as I mentioned before, they find new ways to reach one another. So I am sure that if you use Google, if you login you can share documents, you know, there are so many different ways. But it is up to the students, the individuals in the team to decide."

Question 9: Do you use Instant Messaging as the medium in online learning?

"When we use the LUVIT system, it is easy to send like a quick message. I often use it. When we have participants perhaps that were fewer than 500, we could use it. But when we have perhaps about 1000 to 2000 participants, and then perhaps that there is a little bit limit. Because if I going to a course as a teacher or a coordinator or a course designer, I might have some tasks that I need to do, so that I would rather like to be invisible. As I don't have time to say hello and answer questions, I think it is good to use it sometimes, but it depends on how much time you have to be contacted, like contemporary."

(Except this immediately text, do you have any applications like voice and video?)

"It depends on anyone who use it, since I have such a big volume of participants, so we have not developed it mainly because we don't have rescores to have very individual contacts. Within this platform we use, there is speakers' voice, if you want some like read for you and you can listen to it, so you can activate the voice of speaker. About videos, there have not been yet provided, but since two years ago, we have already started to place this function in the community, but then we have talk about web 2.0. But then we have had to give priority to other things to use the resources in another way. So we hope to get more partners and sponsoring and so on. So it always some limit."

Question 10: Do you think IM can improve or solve existing communication problems in online elearning?

"It could help if you building the learning activity on one to one communication, it could be very good and also efficient in a way because it can be used quickly and directly. When a question appear you can get immediately answers, if you have some teacher or

mentor or some tutor available, so it is very much depend on the volume and the resources available."

Question 11: What is the IM's feature that you think is most important for efficiency?

"I think that if you have learning process, if you want to ahead for deep learning, then you must still like what I said before, have person available who have time to give comments that are with quality and very perorate with the content of the courses, so it is very much about having a competent person available. If you have 2000 high school students, and all of them want to have instant messaging information, there would be a lot of limitations for you to have a deep learning process. But if you only want to have a quick answer, where to go and where to have, then it could have better ways to solve that type of troubles. About the efficiency, because it is only like appear very quickly and you can get direct answer, it is efficient if you just want to get a quick answer."

(For example, if you are doing this one to one communication with students, which application do you want to use? Instant messaging? Email or forum?)

"If this like simple questions, I think it is possible to use IM. But if you have a complex field, complex area of knowledge and you want to go deeper in that, then it take a lot of resources if one person explain to another person. Because if you have 2000, and 1999 stand in a queue waiting to talk to the teacher, instant messaging will not help. Then you perhaps found you use a video, perhaps a conversation, and students can download the video and to see what are the different questions have been raised in this area, so I think it is very depends on if it is a surface or deep question that you want to have the answer on. I think that IM can be very good, but you must have to someone that have time to answer it. It is resource demanding. But IM could be good when it use between students, more students can help, perhaps one students can talk to another 5 students, then you have many more opportunities."

Question 12: What are the missing IM's features do you think should be included in the communication in e-learning? What else IM applications do you think are needed for e-learning?

"I am not sure if there are something missing in IM, perhaps it could be that participants and users who use IM can realize the different opportunities, so perhaps you need some pedagogical ideas, presenting or motivating people to use IM when it is good or when it beneficial to use it, so it hard to say if there is anything missing in the IM features. Of course as you said before that it has individual conference, and also oral instant messages instead of written messages. If the person has the web camera, it is just so easy to talk, some people prefer the written work and some people prefer to write, so you can get different things out of that, so it always could have variation."

Question 13: Like what you just mentioned, two years ago, you have already planed to include the function of video in your e-learning system right?

"Yes, we are going to take a further step, but we have to focus on other things, because we have a big volume for the moment. Our students will also do project work, and they want to apply it and present it on the convention. There are so many students and we plan to have a 1000 students meeting in the November in Beijing. Then they have to do 8 modules first and a project work two months. So there are different parts within the young master's program."

Question 14: What are the IM features that should be improved? Are you satisfied with current IM application? Any suggestions for improvement?

"I think that you must always focus on what the purpose is with the meeting online, why I am trying to talk to someone else, why am I try to have this knowledge, then you must have the best way to exchange the knowledge and build the knowledge together. So what you might need as a IM application, it is very much depends on what the content is."
(For example, if the students want to do a presentation online, do you think there are any efficient applications can help them to do that?)
"Yes, they have done with other program that having video conference and they have a lot of video conference. They have big screen and studio but also some very easy quick equipments, and you can also have a like brain storming. When you talk and you can find things together. But if you want to do some investigation and share it and present it, you have to do a preparation. You can do that with any type of equipment, but you also have to know what you want to talk about. I think IM is tool, but you also have to have something that the tools can carry, so you have to combine the best way, so that the tools can work with the knowledge."

Interview Four

Interviewee Name: *Viveka Jerndorf*
Interview Date/Time: *23 April 2009, 09.00 at Department of Education*
Interview type: *Face to face*

Question 1: How many student or teachers participate in this course?
"25 or 30 active students per course – about 25"

Question 2: How do you think the role of communication in e-learning?
"The role of communication is obviously paramount; I mean all you have is basic communication. This course is a quite new and my plan was to expand by using audio, video, Skype or some source of video program because the learning management system that we use, allow for that. But since I was completely new to e-learning when I started. So what I have been doing is basically communicating to written communication and usually not instant messaging. It happens because the students actually have access to Chat room, sometime when I see them online, they tend to call at me. That's usually when I have some source of questions about a deadline or something difficult to ask in the certain of instruction or short problem. You see what I mean, things are easily solved otherwise it usually commenting, feedback, discussing through forum and e-mail."

Question 3: How this course doing, for example, you recording teaching and put it on the website?
"No, I have not done either actually. What I have, it is different types of assignments that they suppose to finish in the certain period of time and the assignment can be either group base or individual. The group base assignment can be either to produce some source of texts and submit, and the course that I running right now, I am use the group discussion and the group forum quite a lot. So I have some source of the assignment to read the second part of the book, think about something and then start discussion between them in the group forum. And keep that discussion going. Everybody suppose to participate at least two or three. And at the end, they all need to come together in the forum and agree on some source of summary of the discussion, the main point of discussion and then there are individual assignment with student finish and submit.

Sometime, students will do group work together and they will communicate with each other with forum."

Question 4: What do you mean with "forum"?

"Like any other Internet forum, where you start discussion with friend and they post and comment each other, that what I do."

Question 5: This forum is embedded in the platform?

"Yes. It call LUVIT. You have like a course in LUVIT and the teacher build different things in that course. So I can make, build forum, I can make twenty forums if I want. I can open Chat room. I can divide students into groups, whatever. So the teacher always designs what there."

Question 6: Do you think there some communication problems in e-learning?

"Lots, yes, one problem is that usually, from the teacher perspective, I use to having a dialog with my students. I used to have a student in front of me. I used to be able to discuss something with them get instant feedback from them whatever they don't understand; they need clarification and so on. Here is always delay. And it take a while actually to learn as a teacher how you need to express yourself to make sure that the student actually know what you mean and you never know at which point everybody has taken part of what you trying to say, it up to the student. I can't say that I could but I done. I mean most of the student that I have here are, this is part time course, most of them work. So they are not actually in the course when I am working. So I don't know at what point I can move on, that is difficult. It also difficult to find the way to communicate in writing that builds a relationship between me and the student which I am looking for. For student, sometime they tend to misunderstand each other a lot than a campus course so since they misunderstand the writing. So it usually the problems are as I see it or mainly type to the fact that all communication written which I want to move on to video conferences. Another problem, as a teacher, I hated when my student have to wait for the answer that they need. And of course the situation when I tend to be online eighteen hours a day, I am always online. And of course the student appreciated, my husband doesn't. Just to make sure that the communication work, I tend to be online more than I should. But it's exciting, it's challenging."

Question 7: How the teachers communicate with the students, by email, do the assignment?

"Yes, email or that it builds in messaging within LUVIT which is most I often use. But for assignment if you mean how do I distribute an assignment. Well, I think the post that in LUVIT, there is a list to the left and the picture if you look at LUVIT, just like another webpage with link. So I just post them there. And they always have a schedule or web plan that tell them what suppose to be done which week and so on. So the assignment they usually there from the beginning so they can look at the entry course and then of course I always have one forum that designated to discussing the course as such where the student can post questions about things such as assignment that they want because I think it's good, if one person and one link something. That usually lists one more with the same question, so I prefer that they do it that way use the forum where everybody can see the question and the answer. And of course they also can contact me as well."

Question 8: When the student doing group work, they always use only forum or some other kind?

"I think, some group, I usually give them the opportunity to use the chat room if they want within LUVIT. Some like to use that but that have to online the same time with the

forum they don't have to. That depend on participant really, sometime they do one thing, sometime another. And I know that sometime they have also use the Skype, email, MSN. I think I have one group actually use some source of video conference technology but there was outside LUVIT. But usually, the problem with the Chat room or Instant Messaging is that the number of people grows up, it's become unmanageable. So two or three can have discussion in the chat room about the certain assignment. In my course, usually five or six not really to manage become difficult to follow the discussion, with the student."

Question 9: What kind of communication tools do you think most efficiency one?

"The way that my assignment that are built, I would have to say the forum. But that doesn't mean I think, forum is better than anything else but you always need to make sure that the communication opportunity is adopted to the assignment, they have to agree, and I think that I would have like to have some source of video conference system to discuss full instant to have two groups in a seminar and that would be impossible in a forum that you need another type of technology, so it's difficult to say which is more effective, I think it really depend on what you are trying to achieve."

Question 10: Now, LUVIT provides the function, do you think student satisfied with it for the communication tool?

"Since they are part time courses, most students tend to appreciate that they do not have to be online at certain time a day, that's difficult for them as they are working. So in that sense "yes". And again if I have presented something different, perhaps they will love it."

Question 11: Instant Messaging, there are a lot of features, for example, Text messaging, Chat room, video conference, and so on. Do you use Instant Messaging in your course?"

"I am not. The students may but I don't."

Question 12: The only reason that you are not using just because the course is started, you are not sure now for this or other?

"For my plan was to stat that next semester and to use this semester to explore the possibility but since I am not going to be here and the course is not going to be here, I just drop it basically. So I can't answer that. It's difficult."

Question 13: If you have plan to use IM in your course, what kind of IM application do you prefer, for example, MSN or Skype.

"Most personally I most accumulated to MSN type. I would probably have use video conferencing and Chat room because it already in LUVIT. I would have used them for some source of seminar work I think. I think mainly where the student could work online for a hour with some type of assignment could be to discuss each other paper something like that, just to make it more. I would like to create more between the student to make sure that all students actually have contact with other students because I believe that the important an education, some many people in course distance the get rid of isolated with the course work. It's not a good thing, you need input from other, you need other take on different part of the course lecture and so on."

Question 14: All of these feature, for example, text, video and other thing. Do you think which one is the most efficiency?

"The feature like that technology feature or technological feature. It depend on what you want to achieve."

Question 15: Just now you talk about if they have some question you prefer to answer them quickly and don't want them to get delay answer. Do you think IM can solve this problem?

"It depend, on one hand, you could end up with the situation when you actually begin expected to be online all the time accessible all the time with obviously you can never be because I mean I have another courses to teach while need to do other thing. On the other hand, if you use widely you could say that "Ok I will be on the Chat room from nine to ten on Monday, Wednesday, and Friday" if you have questions log in and ask them that would be a smart way. But I think you need to be very clear on the limitation on accessibility. The problem is when the student they might be sitting somewhere. And they have absolutely no idea what I am doing when I am not online. And you are waiting for answer through e-mail, perhaps you notice that if the day to go by that you don't get that answer, you begin to get annoy. And the first start is never obviously this person do not have opportunity to check his or her mail or simply have some hard time to answer. The first reaction is always, "this person is lazy, I need answer, I mail two days ago" I mean this person could be in Ohamas, we don't know that. And it's the same with student. So it really important to be very very clear about what're you doing other than teaching this particular course."

Question 16: Do you prefer to use MSN to the e-learning in the program?

"MSN is only application that I familiar with."

Question 17: Do you think what feature should be including in MSN?

"So I think MSN is very practical, many people use and it accessible it free, easy to use."

Question 18: Now MSN doesn't have video conference feature (one to many)

"I am MSN will involve in that indirection soon or later, otherwise MSN will soon be obsolete."

Question 19: Do you think this function will be useful in e-learning?

"Yes I think so, I am really think so, particularly and in distance courses where have no physical meeting at all or many organization today for their on the job training, the global organization they need to have a lot of people from around of the world to participate in the same program and of course that would make sense to have some source of video conferencing system build in obviously."

Interview Five

Interviewee Name: *Farid Naisan*
Interview Date/Time: *29 April 2009, 09.00 at Center for Technical Studies Malmö University*
Interview type: *Face to face*

Question 1: How many students and teachers participate in this program?

"The teachers are actually me and the assistance. Usually I have 2 more assistance with me."

Question 2: How do you think about the role of communication in e-learning?

"It is a must. I assumed that the communication is working well, so communication is very important of course. Because you can not see students and there must be a way to communicate with them, so it is very important."

Question 3: Do you think there are some communication problems in e-learning? Could you describe the problems for us?

"Sure, there are a lot of problems. First of all, the communication in distance learning requires that the network is working well. The service is working and there is no crush in the service. And sometimes it is happened that the service is down, and people can not reach the courses and they can not get into the courses. So it is very important that the services are working well. And then there should be some ways for communication, for example, the forum and the mail. The biggest problem is the technical problem. The biggest problem is that the service is down. Fortunately, our services have been working very well during the past time before. But sometimes it is down especially on holidays."

Question 4: How do the teachers communicate with students? For example, delivery of the assignment, answer the questions of the students.

"We have a platform, an educational platform. That is like a classroom. This platform is called It's learning. This is very important that we have an educational platform, and it works well. In this platform students ask questions, other students or teachers answer their questions. Also we uses this platform for assignments. So the students published their assignments on the platform and the teachers can get access to them, but other students can not see each others."

(So it is like a mail?)

"It is like a mail function, but it is not really a mail, it is a message inside the platform. So you just write a message and upload it."

(How the teachers answer the questions of the students?)

"Usually I encourage the students put up their questions on the forum. And I have a lot of forums in the platform. So that others can also use it and see the questions and answers. But it is not the only way, the students also send me a lot of mails. They also send me about the projects and the subjects that they are fascinated about. I will give some personal or individual help through mail. Unfortunately I have a lot of students and this is not always possible for me."

Question 5: How do students communicate with each other? For example, when students need to do group work, how they communicate with each other?

'They communicate mostly through the forums. But when they work together on projects, then they have each other's email and also telephone number. But usually they use the forums."

(Do you think that they use some tools like Skype and MSN?)

"I am sure that they do. Because when they have to project works, they also have some problems to solve."

(But in It's learning, there are no application like Skype or MSN, right?)

"It is, actually there is chat function that I have not used it that often. But the students can not use it unless the teachers are online. So the teacher need to start the program, so this is not working very well."

Question 6: Do you have communication tools for sharing information? If yes, what kind of communication tool?

"The communication tools are what I have already told you is the platform. This is actually the only one that we have. And I also mentioned email, these are the basic things that we use to communicate. Sometimes also the telephone, the students just call each other."

(Is that because most of the students live in Malmo or at least in Sweden right?)

"The students come from all over Sweden and also form other countries. So I have also some foreign students especially in my English courses. They do not call of course, they send me emails or write me in the forum. So mail and forum are the mostly used applications. But once in a while, they come to my office those who are close to Malmo, actually there are a lot of times that students live in this area, they come to my office and I give them some help."

Question 7: What kind of communication tools do you think is the most efficient one?

"The most efficient one is of course the communication tools inside of the platform, which is the forum. But otherwise, mail is also working well. But I can not say that these are the best ones. Because I do wish to have better ones."

(Why do you think forum is efficient one?)

"Because it is available and everyone can participate in it. The questions are all there all the time. If you send mail, it is one person to one person, so the forum is a better way. They can exchange ideas and they ask each other questions, they can help each other and they have discussions some other time so they also share a lot of information. So the forum is very effective but unfortunately not all the students are active there."

Question 8: Are students satisfied with the communication tools? Why?

"Yes, they are, because they have these forums. I think they like this platform. There are some problems of course, but otherwise once it works, it was well. So they are ok with the communication tools."

Question 9: Do you use Instant Messaging as the medium in online learning?

"Not really. This application as I have already told you under the supervise of the teachers. Therefore, as I am a teacher, I have to login and start the chat. The other problem is that as it is a distance course, there are not always a lot of students online. They study according to their own schedule or time table. So therefore I have not been used this application successfully. I tried it once, but it did not worked very well. So I don't think this is the thing that works right now. but on the other hand, it should be a good application. Maybe we could have a special time during the week that everyone is online, they could ask me questions, and I could send them the answers especially if there is a video chat or audio. If it can work very well, and we can talk. If I have some of the IM features in use, then I will have around 100 students who would write questions to me, so it can not work. But they can use it to help each other or contact each other. But this is not possible right now."

Question 10: Do you think IM can improve or solve existing communication problems in online learning?

"I am sure it will. I am sure that it could be a good help for the students and for the teachers. But it should be a tool that is practical and effective."

(What you mean by practical?) *"Practical means easy to use, I mean there should not be any difficulty in using it. And also practical also means it should be practical for many students. If everybody should be online at the same time, it will also cause some network*

problems. (You said that you have already tried to use IM in your course, right?*) It was for sometime ago. I started to chat and was waiting for people to participate, but it didn't work very well."*

(But in the future, do you have any plan to adopt IM in your learning program?)

"Right now, I don't. Because I told you that I have a lot of students, it is not very practical for large number of students. But if I can make some groups, I can also let some students in charge of it. All the students can help each other, then that will be ok. But right now it is not possible as I have a lot of students."

Question 11: What is the IM's feature that you think is most important for efficiency?

"For IM features, I think it should include some functions like audio and video, especially audio, so that we could talk and instead of just reading and writing. Audio feature will be very nice and maybe also video, because it would be very nice to see the students face to face."

Question 12: What are the missing IM's features do you think should be included in the communication in e-learning? What else IM applications do you think are needed for e-learning?

"Generally I think I have already answered this question, it is the audio that is very important. Of course chat and text messaging are important. But with audio, we can talk to students, and students can talk to each other, and it takes less time and you can also explain to each other. If we take the priority, I think I should say audio, text messaging and then video. I don't really see any use of SMS here, because if you are in the platform, you send the text message, it is like not necessary."

Question 13: What are the IM features that should be improved? Are you satisfied with current IM application? Any suggestions for improvement?

"I think IM should work for groups of students, it must be able to work for a large number of students. For a class that have 200 students, and should have a feature that can help to administrate. Also maybe it should have some features to provide for group talking. So maybe it could have some features like group chatting room. So they can have different types of group. They can talk to each other but also all can work at the same time without causing any inconvenience in communication and network. So that is my problem, I have a lot of students, IM should work for this problem. We should have something like a project room that is like a chat room."

Appendix C: Questionnaire

The main purpose of this questionnaire is to identify the Instant Messaging (IM) features (e.g. Instant message, Chat, Video Conference and etc.) used in Distance Learning (DL) and the effectiveness of using different features in the DL process to help the communication among the participants.

Part A: Background

Purpose: Gain basic information about the person who answers the questionnaire. So that in the later part we can use the basic information to group the students or even do more further research.

1. How old are you?
☐ <16 ☐ 16-25 ☐ 26-35 ☐ 36-45 ☐ >45

2. What is your gender?
☐ Male ☐ Female

3. What is your highest education degree?
☐ Middle school ☐ High school ☐ Bachelor ☐ Master
☐ PhD ☐ Other (_____)

4. How many e-learning programs have you experienced except the current one?
☐ None ☐ One ☐ Two ☐ Three ☐ More than three

5. Which of the following Instant Messaging is your most often used one when communicate with your friends online?
☐ MSN ☐ Skype ☐ Yahoo Messenger ☐ QQ ☐ Other (_____)

Part B: Instant Messaging current usage situation in e-learning

Purpose: Basic information about the IM uses habits and opinions about the current IM usage in the e-learning system. From these questions we can get the information about the first main question in for our thesis.

7. When you want to discuss with your classmates/teacher, which of the following applications do
you prefer? (You may select up to 3 answers)
☐ Instant Messaging ☐ Forum ☐ E-mail ☐ Telephone ☐ Wiki/Blog
☐ Other (_____)

7. Which Instant Messaging is used in the e-learning system that you are participated in?
☐ MSN ☐ Skype ☐ Yahoo Messenger ☐ QQ
☐ Instant Messaging that is embedded in the e-learning system
☐ Other (_____)

8. How important do you think Instant Messaging is in your e-learning communication process?
☐ Very Important ☐ Important ☐ Medium ☐ Less Important ☐ Not Important at all

8. When you want to discuss with your classmates, which of the following Instant Messaging applications/features do you ***prefer***? (You may select up to 3 answers)
   ☐ Instant Message ☐ Chat/Chat room ☐ Short Message Service (SMS)
   ☐ Voice Over IP (call PC-to-PC, call PC-to-Phone)
   ☐ Video Conference ☐ Emoticons ☐ Display Image
   ☐ File transfer ☐ Other (_____)

9. Which of the following Instant Messaging features are ***included*** in e-learning system that you are using? (*Please check that all included*)
   ☐ Instant Message ☐ Chat/Chat room ☐ Short Message Service (SMS)
   ☐ Voice Over IP (call PC-to-PC, call PC-to-Phone)
   ☐ Video Conference ☐ Emoticons ☐ Display Image
   ☐ File transfer ☐ Other (_____)

10. Which of the following Instant Messaging features do you think are ***missing*** in e-learning system
    that you are using? (Please check that all included)
   ☐ Instant Message ☐ Chat/Chat room ☐ Short Message Service (SMS)
   ☐ Voice Over IP (call PC-to-PC, call PC-to-Phone)
   ☐ Video Conference ☐ Emoticons ☐ Display Image
   ☐ File transfer ☐ Other (_____)

11. What are the reasons that you ***are not interested*** in using Instant Messaging in e-learning? (You may select more than one answer)
   ☐ Difficult to use
   ☐ Lack of experience
   ☐ Using Instant Messaging is easy to misunderstand
   ☐ Time difference, it is not comfortable to meet online
   ☐ Busy and prefer to use other application e.g. email, forum, and etc.
   ☐ Other (_____)

12. What are the reasons that you are ***interested*** in using Instant Messaging in e-learning? (You may select more than one answer)
   ☐ Easy to use
   ☐ Have an experience
   ☐ Real time communication
   ☐ Reduce confusion when communicate with teacher/classmate
   ☐ Instant Messaging *features* make the communication efficient
   ☐ Using Instant Messaging is easier to communicate than other application
   ☐ Other (_____)

14. How satisfied are you when using Instant Messaging in e-learning education?
   ☐ Satisfied ☐ Dissatisfied ☐ Neither Satisfied nor Dissatisfied

Reason_____

_____

In this section, please rate the following sentences;
Each item corresponding to the constructs was measured using a 5-point scale, with answer choices ranging from strongly disagree (1) to strongly agree (5)

15. I can concentrate more when communicate with my teacher/classmate by using the following application/feature.

Please rate the following items:	Not Applicable	(1)Strongly Disagree ↔ Strongly Agree (5)				
		1	2	3	4	5
Instant Message						
Chat/Chat room						
Voice Over IP (call PC-to-PC, call PC-to-Phone)						
Short Message Service (SMS)						
Video Conference						
Emoticons						
Display Image						
File transfer						

16. It gives me an immersive feeling of real classroom when using the following application/feature.

Please rate the following items:	Not Applicable	(1)Strongly Disagree ↔ Strongly Agree (5)				
		1	2	3	4	5
Instant Message						
Chat/Chat room						
Voice Over IP (call PC-to-PC, call PC-to-Phone)						
Short Message Service (SMS)						
Video Conference						
Emoticons						
Display Image						
File transfer						

17. I intend to use the following Instant Messaging features in my e-learning education.

Please rate the following items:	Not Applicable	(1)Strongly Disagree ↔ Strongly Agree (5)				
		1	2	3	4	5
Instant Message						
Chat/Chat room						
Voice Over IP (call PC-to-PC, call PC-to-Phone)						
Short Message Service (SMS)						
Video Conference						
Emoticons						
Display Image						
File transfer						

Part C: The effectiveness of using Instant Messaging in e-learning

Purpose: To try to get the information about whether the Instant Messaging can help with the communication efficiency or not and which feature or features of Instant Messaging can most help with the e-learning communication.

In this section, please rate the following sentences;
Each item corresponding to the constructs was measured using a 5-point scale, with answer choices ranging from strongly disagree (1) to strongly agree (5)

18. I feel that the following Instant Messaging applications/features are easy to use.

Please rate the following items:	Not Applicable	(1)Strongly Disagree ⟷ Strongly Agree (5)				
		1	2	3	4	5
Instant Message						
Chat/Chat room						
Voice Over IP (call PC-to-PC, call PC-to-Phone)						
Short Message Service (SMS)						
Video Conference						
Emoticons						
Display Image						
File transfer						

19. I feel that the following applications/features of Instant Messaging enhance the communication in e-learning.

Please rate the following items:	Not Applicable	(1)Strongly Disagree ⟷ Strongly Agree (5)				
		1	2	3	4	5
Instant Message						
Chat/Chat room						
Voice Over IP (call PC-to-PC, call PC-to-Phone)						
Short Message Service (SMS)						
Video Conference						
Emoticons						
Display Image						
File transfer						

20. I feel that the following applications/features of Instant Messaging can help to improve the learning efficiency of e-learning.

Please rate the following items:	Not Applicable	(1)Strongly Disagree ⟷ Strongly Agree (5)				
		1	2	3	4	5
Instant Message						
Chat/Chat room						
Voice Over IP (call PC-to-PC, call PC-to-Phone)						
Short Message Service (SMS)						

Video Conference						
Emoticons						
Display Image						
File transfer						

21. I find that the following applications/features of Instant Messaging using in e-learning system is useful in my schoolwork?

Please rate the following items:	Not Applicable	(1)Strongly Disagree ⟷ Strongly Agree (5)				
		1	2	3	4	5
Instant Message						
Chat/Chat room						
Voice Over IP (call PC-to-PC, call PC-to-Phone)						
Short Message Service (SMS)						
Video Conference						
Emoticons						
Display Image						
File transfer						

22. Please indicate that the following aspects of the communication in e-learning are improved by the use of Instant Messaging.

Please rate the following items:	Not Applicable	(1)Strongly Disagree ⟷ Strongly Agree (5)				
		1	2	3	4	5
Better understanding with the lecture of the teachers						
Better understanding with classmates when discuss						
Saving time when doing the group work						
Saving time when discuss with teacher/classmate						
Better concentrate when the teacher is doing the lecture						
Better concentrate when have group discussion with classmates						
Not feel been separated, has the feeling of real classroom						

23. Do you think that using Instant Messaging help to improve the effective communication in e-learning education?

☐ Yes

☐ No

Because_____

_____

_____

Thank you for taking our survey. Your response is very important to us.

Appendix D: Questionnaire result

Age:

Age	*Frequency*	*Percent*
<16	*0*	*0*
16-25	*26*	*57.8*
26-35	*18*	*40*
36-45	*1*	*2.2*
>45	*0*	*0*
Total	*45*	*100*

Gender:

Gender	*Frequency*	*Percent*
Male	*24*	*53.3*
Female	*21*	*46.7*
Total	*45*	*100*

Education:

Education	*Frequency*	*Percent*
Middle School	*0*	*0*
High School	*0*	*0*
Bachelor	*25*	*55.6*
Master	*17*	*37.8*
PhD	*3*	*6.6*
Other	*0*	*0*
Total	*45*	*100*

E-learning Experienced:

Education	*Frequency*	*Percent*
One	*28*	*62.2*
Two	*7*	*15.6*
Three	*7*	*15.6*
Four	*1*	*2.2*
More than four	*2*	*4.4*
Total	*45*	*100*

Often used Instant Messaging:

Often used Instant Messaging	*Frequency*	*Percent*
MSN	*19*	*42.2*
Skype	*2*	*4.4*
Yahoo Messenger	*0*	*0*
QQ	*20*	*44.4*
Other	*4*	*9*
Total	*45*	*100*

Path analysis for Instant Message:

Dependent Variable	*R square*	*Independent Variable*	*T-value (P-value)*	*Beta*	*Coefficients B*
Intention to use IM	*.818*	*Easy to use IM*	*3.059 (.004)*	*.435*	*.435*
		Useful_IM	*2.608 (.013)*	*.260*	*.251*
		Concentrate_IM	*2.077 (.045)*	*.289*	*.274*
Efficiency_IM	*.294*	*Intention to use IM*	*4.231 (.000)*	*.542*	*0.621*

Path analysis for Instant VOIP:

Dependent Variable	*R square*	*Independent Variable*	*T-value (P-value)*	*Beta*	*Coefficients B*
Intention to use VOIP	*.664*	*Easy to use VOIP*	*4.371 (.000)*	*.529*	*.477*
		Useful_VOIP	*2.638 (.012)*	*.253*	*.218*
		Concentrate_VOIP	*2.593 (.013)*	*.316*	*.334*
Efficiency_VOIP	*.243*	*Intention to use VOIP*	*3.584 (.001)*	*.493*	*.436*

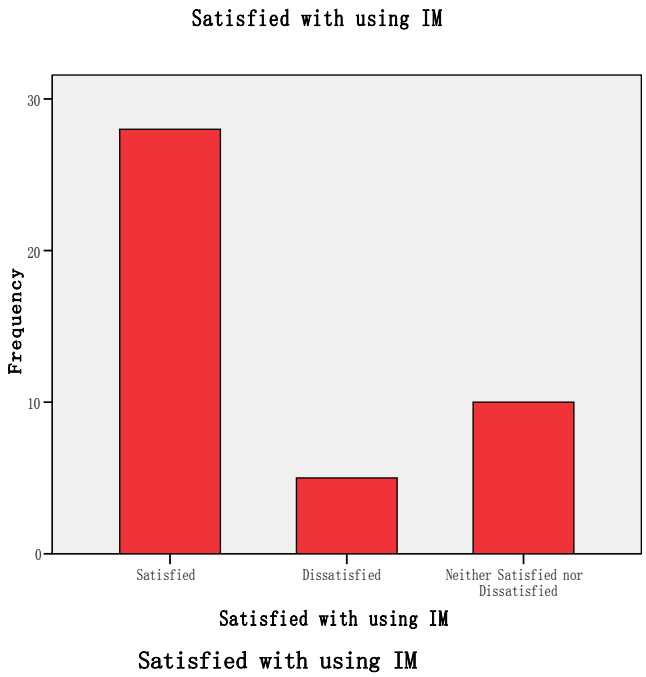
Path analysis for VC:

Dependent Variable	*R square*	*Independent Variable*	*T-value (P-value)*	*Beta*	*Coefficients B*
Intention to use VC	*.618*	*Easy to use VC*	*2,933 (.006)*	*.325*	*.320*
		Useful_VC	*2.817 (.008)*	*.341*	*.435*
		Concentrate_VC	*2.631 (.012)*	*.334*	*.336*
Efficiency_VC	*.059*	*Intention to use VC*	*6.328 (.114)*	*.242*	*.205*

Path analysis for File Transfer:

Dependent Variable	*R square*	*Independent Variable*	*T-value (P-value)*	*Beta*	*Coefficients B*
Intention to use File	*.548*	*Easy to use File*	*-.573 (.570)*	*-.094*	*-.063*
		Useful_File	*1.334 (.190)*	*.206*	*.142*
		Concentrate_File	*2.511 (.016)*	*.461*	*.396*
	0.368	*Intention to use File*	*3.947 (.000)*	*.607*	*.719*

Bar chat- user satisfaction with using IM:



Bar chart- the importance of IM in e-learning:

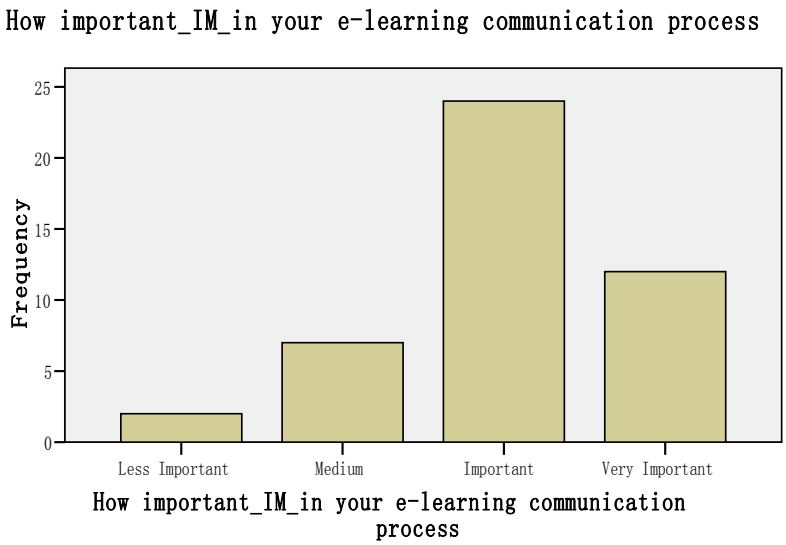


Table- User's favourite IM applications:

Application/feature prefer when discuss with classmate

		Frequency	*Percent*	*Valid Percent*	*Cumulative Percent*
Valid	*Instant Message*	*34*	*11.2*	*29.3*	*29.3*
	Chat/Chat room	*25*	*8.3*	*21.6*	*50.9*
	Short Message Service (SMS)	*6*	*2.0*	*5.2*	*56.0*
	VOIP	*14*	*4.6*	*12.1*	*68.1*
	Video Conference	*19*	*6.3*	*16.4*	*84.5*
	Emoticons	*2*	*.7*	*1.7*	*86.2*
	Display Image	*4*	*1.3*	*3.4*	*89.7*
	File transfer	*12*	*4.0*	*10.3*	*100.0*
	Total	*116*	*38.3*	*100.0*	
Missing	*System*	*187*	*61.7*		
Total		*303*	*100.0*		

Statement of the reason for question 14 - "How satisfied with instant messaging in e-learning system"

1. *"I think IM reduces the sense of isolation among students. Besides, this is a channel that most students are familiar with; they don't need to learn new technology in order to communicate with their colleagues."*

2. *"Seldom communicate with others"*

Appendix E: Virtual Learning platform

IT's Learning

IT's Learning is a virtual learning environment tools which designed for schools and universities. The main focus on the implement process to make sure that the school will optimize this set of pedagogic tools for achieving its particular objectives. IT's Learning embedded with many functions that would help the user to reaching the following;

- adapt teaching to the varying needs of learners
- give learners overview over their own progress
- help learners keep order of their work
- improve home–school links by allowing parent access
- make school work available at home
- simplify the re-use and sharing of teaching material
- create or integrate digital content

Source: http://www.itslearning.com

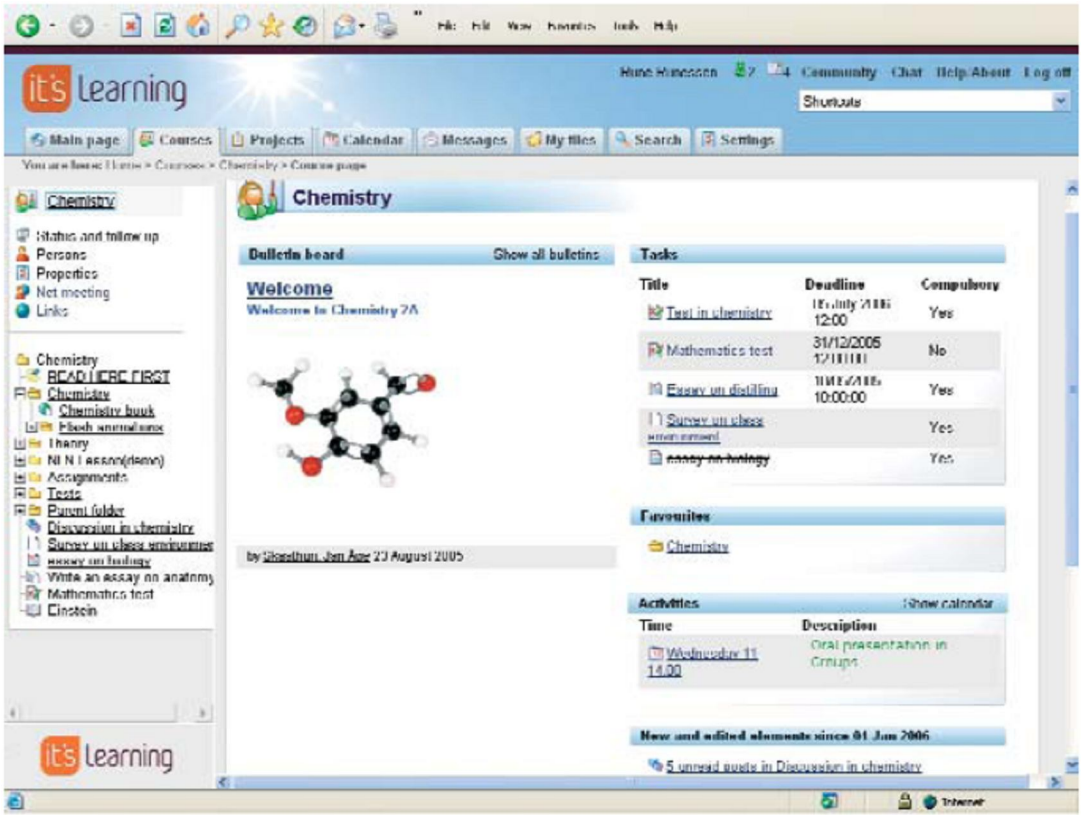


Figure A: IT's Learning screen shot

LUVIT

LUVIT learning centre is combine of three different components: LUVIT Portal, LUVIT Administrator, and LUVIT education. In LUVIT Portal, user can do many things on the same place, such as, open a course, view the course catalogue or your calendar, and etc. LUVIT administrator is a tool for administrative work, such as managing units, users and courses. In LUVIT Education or the learning environment, the participants can find their courses material and also can communicate with other course participants by using chatting, forum and messaging.

Source : http://luvit.ced.lu.se/LuvitPortal/default.aspx

Figure B: LUVIT screen shot

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