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PERCEIVED USABILITY: FOSTER STUDENTS INTERACTION THROUGH
ONLINE SYNCHRONOUS CHAT

A thesis submitted in partial fulfillment of the requirements for the degree of
Master of Information and Communication Technology - Research

From

UNIVERSITY OF WOLLONGONG

By

LAM CAM LE

Bachelor of Business, Deakin University

SCHOOL OF INFORMATION TECHNOLOGY and COMPUTER SCIENCE

2006

STATEMENT OF ORGINAILITY

I, Lam Cam Le, declare that this thesis submitted in partial fulfillment of the requirements for the award of Master of Information and Communication Technology - Research, in the Faculty of Informatics, University of Wollongong, is wholly my own work unless otherwise referenced or acknowledged. The document has not been submitted for qualification s at any other academic institution.

(SIGNATURE)

Lam Cam Le

28 August 2006

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Preface

Key words

Online chat, synchronous discussion, Computer Mediated Communication (CMC), online group discussion, blended learning, usability, satisfaction, perception, attitude, ease of use, usefulness, foster students engagement.

Structure of the thesis

The thesis is divided into three major parts. Part 1 presents the introduction, a broad overview and the objectives of the two case studies, their common settings and the overall findings of this research. It begins with a debate of the existing literature and the gaps in research followed by an explanation of the established framework for measuring usability. The methodology, limitations, findings and conclusion of case study 1 is described in part 2 of this thesis. While case study 2 is discussed in part 3, and finally the last chapter of the thesis discusses the contribution of this research to the literature and identifies opportunities for future research.

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Publications

The following publications have been prepared in the course of this research

1. Fuller, A. McFarlane P., and Lam K. (2002) 'Remote Collaborative Teaching for Computer Science Using Simple Technologies', Proceedings of the 32ndASEE/ IEEE Frontiers in Education Conference, Boston, M.A., 6 - 9 Nov 2002.
2. McFarlane P., Fuller A., Lam (C.L.) K., (2003) 'Remote Collaborative Teaching for Computer Science Using Simple Technologies', Proceedings of the AustWeb 2003, The Ninth Australian World Wide Web Conference, Gold Coast, Australia, 5 - 9 July 2003.
3. Lam C. L., McFarlane P., & Fuller A., (2003). 'Blended Learning Environment: students viewpoint toward interactivity with the offshore lecturer and their peers', Proceedings of the Cita 03, Kuching, Malaysia, 16-17 July 2003.
4. McFarlane P, Fuller A & Lam CL (2003) 'The POSITIVE Approach to Offshore Team Teaching'. Proceedings of the 3rd IEEE International Conference on Advanced Learning Technologies. pp 410 – 411.
5. Lam C L (2003) 'Fostering Students Interactivity through Online Synchronous Discussions: Student Viewpoint', Proceedings of SITACS Research Student Conference.
6. Fuller A., McFarlane P., & Lam C. L., (2005) 'Encouraging participation in electronic discussion forums', Proceedings of the WCCE Cape Town 2005 – 8th IFIP World Conference on Computers in Education conference proceeding, Cape Town, South Africa, 4 -7 July 2005

Abstract

Demand for innovative and accessible Western education throughout Asia has significantly improved the use of online teaching and support tools. Previous research studies of online education have focussed primarily on full online and distance education, and asynchronous tools for fostering communication. Few studies have explored blended learning strategies in an education environment using synchronous tools to support ongoing communication amongst students from South East Asia facilitated by their offshore subject co-ordinator.

This qualitative study explores South East Asian students' attitudes and perceptions to the usability of online synchronous communication and to determine the success of such a tool in fostering communication and supporting group interaction. The study comprises a group of 40 computer science students for Case Study 1 and a class size of 29 students for the second case study undertaking the same subject have agreed to participate in the research.

The triangulation method adopted for the two field studies has established that there are interrelationships amongst the three usability constructs in the context of this study. The usability constructs refer to the perceived ease of use, perceived usefulness and attitudes toward participation.

A combination of questionnaires, focus groups and observation techniques have been conducted; and the results show that students' perception and attitudes are influenced by the multiple and interrelated facets of the online group communication: the human-to-technology interaction, the human-to-human communication, and the capability of the initial studies have elicited the importance of motivation along with connection stability as significant influences on students' attitudes toward participation. The first case study identified the large group size, the fast speed of the messages posted, and the instability of the technology as key difficulties.

A revised methodology was applied to the second case study allowed a more stable environment for evaluating students' perceptions. A number of underlying interrelating group characteristics and individual attributes including technology and human factors that influence student usability and participation are discussed and presented in Case Study 2.

Contrary to the stereotype that Asian students are passive students from a South East Asian background in both case studies have been highly interactive during the online chat sessions. Evidence from the observations and questionnaire feedback showed that all participants contributed to the discussion and were heavily engaged with the live chat sessions. The majority of participants indicated that they value the opportunity to interact with the offshore lecturer, and to receive timely feedback to their queries.

According to student perceptions, the findings from the various data collection methods have shown that the medium being easy to use, a less confronting form of communication as well as useful for enhancing communication and learning objectives. Common themes across the two case studies include suggestions for greater clarity and quality of the messages posted; and that the pace of the message flow should not inhibit a student's ability to participate in the open dialog. The lack of visual cues means that no movement on the screen can lead to participants concurrently posting messages. This calls for the need to find a balance between too much activity and no activity, which could further improve the quality of participation.

Overall evidence from this research suggests that the interaction amongst the students is highly positive. The studies indicate that there is great potential for students from South East Asia to use synchronous chat, under this particular blend of learning, to actively participate and engage in their learning. This research provides a good foundation for further studies to evaluate and improve on the delivery of synchronous online tools for communication and interaction.

PART I

Chapter 1 INTRODUCTION and BACKGROUND

Since the introduction of the World Wide Web and the Internet communication tools, the number of online courses has proliferated in Australia and the Asia-Pacific region. The quest for degrees from Western Universities combined with the ability to study locally has become popular and continually growing, not only in Malaysia but across South East Asia, (Ziguras, 2001a). It has resulted in significant advances in designing innovative teaching models including online tools that aim to take student learning and engagement to new levels.

The Asian economic crisis in 1997 has further magnified the demand, concurrently there has been an 80% dropped in visas issued to Malaysian students going abroad (Illing cited in Sohail and Saeed, 2003), Academic institutions and the corporate sector alike are looking at this form of delivery as opportunities for future learning. This type of collaboration is not limited to partnership arrangements, offshore campuses, distance learning, and franchising arrangement education it also involves implementing flexible and innovative tools to foster students community and social presence.

The success of full distance education with little or no face-to-face interaction has been subjected to many debates and deficiencies as it neglects the social dimension (Spitzer, 1998). Online learning has said to not be accommodating for individual's learning styles, it presents a challenge for students to stay motivated while learning on their own (Shan, 2003). The quality and inadequate opportunities for collaborative learning and building on social competencies have been questioned. It has been acknowledged in research that e-learning complements traditional face-to-face learning but not replace it (Development and Learning in Organizations, 2003).

Ziguras (2001a) has interviewed several Malaysian higher education academics and reports that some of their programmes have still maintained traditional face-to-face teaching in the curriculum. This strategy is mainly tied in with students' expectations, students and particularly the younger Malaysian graduate students are reluctant to work independently,

and expect close supervision and direction from teaching staff. Students themselves suggested that they prefer “.. *locally-available (as opposed to remote) teaching staff.*”, and students have a preference for traditional face-to-face learning. Similarly, school administrators together reported that students value the local facilities and academic support, and have no desire for courses without such support, even though there has been an increasing use of online asynchronous interaction, (Ziguras, 2001a).

Under such circumstances, blended learning approaches appear very appealing allowing each component, namely integrating face-to-face and online learning environment together (Foresheew, 2002) to be executed, the strength of one-technique complements the weakness of the other. However, it is important to establish the suitable blend that serves the learners needs without jeopardizing the effectiveness and financial spending, this can be very challenging, as it is not simply a matter of course delivery and training (Development and Learning in Organizations, 2003b).

The blended model has been adopted in this transnational program, such education services in which the degree is award by the offshore university at a different locality where the learners are based (UNESCO & Council of Europe, 2000). This research project is planned and delivered under team teaching environment between the lecturer in the offshore (Australian) university in collaboration with the local tutor in the private college. The offshore (Australian) lecturer provides one week of intensive face-to-face lectures on site, while the local tutor managing and supports the classroom sessions for the remaining semester. Having continued access to the offshore (Australian) subject lecturer has been perceived as beneficial given that the core responsibility of the subject lies with the offshore university academic. Fuller and McFarlane (2002) model has been incorporated into the settings of the study. The model is characterized by utilizing the synchronous online delivery to supplement the current face-to-face mode of teaching, allowing ongoing contact between the offshore lecturer and the local students.

The setting enables the offshore Australian lecturer to remain the primary source of information for the subject, and stay in tune with the needs of the students, through observing student interaction. This concept requires the offshore lecturer to assume

responsibility as the facilitator while students' actively participate and publicly contribute their understanding to the discussion topics. This is inevitably different to some of the literature on Asian learning tradition as Asian students have been perceived as passive observers attributed to their class room cultures and educational experiences (Chester and Gwynne, 1998; Ballard and Clanchy, 1997).

This research has investigated simple technologies and instructional design to facilitate the interactions between students and their offshore (Australian) lecturer. It explores perceived usability of the online chat sessions in supporting students and peer interaction, as well as students' and lecturer interaction, through employing iterative design. A revised methodology has been applied to Case Study 2 which enables an improved environment for evaluating students' perceptions.

Variables that encourage and discourage participation are explored along with how the research contributes to future studies of blended transnational learning involving synchronous online chat. Findings of the research recommend that the success in the planning and delivery of online synchronous chat is dependent on human to technology interaction as well as the sociability amongst the participants. The study has established that the perceived ease of use, perceive usefulness, and satisfaction for measuring usability towards synchronous online communication are interrelated.

An overview of the findings of the study demonstrates that students value the benefits of the online communication for timely feedback and feel that it is a relatively comfortable environment to voice their opinions. Participants in both case studies including those who are typically less vocal in the classroom setting contribute to the discussion and they value the opportunity to interact with the offshore lecturer.

The findings of Case Study 1 indicate that participant's main concern has been around the fast speed of posted messages inside the online chat room. Based on student responses it relates to the large group size and the instability of the technology. The learning from this initial case study has been used in planning for Case Study 2. To overcome the issues identified in Case Study 1, the group size has been reduced by one third and the technological environment for interaction has been further stabilized.

In the second case study, students report that online chat sessions have been well received with many indicated their interest to continue this mode of learning. It has also been shown that participants will clarify and challenge comments posted during online chat sessions.

Based on students perceptions, the medium is relatively easy to use and some participants note the fast pace of incoherent conversations scrolling down the screen presented challenges to follow and make a productive contribution. This in turn has a negative impact on the quality of discussion. It is difficult to anticipate the level of interactivity of online chat sessions without prior knowledge of the group dynamics. There is a need to manage and work out an appropriate amount of activity within the chat room. It is concluded that the majority of participants are highly engaged with the medium to facilitate group dialog and for interaction with the offshore lecturer.

Chapter 2 LITERATURE REVIEW

2.1 Introduction

This chapter provides an overview of the literature conducted in the area of online discussion, it specifically explores the use of synchronous communication tool to foster participant's learning and discusses effectiveness of tools adopted to assess and measure usability.

2.2 Background

Participant interaction has always been known as an important component of learning, and since the explosion of the Internet and World Wide Web, online interaction has been the central focus of many research studies. Current research has acknowledged the potential of online chat dialog for encouraging educational learning (Harasim, 1993; Murphy and Collins, 1997). The demand to obtain undergraduate qualifications from Western Universities along with the benefit of being able to study for the course locally in their own city has been continually growing not only in Malaysia but across South East Asia (Ziguras, 2001a). This has resulted in advanced developments in a range of online teaching and supporting tools including blended learning models to improve student learning outcomes. While technology is a tool that need to be appropriately applied within the context of use, and "Culture is the ultimately context of use" (Day, 1999). Joo (1999) further recognized culture has influence on the way Internet is adopted in the classroom. However, there has been relatively little documented research describing Asian participants' perception and their reaction to synchronous conferences.

Undoubtedly, there is increasing demand for academics to research and have greater clarity of students' views and plan comprehensive assessment mechanisms. They are also held responsible for managing the assessment process and are expected to have specialist knowledge to guide student educational learning (Boud, 1995).

Online chat is considered relatively new, much of the research that has been conducted covers aspects of usability associated with online discussion groups using asynchronous

forum such as bulletin board (Mock, 2001). Little literature has been found on how synchronous interaction is used to support group interaction Preece (2001).

Generally, the literature tend to evaluate user attitudes and perception in relation to the effectiveness, deficiencies and satisfaction of the online chat either from a technical aspect, or to explore the possible determinants and measures of usability of synchronous chat used for group discussion. User perceptions and attitudes are usually examined from the context of customer support in a commercial environment or within an educational context. In an educational context, it is primarily set in a “full online learning” environment aim to improve teaching pedagogy as opposed to blended learning, where online chat is an additional supplement to learner classroom learning.

The appropriateness of the technology that has been applied to mediate learning associated with tasks is therefore important to ensure the design and the system will facilitate outcomes that are both valued and perceived by academics and participants to be worthy of the effort.

Currently, researchers specializing in usability studies recognize that no two online environments are identical (Preece, 2001). Hence, acknowledging that the unique aspects of each community is considered important in order to develop strategies and successful determinants to assess whether the context could be improved upon in future studies. She recommends a range of measures to evaluate and improve the success of online communities. More specifically, she suggests that the key measures of sociability and usability need to incorporate a descriptive approach to research, triangulation of data and painting the respondent’s viewpoint to the many facets of online synchronous medium in a selection of studies.

The determinants used for each study is dependent on the setting as well as the selection of tools to guide the desired outcomes. Preece (2001) identifies that it is no longer adequate to design studies only in terms of usability, there is a need to understand how technology can support interactivity amongst the users.

International Standard Organization (ISO 9241-11) and Technology Acceptance Model (TAM) are designed to equip researchers to measure usability towards information systems. These tools can be used to complement with one another as ISO is more general, while TAM has a greater emphasis on user perceptions. A limitation with both of these models is that very minimal references are made to user group collaboration and engagement amongst themselves.

Those that have been conducted are experimental studies, and due to differences in the context of the studies, generalization of results and findings are limited. However, it provides the ground work and foundation for other research to build on and reconfirm such work as is the case with this research. Hence, qualitative approach to usability and sociability enables deep threads of discussion to occur to understand individual and group behaviour which otherwise is not explored (Preece, 2001).

Intensive research has been conducted on teaching Asian students in a traditional setting; this is unlike this research which has been applied to online environment combined with face-to-face contact. Those studies that include administering online chat communication identify mixed results, some are generally positive while others note the disadvantages of such communication medium (Downes, 1998). Overall, no strong conclusive evidence could be drawn. Few studies have included a strong presence of Asian students as a key study group. Most studies found have Asian students making up a proportion of the diversity of the study group in a distance synchronous chat (Lawrence-Slater, 2002; Balazs, 2002; Bernath and Rubin, 2001).

There has been mixed reviews of how Asians students interact an educational setting, the stereotype that Asian students are passive and more subtle in their interaction has been noted in some studies. However, it has been argued that they are not passive in synchronous learning, on the contrary some research studies show that Asian students are involved in vibrant interactivity and are quick witted in debating the issues via synchronous learning. To date, no research of this kind has been found that involve study participants solely from a South East Asia background consisting mainly of Malaysian students.

Little research has focused on evaluating the success of online communities using online chat across South East Asian cultures particularly one that has been adopted under a transnational environment where students have face-to-face contact and it is further supplemented with the online dialog with their offshore lecturer.

2.3 Features of Online Chat Software

Internet Relay Chat (IRC) is a communication tool that enables online, text-based, synchronous communication (refer to as online chat in this study). IRC may be defined as groupware when a group of individuals use IRC to facilitate communication, cooperation, coordination (Brinck, 1998), or to share assignments or goals, then IRC may be defined as groupware (Ellis et al., 1991). This technology is also being referred as Computer Mediated Communication (CMC) when two or more persons interact with one another mediated by the computer (Wikipedia, 2006).

Messages in synchronous media are spontaneous, typically interwoven with other discussion threads (Klemm, 1998). There is no organization, order or structure to the flow of messages posted; the posted messages are in the order in which they arrive to the central server when the user presses the enter key (Smith et al., 2000).

A major shortcoming of text-based communication is the lack of meta-communication, such as visual cues and other sounds to support the exchange of information. In face-to-face situations, gestures and tone of voice convey meaning, allowing participants to judge reactions and determine whether words are understood. Hence the risk of misunderstanding is higher when the communication is purely text-based (Balazs, 2002).

User perceptions of the usability in online communities refer to various aspects which cover dialog and social interaction support, as well as information design and access. These relationships can be measured in terms of the speed of learning performance, user satisfaction, knowledge retention, and error rate. The commercial and educational sectors are fast to realize the concrete values in reference to the immediacy of synchronous chat.

The impact of such features on group communication will be discussed in detail under each of the subsections below.

2.4 Experiences with Online Chat in Educational Settings

This section of the literature review concentrates on users overall perception and attitudes in relation to online chat with a particular focus within an educational setting, it details the valuable features, deficiencies and benefits of this communication medium.

Online chat has been examined widely in the research arena for a number of years, it is not until more recently that the impact, success and the effect of this form of synchronous communication is explored in greater depth (Mosher, 2003). At present there is still an apparent gap in the research relating to the social interaction amongst the users via the Human Communication Interface.

The limited research has been documented in relation to attitudes and perceptions of the online chat within the educational sector usually involve suggestions from experience researchers from similar field, early initiation, or pilot studies. These studies are primarily focused on “full online education” as opposed to blended learning, as found in Wojnar (2002), Mercer and Davie (2002); Wang and Newlin (2001, 2002); and Motteram (2001). Apart from Wojnar (2002) other authors adopt both synchronous and asynchronous tools for communication. Their findings have been generally positive; they not only reveal some common findings but also their own unique view and recommendations to enhance Computer Mediated Communication (CMC) using synchronous chat.

Participants value synchronous communication, and have found it to be a comfortable medium for participation which enhance users social presence and supported their learning (Mercer and Davie, 2002). However, users have encountered technical problems that limit their ability to further increase participation levels.

Participants in Motteram (2001) have also experienced frustration with the instability of the tools. Similarly, Motteram (2001) has found that synchronous CMC reduces the isolation that exist in full distance learning. This has been achieved through building groups of communities enabling individuals to gradually feel settled and comfortable in voicing their ideas once they have familiarized themselves with each other.

On another perspective, Wojnar (2002) research study on pedagogical design suggests that synchronous communication may be more valuable than as previous literature reported, and acknowledge that quality of participation is not automatic, it needs to be build into the course and the lecturer has taken responsibility to guide and coach students into deeper learning. Higher level of thinking has been revealed in her student log file of the chat session note that online learning allow participants extra time to think and learn.

Wang and Newlin (2001) state that most online courses could benefit from this type of timely communication technology permitting greater understanding and clarity of the information gathered through asynchronous communication. It also creates a sense of belonging to their learning community, and values the instructor's personal contact with the students. Again learners experience comfort inside the relatively anonymous text medium, it encourages those participants who have low self-efficacy, who will not typically be vocal in a traditional setting, to participate more actively in a lively discussion, this brings about a sense of belonging though participants are geographically apart (Wang and Newlin, 2001; Wang and Newlin, 2002).

The authors highlight in their papers that those who have not participated inside the chat tend to earn low grades in the class. This suggests a likely relationship between students online chat involvement and student performance (Wang and Newlin, 2002). Their chat room has been rated the highest among a range of other online communication tools (2001). It also confirms that those who are members in the online group are likely to have higher final grades than those who study alone.

Limited research used online chat as an additional tool to supplement classroom learning as in the case of Mock (2001), or under a transnational study setting. Transnational settings involve close collaboration between two culturally different and geographically separate institutions, such as in Balazs (2002). Few studies have been conducted under a mixture of both blended learning setting and under a transnational institution, one of which has been Lawrence-Slater's (2002) research.

In Lawrence-Slater's (2002) pilot study, the hybrid model has minimal face-to-face contact, where the lecturer conducts an initial lecture and a mid-term tutorial face-to-face. The remaining sessions and contact are mediated with online communication tools. The chat sessions simulated as online tutorials, which is conducted in addition to asynchronous discussion. The participants are students of local and international backgrounds consisting of Singaporean working adults and Australians. However, in his discussion, the feedback refer to text-based communication tool as a whole and is not specific to synchronous chat. Therefore, it does not highlight the values and deficiencies of synchronous online discussion; given that the two tools have some significant differences in features. While in Balazs' (2002) initial study, virtual seminars are administered via synchronous and asynchronous text-based communication and integrated into the course structure. This medium aims to complement the little face-to-face classroom delivery of the course as opposed to this research which includes face-to-face classroom delivery. However, it appears the students place more emphasis in the use of the asynchronous discussion, and are unclear to what extent synchronous medium should be used.

Mock (2001) also has online tools to supplement classroom-based instruction; besides online chat, other communication tools were utilized including Online Bulletin board, instant messaging, and email, where online chat is used for dialog session if they do not wish to physically attend the institution.

Lawrence-Slater (2002), Balazs (2002) and Mock (2001) have all recommended in the context of their studies, that without additional motivation, students' participation is very minimal, even though it has been acknowledged in other literature that chat has the ability to

encourage group participation (Karayan and Crowe cited in Mock, 2001). The description of the tasks and the environment does not provide sufficient details as to whether the participants themselves have their own face-to-face meeting. Recognizing that the values of the online interaction are influenced by the instructional design and the technology, many of the literature touch briefly on the issues of environment. One obvious example, is that description does not clearly describe whether the participants still have their face-to-face meeting with one another.

All three authors' note that students have positive attitudes in regards to the online tools despite some difficulties encountered. Lawrence-Slater's (2002) study highlight that difficulties associated with text-based, group communication, and with a lack of additional motivation students tend to place class-based work at higher priority. In support, Mock (2001) further clarify that there are no students-to-students' interaction occurring inside chat, few who have the motivation to attend, merely to interact directly with the instructor. However in Mock's case, the chat session could have been over shadowed by Netmeeting, another form of online chat with additional features. Netmeeting also has the ability to notify the users that chat has been initiated and messages are delivered regardless of whether the other participants are online or not. Under these circumstances, Mock's (2001) participants highly value the Netmeeting being interactively engaging.

These studies highlight the importance of course design and management to facilitate satisfaction and the success of online learning required active participation from both students and the instructor. Participants in Lawrence-Slater's (2002) study indicate that they value more control and lecturer moderation inside the chat session. In Lawrence-Slater (2002) and Balazs (2002) delivery of online chat both studies argue that students are very engaging. Mock (2001) observe the potential disadvantages of the online synchronous discussion is the tendency of student's reliance on the instructor to provide solutions, and participants spent less time seeking and exploring their own solutions and findings. Balazs (2002) also acknowledge that without exact guidance, students are not even active in seeking solutions or asking questions, when the instructor has not automatically provided solutions, instead they felt left out and frustrated.

Downes (2002) through his extensive academic experiences in using online synchronous mediated communication, provides his reflective view on synchronous learning. The researcher illustrates the negative perspectives of the medium, namely barriers associated with the technologies, the process involved in user participation, and the content of interaction, which will be discussed intensively later on in the literature review.

As noted in Andrews and Haworth (2001); Dolen and Ruyter (2002), several research studies have been conducted under commercial and e-service context. Staff are responsible for monitoring such studies, they observe that the experience inside the chat room is far more complex than human communication with the system, as human-to-human interaction is just as important, and it plays a key part in influencing users satisfaction. They identified various factors influencing users' satisfaction, which will be discussed later under section 2.9 Measuring Usability of Online Chat.

Overall, Andrews and Haworth (2001) has identify that chat sessions has the potential for social interaction and personalizing shopping experience, and enhance responsiveness to customer service giving an overall positive experience. He articulates that operational problems that interfered with the services are due to technical design, sociability design and web performance, where access has been a concern. However, according to users in study by Dolen and Ruyter (2002) note that their moderated chat is well perceived in an experimental laboratory test setting. They believe it is easy to use, useful and fun, and also establish that group size has an impact on the satisfaction as it influence the amount of activities inside the chat session. Its research is different compared to Andrews and Haworth (2001) in that the subjects in Dolen and Ruyter's research consist of business students, who could be more tolerant than those participants from Andrews and Haworth's (2001) live test on experienced Internet users

A usability research studied by Ekermans and Hartsliel (2003) provide a first step to investigate usability of an online interaction using a computer mediated system. Taking a closer examination of this study by Ekermans and Hartsliel (2003), the researchers' aim to

explore usability based on participant attitudes towards video conferencing via NetMeeting, which is another form of synchronous chat medium with additional visual aid. The study group consists of 35 South Africans working students, and is conducted in a laboratory environment with an observer where the technology of Intranet for on-campus and Internet for off campus was simulated. Although there is insufficient information regarding the delivery design, both subject and objective assessment results reveal an acceptable usability level for participants with little difficulties completing the tasks and has enhanced information sharing.

Given it has been acknowledged that the usability and satisfaction are very much dependent on the context of use (Jokela et al., 2003; Bevan et al., 1991), these studies assist to provide a good foundation, a body of knowledge and framework for which could be applied to subsequent research including case studies in this research.

The results from these studies have been generally positive where participants enjoy the online participation even though they encounter a variety of difficulties that will be discussed in the upcoming sections.

Clearly the technology use to support student communication and interaction should not detract from the main aim of learning. Learners must be able to focus on the content and the interactions within of the chat session. In some cases, students who are new to this form of communication must familiarize themselves with the technology while having an understanding of the course content discussed. Hence, the technology should not impose a barrier to student learning, be easy to operate and user friendly to most if not all individuals (Schrum and Hong, 2002).

Studies on of the online chat experience in education, in particular full online learning, embraced the principles of online interaction to foster student learning and its immediacy, this in turn enhance users social presence (Motteram, 2001; Mercer and Davie, 2002; Wang and Newlin, 2001). Researchers indicate some valuable features, some deficiencies, and

some conflicting views of using chat software to promote participation and the impact of the underlying supporting technology.

Recognizing that different cultures have different values and perception, therefore the usability of the system depends upon the context of use. The literature tend to include a mix of participants from diverse cultural backgrounds in which Asian participants are a subset of the overall group. No literature found to date examines the blended learning model in which almost all the participants are from South East Asian background, interacting with the offshore lecturer located geographically apart in Australia. In this regard, it makes this research unique and furthermore it contributes knowledge to current research gaps. Research generally investigate a small sample of participant's perception and their experiences of online learning in a board context, without discussing the underlying factors affecting their perceptions and perceived values and deficiencies of synchronous online chat. Hence it is not clear how relevant individual perceptions are in comparison to the overall group.

2.5 The Positive Perception and the Value Of Online Chat in Practice

One of the most recognised benefits of online chat is its ability to promote participation and provide an engaging experience for participants, in particular those who will not normally participate in a traditional classroom setting (Mock, 2001; Lawrence-Slater, 2002; Balazs, 2002). Many educators acknowledge the importance of student interaction and engagement in the learning process (Balazs, 2002; Klemm, 1998). Furthermore, the literature review surrounding synchronous chat strongly supports the notion that the immediacy of this form of communication has strong merit in engaging students and maintaining their attention (Wang and Newlin, 2001). Generally, it has been conveyed as a comfortable learning environment for student discussion Department of Education and skills (nd). Many chat forums are also readily available and at no cost, with only basic computer literacy required to operate the system.

The nature of text-based communication, as in a synchronous online chat medium, provides a level of anonymity that “allowed students the freedom to express what they might not in a

face-to-face setting” (Pallof and Pratt, 2001; Mock, 2001). Passive participants readily open up to partake in the discussion, as it is less intimidating. Apart from being “free of socio-cultural bias”, Kearsley (2000) and some of Balazs (2002) participants, suggests such interactions concentrate on the content rather than being influenced by external factors such as appearance, language skill, speech difficulties, and unease of speaking in public, which may interfere with active participation in the traditional environment.

Hence, students who are more introverted, less self-conscious and typically timid in a face-to-face learning environment, are more likely to feel comfortable and be actively involved with the online chat. This helps to create a lively and open interaction without the need to deal with facial and body cues of their instructors and peers (Pallof and Pratt, 2001). Pallof and Pratt (2001), and Balazs, (2002); have found that students with a more reserved personality are seen as more extroverted, more vocal and actively participating in the discussion. Similar findings are found in Wang and Newlin 2001, who reported that chat is particularly helpful to shy but “enthusiastic” students, helping them to open up to share their views. Karayan and Crowe (1997) in Mock (2001) identify that the goal of online discussion is to facilitate group discussion allowing more equality participation amongst the participants, at the same time promote classroom community and information sharing. Text-based communication allow these students to enjoy the benefit of being able to reflect and provide a more well thought out response prior to sending the posted messages, as well as a fair opportunity to participate in the discussion (Balazs, 2002).

Despite conflicting views regarding the value of Computer Mediated Communication (CMC) in the literature, Garrison (1990) argues that CMC is highly successful precisely due to its very nature. The entire dialogue could be reviewed at any stage, while ideas and issues could be worked on and refined before messages are posted. It enables all users to archive the discussion to follow up or check on any part which may have been confusing (Mercer and Davie, 2002).

Having the time to think about a message before it is posted means that more dominant participants are not in a position to interfere when more timid students express themselves in online chat. This process enables the majority of, if not every students with a fair chance to be involved in the chat discussion (Balazs, 2002). The timeliness of chat does not have the same real time effect of the face-to-face discussion, students can view their text messages before determining to post to the public. Hence, it is not surprising to note that online text-based communication stimulates more “reflection, focus and understanding” of the discussion taking place, as well as providing “increased opportunities for dialogue” with the lecturer and the study group even in instances where it is part of the on-campus learning programme (Bunker and Ellis in Ho, 2002).

The ability to question and receive immediate feedback increased the learners’ social presence and sense of belonging to the learning environment (Motteram, 2001). This serves to motivate student participation and encourage positive student perceptions to remain engaged and personally connected with other students (Wang and Newlin, 2001).

Furthermore, the timeliness of communication in synchronous chat provides opportunities for questions, responses, and follow up queries, to be addressed and follow through. It maximizes the chances of achieving an appropriate level of shared understanding and enable participants to feel associated with the (offshore Australian) instructor (Mosher, 2003 ; Mulder, Swaak and Kessels (2002) in Ekermans and Hartslief). Aside from this, Dolen and Ruyter’s study (2002) expressed that a valuable feature of online group discussion is that it allows the sharing of information, even across cultural and international boundaries (Lawrence-Slater, 2002). It is highly receive as an innovative way of learning (Dolen and Ruyter, 2002). As a result, interaction is often been cited as a key reason for the use of synchronous chat in online learning (Downes 2002).

2.6 Chat as Compared to Asynchronous Learning

For all individuals, online learning aims to empower students to show more initiative and play an active role in their learning and in this process the instructor act as a facilitator (Pallof and Pratt, 2001).

Research continues to emerge regarding the ability and usefulness of various modes of interaction to champion best practice in online education. Herring (in Smith et al., 2000) believes that the key benefits of synchronous online chat over asynchronous chat is the immediate response time for brainstorming of ideas and unclear issues are more likely to be resolved on the spot. Mercer and Davie's (2002) work also suggests that synchronous communication facilitates an environment for participants to share a range of views, challenges, and reduce anxieties creating a fun and relaxing environment, which forms part of the chat experience. It also aims to facilitate an increased commitment to learning for participants.

Although, it is obvious that chat media is useful for building community and increasing student presence for online learning (Mosher, 2003, Mercer and Davie, 2002, Wang and Newlin, 2002), it has been argued that it might not be viable for in depth discussion (Horton, 2000; Motteram, 2001). Downes (2002) comments that from his experience as an academic that the communication inside the chat may be merely presenting information rather than the actual interaction or discussion over the issues. Interaction in this case refers to the process between participants or a group of users posting messages online, reviewing them and responding with return posts occurring several times. In contrast, Motteram (2001) indicates that in depth academic discussion is possible in a synchronous environment provided the activity is well managed. In supporting this view, Preece (2001) argues that academic discussions have greater depth compared with other scenarios such as patient support communities. The breadth and depth of the discussion varies depending on the context and environment.

Other evidence in the existing research claims that quality of discussion and cognitive level of thinking is not a natural process; preparation needs to be captured in the course structure.

Factors, including instructional design, has a large influence on the quality of online synchronous discussion (Mercer and Davie, 2002; Wojnar, 2002). In Wojnar's study (2002), the discussion questions are intentionally designed at a more challenging cognitive level. The result shows a higher level of thinking and reflection in the printed synchronous chat material. In the research undertaken by Mercer and Davie (2002), a more constructivist-learning environment is created, utilizing synchronous online chat as a method to debate and clarify issues and reach consensus.

There is a requirement for well thought out and tested strategies to ensure online chat meets the need of the learners; this includes the instructor's ability to facilitate the chat well through timely responses to queries and confidence in providing accurate responses (Wang and Newlin, 2002).

Wang and Newlin's (2001) and Motteram (2001) comprehensive research on full web based learning includes the use of various components such as asynchronous forum posting, email, web pages, and online chat. Chat rooms are being rated highly in promoting successful learning by the cyber students but unlike asynchronous communication it is limited for instigating in-depth discussion.

Synchronous tools are more effective at promoting interactivity amongst students to enhance learning potential while asynchronous tools are more suited to dealing with the academic aspects of the course. The value of synchronous tools lies in enabling students to elaborate and consider their viewpoints in relation to other different perspectives. Students have a prominent role that move beyond being merely passive recipients of information to being actively dynamic participants engaged in communication. Under these circumstances, participants are able to reflect and competencies providing pedagogical planning and effective management (Motteram, 2001).

2.7 The Negative Perceptions And The Deficiencies Of Using Chat Software For Group Interaction

A key shortfall with text-based communication is the absence of verbal cues, there is no way of knowing whether words are being understood and keeping a check of user reactions

(Balazs, 2002; Carroll, 2002). To minimize the risk of misunderstanding, it is helpful to set ground rules prior to the beginning of the session in reference to inappropriate language and behavior (Carroll, 2002).

Ironically, there has been substantial research, which demonstrates that, while the most standard online chat software does offer benefits such as a text-based medium and almost real time conversation, it also suffers some deficiencies that influence chat efficiency. These deficiencies can be grouped into two core areas. Firstly, there is the difficulty of differentiating speakers, and secondly the lack of interaction controls. Standard chat software lacks the ability to administrate interruptions, orchestrate turn taking, convey comprehension and resolve floor conflicts. (Motteram, 2001; Vronay et al., 1999; Smith et al., 2000). Participants in Lawrence-Slater's (2002) study suggests more controls is needed and for the offshore lecturer to improve the management inside the chat room.

Chat efficiency may be hampered either by the lack of an obvious identifier for users such as the use of nicknames (Vronay et al., 1999) or the manner in which each message and identifier are presented may make it difficult to associate the name with its post (Smith et al., 2000). It could be argued that a main weakness with the spontaneous nature of chat is that it allows users to construct messages simultaneously and there is no a need to wait in turn. In contrast, other researchers see this as being a desirable feature of online chat (Mercer and Davie, 2002; Wang and Newlin, 2001; Smith et al., 2000) allowing freedom to express with less interference as discussed under previous section. Therefore, it is a challenge for academics to strike a balance in drawing on the most positive aspects and improving learning outcomes of online chat while minimizing the undesirable features for users of this medium.

Standard chat software lacks visible indicators to convey the progress of a user's turn such as whether the user is typing a response, or the user is in the process of absorbing the posted message. It also lacked the ability to control interruptions, as there are no mechanisms in place to manage turn taking, either in asking or responding to a message. Short delays are experienced while messages are being transmitted, suggest that users are also likely to send

through additional post or may eventually modify their initial query. The number of individual turns each user has during a session is not visible to all. Similarly, there is no control or formal structure over whose turn it is to respond, reply or ask questions (Garcia in Smith et al., 2000).

As with face-to-face discussion, synchronous messaging may also encounter “flaming” behavior such as rude, aggressive and impulsive messages (Handel and Herbsled, 2002). Users generally do not have an opportunity to relay comprehension, any conflict can be frustrating and may not be easily resolved in a short space of time (Smith et al., 2000).

These shortcomings often lead to misinterpretation when users experience possible time lag with the system or silence in a conversation. As a result, the individuals carry on with a conversation without necessarily waiting for a response causing incoherent conversation flow as well as affecting the readability of messages (Vronay et al., 1999; Smith et al., 2000).

Extroverts thrive on needing feedback quickly on ideas; hence these individuals find any online environment, which does not address this element annoying. Hence, it comes as no surprise when Pallof and Pratt (2001) noted that extroverts, as opposed to introverts, might find it more demanding to use text-based communication compared to verbal and social interactivity.

Often it is not clear whether specific comments are being directed to all users as a broad comment or being address to a particular user for their response. Alternatively, it may be difficult to identify which question a written response is addressing in an often busy online session (Vronay et al., 1999; Smith et al., 2000). These factors in affect add to the frustration extroverts’ experience.

The rationale that explains the difficulties experienced is that the central server arrange posted messages in the order in which the messages arrive, when user presses the enter key. Consequently, messages do not generally flow on in a systematic order, but are intertwined

and can be hard to follow. Smith et al. (2000) describes the end affect being confusing, characterized by a disorganized chain of short messages with a high portion of chat used to clarify confusion. Furthermore, users could be easily distracted and baffled by the amount of activities, this creates a continuous flood of messages scrolling down the screen. The history of the chat recording can easily be lost when the conversation flow moves to a new page (Vronay, 1999). It is difficult to scroll back to revisit the chat history during a live session, whilst the user could be doing this, the conversation has since progressed (Vronay et al., 1999; Smith et al., 2000).

Thus, users find it practically difficult to follow the conversation if they are not attentive or are being interfered at any stage during the entire chat session. In fact, sometimes participants will give up their turns when they perceived someone else has beaten them in posting the message and changed the direction of conversation topic (Garcia in Smith et al., 2000).

Users could also be insecure in knowing that their remarks are in written form and could be kept as a permanent record by all as oppose to conversations being verbal (Motteram, 2001).

From a different perspective to Balazs (2002), other authors, like Lawrence-Slater (2002) studied a class consisting of a mix of cultural groups from Australia and Singapore. He suggests that language proficiency skill in particular written communication can interfere with participation. Students with a lower level of language proficiency find it difficult to discuss complex issues. They are said to be less likely to participate with online discussion (Bernath and Rubbin, 2001). Online messages are purely reliant on text-based communication, which could be misinterpreted since there is a lack of visual cues such as eye contact and body gestures as noted in Wang and Newlin (2001). Despite that, they also find individuals with language barriers who are motivated and enthusiastic are readily prepare to participate as the medium is particularly helpful to timid and interested students to open up to, and share their views.

A participant in Motteram's (2001) study note that thorough explanation may not always be clear and could potentially be ignored. It acknowledge some students feel uncomfortable questioning basic concepts, as they fear that it may be a public indication of their level of understanding or ability to cope, yet their fear has been outweighed as it could be demonstrated that students has gone beyond surface chat discussion and have become critically involved in the debate.

Users have claimed the difficulties in communicating under a group environment. (Lawrence-Slater, 2002). Synchronous chat is typically delivered in a fast pace environment, it is evident that online chat disadvantaged those with slower typing skills as well as those who need sufficient time to reflect before constructing their response. A couple of participants in Motteram (2001) note that by the time students with slower typing skills post their message they may find that numerous messages have already been posted, making theirs out of place. Slow typists may abandon their turns. However, other researchers recognize that synchronous chat media is not solely about acquiring fast typing skills, more importantly it requires users to be quick witted and respond on the spot as well keeping up to pace with the discussion (Department of Education and Skills, nd.). Klemm (1998) explains that this is not an easy process; it demands much effort. It is therefore vital for students to remain focused and in full concentration to prevent themselves from losing track of the context of the conversation.

It has been observed in Mock's (2001) research that a potential disadvantage of synchronous chat is that some students are likely to take the easy option of seeking the instructor for solutions to their questions. These students are likely to ask the instructor for answers rather than spending time and effort to explore the solutions on their own or amongst their peers. They merely present ideas and information (Downes, 2002) rather than discussing the topic, essentially this compromises the purpose of promoting interaction and learning.

Consistent with the literature, Downes (2002) an academic who uses online chat for teaching, describes through his own experience, that online chat interaction and the content is delivered fast, slower learners are placed in a vulnerable position by not being able to keep with the conversation flow and could easily be lost in the process. Participation and discussion demand mental efforts as noted by Klemm (1998) is not an automatic process (Balazs, 2002). Without additional guidance and incentives, participants are relatively reluctant to participate voluntarily (Lawrence-Slater, 2002; Mock, 2001).

Downes (2002) comment that interested and engaging participants are less patient during less productive instances of the chat event. On the other hand, other participants are agitated during less productive times of the synchronous chat. It is not uncommon that online chat can create a competitive atmosphere or be seen as a race to respond to the floor immediately after someone convey their point across. This may hamper the quality of the messages posted (Smith et al., 2000).

A range of variables come to play around the issue of student behaviour and their likelihood of participating with text-based discussion. Students' positive perception and satisfaction with synchronous online media are critical to the success of the online course. Their perception and behavior can drive a range of motives. A lack of participation or refusing to try online chat media for instance as described in research could have a real impact on the overall learning experience for the entire class (Pallof and Pratt, 2001).

2.8 Supporting Technology Issues With Network Connection And Transfer Rates

One of the key factors affecting students' satisfaction with online courses is technical design (Bolliger and Martindale, 2004). Clearly the technology used to support student communication and interaction should not detract from the main aim of learning. Learners must be able to focus on the content and the interactions within the chat session. In some cases, students who are new to this form of communication are required to familiarize themselves with the technology in the same online chat session, in which the course content

is discussed. Hence, the technology should not impose a barrier to student learning, be easy to operate and user friendly to most if not all individuals (Schrum and Hong, 2002).

Educational institutions are continuously aiming for higher standards to enhance technology and equipment enabling communication lines to be faster and further increase the rate of transfer. Many of the text-based messaging services systems rarely work well in the initial trial and their reliabilities vary; some systems might not work well due to firewall problems others might require special connection to ensure quality of the transfer. The rate of transfer with Internet connections remains a common problem (Downes 2002) and it has proven to be a difficult barrier to overcome, thus is likely to interfere with the delivery of any live chat session (Pallof and Pratt, 2001). Mosher (2003) describes the experience, as *“there’s nothing frustrating than trying to learn when your screen doesn’t replicate as quickly as you’d like or when the audio gets delayed or broken because of a slow Internet connection.”*

The benefits of incorporating the latest gadgets and technology do not appear to outweigh the desirability of faster Internet access. Mercer and Davie (2002) highlight that problems associated with technology at any point in time during the timeframe in which the online chat is to occur could have substantial impact on effective participation and collaboration. It could potentially limit the level of involvement and engagement of what could be highly interactive environment. This is a delicate issue to address as online chat such as IRC does not have the ability to capture the messages as in asynchronous communication if participants are not logged into the chat room.

2.9 Usability of Chat Software For Group Work

Having an understanding of user interest and the need to engage them in online communication is crucial. Equally important is determining the possible underlying values and difficulties experienced by users of computer mediated chat for group interaction. It helps to ascertain whether the needs of specific groups can be matched up or whether a one size fits all approach is appropriate and manageable (Herbsleb et al., 2002).

This section is devoted to the challenges being presented and debated on in relation to the usability of the chat software for group work. It begins by exploring the different definition

of usability and the different approaches of measuring usability. This leads to a discussion of why usability is a significant aspect of the chat software in determining human-to-human interaction and human to technology interactivity. This is followed by a presentation of the key determinants of perceptions and satisfaction for group discussion that have been reported in the literature.

Understanding users' acceptance or rejection of the information system has been a challenging area for researchers (Doll et al. cited in Money and Turner, 2004). Traditionally, the term usability is broadly defined as the ease of use and acceptability of a product; more specifically Foraker Design (2002-2005) articulates it as "the quality of a system that is made easy to learn, easy to use, easy to remember, error tolerant and subjectively pleasing".

2.9.1 ISO 9241-11 International Standard Organization definition

Generally, usability can be described as a measure of the effectiveness, efficiency, and satisfaction as specified in ISO 9241-11: "The extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specific context of use" (Bevan et al., 1991). This definition is primary for measuring information system, and International Standard Organization (ISO) described them as three distinct aspects (Frojkjaer, Hertzum and Hornbaek., 2000).

It is appropriate to employ Frojkjaer, Hertzum and Hornbaek (2000) explanation these three aspects are effectiveness, efficiency and satisfaction.

- Effectiveness is referred to as "the completeness and accuracy with which users *achieved certain goals*, the outcomes of user's interaction with the system."
- Efficiency being the product of users' ability to achieving their goals through *resources utilized or work rate*.
- Whilst satisfaction is defined as the users' comfort zone and positive attitudes towards the use of the system.

It further recommended that usability tests for complex tasks in computer system should include these three measures. In selecting these constructs, it calls for the need to consider the domain and context of use to reveal measures that are critical and relevant for the particular context. Mitsue-Links Co., Ltd. (2005) proposes that “engagement or fun” may be more appropriate attribute to consider rather than efficiency when developing a computer-based training package.

The ISO9241-11 theoretical definitions on effectiveness, efficiency and satisfaction are very broad allowing it to apply to a variety of product oriented systems; for instance what is meant by efficiency in one context may not apply to another system. Indeed the term has a different meaning to different people depending on the purposes and the context or scope that it is being used (Bevan et al., 1991). This broad definition perplexed some researchers in the field, and there are ongoing debates on the relationship amongst these three constructs (Frokjaer, Hertzum and Hornbaek, 2000).

Not only are these constructs difficult to directly observe (Bevan et al., 1991; Gutwin and Greenberg, 1999) it is influenced by many other variables, not limited to individual characteristics (Bevan et al., 1991). The context of use within the system domain covers the tasks, the people, and the interacting technology that constitute the domain specifics. (Frokjaer, Hertzum and Hornbaek, 2000). Hence, in selecting the measures, it is crucial to take into account the application domain and the context of use to reveal the appropriate and critical measures that are suitable for the environment.

In addition, according to Foraker Design (2002-2005) the usability of groupware are required to be more efficient compared with single user systems as the pace of the conversation influence the interaction speed of the application. Groupware systems are designed to facilitate group communication, cooperation, coordination group work such as chat room applications where participants communicate with one another on a specific topic, elicit possible and alternatives ideas, offering a diversity of opinions to the issues. Therefore, it could only be successful if a majority of users choose to use the technology. It can also be defined as “computer-based systems that support groups of people engaged in a

common task (or goal) and that provide an interface to a shared environment.” (Ellis et al.,1991)

Groups could be supported in informal chat and be highly interactive as they have the opportunity to interact with all users in a geographically separated environment (Herbsleb et al., 2002).

The software application reliability and efficiency becomes more critical in order to support a groupware system, which relies on all, or a majority of the user group to accept both the efficiency and the use of the system. (Brinck,1998). In this respect, it is important to understand the users’ attitudes and perceptions to use the innovative system for group interaction.

2.9.2 Technology Acceptance Model (TAM).

A well accepted model known for evaluating perception and attitudes is the Technology acceptance model (TAM). Unlike ISO 9241-11 to a certain extent, TAM is well known by usability researchers for its reliability and validity in evaluating various information systems. Consistent with ISO 9241-11, TAM also consists of three primary constructs, these are:

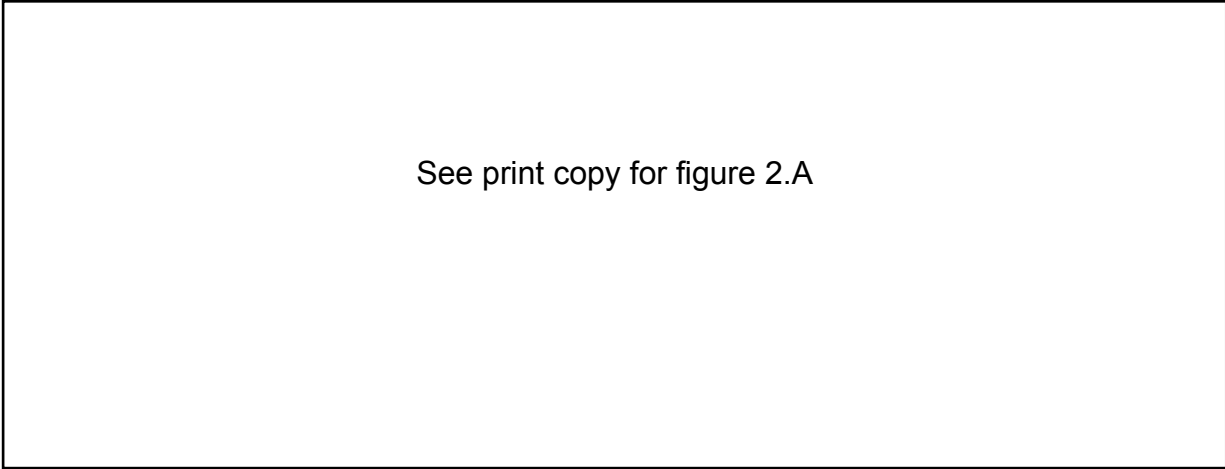
Perceived usefulness (PU) is defined as “the degree to which a person believes that using a particular system will enhance his or her job performance.” (Davis 1989).

Perceived ease of use (PEOU): “the degree to which a person believes that using a particular system will be free from effort”, (Davis 1989), that is free from physical and mental effort. Perceived usefulness is also subjective to EOU with other factors remain equal (Davis and Venkatesh, 1996).

User attitudes is defined as users’ desirability of using the system (Mathieson, Peacock and Chin., 2001) or simply user satisfaction. An understanding of what is meant by user satisfaction is also discussed in Goodhue and Straub’s work (in Evers and Day, 1997), it

represents the degree to which a “user’s perceived personal needs” and “their ability to perform a task” is satisfactorily met by the system.

While both PEOU and PU also influence users’ attitudes toward using the system, there is also an indirect influence of PEOU on the perceived usefulness of synchronous online chat as illustrated in the original TAM model, as shown in Figure 2.A. This essentially means that the easier it is to operate the system, the more likely students will communicate with one another, hence the more they learn from the information exchange, with other factors remain equal.



See print copy for figure 2.A

Past information system research confirm that users beliefs and their attitudes towards new IT systems play an important role in determining their likelihood to adopt or use the technology (Davis, 1993). This is also supported by a series of works conducted by researchers such as Xia and Lee (2000) who argued that users freely act in using the technology if they intend to do so. They found that user beliefs and perceptions are the key determinants of behavior.

The TAM theory, originated and is modified from the model - Theory of Reasoned Action (TRA) (Fishbein and Ajzen, 1975, in Malhotra and Galletta, 1999), it has been created to link external variables, user acceptance and actual use of technology in a work setting. External variables relate to system design characteristics, training, computer self-efficacy, users being involved in the design process, and the implementation process influenced their perceived usefulness and perceived ease of use. The perceived usefulness and PEOU in turn

influence users' attitudes towards the technology, subsequently affecting the intention to use.

The difference is that TRA is used to explain a broader range of behavioral intention based on belief and attitudes of individual and of others (Money and Turner, 2004). Ultimately, the user will learn to possess particular behavioral characteristics and perceptions as it is likely to result to a positive outcome (Compeau and Higgins 1995). The classic TAM is tailored to investigating user behavior in the context of information technology acceptance.

Subsequently, Venkatesh and Davis (2000), identify that some users utilize the new medium independent of their attitudes towards the new product. It is also independent to the fact that the product may provide productivity enhancement and the technology is easy to use. In the light of this, the attitude construct has been removed from the TAM. In recognizing TAM's shortfall, interestingly, a number of researchers thereafter still continue to use the original model of TAM; such as Mathieson, Peacock and Chin. (2001); Malhotra and Galletta (1999); Dolen and Ruyter (2002). These researchers have found strong relationship between, either one or both of the perceived perceptions and the attitudes. In evaluating user perceptions and attitudes, it is logical to analyse the desirability of the system using the three primary constructs of TAM namely PEOU, PU and User Attitudes.

According to researchers, TAM is widely recognised as a leading model utilised to assess, predict and explain user acceptance and utilisation of upcoming technology to evaluate high-risk investments in information technology (Davis, 1993), Davis and Venkatesh (1996).

A limitation of TAM is that not all variables which impact on product assessment has not been extensively investigated (Malhotra and Galletta, 1999), but the empirical research has supported that the key constructs to consider are perceived usefulness and perceived ease of use (Davis and Venkatesh, 1996).

2.9.3 Similarities Between ISO 9241 and TAM

As ISO 9241-11 is particularly broad, it is therefore not surprising that these variables fit well with the key constructs in TAM that has been used to determine user perception toward accepting the information system. Compare to ISO 9241-11, TAM provides greater emphasis on user perception and attitudes towards participation and using the system.

The three key TAM constructs that resembles the three ISO 9241-11 constructs (in Bevan et al., 1991), has been applied to this research are:

- Usefulness which resembles closely to the effectiveness in ISO 9241-11, in that it covers the outcomes of the interaction;
- Ease of use which resembles efficiency in that it denotes the process leading to the outcomes; and
- User attitudes, this is closely related to satisfaction in ISO9124-11, as it refers to the positive attitudes toward using the system, which are influenced by the previous two constructs, that is a fail system could lead to undesirable outcomes.

At a deeper level, TAM further elaborates and identifies the association between the constructs.

TAM has had its validity tested on using questionnaire approach to research mainly on software application (Davis and Venkatesh, 1996). A weakness with the TAM and the ISO-92411 models are its limited ability in measuring human-to-human interaction component as required in an interactive chat system to be used for group discussion. Davis et al.(in Malhotra and Galletta 1999), identifies that TAM does not account for social influence in the adoption of the technology, nor does it evaluate users acceptability looking at the overall perception without the specific details. Hence it is not sufficient for iterative design purposes, which is required to assist improvement of future research design (Xia and Lee, 2000).

The two theories provide a sound framework for the two case studies in this research evaluating users' perception and attitudes toward participating in the synchronous group

discussion using the online chat software. Unlike other information systems, which tends to concentrate on human to system interaction, this research will also place emphasis on human-to-human interaction.

Again, there is a very limited TAM research that has been applied to online chat. One of the few studies that have been found in Dolen and Ruyter (2002) research, TAM has been applied to synchronous chat. In this context, usefulness refers to the outcomes of the usage; this could be information and (or) social value. While, EOU relates to the outcomes that has been achieved through using the services (Childer et al., 2001 in Dolen and Ruyter, 2002), it is concerned with information and social values (Dolen and Ruyter, 2002). Dolen and Ruyter (2002) experimental research has been conducted inside a laboratory, under a commercial context using Internet Relay Chat (IRC) to support e-services and enhance consumer and consumer interaction. In this case the participants chatted with an advisor on financial investment fund. It is instrumental for groups to accept and use the system in the context of online communication as they need to work in collaboration to interact with one another (Brinck, 1998). In the light of this, researchers note that at the group level, both ease of use and usefulness are significantly related to satisfaction.

It has also been articulated that the favourable perception of ease of use is possibly affected by the design of the software and members inside the chat room who help and supported one another.

2.9.4 Measuring Usability Pertaining to Online Chat

Usability measures for online chat varies according to the context and domain of use. A narrow selection of usability measures for system evaluation risk unreliable conclusions drawn and the overall usability is compromised. It is therefore worth investigating the literature to find out what has been documented on the determinants or measures specifically related to online groupware or community.

The literature documents that there is no one accepted definition and approach to usability (Bevan et al 1991). Since there are difficulties in the ability to directly measure usability,

more recently, researchers seek to explore the possible indirect measures of usability, which places more emphasis on users' attitudes and satisfaction measures to various factors that are found in the context of study. Although the determinants for satisfaction are also yet to define in the context of online synchronous chat, but it is an important construct for the success of online tools (Dolen and Ruyter, 2002).

In theory each element of groupware may require different research methods and can be approached in a variety of ways to determine its usability. It can be measured from *product oriented view* such as the ergonomic attributes of the product, or *from user-oriented view*; such as mental effort and users' attitudes such as ease of use and acceptability, or from quality of use measure, and internal state of users. Nevertheless, there is a consensus that the term usability tends to focus on the *user's viewpoint*, as illustrate by the researchers below. Besides TAM, only takes in account general user perceptions and attitudes, while other researchers note users attitudes can be elicited from each element of usability. How this could be applied in the context of online chat is illustrated.

In applying the concept of usability to the groupware, Gutwin and Greenburg, (1999), recommends focusing on indirect measures of collaboration; on the product, the process or on user satisfaction:

Product measures consider the outcome of the tasks in terms of product quality and are essentially concerned with task work oriented in groupware usability where task outcomes are evaluated. It is assumed that the ease of use with the system will impact on the group's success in finishing the group's task. (Olson et al., in Gutwin and Greenberg, 1999).

Process measures concentrates on the team aspects of groupware usability, in that trends in behavioural or verbal activity during a session and are linked to effectiveness or efficiency. Video and audio tools or by observation are often utilized to measure processes.

Satisfaction measures is based on both teamwork and task work, in conjunction with the user's perceptions and attitudes regarding the collaboration process. It takes into account

the users' subjective experiences with the groupware system and their views are generally attained through questionnaires and interviews.

A shortfall with product measures in problem-solving tasks, however, is that users are able to "work around" a range of difficulties; as a result, product measures are only responsive to significant changes in the communication setting (Monk et al., 1996). Consequently, many studies of product measures report no differences in outcomes (Anderson et al., cited in Gutwin and Greenburg, 1999).

The determinants of satisfaction with moderate group have yet to be defined (Dolen and Ruyter, 2002). Several attempts to define student satisfaction level has been particularly difficult in regards to the quality of online teaching and that learning could be influenced by three important factors, namely, satisfaction with the delivery medium, the productivity and the quality of the course. Zhao (2003) suggests that student satisfaction levels with online communication are directed by course quality standards, instruction interaction and collaboration amongst the group of users, and supporting services.

Satisfaction and preference measures are primarily used in combination with other measures or with observational techniques to determine how participants feel about product and process issues (Olson et al. cited in Gutwin and Greenburg, 1999). Incorporating these aspects of groupware usability make groupware systems a much more superior and a user friendly product (Preece, 2001). This also fits well with the parameters of ISO 9124-11 and TAM definitions.

More specifically, the usability of an online chat medium to support group interaction is complex as it involves many facets of Human Computer Interaction (HCI); it is not only influenced by human to technology interaction (the supporting technology aspects), but also by Human-to-human interaction (the social aspects). When dealing with systems design, the literature (Preece, 2001; Andrews and Haworth, 2001; Foraker Design, (2002-2005) recognizes the need to understand and design for social interaction given there is a strong relationship between the two aspects.

It can be seen that a positive and successful learning environment ought to enable users to read, comprehend, discuss and share ideas and information to encourage active student participation. The feeling of being engaged is linked with user motivation levels, learning and understanding of class material (Knight et al., nd) Users need to stay engaged in chat communication for the extent the system to work successfully under these circumstances.

Having said that, factors that has been noted to have impact and influence of online course included the relationship between technology employed, instructors and users. A successful and well planned course need to consider a balance amongst the three interrelated variables: the user and the technology, the instructor and user connection along with the interaction amongst the participants (Schrum and Hong, 2002).

Both Andrews and Haworth (2001) and Preece (2001), who are experienced authors in this area, feels that there is a need to differentiate sociability and usability to evaluate the success of online community. Preece, J. (2001) notes that “Sociability is closely related to usability and could be thought of as a new genre of usability, it also has significant differences.” Sociability is described as how individuals interact amongst themselves utilising a supporting technology, whereas usability is primarily involved with how users interact with the technology (Preece 2001).

She further articulated some of the important facets that influence sociability and usability frameworks. For sociability, the three contributing factors are firstly, objectives of the community. This may be shared focus, information, or supports that inspire the members to associate to the group. Secondly, the participants and the possible roles they play in the community, their characteristics; noting that passive receiver as opposed to active contributor can cause small community to fail due to insufficient posts to attract participants. Thirdly, policies and governance construct relates to the facilitating of the interaction; such as rude and abusive language.

Clearly there are shortfalls with online communication as there is no face-to-face contact which makes it difficult to recognise any problems users are being confronted with. Well defined objectives and clear expectations of the online chat session may help to strengthen students' trust in the process. Collier and Morse (2002) suggest that this is likely to play a positive influence on student satisfaction and commitment.

From Preece's (2001) description of these factors, it can be seen that these factors can set up the environment that influence participants interaction or climax during the chat session, hence affecting participants attitudes, or more specifically their satisfaction toward using the system. This has been supported by Deighton et al. cited in Dolen and Ruyter (2002), whose research demonstrates that customers have the ability to create a positive impact on the climax during the interaction.

As a result, Preece (2001) offers but a more detailed set of criteria for assessing sociability specifically related to online community including online chat. She identifies the following set key measures of sociability, it covers the: "number of participants in a community, the number of messages per unit of time, and *member satisfaction*". Primary measures for usability includes "productivity, the numbers of errors and again, *user satisfaction*". The common measure between usability and sociability highlight in Preece's work is user satisfaction.

The four component influences usability consists of firstly, the dialogue and social interaction support, which relates to the timeliness of feedback, the speed of learning, the ease of participation, and satisfaction of the overall interaction experience. The other components include information design of the system, the aesthetically pleasing of the system design. Thirdly, navigation being the ability of users move around to gather the information they are seeking, and finally, access to the medium, which also covers the bandwidth and innovative technology. Each of these components can be tested base on the pace of user learning, outputs, *user satisfaction*, retention, and error rates. Much of the online chat research in education that has been raised align with Preece's four major components to usability.

However, as no two online environments are identical, Preece (2001) acknowledge the unique aspects of each community, some being more tolerant than others, this is considered important in order to develop strategies and successful determinants to assess the context. The determinants used for each study is dependent on the setting as the selection of tools to guide the desired outcomes. The set of key determinants she identifies above are her initial steps to define usability, and have yet to be applied to a community. Preece (2001) recommends that key measures of sociability and usability incorporate a rich descriptive approach to research, triangulation of data and painting the respondents' viewpoint to the many facets of online synchronous medium.

Similar, but not as extensive as Preece (2001), usability and sociability components are elicited in Andrews and Haworth's (2001) study, the study examines the operational problems and customers experience of using the online chat for one to one electronic customer services. They suggest that access, technical design, sociability design and website usability, have impacts on user attitudes, specifically satisfaction towards the use of the medium under the context of customer services. Problems with usability components could be elicited based on analyzing the results of user online customer service chat experience.

The authors note that during periods when of the pace of the chat is slow, there may be a level of uncertainty and an uncomfortable atmosphere particularly given that there is a lack of status when there are no responses. Therefore, users' not knowing what is happening on the other side of the communication unless the recipients at this end indicate their intention. Furthermore, participants often feel impatient when they experience slow connection while attempting to log into the site and when the facilitator is not available once they log into the site. Other technical design problems relate to a small text box design for data entry in conjunction with website usability problems such as web page design and navigation of the system.

Sociability design problem relate to human aspects that are being affected by the underlying technical design problems, this includes generic response and a lack of personalized interaction. Politeness, etiquette and the quality of the messages or wordings, also have an impact on participants.

To this end, they suggest that perceived satisfaction with the conversation is influence by the quality and clarity of the messages, responsiveness efficiency with the chat system and the technical difficulties experience such as disconnection and ability to timely log in to the system (Andrews and Haworth, 2001; Preece 2001). Gutwin and Greenburg (1999) acknowledges that, Andrews and Haworth (2001) and Preece (2001) usability and sociability determinants have similar coverage in measuring satisfaction levels using product and process determinants.

2.10 Delivery Design Of Chat Session For Group Discussion

Online instructional designs are generally customized to meet the needs of users and the setting and the nature in which the material is to be delivered. There are no clear cut or prescriptive method of delivery, simply more preferred ways to facilitate an ideal setting for learners to maximize their educational outcomes (Shambaugh and Magliaro 1997) in Wojnar (2002).

Research to date has been heavily concentrated on how technology impacts on student learning and satisfaction (Phipps and Merisotis 1999). Many researchers including Pallof and Pratt (2001), also establish that having an understanding of using the technology and the software alone was an initial step forward in utilizing synchronous online chat, as there are many factors that influence the optimal use, user attitudes and their experiences of the system, while group size, learning tasks, student motivation and the style of teaching and interaction with the instructor are just as important Phipps and Merisotis,(1999).

These factors will be discussed below and they will be taken into consideration when designing the online chat medium for this research.

2.10.1 Group Size

Many of chat systems available limit the number of participants in a chat room for a valid reason. The group size has known to have direct affect on the ability of all members of the group to participate and the interactivity of the chat media. Dolen and Ruyter (2002) have also found that it has significant influence on the user satisfaction. But research to date has little evidence to suggest the optimal or maximum number of participants per group in each online chat session.

Pallof and Pratt (2001:2001) proposes that groups should be kept very small to enable equitable contribution by all users not simply the more outspoken ones or the users with fast typing speed. It conduces an environment to enable users to stay in pace of the message flow and users are free to convey their opinions openly. However, the authors are not prescriptive in providing exact figures for an optimal group size.

Whilst, it has been documented in the literature that the ideal design for successful use of group communication technology is collaborative learning with group size less than ten students (Hiltz cited in Coles and McBride, 2004). Mercer and Davie (2002) study group had 3 to 5 students for their collaborative project which has been highly successful. While Wojnar (2002) case involved a group of six participants for her chat session reported positive outcomes.

Dolen and Ruyter's (2002) identify in their moderated chat group of seven participants delivered as part of customer service support note that groups consisted of a greater number of respondents are more satisfied with the chat experience than groups with very small numbers. It proposes that their more satisfying experience is due to the ability of a range of users being able to share experiences with each other. He further arbitrated that a continuous increase in the group size is not unlimited and but should carried out with caution. In situations when groups turn out to be large, the chat session has often been described as confusing and a challenge to keep up with the discussion flow. Downes (2002) notes that many people in a group session could lead to "presentation" of the post rather than interaction.

Interestingly, Wang and Newlin, 2001, indicate a much higher maximum number of participants in a chat room. The authors have recommended a group size not exceeding 25-30 participants otherwise it could compromise effective interactivity amongst participants. While, Vronay (1999) work with a group of five users utilising an alternative chat interface users face issues in reference to ease of use which in turn negatively impact on user satisfaction.

One explanation to suggest why some small groups thrive while others lack a hive of activity despite best effort to reinforce user participation relate to group dynamics (Pallof and Pratt, 2001). In small group size there is risk of not enough activities, to engage users which can devastate a chat room in particular if the participants are passive.

The nature of chat means that the outcomes are clearly unpredictable and can vary from session to session even with the same group of participants. No amount of planning could prepare for the reasons why some chat sessions are particularly dynamic while other chat sessions lack activity.

The literature does provide a link which suggests that there is a need to look into the composition of the chat group. However, it is often challenging and not easily feasible to be in a position to be aware of group interaction style prior to the start of the first online chat session. Individual roles inside the chat room and the level of interaction could change with this style of communication, along with the dynamics of the group which could vary substantially (Pallof and Pratt, 2001).

An instructor's ability to grasp the online group dynamics or have information of online dynamics of their user group better equip the instructor in devising methods in dealing with a range of situations. Such instances could include resolving issues with challenging users and encouraging collaboration and facilitate more interactive group dynamics (Pallof and Pratt, 2001).

2.10.2 Motivation

Two other common barriers often cited as problems include the “lack of interoperability and the lack of appropriate individual benefits” (Brinck, 1998). Though synchronous communication tools have been widely available to students, several researchers (Mock, 2001; Lawrence-Slater, 2002; Balazs 2002) feel that without additional motivation students will unlikely use the medium, due to the amount of effort involve in order to participate on top of their other commitments. Participants tend to focus on their class-based work (Lawrence-Slater, 2002). Kearsley (2000) emphasised that this is particularly true for novice online users with hectic schedules. It has been well known that interactivity enhanced attention span and motivation levels and is related to engaging users in the learning process. Under ideal circumstances, it has a positive affect on student satisfaction (Steinert and Snell, 1999). One effective strategy may be to include quality contribution to online chat as part of the course assessment and requirement.

There have been arguments for and against including participation as part of the course assessment. One needs to be aware of other aspects which is likely to be linked to motivating student participation this includes the topic for discussion, the perceived usefulness of the discussion and the level of instructor involvement (McLoughlin, 2001).

Students’ comment that personal motivation is paramount as inadequate contact time in online chat means that they are more likely to place classroom based activities in higher priority over work required for online communication. It becomes obvious during and after the chat session whether participants have taken time to prepare and read the background material as this has a huge affect on the quality of discussion (Downes, 2002).

2.10.3 Role of Instructor and Facilitator

Effective planning, design and delivery of online course is needed to drive student learning as “technology does not teach students; effective teachers do” (Whitesel cited in Pallof and Pratt, 2001). Teachers now experience a major change from their traditional role from directing instructions, leading the lesson and prompting responses to playing a facilitator role. Debate on how this change has occurred in the delivery of synchronous online chat has

been highly contentious. Being a facilitator in online chat, the teacher no longer planned the activities or followed strict agendas and only offered guidance as required (Motteram, 2001).

A proportion of students lack confidence in participating in the online chat discussion as they fear being intimidated in front of others and or are concerned about being attacked by other fellow classmates if they voice their opinions (Klemm, 1998; Downes, 2002). Participants with these characteristics are less likely to actively pursue in the chat discussion and often have minimal interest in the class itself (Pallof and Pratt, 2001). Part of the role of the facilitator is to resolve such issues satisfactorily early on; otherwise this in turn could result in an undesirable learning experience for all participants involved.

Unlike a traditional classroom experience in which students have an expectation that they rely on learning from the instructor, students in an online learning environment may be overwhelmed and often confused when they realize that a large part of learning is done through collaboration and interacting with other peers. Students need preparation to anticipate that there be a change with the instructor's role when engaging in synchronous online chat (Pallof and Pratt, 2001).

To complicate the matter further, it has been suggested that linking culturally inclusive pedagogy and online learning with an adaptable curriculum and assessment is central to increasing the success of such courses. Assessment design ought to relate to positive student educational outcomes and be completely supportive of cross-cultural educational requirements (McLoughlin, 2001). Research to date has focused heavily on the design of teaching resources for transnational delivery. Cultural differences and diverse teaching methods are thought to be the main barriers to effective online learning and global communication (Collis, Parisi and Ligorio, 1996). Dealing with different cultural values and educational systems, technological issues should to be dealt with effectively to foster a collaborative learning environment.

As a way to achieve this, Reeves and Reeves (cited in McLoughlin, 2001), recommends that the design of online chat support the following ten pedagogy variables, these are “learning theory, goal orientation, task orientation, source of motivation, teacher role, meta-cognitive support, collaborative learning, cultural sensitivity and structural sensitivity.”

Virtual online communities can only be created if learners have a common learning objective, not feel disconnected, acknowledge each other’s different perspectives and are prepared to share their knowledge (McLoughlin and Oliver 2000). Mazzolini and Maddison (2003) reports that students prefer lecturers who are actively involved in the forum, as they value the lecturer contribution a great deal more. Even though the discussion forum has been highly interactive, lecturers providing minimal input are thought of in a more negative way. Wang and Newlin (2001) recommends the instructors to facilitate meaningful interaction. In Pallof and Pratt (2001) work, it has been acknowledged that some students struggled with online chat and require the tutor to provide prompts and encouragement along the way. The tutor’s role is to monitor the level of participation by as many students as possible, investigate any issues as they arise and to devise strategies to keep the course running well (Pallof and Pratt, 2001).

An effective facilitator for a group is more likely to have a large positive affect on student motivation and maintaining their attention. Supportive interaction and scaffolding can help to increase the level of development in solving problem or minimize cognitive conflict. (Savery and Daffy cited in Mercer and Davie, 2002).

2.10.4 Training

It has been understood that product experience is likely to impact on the ease of use in performing the tasks. In research undertaken by Rice and Cases (reported in Xia and Lee, 2000), it has been identified that user’s judgments regarding system performance are associated with their duration of use and familiarity. User beliefs and their evaluation of the new technology are likely to dramatically differ as users are more accustomed and have greater direct exposure with the new technology (King and Xia, 1997).

Participants require adequate preparation time to familiarize themselves with the technology and software in conjunction with being aware of the expectation of the online chat room (Pallof and Pratt, 2001). User perception of the media is likely to have an impact on the interaction during the chat as discussed in the literature by Walther (reported in Mercer and Davie, 2002). With the immediacy of the online chat organized for group discussion, one is likely to expect that once the session starts, the conversation and messages will progress rather quickly. Participants will need to be prepared to comfortably negotiate their way through the technical and socialization aspects of this technology.

2.10.5 The Connection Between Assessment and Participation

Some researchers questioned whether participation in online communication should be a part of the assessment (Ho, 2002), as compulsory participation does not necessarily correlate with quality interaction.

In examining other research work, Hallet and Cummings cited in Ho (2002) observe that online interaction occurs when the session has an added assessment component to the course. The question of whether online participation should be assessed in order to stimulate participation is yet to be confirmed with solid evidence.

Based on Levenburg and Major's (2000) perspective, the two key reasons to grade participation is firstly to acknowledge student workload and secondly the time commitment related to online chat.

In Ho (2002), both Davis, Lacoss and Chylack feel that genuine positive learning experiences are hampered by awarding marks for active participation. The theory is that student motivation could be facilitated by the free flow of text conversations rather than passive responses to instructor driven questions. Further research is required to ascertain the connection between student motivation and graded participation.

2.11 Other Factors Influence Participation: Human Factors

Much of the research has been focus on the impact of technology on students' satisfaction and learning. Many conclude that many of the results show that the technological system is not nearly as critical as other variables including the actual task, characteristics of the

learner, the instructor and student motivation (Phipps and Merisotis 1999). Horns (1994) also suggests the effectiveness of online chat is affected by instructor characteristics, user beliefs and attitudes, as well as other aspects such as the interactivity of the media, presentation styles/mode and social group factors.

2.11.1 General Attitudes and Effort Involved in Online Discussion

Many educators acknowledge the importance of maintaining student engagement in the learning process for learning to be more proficient. Essentially, this mean users ought to be

provided with opportunities and encouraged to express viewpoints and input throughout the process (Eisley in Klemm, 1998).

The literature review surrounding synchronous chat strongly supports the notion that this immediacy form of communication has strong merits in engaging students and maintaining their attention (Wang and Newlin, 2001).

Following an unsuccessful CMC experiment by Davis and Holt (in Motteram, 2001), they suggest that there may be a strong resistance to participate online if the group have not yet met in advance. This demonstrates that it may be necessary to implement adequate strategies and additional motivation to inspire students to utilize the technology and remain engaged (Balazs, 2002) as having access to the medium alone is not enough to motivate students' participation.

While Klemm (1998) believes participants' academic performance, skills and experience differ substantially among the students. Some students are more passive and less outspoken with groups or in public; others do not have a high level of literacy skills or are not keen in written communication. These attributes may hinder their satisfaction and participation inside the chat room.

Given that participants are mainly accustom to a traditional classroom teaching style, Klemm (1998) describes in many instances they are observers or passive recipients of information known as "lurkers", lurkers read rather than directly contributing to the chat session as it is easier for participants to be lurkers under an online environment. However, as learners apply their newly learn knowledge, on many occasions students do not have the capability to identify their knowledge, or have the skills to analyze, seek solutions and solve problems. They lack reasoning ability or limited ability to build their own opinions or arguments (Balazs, 2002). They could answer questions but are unable to discuss (Downes, 2002; Balazs, 2002), these are the important communication skills expected from the workplace.

It is not a straightforward process to facilitate an environment for passive participants to becoming more active learners, as it is a significant shift from their comfort zone. Active involvement in the discussion requires participants to possess clear and concise written communication skills, well organized thought processes, critical thinking and an understanding of the discussion topic (Klemm, 1998). Balazs (2002) work also supports this issue as participants could easily read what others are contributing and remain inactive or even ignore the existence of the group. He further acknowledged that collaborative learning could not be successful without strong facilitation and conversation skills of an instructor.

As a learner, they need to be able to seek and apply their knowledge, and be able to share this information with others through text-based communication. Synchronous chat is reliant on users to be open to different perspectives surrounding the discussion topic, just as much as the ability to deal with critique or to give supportive feedback. However, some students are not as receptive to other opinions, which differed from their own. Group discussions in online chat are not productive in instances when the messages are attacking the person rather than looking for a compromise or a common solution and providing supportive critique. (Balazs, 2002).

Some students feel frustrated in situations when they could not obtain exact answers to their questions from their tutors and are confused about how they could resolve it. Instead of actively seeking additional information needed to resolve their queries, they often waited for answers to be given to them in an online chat session (Balazs, 2002).

Generally, online virtual communication aims to bring students to a new level of learning beyond the theory and taking in the material at face level. It seeks to prepare students to discuss challenging issues and debate the topic (Koschmann, 1996; Balazs and Schoop in Balazs, 2002). Students are taken outside their comfort zone to apply their knowledge, develop confidence to build on their own opinion and become more adaptable (Wang and Newlin, 2002).

Balazs (2002) have also found that students without prior contact with their peers are unlikely to seek feedback from them, which demonstrates no face-to-face interaction has a direct impact on online collaborative learning. Overall, the level of success in the delivery of online synchronous chat relies on a range of learner characteristics and learning styles that come to play. Literature has acknowledged that not all learners would do well online (Wojnar, 2002; Pallof and Pratt, 2001; Shan, 2003).

Wojnar (2002) unlike Wang and Newlin (2000) recognised that some participants could not perform well with online learning on its own. A lack of structure, no practice trial sessions and without face-to-face interaction could create issues with students reaching their potential learning abilities and performance (Pallof and Pratt, 2001). It is an initial challenge for students to be accustomed to learning through new technology and being familiar with a new style of education (Pallof and Pratt, 2001).

A proportion of students lack confidence; feared being intimidated in front of others, and are concern of being attacked by peers if they voice their opinions (Klemm, 1998; Downes, 2002). Participants with these characteristics are less likely to contribute and have less interest in the class itself (Pallof and Pratt, 2001). Students who are not familiar with face-to-face discussion have a negative attitude toward virtual discussion as well. If the instructor does not facilitate in resolving such issues satisfactorily early on, this in turn could result in an undesirable learning experience for all participants involved.

2.11.2 Asian Students Attitudes Towards Online Discussion

One of the greatest benefits of applying synchronous chat in an Asian cultural setting is the opportunity to actively participate in the virtual seminar (Lawrence-Slater, 2002). Some students who are not normally contribute in a classroom setting for various reasons including a lack of confidence, language difficulties, speech problems have found themselves interacting in the discussion online. Unfortunately, misunderstanding can be heighten for non native English students, and difficulties in expressing themselves may also be a concern, as reported earlier.

In contrast, Freeman and Caper cited in Bell (2001), have identify that anonymity assisted people from culturally and linguistically diverse backgrounds to more openly ‘criticize’ or disagree with their peers during online role-play, than in an environment where they can be identified. As Maloney (1999) notes it needs to be recognized that increased performance is detected for some students that thrived on interaction with the professor in a face-to-face context, while other students succeed in an online setting. Both international students with English proficiency issues and timid students feel more open in an online environment (Bell, 2001).

Similar findings have been noted in Freeman and Capper in Bell’s research (2001). Bell’s research is based on role-play in asynchronous discussion forum, and a level of anonymity may increase equitable and increased participation. On the contrary, this concept is invariably different from one of the key focus of online learning in which students find it difficult not to be able to identify their peers and the instructor through the maze of conversation flow.

In reviewing the literature, it has been suggested that interaction across cultural groups are more effective using text-based medium. Communication within one cultural group is obviously much easier and participants feel more comfortable (Balazs, 2002; Chester and Gwynne, 1998).

The literature also suggests that cultural values come to play in accepting new technology; Chinese students are more willing to try to work with a useful interface even when it has been difficult for participants to use. While, students from an Indonesian and Australian study group tend to give up more easily when an interface is hard to understand (Evers and Day, 1997).

Critics argue that online learning may not suit the individual’s learning styles, and that some students find it difficult to learn alone or stayed motivated online (Shan, 2003). Others suggests that possible cultural differences between education styles in different countries might impact upon student’s perception of online technology (McLoughlin, 2001; Joo,

1999). People from different cultural backgrounds have diverse value systems, perceptions toward the appropriate manner of relating and communicating with others (Smith and Bond, 1993; Triandis, 1988). Ziguras, (2001a) elicited common themes amongst his interviews with academics from different universities in Malaysia offering online classes and flexible learning models. The interviewees perceived young Malaysian students having difficulties in generating a highly active student interaction. It is thought that the Chinese place high emphasis on discipline and behaviour in an educational setting throughout the child's entire school years. This was further supported in Joo (1999) research which suggests that students who are comfortable with the traditional way of learning may struggle to adapt to active and innovative educational models.

The literature review shows inconsistencies and even contradictory descriptions regarding Asian students approach to their educational learning. Experienced educators believe that Asian students come across, as passive learners, susceptible to rote learning, not freely express their opinions and possess a lack of critical analytical skills (Samuelowicz, 1987; Ballard and Clanchy, 1997; Watkins and Ismail, 1994).

These findings conflict with Chan's (1999) research in exploring similarities and differences in cross cultural learning recognized that students from different cultures had some subtle differences in they way they learn. In conclusion, Chan's study in relation to Hong Kong students does not support the idea that these students rely on reproductive mode of learning, reliant, uncritical and passive. In fact, these students show their criticism or disagreement in a more subtle manner.

Results from Samuelowicz's (1987) study on the other hand argue that Asian students are more dependent on rote learning and less inclined to apply their knowledge in comparison to a group of students who lived in Australia. Similarly, Watkins and Ismail (1994) compare Malaysian student's responses to the learning process questionnaire with those of the Australian and the Hong Kong students. The research indicates that both Hong Kong and Malaysian students accounted less extrinsic motivation, afraid of failure and do not have full understanding in the applying their learning.

Chester and Gwynne (1998) through their own teaching experience also concludes that Asian students have not reach the minimum required number of postings and posted response. Much of the online conversations are superficial and often confusing to follow. A lack of visual cues means that it is even more difficult for Asian students to rely only on written communication.

More evidence is confirmed in Ballard and Clanchy (1997) work regarding Asian students being reluctant to ask questions, raised objections to or disagree with either their teacher or existing literature presented to them. This is based on the experience of teaching staff assisting students with language and study skills. The authors feel that the differences in cultural behaviours could be in part explained by Asian students are moulded by their years of traditional educational experiences, their cultural attitudes which are different to that of the Australian cultural values and beliefs. Unlike Chester and Gwynne (1998) and Samuelowicz (1987), Garrison's (1990) experience is that culturally and linguistically diverse participants with strong verbal communication in a face-to-face session are equally engaged with the online chat utilising written communication for interaction and added in humour as well (Garrison, 1990).

Kember and Gow cited in Chan (1999) offers a constructive explanation suggesting that it is not an innate characteristic of the students but rather the nature of the curriculum and the traditional teaching methods which directs students towards rote learning.

In Chester and Gwynne (1998) a student claims that he rarely spoke unless he specifically was called upon in face-to-face class room setting, this was support by the teaching staff in Ballard and Clanchy (1997). However, in the asynchronous forum the student claims he has written an enormous amount during the discussion. This could be primarily explained by the informality of online discussion as well as no demands to follow classroom rules and etiquette (Chester and Gwynne, 1998).

Balanced against his advantage is the language barrier for Asian students where English is a second language. Text-based communication being the sole form of interaction creates

barriers for some students who struggled to clearly articulate themselves in a fast pace online environment.

International students studying abroad are faced with difficulties adapting to the educational methods and teaching styles of western universities. In a scenario, an international Thai student feel awkward questioning and exchanging information during tutorials even though his English proficiency is above average for students with English as a second language.

2.11.3 Cultural Variations Learning Styles

Common issues in exploring cultural differences in student learning relate to a mismatch of student and teacher expectations, educational traditions and teaching models. The CEO of an established Malaysian computer based training provider, Sage Interactive Sdn. Bdn, note that Malaysia has experienced slow adoption of online learning and attribute it to a high dropout rate. He indicates the need of integrating online learning into classroom based education which has been to refer to in this study as blended learning.

Different cultures have different ways of interacting and Joo (1999) recognized it affected the way Internet has been adopted in classrooms. It is therefore important to take account of culture perspectives before adopting innovative technology and offer offshore delivery (Rizvi cited in Goh, 2001) to ensure students satisfaction are not compromised.

Ballard and Clanchy (1997), share their experiences of Asian students in their case study who displayed silent faces with no reaction, waiting for their lecturer to provide the best possible explanation and answer without wasting any time. Language barriers and inadequate resources have less of an impact than students' previous educational experience, which lead to such reactions. Ballard and Clanchy (1997), reaffirmed that it is the educational system itself, in which teachers conduct their classes and practice traditional methods in training students to study, that attributed to their attitudes and behavioural characteristics. It becomes the lecturer's responsibility to develop mechanisms to encourage students to adapt to a new teaching model.

In many Asian countries, students at a very young age have been made aware of the pressure and competitiveness in doing well in exams. Each exam is a step towards the path of a successful education, which is a paramount for them and their family.

Throughout their educational experience, students are taught that it is inappropriate to question their teacher, raise questions or criticism during class. Detailed notes are taken but contributing to discussion or volunteering to respond to queries is uncommon. Students often waited till the end of the class to ask their questions to their lecturer one on one. It is their role to clarify what the lecturer expects to be covered in their assignments and seek guidance in which they will follow without question. Students are not encouraged to question the material, evaluate the information and scrutinize the content in order to derive their own opinion Ballard and Clanchy (1997).

Many students often worked together on assignments to build a mutual stance and deliver assignments based on what they believe lecturers expected rather than building their own opinion.

Without a thorough understanding of the Asian cultural values and preconceived expectations both teachers and students could be lead into frustration, hence such recognition sets the scene for a precondition to begin any effective change. An account of international students in a classroom setting illustrates that students from a Chinese background are not accustomed other teaching styles which requires them to not only read the material but also challenge, critically analyse the material, argue their stance and apply their knowledge.

The researchers note that international students from a Chinese background secretly question in their mind the competency of the lecturer in situations where the correct answer is intentionally not provided. These students are ashamed to ask questions in class with the fear it may not be understood nor do they have the courage to request that the pace of the lecture be slowed down (Ballard and Clanchy, 1997; Garrison, 1990). This has also been noted in McLoughlin (2001), that international students depend heavily on their lecturers

and are vulnerable to rote learning, yet Kember in Motteram, (2001) research indicates that international students often performed better than their peers.

Klemm (1998) suggests the main goal with online learning is that students are encouraged to learn from each other, to promote critical thinking and communication, therefore, become more active participants in the subject as opposed to being passive observers. The role of the online instructor becomes that of a facilitator, promoting the interaction and participation during the online classes, Kearsley (2000).

However, it has been a long tradition for Asian teachers to be primarily responsible for the moral and spiritual development of their students and is treated with great respect by all in the community. Students are lead to believe that their teachers have all the knowledge and wisdom that is needed for their course. It is the role of the teacher to lead students to the correct answers or viewpoint. It was expected that students are obedient, study more conscientiously, revise lecture notes, work hard and are not encouraged to have their own views.

In Malaysia, traditional classroom teaching style is heavily based around a one-way interaction process in which the teacher's role was to teach and the student's are present to listen and not challenge or critically analyse the topic matter. With regular exposure to this method of learning, it is not surprising to discover that younger Malaysian undergraduate students are hesitant to work independently and are in need of exact guidance and instructions from teaching staff. Students have a preference for local teach staff with face-to-face interaction over offshore teaching support. University administrators are informed that students preferred having access to academic support and local facilities even if it means a greater utilization of asynchronous interaction (Ziguras, 2001a).

Many Malaysian educators feel students from Malaysia have greater regards for their lecturers and believe that lecturers are the provider of information required for them to prepare and to recall during examination. Malaysian students are most familiar with and opted for lecture style of learning, in which the lecturer takes on the lecture style of

teaching, while students become the receiver of valuable and accurate information (Ziguras, 2001a). Consequently, Malaysian students are not comfortable with the notion of critical thinking, problem based learning and debating the issues.

Cultural differences can create a mismatch in participants' expectations regarding the role of the lecturer and had misconceptions regarding the aims of the chat discussion (McLoughlin, 2001). Rossman (1999) identifies that online learners are concerned about receiving meaningful and frequent feedback, while Zariski and Style's (2000) work documents that students prefer to study in an environment where they can receive immediate feedback and support.

It is recommended that differences in educational experience and culture be taken into consideration when adopting online learning in the curriculum (McLoughlin, 2001). If such cultural differences are disregarded it could lead to student dissatisfaction, Fazal Rizvi cited in Goh (2001).

2.11.4 Learner Characteristics

Students need to grasp the opportunity to develop confidence with new types of learning environment (Wang and Newlin, 2002) and be prepared to be more adaptable. The level of success in the delivery of online synchronous chat is dependent on a range of learner characteristics and learning styles. Literature acknowledges that not all learners could do well online (Wojnar, 2002; Pallof and Pratt, 2001). In the conclusion to Pallof and Pratt (2001) research, they identify a set of attributes required for a successful learner in a general online classroom:

- Those need time to think and reflect before responding to questions and ideas
- Those who express themselves more effectively in writing than verbally
- Voluntarily seeking further education
- Motivated
- Higher expectation
- More self disciplined
- Enjoy learning for the sake of learning

- Energized by the ability to be set free to explore a topic with peers
- Good thinking skills, work in minimal amount of structure, undertake independent research.
- Introverts as it enables them to express themselves more freely as compared to a classroom setting
- Having the ability to help motivate the group

While Klemm (1998) builds on a set of practical recommendations to maintain student engagement with online conferences:

- Participation is compulsory therefore making it part of the assessment rather than optional component
- Form learning teams to encourage cooperative and collaborative learning
- Interesting and meaningful topic for discussion
- Requires thought and analysis and research support rather than just opinions.
- Structure the activity
- Require a hand in assignment
- Teacher participation by providing extensive critique, feedback and encouragement
- Peer grading.

It is long regarded that any study on people's behaviour and actions are fought with complex issues, interdependencies and discrepancies in the literature. Some researchers argue that the principles of good teaching practice are far more important than learner characteristics.

Instead of focusing on cultural differences, Biggs in Ziguras (2001a) suggest the application of "universal principals of good teaching" would prevail over students' previous experience and expectation. To increase the quality of courses, Phipps and Merisotis (1999) also share their findings on the *principles of Good Practice* in Undergraduate Education. A strong foundation for online courses provide an avenue that encourage student interactivity, active learning strategies and the ideology that the instructor is present as a guide and not in control of the process.

In practice, the application of the technology together with the flexibility of learning in a team teaching and a transnational education environment is far more complicated than a simply implementing the principles of good teaching guidelines.

2.12 Summary

Research to date has been primarily focused on full online education, only few studies have investigated blended learning strategies in a transnational education in South East Asia. These few studies involve a mix of participants from Asia and other cultural groups therefore the outcomes could be different if the study group are mainly from Asian backgrounds. Furthermore, few participants' comments have been elicited from such studies and as such they do not highlight significant values or deficiencies of the online medium for group interaction.

Online chat has become increasingly popular for many industry sectors including both commercial public and the educational sector to support collaboration (Mock, 2002; Balazs, 2002) and customer service (Andrews and Haworth, 2001; Dolen and Ruyter, 2002). Some general issues with using such medium for group interface could apply to both commercial sector or distance and online learning.

The literature has identified a range of key benefits to online chat, it has the ability to encourage not only active participation but also enhance user learning potential. It has the capacity to engage students who are less likely to contribute to online discussion in a traditional classroom setting. The level of anonymity enables users to more openly express themselves during the live session and receive immediate response to messages.

A detailed examination of the literature has shown the importance of learner interaction within an online learning environment design to suit the candidates involved. A number of studies in the literature have illustrated that without considering a range of variables that influence student interaction, student participation and satisfaction are likely to be hampered.

A review of literature has determined that the perceived usability and user satisfaction are significant aspects to engage student interaction and learning. Yet there is a lack of research focus on the usability measures within an online chat context, it is clear that further research needs to be conducted to determine the most appropriate setting and learning strategies for maximising student satisfaction without compromising learning through quality and effective interaction.

It is recommended that usability and sociability measures could incorporate qualitative approach to research, the triangulation of data along with examining student perception towards online synchronous medium.

The idea of maximising student learning outcomes could be undermined in situations when there is a mismatch between students expectations of the online chat and their perceive outcomes of the session. Within the Asian context and its cultural values, the academic and students experience a change from their traditional roles, students are taken out of their comfort zone and are encouraged to critically analyse the topic and debate amongst themselves and their facilitator.

Students who have been exposed to years of traditional teaching methods believed by some researchers to be at risk from rote learning could no longer ask the facilitator for answers. Instead they are asked to discuss and draw their own conclusions and understand that there is likely to be a range of views that are different from their own stance.

The benefits and limitations of TAM and ISO tools are examined as a platform for the application of synchronous online chat. Research to date has been making progress in developing tools to further improve and evaluate the success of synchronous chat, this research examines a way in which the three constructs could be used to measure the usability of the medium to foster student interaction. Students' positive attitudes and perceptions of the medium have a strong presence in contributing to sociability and usability

of online chat. Further studies will assist to confirm the findings that show how sociability is a key factor worth considering in the planning of synchronous chat.

Chapter 3 IMPORTANCE OF THIS RESEARCH

This chapter presents the rationale of the study and the significance of the research in addressing the gap in existing literature. The overall goals of the study are discussed followed by it concludes by providing an overview of the two case studies.

3.1 Problem Statements

In recent years, the unsurpassed demand for Western education in Asia has resulted in significant inroads in designing innovative teaching models to take student learning and engagement to new heights. Previous research studies of online education focus primarily on full online and distance education, and or asynchronous tools for fostering communication. WWW and the Internet communication tools have been readily available, and have been often used as a medium for interaction between students and their instructors in their online courses.

Only more recently have there been studies on online instruction and blended learning.

Synchronous communication has been perceived as providing students with greater opportunities to raise questions, receive more timely feedback, reflect and apply what has been learnt. However, matching of student's expectation with the goals of the online learning can be a major challenge for academics who has sought to promote student-centered learning through the introduction of innovative education technologies.

To date there has been little research into student perceptions to the synchronous online medium for ongoing lecturer and learners, and learner to learner interaction under a transnational learning environment. Few studies have explored blended learning strategies in an education environment using synchronous tools to support communication, amongst students from South East Asia. The concept of usability particularly how it is measured and applied to computer tools is an area that requires more research. The study is considerably beneficial to assist academics in the evaluation of their instructional design of the subject.

With the increase in transnational education in South East Asia, and the competitive nature of private colleges, students' perceive satisfaction and the quality of delivery has become

increasingly critical and has been taken seriously. Student perceptions affect the retention rates in undergraduate courses, yet their perceptions toward their educational experience appear to be undervalued in reality (O'Malley and McCraw, 1999).

3.2 The Significance of the Study

Overall, the study applied an innovative blended learning model characterized by a combination of online chat sessions and face-to-face classroom delivery with the offshore lecturer and the local tutor. The online chat sessions was conducted with a class of students who were geographically apart from the offshore subject coordinator. The offshore subject coordinator's role was to facilitate the synchronous online chat communication as a class dialogue. Inside the spontaneous nature of the chat tutorial, led by the offshore lecturer, pupils were required to think fast in order to be able to use the chat software effectively, process the information and follow the conversation. Such processes were not conducted without any challenges and confronting issues.

The successful implementation of this instructional method relied on user acceptance, which may be significantly influenced by their attitudes. With little research available in relation to students' views towards this model of learning within a South East Asian learning environment, the research has the potential to add new levels of findings on student engagement and usability towards synchronous online chat.

Critics argued that possible cultural differences between education style in different countries might impact upon student's perception of online technology (McLoughlin, 2001; Joo, 1999). Joo (1999) suggested students who were only accustomed to the traditional method of teaching might find it difficult to adjust to the active learning and have unexpected reactions to innovative learning techniques.

It was recommended that differences in educational experience and culture should also be taken into consideration when adopting online learning in the curriculum (McLoughlin, 2001). The challenge for academics was to take into consideration the following factors that has also been identified in the literature (Fazal Rizvi cited in Goh, 2001) in designing this

new mode of learning for students from a South East Asian background, , firstly, it has been an Asian tradition that most classroom activities are based on the teacher teaching and students listening. Secondly, the language barrier and unease of public speaking interfered with student participation in traditional classroom activities. In addition, the belief that Asian students are not proactive in giving their views unless being asked nor will they inquire or think critically independently. The authors, Ballard and Clanchy (1997), argue that this might be attributed to their previous educational experience and their cultural attitudes. Furthermore they have difficulties using text-based communication given there is no visual cues to give the additional meaning of what is being said, (Chester and Gwynne, 1998). Therefore, it would be interesting to examine the factors that influence students' perception and in turn their attitudes toward this mode of teaching. Given that the main goal with online learning was that students were encouraged to learn from each other, promote critical thinking and communication, therefore, becoming more active participants in the subject as oppose to being a passive observer. This raised the question of whether students would value the continual interaction amongst their peers and the offshore lecturer. What might be the views of students in relation to communicating inside the chat room? Since the goal of the offshore lecturer with synchronous online chat became a facilitator promoting the interaction and participation during the online classes Kearsley (2000) as oppose to providing participants with direct answers to queries.

From another perspective, text-based communication was known to encourage passive student to open up and participate as it focused on the content rather than being influenced by external factors (Balazs, 2002). Would this be the case for both case studies? Would students be prepared to participate and accept this new mode of learning, or perhaps there were attributes in the instructional design or the system that prevented full participation?

The findings of this research provided insight into the problem areas, and a baseline to help trainers, academic designer, and the offshore instructor, further ideas to improve the future delivery of online chat for communication. It could also enhance the integration of communication technology and teaching strategies in a team teaching environment without compromising student satisfaction.

The study had enormous potential to facilitate and improve the chances of delivering a successful learning model that supplemented online chat with traditional classroom teaching. This would enable students to have continual access to the offshore lecturer, the subject expertise, as well as enhancing their learning outcomes. Provided the majority of students were positive towards the model of learning, it would assist in the assessment for the future delivery of the subject and its implementation. For instance, a framework and a set of guidelines could be developed contributing to the knowledge base of instructional design and appropriate measures of perceived usability. This research would be beneficial in gaining a better understanding of the issues around transnational education in a blended learning environment.

3.3 Goals of the Study

The study adopts a qualitative approach to explore students' attitudes and perception of the usability of synchronous online learning for communication. It explores the gap in existing literature in relation to students from South East Asia's learning experiences based on an innovative blended learning model.

The research involves two case studies and attempts to measure usability in terms of perceive usefulness, perceive ease of use and satisfaction. Chapter 5 of the methodology provides definitions of these terms. The many associating variables and underlying factors that influence the usability of the synchronous online chat are investigated. By addressing perceived usability of the online chat session in detail, rather than satisfaction alone, academics could highlight any major functional or design problems, and obstacles that may be improved for future delivery of the subject.

One of the primary purposes was to encourage student participation, enhance their learning and share their understanding through interaction with their peers in relation to the topics entailed in the assignment topic using online chat sessions, facilitated by the offshore (Australian) academic. It aimed to promote critical thinking and improve communication amongst the participants, and enabled them to have further contact with the offshore lecturer where it would not otherwise occur.

The mutual benefit with this mode of learning was that it also allowed the offshore (Australian) subject coordinator to note participants' progress and their level of understanding of the topic. This meant that the offshore lecturer can identify, and tailor to the need of the learners. However, this can only be successful if the majority of participants were willing to participate in a semi structure open dialog.

Figure 3.A. below shows an overview of the two case studies and presents an outline of the specific objectives of each study. It refers to the actions that have been undertaken in preparation for the second case study.

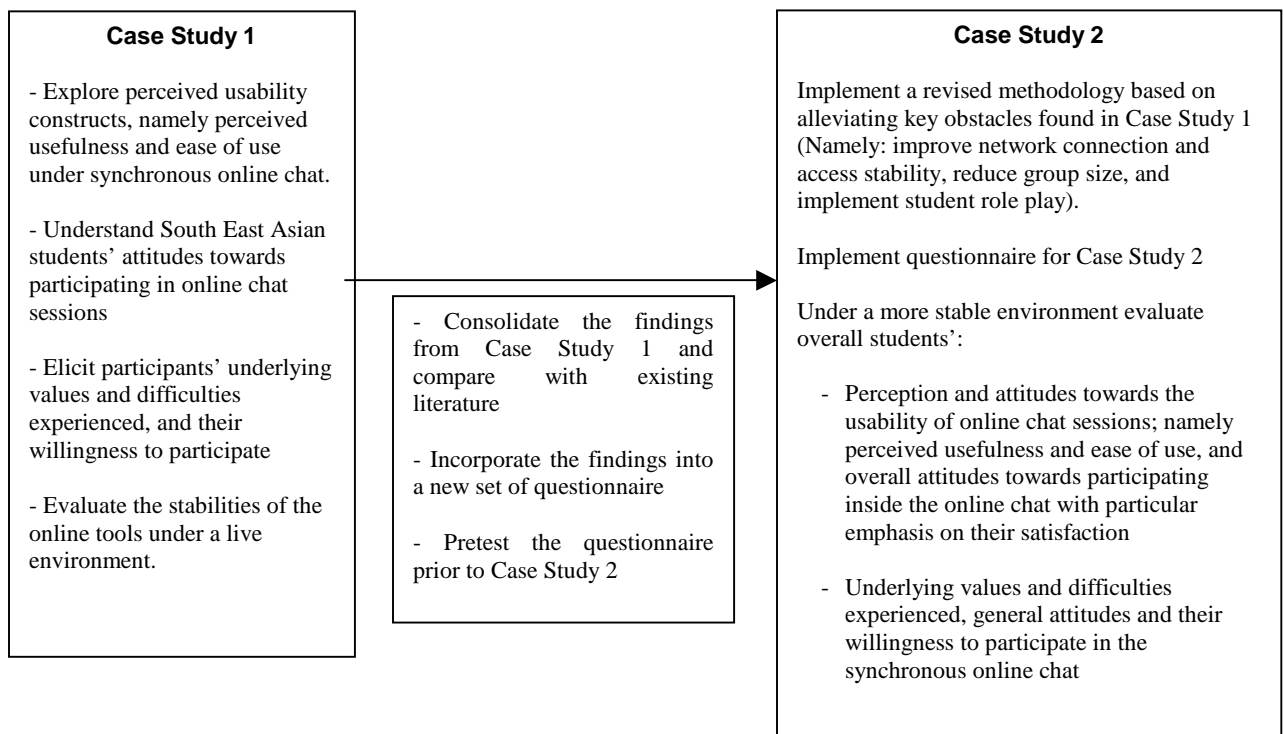


Figure 3.A. The Overview Of The Two Case Studies And Their Association

The common objectives of both case studies were to:

- Explore students' (from South East Asia) perceived usability constructs towards synchronous online chat in a blended learning and team teaching environment to foster interactive class communication. This involved eliciting participants' views on perceived usefulness and perceived ease of use;

- Understand participant's general attitudes and willingness to participating in synchronous online chat sessions, while Case Study 2 had a specific emphasis on their overall satisfaction; and
- Capture participant's underlying values and the difficulties they encountered in using this medium to supplement their usual classroom activities.

Case Study 1 considered an evaluation of the technological system to support such communication. It aimed to eliminate obvious obstacles that may prevent students from participating and identified the attributes that impact on usability constructs with a view to improve the design for future studies. The themes derive from this case study were used to derive the Likert scales that were pretest in the semester prior to conducting the second case study.

Hence, Case Study 2 alleviated the problems encountered in the first case study and provided a more stable environment for text-based communication. On broader context, the second case study explored the overall perceptions of the participants' towards the usability of online chat, in particular the themes that emerged from Case Study 1.

Chapter 4 Studies Design And The Overview Of The Two Case Studies

4.1 Introduction

Much of the literature has acknowledged that technology affects student satisfaction and learning, and their results indicate other technology are not as important as factors such as learning tasks, learner characteristics, motivation and the instructors. (Phipps and Merisotis, 1998). Interactivity enhances attention, motivation and promotes active learning process. When conducted effectively, it is likely to increase students' satisfaction (Steinert and Snell, 1999).

In light of this comprehensive planning prior to the commencement of the online chat is crucial to increase the likely success of the technical support pedagogy. This also involves taking into consideration recommendations in the delivery of online chat that has been discussed in the literature (Klemm, 1998; Ho, 2002; Downes, 1998).

This chapter is devoted to describing the overall delivery design of the subject, the setting and the online chat sessions along with the role of the offshore lecturer, the local tutor and the participants.

4.2 Subject Delivery Structure

The research was conducted on students completing their final year of the computer science degree undertaking a subject titled "Software Process Management", in which a crucial part of their study involved critical analysis, students' interaction and collaboration. Participants of the study were mainly from Malaysian and Indonesian backgrounds.

The subject was conducted under a unique "blended" learning environment. Upon the offshore (Australian) lecturer conducting an initial orientation with the local students, a one week of intensive face-to-face teaching followed. Thereafter the offshore lecturer continued to interact with the students through a number of online classes as part of their online tutorials program using Internet chat, along with peer-to-peer discussion mediated through

asynchronous forum. To prepare for these online classes the local instructor would provide students with support and tutorials. Students ongoing contact with the offshore lecturer enable her to remain accountable and be the primary source of information for the subject, as well as to tailor and better meet the needs of students and their assessments.

For more details regarding the blended learning adopted, the cultural differences between the offshore university and the local college, and the associating benefits, refer to Appendix AA.

4.2.1 Instructional Design and Tasks

The topic chosen for discussion during the online chat is a case study that examined the ongoing issues of software engineering problems such as software crisis and project management issues. The reading materials related to the topic were distributed to students for study preparation prior to each of the online chat sessions, also known as online tutorials. The primary purpose of the background reading material was to enable students to familiarize themselves with the material for the open dialogue and to instigate discussion amongst students themselves and their offshore lecturer inside the chat room.

The online chat was conducted approximately a week after the online asynchronous discussion with students participating inside the college laboratory. The asynchronous forum served to initiate the discussion on the issues raised in relation to the reading materials prior to the chat session, in which the students had the convenience to participate at their own time and at the comfort of their own home. Upon the completion of each online chat session, participants were to produce an overall summary of their understanding toward the issues. Together the written summaries were worth 4 to 10% of the overall assessment.

4.2.2 Mark Incentives for Participation

There has been continuing debate on whether assessment marks should be allocated to stimulate participation inside the online discussion (Ho, 2002), in this case, only minimal marks of 5% (as in Case Study 1) and less (2% as in Case Study 2) were allotted for each chat session as an incentive for participation.

The chat was semi-structured, in that it focused on the issues, which were related to the key questions posed in the assignment topic. However, depending on the discussion flow, the responses, and the dynamics of each group, the discussion might lead to different issues for each group.

4.2.3 The Role of the Lecturer Inside the Chat Session

The role of the offshore lecturer has been much promoted and talked about in literature as an important aspect to promote student based learning. This means the offshore lecturer should act as moderators to encourage participation rather than an information provider under a traditional class room setting. In this context, the aim was to encourage students' interaction and communication, the lecturer role was to serve as a facilitator, adding in comments, provoking interaction, providing direction, and posting questions occasionally to ensure students remained on the right track.

4.2.4 The Role of the Local Tutor Inside the Chat Session

The local instructor/tutor provided further support in the background, and has the responsibility to minimize any impact in relation technical issues. It was the role of the local tutor to provide an appropriate level of coordination with the key stakeholders: the participants inside the laboratory, the offshore subject coordinator, technical laboratory assistant as well as the online chat system.

It became apparent that the local instructor needed to update any latecomers during the online chat discussion. A key part of the local instructor's role was to supplement visual cues that were readily apparent in the classroom environment, such as inattentiveness, student anxiety, that the offshore lecturer could not observe over the chat medium.

Goals of the online chat sessions

The purpose of the online chat sessions, as oppose the purpose of the research ,was set out primarily to encourage student participation, learn and share their understanding and interaction with their peers in relation to the topics entailed in the case study, facilitate by the offshore (Australian) academic. It aims to promote critical thinking and improve

communication amongst the participants, and enables students to have further contact with the offshore lecturer where it would not otherwise occur.

In turn, this would allow the offshore (Australian) subject coordinator observes the progress of the participants and their understanding of the topic matters, permitting the academic to identify, and tailor to the need of the learners. However, this can only be successful if participants are willing to participant in a rather semi structure open dialog.

4.2.5 Technology

The research conducted utilising resources readily available at minimal or no cost to the college. After extensive testing of a number of public chat software, Microsoft Internet Relay Chat was selected as it could support more than 20 participants and was compatible with the college firewall.

4.2.6 Chat Session Venue and Duration

The chat sessions were conducted inside the laboratory session for duration of an hour with the presence of the local instructor and facilitated by the offshore lecturer based in an overseas University. Both participants and academics alike have the advantage of having previous face-to-face interaction.

Chapter 5 OVERVIEW OF THE COMMON APPROACHES TO THE TWO CASE STUDIES

This chapter provides an overview of the two case studies and its commonality in terms of the chosen methodology, the data collection techniques, and the data analysis approach. More detailed procedures and information that is specific to each case study are reported in their respective chapters.

5.1 Why Use Qualitative and Case Study Approaches?

Qualitative and quantitative approaches both have their place in the research arenas, and in particular the educational field. Qualitative research is known to be effective in preparing teaching staff in acquiring and broadening their knowledge based on their experience as shown in this study. It serves to integrate theory into practice, accommodating flexibility in teaching while promoting reflection and critical analysis by exposing learners to different perspectives to meet their needs (Breidenstein, 2002).

The core approach to this research was to explore the perceptions and attitudes of participants' using synchronous online tool to foster communication. The unique blend of learning was applied to the two case studies involving participants from South East Asia and their offshore (Australian) lecturer. The blended learning model integrated online components into students' class-based teaching with their local instructor, this allow continual contact with the offshore Australian lecturer, which would otherwise not have occurred. The study examines how usability could be measured and applied to synchronous computer tools used to support such blended learning, an area that have not been well explored to date.

Qualitative approach allows for capturing a detailed picture of the participants' experiences, their attitudes, perceptions and their satisfaction in using the synchronous communication tool for facilitating group discussion. It enables the academics to determine the suitability of

such tools for fostering interaction; and the possibility of enabling continued improvement if it is deemed feasible.

Qualitative research is also a suitable choice as it has been described “*as a form of social inquiry that focused on the way people interpret and make sense of their experiences and the world in which they live*” (Glesne and Peshkin in Breidenstein, 2002). Qualitative researchers “tend to observe what others miss, listen when others talk, and ask questions that others might not think to raise”, providing a “wholistic picture of what goes on in a particular situation or setting” (Fraenkel and Wallen, 1990).

In building a qualitative approach to research, Britzman in Breidenstein (2002), suggest the need to understand the complex process of learning, which required an exploratory standpoint in which education is delivered. To shape the interaction between time, place, people, ideas and personal growth, students and teachers are required to become knowledgeable as to how the process contributes to professional development. This approach strives to prepare teachers who will have a reflective orientation toward teaching; and to encourage reflective teaching.

Literature found to date has not shown solid and specific attributes to determine the usability of online chat. Under Case Study 1, qualitative research was used to elicit the usability constructs related to usefulness and the ease of use to foster communication amongst students’ themselves and with their offshore lecturer inside the chat room. It allowed participants to reflect on and articulate their individual views regarding their online experience, such approach has also been supported by Holloway’s (1997) work.

The specific factors that students appeared to value or were concerned with when participating in the online dialogue in the first case study would be used to create more specific Likert scales questions in the final pilot study. Case Study 2 would further explore collective community responses towards participants’ satisfaction levels, values and their perceptions with the use of this medium.

A combination of qualitative and quantitative approaches adds greater depth and dimension to the study. One approach complements the other; and abnormal cases and overlooked

information could be identified and discussed by incorporating a qualitative method. Using a combination of approaches helps to reduce and avoid biased information obtained from an unbalanced group of respondents. When studying qualitative approach to research, it assists in “*validating , interpreting, clarifying and illustrating quantitative finding as well as strengthening and revising theory.*” (Miles and Huberman, 1994) Findings could be interpreted in a number of perspectives from individual comments to shed new light or to demonstrate the mass opinions of specific observations (Miles and Huberman, 1994).

There are certain aspects of qualitative research that supports the principles of important quality with people’s experiences and their values which is beyond numbers and statistics. At times, numbers can help to ascertain the reoccurrence and the distribution of certain themes, and the significance of these themes (Creswell, 1994). However, overall patterns and unpredictable differences in the detailed descriptive data could be picked up with a qualitative approach to these case studies.

A case study approach was a logical choice for studying participants’ attitudes and perception towards “group” interaction mediated through online chat; whereby the success of the online chat depended on mass acceptance and the setting in which it occurred. Researchers have acknowledged that a case study approach for its credibility in ethnographic studies provide descriptive-analytical interpretation in the assessment of the educational phenomena (McMillan and Schumacher, 1993).

5.2 Overview of the Methods Adopted for the Two Case Studies

This section provides a flowchart showing the overall methods adopted in the two case studies, specific techniques unique to each case study are reported in their respective chapters as illustrated in the Figure 5.A.

This section documents and explains the data methods that have been employed in both case studies.

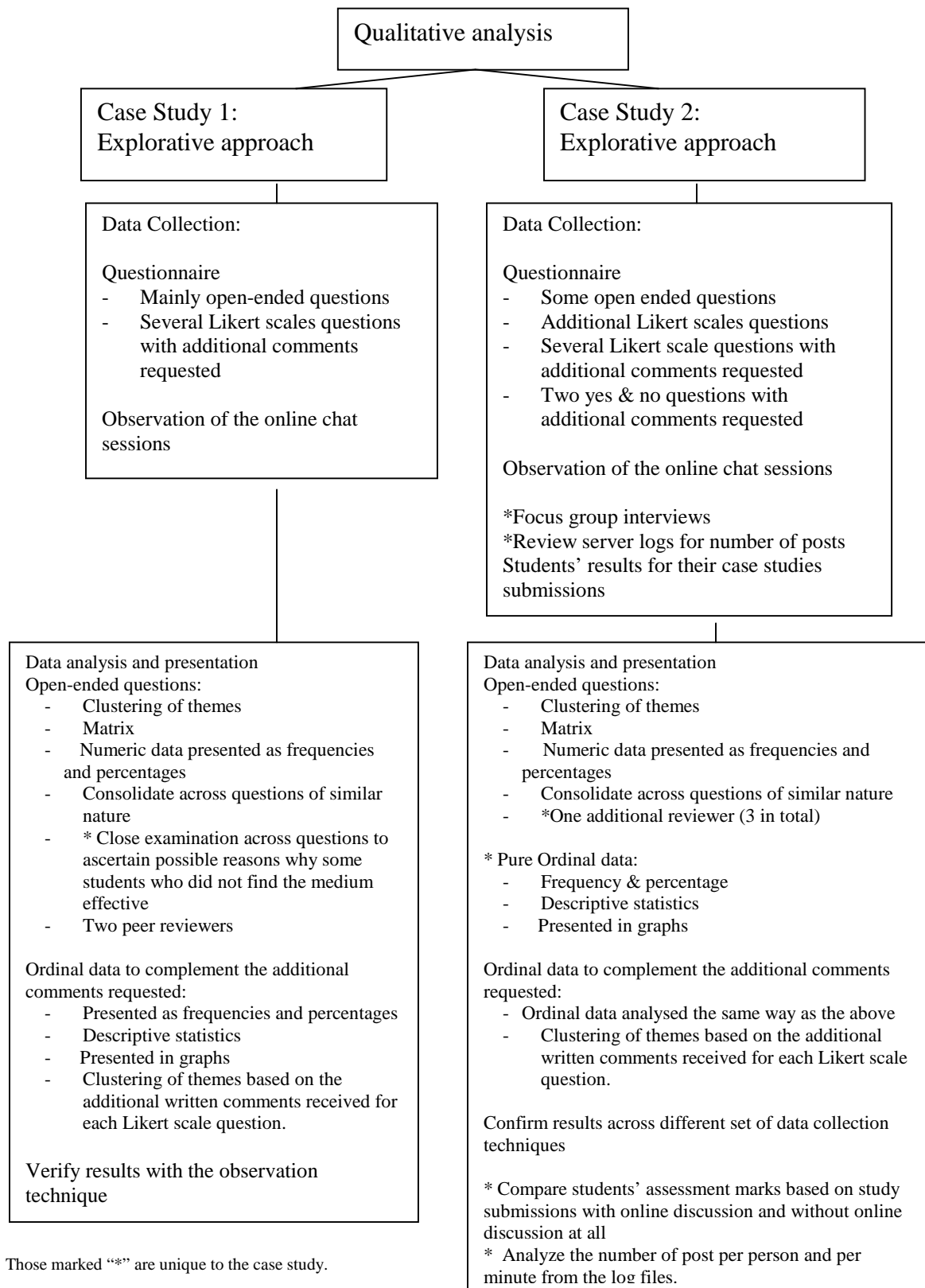


Figure 5.A. The Overview Of The Methods Adopted Under The Two Case Studies

5.2.1 Reasons for Multiple Data Collection Methods

The principle of triangulation has been applied to both case studies. This refers to multiple methods of collecting data - this means that the weakness and strength of each method can compensate one another Burke (1997). Researchers agreed that (Merriam, 1998, Miles and Huberman, 1994) methodological triangulation strengthens the internal validity and reliability of research studies. Conclusions could be drawn from multiple sources of information and from independent angles on the same issue to establish a clear picture of what is happening (Merriam, 1998; Miles and Huberman, 1994).

Data was collected for the two case studies, using a combination of questionnaires and general observation of students' participation while focus group interviews were specific to the second case study. Such a process facilitated the ability to confirm or note any differences between the data collections, therefore increasing the reliability of the results (Jakob, 2001).

Inconsistencies and contradictory information resulting from the triangulation method could capture a whole picture based on an array of perspectives (Popay et al., in Barbour, 2001). Such findings may simply suggest further elaboration or initiate additional examinations from different perspectives (Rossman and Wilson, in Miles and Huberman, 1994). Hence May and Pope in Barbour (2001) concludes the main purpose of qualitative research was to provide a more in-depth and comprehensive picture rather than internal validity. There was a possibility that contradictory results could be due to weaknesses in the questionnaire design or a researcher without an in-depth understanding of the topic.

5.2.2 The Common Data Collection Instruments

Questionnaires and the observation technique were the common methods adopted in these case studies. Questionnaires served as the basis for comparison and confirmation against other techniques such as general observation of the live chat sessions. Both sources of information complement one another, they provide more clarity and confirmation of the data. Subtle differences in student perceptions could then be lifted out, and evidence of user participation could be detected.

The questionnaire provided a useful technique given its ability to gather opinions from a mass audience, in this case the majority of participants' (if not the whole class') attitudes and perceptions. Open-ended questions were incorporated into the questionnaire for both studies, to encourage a diversity of participants to share their insights and their experiences. They were not structured in any way, hence this helped to furnish any unexpected impact that may not have been known to the researcher. This provided a closer match to the respondent's position in comparison to closed-ended questions.

In addition, some questions within the questionnaire consisted of two parts to query a specific item. It contained a Likert scale question in the first part followed by an accompanied open ended question requesting additional comments from users, and designed to enable users to clarify the reason for the Likert scale rating selected. In essence, this strategy enable the researcher to verify in determining whether the respondents understood the Likert scale question, or whether it should be further refined for future studies.

Two experienced research academics reviewed all questionnaires administered for Case Study 1 and a third academic was also invited to critique the questionnaire for Case Study 2. Practical suggestions and advice on the number of questions and wordings were taken into account before administrating the live questionnaire. Students' feedback of the questions were also sought to ensure greater clarity of the questions, specifically tailoring the questions to minimize misunderstanding for students from culturally and linguistically diverse backgrounds.

General observations added additional information which might be difficult or left undetected via other instruments. The observer could also detect the status with the level of student engagement, inattention, frustration, and difficulties experienced during the chat session. Problems or unexpected events could also be identified. Special attention was paid in regards to the difficulties that students encountered, in particular issues with technology and participation in the live online session. In these two case studies, the presence of an on site tutor's general observation allowed less intrusion, permitting the class to carry on as normal.

There is still a risk of research bias as referred to in Burke (1997), where the researcher may unintentionally be selective while observing the session, and could misinterpret or overlook recording of critical data. However, according to researchers, observations are theoretically less susceptible to research bias, and responses are more precisely reflective of the participants' views.

5.3 Data Analysis Procedure: the Commonality Between the Two Case Studies

The results from ordinal data were tabulated, and reported as frequencies and percentages, and presented in a graph format (Mogey, 1999). Within each question, the two most positive categories were summated while the two most negative categories were also combined, leaving the midpoint category on its own. For instance, the “strongly agree” and “agree” categories were summated; “strongly disagree” and “disagree” categories were also summated, leaving the midpoint or “sometimes” category on its own. For each of these three aggregated categories, the written comments supporting the Likert scale questions were reviewed in the same way as open-ended questions. This helped to understand the reasons behind the students' responses, and provided additional information regarding their selection.

Following an intensive review of the data collection, Creswell's (1994) descriptive analysis was adopted in this study for analysis of all the open-ended questions. In brief, it encompassed the following sequence of steps:

1. Read all transcriptions and questionnaires thoroughly;
2. Examine individual surveys to determine the meanings of respondents' comments;
3. Cluster student comments that are of similar topics, and include any miscellaneous comments;
4. Conduct primarily-organized comments and checked them against the original data;
5. Identify a descriptive title for each of the categories;
6. Consolidate the related themes in attempts to reduce the total list of themes and miscellaneous answers;
7. Organize data into one place and conduct preliminary analysis; and
8. Compare, reconcile, and refine grouping of the themes if necessary.

Clustering was a method performed for this research as a way of grouping representative themes or characteristics that could sometimes overlap, as cited in Miles and Huberman (1994). Aggregation and comparison of similar categories helped to organize the generated results and grouping of data including main themes and sub themes. Each statement was carefully analyzed to ensure that it matched the most appropriate cluster.

Having completed the analysis for each question, the themes were compared to other similar questions to check the consistency of the elements.

The frequency and percentage were also calculated to characterize the strength of support for each theme and organized into table format or matrices (Taylor-Powell and Renner, 2003). The process benefits from creating a matrix to tackle the many attributes that made up an entity. Outliers were examined to see how they belonged in the context of the entire event. Consistency of the responses could be observed from comparing the data from different sources and alternatively worded questions asked of comparable samples. Descriptive conclusions were then drawn out from the findings of the case studies based on relative importance and patterns that could be reveal from the data.

There is a fine balance in the process of reviewing qualitative approaches which Eisner, in Creswell (1994) argues is distinctly different to empirical studies. Qualitative research relies on trusting participants, being open to their values and believing in their experience. This approach has different means to substantiate participants' coherence and reasoning which is based on a vastly different concept to traditional validity and reliability measures.

A peer review strategy was implemented to promote the validity of merging patterns from open-ended questions. This involved an academic, experienced in the human-computer interaction, reviewing and evaluating the categorized data; and another experienced academic, from the field of education, confirming the consistency of the categories.

5.4 Overall Limitations of the Studies

The laboratory tutor facilitating the on site tutorials also conducted this research study, therefore, there was a risk that users were not honest with their responses to the questions or providing feedback that they believed the academic would like to hear rather than their

genuine experience. As objective as researchers need to be, and professionally trained to be, research bias was also possible in any research study, in terms of analyzing the results and the findings.

Data for each of the three groups were not analysed separately, instead the data was collated and reported together as one study sample to gather the overall perception of the class within this cultural setting. The collation of data across the three groups could smooth out the most outstanding item within each group. Undoubtedly, participants in each group have the ability to potentially create highly interactive or inactive group sessions. Hence, there might be a risk that the group dynamics and experiences between each group could vary substantially, however, individual differences amongst each group have not been explored and could be worth future investigation in future studies.

It appeared that this element was not a major issue in these case studies as observations and content analysis were incorporated to take note of these differences. The results showed that groups were relatively similar in dynamics for both studies.

Future design of the questionnaires could consider human factors and group dynamics as these variables have a role in creating the atmosphere of the class. A direct replication of each case study is not possible when dealing with different cohorts of students because the uniqueness of human nature. This imposed a limit on direct comparison between the two case studies, and a generalization across other studies.

Stake (1995) in Merriam 1998, Stake (1990) in Burke (1997) have discussed rough generalization is possible based on trials that are delivered and in many aspects similar to the original study. Burke recommends a common setting, consistencies in the sample selected along with the relationship of the participants with the researcher, similar method of data collection and data analysis techniques used. The greater number of similar findings resulted from the similar replication of the study means the greater stance the research findings have. Given that there are some similarities between this study and other general chat usages, the research results also provide indicative problems likely to be encountered when applied under similar contexts. The findings of the study can therefore be used to guide the design, development, operation and evaluation of synchronous chat system.

The data in this study could also be used for future inductive hypotheses and could be analyze using quantitative analysis – such as correlations, factor analysis, multivariate analysis, and its validity could be determine through Cronbach alpha. A combination of qualitative and quantitative analysis strengthens the findings of the study and the correlation of various variables can be measured and supported.

Chapter 6 OVERALL CONCLUSION

6.1 Overview Findings and Implications of the Two Case Studies

The conclusion to the study begins with a discussion of the findings specific to each case study followed by an overview of the overall findings that have been drawn from the research. It highlights the implication of this research to the body of knowledge in the literature and makes suggestions on areas that warrant further investigation in future research studies.

Presently there has not been extensive literature regarding students' perceptions of usability of synchronous chat for fostering students' interaction and communication, nor have there been adequate tools that focus on appropriate usability measures. The study employs a qualitative approach to explore participants' attitudes and perception to synchronous online learning and communication. It has been long recognised that different cultural groups have different values and perceptions, yet there has been a gap in adequate research that explores the learning experiences based on an innovative blended learning model in particular, studies that involved students from South East Asia. Hence, the initial case study in this research elicited many associating variables and its underlying factors that influence their perceptions and attitudes to using the synchronous online chat. The learning and difficulties of Case Study 1 have been addressed and refined in preparation and planning for the second field study.

The triangulation method adopted for the two field studies established there are associations amongst the three usability constructs under the context of this study. The strengths and weaknesses of such relationships is worth further in depth analysis using the data collected, and findings can be used as a basis for verification in future studies. In adopting Computer Mediated Communication, all three constructs perceived ease of use, perceived usefulness and satisfaction are require for measuring usability, as oppose to general satisfaction alone.

6.2 Overview of the Findings Specific to Case Study 1

The qualitative research has reported and discussed the three key constructs of usability as well as factors that encouraged and discouraged student participation for the first case study. Students have identified a number of attributes that influence their usability in a synchronous chat environment, they have been in principle related it to the large group size and the instability of the technology. The underlying factor to a large group size of 28 or more students is that it is simply too big of open dialog using online chat. The study have affirmed the issues in relation to the technology at any stage, such as instability of the network connection and access during the course of the online chat sessions has potential major affects on users' ease of use with the medium, their participation and collaboration. There is potential for this medium of learning to facilitate online learning and interaction with well controlled parameters.

Many participants value the opportunity to discuss their thoughts and questions with the offshore (Australian) lecturer, however, several participants tend to focus their energies solely on the offshore lecturer rather than spending time interacting with other participants. These students report being disappointed when the offshore lecturer has not given them acknowledgement or a direct response due to the high volume of messages posted during each session.

Case Study 1 has presented challenges in terms of efficiency of the system and mixed user reactions have been received, some participants conveyed positive attitudes and effectiveness toward participating in the open dialog using the synchronous chat medium, others thought otherwise. Some participants have reported that several underlying attributes that affects usability has been the lack of control inside the chat room and no guidelines for turn taking which hampered their ability to fully participate inside the chat room.

Based on the analyzing the questionnaire in Case Study 1, student's perceived usefulness together with their motivation to participate inside the synchronous chat room meant that they have been observed to continue participating and appear to tolerate the deficiency with the technology. The interactivity, instructional strategies and the environment inside the chat sessions provided sufficient motivation for each participant to remain committed to

engage in online dialog despite problems with technology and the fast speed of chat. The deficiencies and learning of Case Study 1 lead to further modification of the design for the second case study.

6.3 Overview of the Findings Specific to Case Study 2

The study revealed in depth details of participants' perspective of the usability variables based on multiple data collection techniques including questionnaires, focus group discussion and the observation method. One of the key findings of the study has shown that both the technology and human factors have an influence on the ease of use construct and the overall usefulness and satisfaction levels in using the system which is consistent with the literature (Andrews and Haworth, 2002; Preece, 2001; Brinck, 1998).

Participants in case study 1 were likely to be clouded by the more dominating difficulties experienced such as network connection to have noticed the impact of being engaged in online chat. Compare with the initial trial, this case study has shown improvements since the system has been hosted locally. Upon stabilizing the access and network connection, human factors such as group dynamics, individual attributes and skills, play a critical part in creating a highly interactive online chat discussion. A substantial number of participants have found the system easy to operate.

To a greater degree the second case study has been able to support that the internal state of users and peer motivation have strong influence on the usability and satisfaction constructs. These user characteristics include students' domain knowledge, communication and language skills, along with their analytical and facilitation skills to develop effective and open group interaction.

The speed of online chat remained a key barrier in contributing to the synchronous chat forum. It has been anticipated that addressing the technological aspect and decreasing the group size for interaction be sufficient to slow down the pace of online chat. Subsequently, it is expected that participants could now fully engage in the synchronous chat medium with smaller groups of 9 to 10 participants. Yet a higher than expected number of participants continued to provide feedback regarding the challenges to follow and contribute to the online chat. According to their perceptions, the strategies have not been highly effective to

the extent of having an appropriate pace to enable all participants to comfortably contribute in the online chat.

It has been a challenge for academic staff to design a delivery method to manage the unpredictable nature and uncontrollable flow of messages of the online discussion. A substantial number of participants has found the system easy to operate and more difficult to follow and contribute to the online chat. Furthermore, some students have recommended that prior preparation to the live chat being an underlying factor to achieving a more successful communication outcome using the synchronous chat medium.

An examination of the interaction log files reveals a mean of 9 posts per minute, this shows a relatively high participation rate. The lowest number of posts per person was 16, this has not been consistent to the previous literature on Asian students being stereotyped as being passive. It also suggests that participants are prepared and willing to contribute to the synchronous interaction. A considerable proportion of participants (72%) have noted that online chat stimulated them to analyse the topic. Their underlying values have been observed that it relates to being engaged with the role play activities along with being motivated by their peers during the live sessions. In reviewing the assessment of students' assignments indicate students that have completed an open dialog using online chat show a higher performance rating compared with those without.

6.4 The Common Findings of the Two Case Studies and the Implications for Future Research

The perceived usefulness for both studies revealed similar findings and results, firstly students found synchronous online chat useful for enhancing learning outcomes, such as better understanding and improved performance on their assignment. In addition, the online medium together with instructional strategies can create sufficient incentive to encourage and increase participation of participants from a South East Asian cultural background under a unique blended learning environment. Accordingly twice as many students feel Case Study 2 has been useful in comparison to Case Study 1 particularly in terms of valuing the ability to share information, voice their opinions, and engage interaction with their peers and the offshore (Australian) facilitator in a less confronting environment supported by their local laboratory tutor.

Both studies reveal the similar themes, core benefits as well as the deficiencies of using synchronous chat for group dialog. However, not all key themes have been the same for both case studies as the settings and methodology has been revised for the second case study. Participants have provided comments on the benefits of online chat medium, the inherited text-based feature, and the immediacy of the communication are attractive features of this learning model. It offers users the comfort of participation, not only it is relatively less confronting, there appears to be evidence to suggest that the interaction amongst the users to be highly positive allowing more opportunities for open dialog.

During the course of these two case trials it has been shown that the sociability aspect of online chat is well supported and is highly interactive in capturing user's attention. The trials have been successful in encouraging student interaction with the entire sample population contributed to the online chat sessions. The study suggests however, the quality of the discussion varies as it is difficult to manage in a fast pace chat environment. In respect, both studies have affirmed that the students have suggested greater clarity and quality in the messages in an environment where the pace of the discussion should not restrain their participation.

Based on students' views, one of the underlying attributes common across the two case studies affecting perceived usability has been in reference to the irrelevant, disruptive and the disorganized flow of messages posted. Some students note difficulties in expressing themselves spontaneously amongst the hive of activities. Overall, there is potential to improve quality interaction amongst users in future studies.

In depth analysis of case studies have revealed that the core underlying problem has been without visual cues in text-based communication, many participants concurrently post messages whenever there was a momentary lapse in messages appearing on their screen rather than waiting for responses. While participants continue to simultaneously post messages, the pace of messages continue to become faster.

Consequently, the impact results in interweaving comments and incoherent conversations occurring in no sequential order making it difficult to productively contribute and follow the discussion. This has implications on both the quality of conversations as well as creating a

barrier for effective communication particularly for those with English language difficulties. As a result, the core problem remains an issue for some participants in the second case study.

Under these circumstances, the smaller group size for Case Study 2 has not had a significant affect in reducing the pace of online communication. It can be concluded from these studies that in designing synchronous chat to facilitate student interaction and learning it is important to determine an appropriate balance of having a dynamic and optimal number of participants to be engaged in online chat at an appropriate pace. The risk of having a group size too small could mean that the number of posts drops to a point where the interaction may not be sufficient to maintain the user's attention.

The perception of usability and ease of use is influenced by the speed at which messages are delivered and at the speed the learner processes the messages in order to provide meaningful responses. This calls for a need to find ways to facilitate quality discussion that considers a fine balance between not too many or not sufficient amounts of activities inside the chat forum to maximize the chance of delivering a successful online interaction. It is difficult to predetermine the likely activity of an online chat group without prior knowledge in regards to the dynamics of members. For instance, a highly interactive group may only require a smaller number of participants. The studies also acknowledge both individual differences and group dynamics have impact on the discussion, the ease of use, the usefulness and satisfaction.

One of the predominant outcomes of the first case study was to establish a comfortable and stable online environment for group interaction via synchronous chat. While the core of the second case study aimed to explore student's perceived usability and satisfaction of online chat for communication. Hence, issues relating to the quality of the discussion including messages deviating from the discussion topic and irrelevant messages were a key variable taken into consideration but not intended to be examined in great depth in this research.

Unlike the broader literature, the findings in both case studies has documented and shown that South East Asian student communities have not been intimidated by their language proficiency. The triangulation method indicates that the majority of students from South

East Asian background are not considered passive participants of synchronous online chat. The belief that Asians have difficulties using text-based communication given there is no visual cues to give the additional meaning of what is being said, (*Chester and Gwynne, 1998*) has not been the case for this study. The research has shown that a lack of visual cues is primarily due to the sheer volume and the fast pace of the synchronous online chat medium.

Students in this research have had personal contact with one another and with their offshore lecturer prior to the live chat sessions, participants have found it less intimidating and not as confronting as compared with face-to-face contact. Together, with sufficient motivation and a comfortable environment, taking into consideration technical barriers, all participants continue to actively participate in an open and lively dialog and the majority indicated that they believe it will be worthwhile to apply this mode of learning to future subjects. Several participants have acknowledged the presence of the local tutor who has been helpful to clarify queries to posted messages or difficulties experienced in the laboratory such as system instability issues.

6.5 Implication for Future Research

A substantial body of knowledge has been elicited from this research for teaching and learning based on the usability of the synchronous chat for open group dialog. The study has provided researchers with a range of parameters to be considered when measuring students' perception and attitudes toward usability of online chat.

From the perspective of actual users, the current two case studies significantly expands the overall understanding of usability of synchronous online chat for mediating group discussion. It has in particular, made a step forward in defining the often elusive concepts of usability of online chat for instructional strategies under a unique blended learning environment. The transnational educational study involves students from South East Asia, the offshore (Australian) lecturer playing the role of the facilitator and supported by the local laboratory tutor.

The general and the underlying variables found in both case studies add value and knowledge to the existing literature on general participant attitudes (Lawrence-Slater, 2002;

Motteram, 2001; Mock, 2001). It helps to furnish a more complete understanding of perceived usability from most (Case Study 1) if not all (Case Study 2) of the participants of the online chat sessions. With a lack of current usability studies that has been applied to blended learning, this research contributes to the much needed body of knowledge.

These case studies have demonstrated that the use of a combination of teaching paradigm can create an effective pedagogy, with technology and instructional design thoroughly planned for; it can facilitate interactive communication without compromising student satisfaction. It also appears that the online chat and the instructional strategy have provided sufficient student motivation and commitment to engage and participate in synchronous online chat.

The study has illustrated student attitudes are influenced by a multitude of variables that could be captured for future research. It has created a foundation for future research work based on continuous improvements to the current methodology and the delivery of the field studies. With a sufficient number of research studies conducted in a similar setting, coupled with the use of triangulation methodologies and statistical analysis, this could result in more solid findings in understanding links and relationships with student perceptions and attitudes towards the usability of online chat. Furthermore, there is potential for a model to be developed that can be generalized to the overall population.

Unlike many of the literature review, the themes in both case studies have been elicited from the majority of the population. It recognizes that students' positive perception, perceive usefulness and ease of use with the online chat model will drive better learning outcomes and maintain their engagement.

Students experience with the online chat sessions is complex and multifaceted and their views extend beyond the interactivity of online chat. Addressing one factor in isolation is unlikely to have a huge affect on student perceptions as simultaneously addressing a combination of variables. Together, the two case studies have highlighted the utmost priorities in delivering a comprehensive online chat medium, firstly, the stability of the supporting technology, specifically the stability of access and network connection, alongside the importance of instructional strategies to develop sufficient motivation levels to

encourage user participation and active engagement. It is recommended that the delivery of online chat is likely have a greater chance of success if combined with measures addressing multiple factors affecting student participation these include user attitudes, perceived ease of use and usefulness.

PART II

Chapter 7 CASE STUDY 1- OVERVIEW

Chapter 8 documents the introduction to case study 1 and its objectives. This chapter outlines the study design and procedures, followed by a description of the data collection method adopted for this initial case study. The final part of the chapter provides a description of the participant's demographic profile.

7.1 Introduction

The primary goal of integrating online synchronous chat into the blended learning in a team teaching environment is to enable the offshore (Australian) lecturer to stay in keep abreast with the progress and the needs of the students during their online discussion. However, this could not be achieved if students, the paying customers, do not have a positive perception or are not prepared to participate openly inside the chat session.

The application of usability has been explored in a wide spectrum however, until more recently little research exists on online communities using synchronous chat (Preece, 2001). Frameworks and theories have broad guidelines (International Standard Organization, ISO 9241-11) or consist of a general understanding of user perception (Technology Acceptance Model = TAM), without providing specific details that is needed for continuous improvement. Researchers continue in their attempts to find multi-facets communication tools and possible constructs to measure such usability.

Furthermore, academics and the existing research alike are faced with the challenge of designing blended learning model that encourages passive students to become active participants without jeopardizing student satisfaction and perceptions (Klemm, 1998). There have been suggestions that Asian students are not proactive in giving their view (Ballard and Clanchy, 1997), while other studies (Balazs, 2002) shows that without additional stimulation students are reluctant to use these systems. To date, there are only limited studies that investigate the South East Asian students' perception and attitudes towards the usability, the benefits and the barriers of synchronous chat medium particularly within the context of blended learning under a team teaching environment.

It entails a discussion on factors that encourage and discouraged student participation, whether students feel comfortable interacting online with an aim to improve the next case study.

7.2 Objectives

The challenge was to determine students' perceived usability of the online chat for fostering open dialogs amongst themselves and with the offshore lecturer. The well known usability framework, characterized by the three constructs from TAM, namely Perceived usefulness, Perceived ease of use, and attitudes, was applied to the investigation of synchronous communication tool. This was unique to the usual information system in which these frameworks have proven themselves.

More specifically this first case study investigated:

- a) South East Asian students', mainly from Malaysian and Indonesian backgrounds, perceptions of usability and attitudes towards participating in the online chat;
- b) An insight of specific aspects that participants' valued and the difficulties they encountered in using this medium which supplemented their usual classroom activities. This in turns helped to ascertain whether students perceive online chat facilitated by the offshore lecturer could foster interactive class communication;
- c) Students' perceptions in identifying the attributes that influence the usability in a synchronous chat environment under this context with a view to improve the design for future studies; and
- d) The stability and an evaluation of the system to support such communication

The learnings and findings of this case study would be utilized to improve the second case study, the next case study would take into consideration the mass opinions regarding the attributes that affect the usability of the medium. Key issues that interfered with students participation in an online dialogue would be refined for the case study 2.

7.3 Study Design

Much of the overall design features applicable to case study 1 and 2 have been described under Part 1, chapter 4, this section is focused on setting the scene with specific details regarding student expectations, how the group size has been determined and the technology selection process.

7.3.1 Briefing on the Expectations

All participants were briefed on the expectations and the objectives of the online chat during the first trial session. The key points discussed can be summarized as follows:

- Assessment was made on the quality and relevance of the messages posted;
- The open dialog was based on the topics in relation to their readings and subsequent write up of the assignment;
- The role of the offshore lecturer was to be the facilitator, only leading the direction of the discussion when necessary;
- Students were encouraged to discuss not only with the offshore lecturer but with one another, with the goal of helping each other to better understand the complexity of the topic and its related issues; and
- Students participated inside the laboratory session administered by the laboratory tutor; and
- Rude behavior in any form or shape was not acceptable.

7.3.2 Group Size and the Number of Online Chat Sessions Held

Research to date have not been able to determine the optimal number of participants for online chat, Wang and Newlin (2001) suggested that groups should not exceed 25-30 participants for asynchronous discussion. Dolen and Ruyter (2002) found that the more respondents in the online chat, the more interactive and satisfied the participants were with the online chat for group interaction.

A class of fifty-seven participants was divided into two groups for Case Study 1, one group of 28 and another group of 29. Based on the apparent lack of research on group sizes, the limited resources available for the subject, and a large class size of 57 participants, this was thought to be a suitable size for each group. However, if the size of the group was found to

be unmanageable, a decision to reduce the group size further in the next study would be considered.

Four online chat sessions were conducted under the initial case study, this was made up of two live and two trial sessions. One of the two trial sitting was a training session with the local instructor, the other was with the offshore lecturer. No mark incentives were allocated for these two trial sessions and it was not compulsory for students to participate. The duration for the two live chat sessions was an hour for each group while each trial session lasted 30 minutes.

7.3.3 Technology

Many trials publicly available chat rooms hosted by an external source were conducted, these systems were not limited to Netmeeting, Paltalk, and Yahoo Messenger. The testing was to ensure the chosen host would function well with both institutions firewall, and allow for a group size of 30 participants to interact in the one discussion forum. Microsoft Internet Relay Chat was the chosen system adopted for the study

7.3.4 Incentives

For case study 1, a total of 10% of the overall assessment for the subject was allocated for the two online chat sessions, 5% for each session.

7.4 Procedures

7.4.1 Data Collection Method

It was uncertain that the type and volume of interaction that could be expected from the live chat sessions. The initial case study was designed with flexibility to enable mass respondents to openly voice their thoughts and experiences without needing the offshore lecturer providing specific answers to queries. This served well by incorporating mostly open-ended questions within the initial questionnaire and Likert scales could then be developed for the second case study based on the themes and the learnings from the first trial. The questionnaire was administered in conjunction with a separate laboratory observation, to allow a more accurate picture in capturing student's experiences; revealing

unexpected or unintended impact that would not otherwise be known. The observation method was conducted with attention to the possible difficulties experienced by the participants and their attitudes towards participation. The overall benefits of qualitative research, questionnaire and observations and attached data analysis for both Case Study 1 and 2 are documented under Part 1, chapter 5.

Subjective data collected in Case Study 1 were gathered directly from users, this provided useful information; however, it had its short comings. Such shortcomings were minimized by gathering data from a larger group of participants and devising a multiple data collection technique as suggested in Foraker Design (2002-2005).

7.4.2 Questionnaire

The questionnaire design was around the multi faceted aspects including student's viewpoints towards the usability of the communication tool. . No suitable usability questionnaire could be found in existing literature that took into account the dynamic nature of synchronous chat used to support group interaction for this cultural group. However, several questionnaires examples in the current literature (Mantyle and Gividen, 1997; Malhotra and Galletta, 1999; O'Malley and McCraw, 1999) were referred to and selected questions were modified to suit the objectives of this study.

The overall questionnaire consisted of seven key questions and the researcher pilot tested the questionnaire to ensure clarity of questions and that all questions used basic terminology. The questions within the questionnaire fitted well into the three usability constructs, namely perceived usefulness, perceived ease of use, and their attitudes toward using the system. (The details of each of these constructs were described in chapter 5). A sample of the questionnaire is attached in appendix BB.

In summary, perceived usefulness was one of the three constructs of usability, which was measured as an outcome of the process of the students' perceptions towards the benefits including the encouragement factors of communicating via online chat. It considered their

overall thoughts on the effectiveness of the interaction with the offshore lecturer using the online chat medium.

The ease of use was measured in terms of the process of achieving the outcomes, in reference to the questions that elicited the “difficulties experienced or disadvantages” of having discussion using synchronous online. Participants’ perceptions were collated in relation to discouraging factors and whether they found it comfortable to contribute online.

The third construct was based on attitudes towards the satisfaction level mediated by the online chat as a communication tool. Data related to participant’s overall feedback and their extent of participation was collected. Participants were asked in a Likert scale question with space to add on additional comments if they would seek further clarification or challenge one another during the live chat session.

7.4.3 Peer Review of the Themes

All questionnaires were reviewed by two experienced research academics, one of whom is familiar with the context of this study. They provided helpful suggestions and advice which were taken into account prior to administering the questionnaire.

7.4.4 Administration of the Data Collection Methods

The questionnaire for case study 1 was administered at the end of first live chat session after the two shorter practice sessions were conducted. Prior to the distribution of the questionnaire, volunteers were made aware of the use of their responses, and the information collected may relate for future refinements of the course subject or possibly other related subjects, and participants should attempt to respond each question as honestly as possible.

The laboratory tutor’s notes from each laboratory observations were compiled at the end of each live session, prior to administering the user questionnaire. This practice aimed to collect and record accurate and detailed information in a timely manner. The data collected focused on the three constructs that affect usability and the interaction inside the chat room.

7.5 Data Analysis for Case Study 1

The findings of this first case study would assist in prioritizing the issues that need to be addressed and help build the second case study. The detailed data analysis of the open-ended questions and Likert scale questions has been discussed under part 1, chapter 5 of this thesis.

Participants' responses to each of the open-ended questions in the questionnaire have been grouped into themes. In addition, commonly cited themes across questions similar in nature were consolidated and examined. Numbers and percentages were derived to assist in determining how common each theme was and its significance in relation to other themes.

While responses to each of the 5 point Likert scale were grouped into three main categories for analysis, essentially the "always" and "often" categories were considered as positive ratings, these two categories were summated, similarly the negative ratings "seldom" or "never" categories were combined, while the results for the midpoint or neutral "sometimes" category remained untouched. Participants were often asked to provide comments to clarify their Likert scale selection to understand the underlying reasons for their choice. These comments were collated and provided some useful data for analysis.

A detailed analysis was undertaken to examine and cross check students who had difficulties in using the online chat. The study sought to understand participant's values and difficulties experienced inside the synchronous chat sessions to enable a clearer picture of the complexities involved in their perceptions of usability of the medium and for enhancing the future delivery of the subject.

The emerging themes were collated and presented to two highly experienced qualitative researchers for peer review. This included an academic from the education sector and another with technical expertise in human computer interaction. Their contributions assisted in developing greater clarity in the naming of the common themes.

Observation notes were used to confirm and provide addition information to the questionnaire method. The local laboratory tutor could make detailed observations in relation to the overall attitudes and ease of use in operating the system to support their interaction that might not be obvious to the participants. This could be related to the intensity of the class participation, or the underlying difficulties interfered with their participation.

7.6 Participants' Demographic Profile

The demographic profile of the participants were collated and showed in the graph below. This information could also be particularly relevant in designing future studies of a similar nature for comparison.

In a class of 57 participants, 40 students volunteered to respond to the questionnaire. Participants are all full time students between 22 to 26 years of age, with majority of the participants are at the age of 20 to 21; the Figure 7.A presents the frequency distribution of the respondents' age.

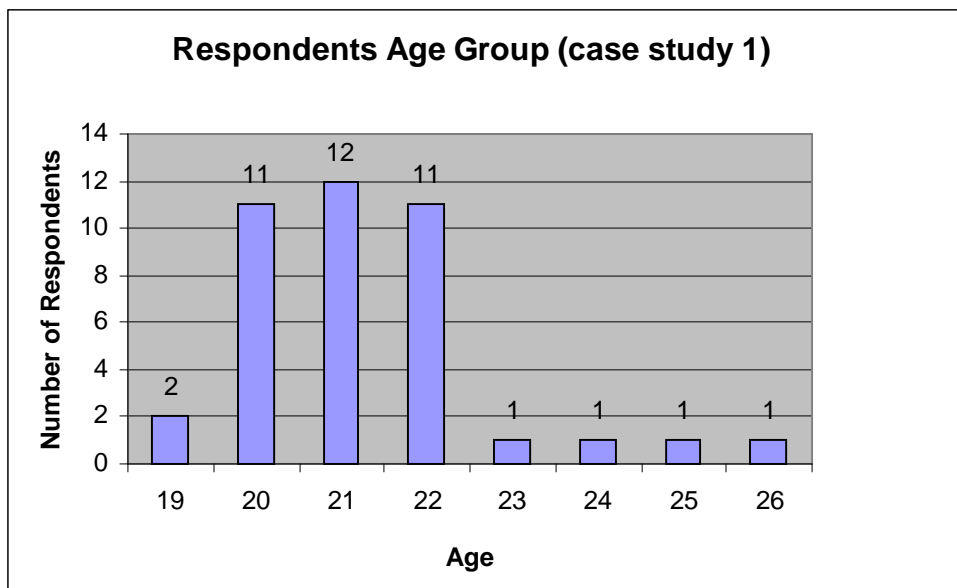


Figure 7.A Students Age Group

There are 42% (17) males and 58% (23) females in the study group.

The nationalities of the students are illustrated in the Table 7.A, 87% of the participants are Malaysian, and the remaining respondents are from Indonesia and Brunei part of South East Asia.

Table 7.A: Country of Origin

Nationalities	Frequency	%
Malaysian	35	87.5%
Indonesian	4	10.0%
Brunei	1	2.5%
Total respondents	40	100.0%

Chapter 8 RESULTS OF THE INITIAL CASE STUDY (1)

8.1 Introduction

The current study represents an important step to understanding student perceptions of online chat in the Malaysian educational system context. This study has potential to make a major contribution to the understanding of student's experience and their views in relation to synchronous online learning along with the various conditions that may set students to have positive or negative attitudes.

This chapter discusses the themes that emerged from the responses to the respective open-ended questions in the initial questionnaire and have been subsequently taken to refine the later questionnaire administered in case study 2. Several techniques have been utilized to collate the results of this study; it included observation of the study group along with the grouping the responses in two ways. The feedback has been organized based on the questions asked in the questionnaire and secondly the results have been appropriately consolidated across questions of similar nature.

8.2 Results From Questionnaire

In a class of 57 students, 40 (70%) students volunteered to fill in the initial questionnaire that were administered at the end of the class, they were encouraged to provide feedback on any problematic or unclear questions. Participants did not find any major issues with the questions or the structure; based on the written comments it appeared that students understood the questions.

8.2.1 Encouraging Factors that inspired Participation

Students were asked about factors that encouraged their participation, as shown below:

(Q.1) What factors or activities influenced your contribution to the online chat?

A) The factors that encouraged you to participate:

The responses were organized into the following three major themes: educational benefits, communication benefits, and assessment marks for participation. A closer analysis of the

two dominating themes, these being the educational and communication benefits as the motivating drive, revealed the underlying perceived usefulness of the medium for communication. The significance of these factors were described and presented in the figure 8A.

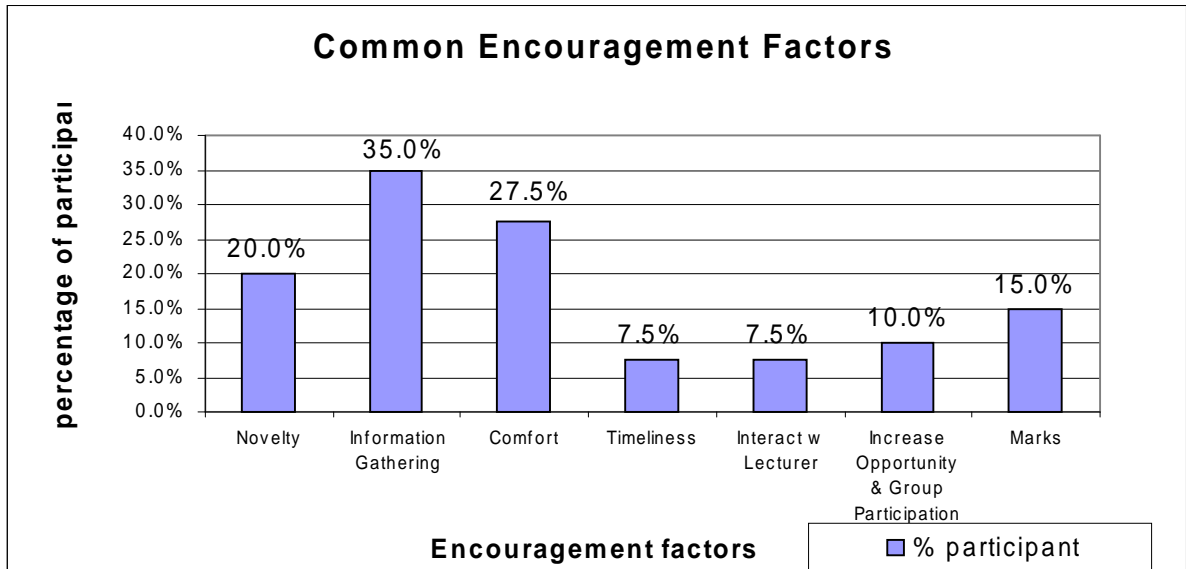


Figure 8.A. The Factors Encouraged Students' Participation

Number of sample (N) = 29. Number of non response = 3
(The clustering of the responses is documented in table A1, under appendix A).

The first theme identified was educational benefits, which referred to students' perception of their ability to obtain information, gain knowledge, enhance their skills or develop a further understanding of the topic by participating in the online chat discussion. This theme was derived from factors that encouraged participants to participate in online discussion.

This encouragement factor had fourteen (35%) participants identifying that online chat provided a communication channel for information gathering; gaining knowledge and understanding. This could be done through either the process of interacting with one another or passive recipients of information. Some students indicated in their responses that it was an interactive process:

(#26) *"exchange ideas/opinions."*,

(#27) *"I can know more and also ask question straight away if I don't understand. ...Know other opinion and something I didn't notice"*.

The following responses revealed that the students found this process useful merely to gather information as passive recipients:

(#14) *“for getting answer for thing that I don’t know [sic]”,*

(#39) *“can read other ppl opinion [sic]”.*

Six (15%) students specifically related that group discussion inspired them to participate in the chat room. This was supported by the following respondent:

(#27) *“I can know more and also ask question straight away if I don’t understand. Don’t have to wait one by one until she [the offshore lecturer] answers my question. Know other opinion and something I didn’t notice”.*

The novelty of the chat medium (8, 20%) was identified as being another encouraging factor, describing the session being interesting and exciting. They found the delivery setting provided them with new experience as quoted by the following participants:

(#6) *“quite interesting because this is the first time using this kind of method for discussion.”,*

(#25) *“this is something fresh”.*

The second major theme identified in the results was communication. This referred to the students’ ability to interact, share or exchange information and ideas regarding the discussion topic via a computer system with other students in their class, which led to the outcomes of educational values or positive attitudes.

A total of 30 of students (75%) were particularly valued the communication outcomes gained from interacting in online communication. This figure included those (14 respondents) who valued the information exchange which was based on the ability to communicate inside the chat forum irrespective of whether the respondents were merely observers (passive learner) who simply read and gather information, or active participants, who contribute, share, and exchange information. For example two participants noted that:

(#38) *“well, I can ask question during online chats and then I can learn more things using online chat”,*

(#21) *“...and the feedback given is come from many sources.”*

It would be important to keep in mind that the results indicated that the two key themes educational benefits and communication value appeared to be interrelated. The Venn diagram in Figure 8.B illustrated the commonality between the two key themes related to human-to-human communication allowed by this medium for information gathering and exchange of ideas and as supported by the following quote:

(# 38) *“Well, I can ask question during online chats and then I can learn more the things using online chat [sic]”,*

It is beyond the scope of this study to investigate the strength of this relationship.

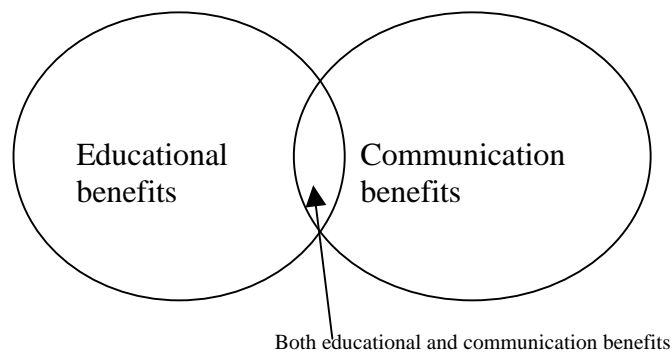


Figure 8.B Interrelationship between Educational Benefits and Communication Benefits

Other encouragement factors included 11 students (27.5%) who mentioned that the chat forum provided them a comfortable medium to contribute their thoughts to the group. Of these 11, eight (20%) mentioned the freedom to participate, referring to the chat medium being less demanding (two respondents), less intimidating (three respondents), less external interference (one respondent) such as noise. Two respondents simply summarized it as the freedom to contribute at any point in time. Others (three respondents) relayed their thoughts to understanding; they felt comfortable participating when they understood the discussion.

This indicated that ease of use not only encapsulated meta communication, it also elicited self confidence. Given this relationship, the question that naturally follows is whether the impact of the environment and the effort of contribution also played a part in the ease of use

construct. The following quotations illustrated the various factors that made participants feel comfortable:

- (#28) *“since it is not face-to-face it makes me feel free and more comfortable to give my opinions[sic]”*
- (#29) *“... more relax, more confident and dare to talk [sic]”.*
- (#25) *“it’s interesting and gives us time to think before asking a question” [sic]*
- (#11) *“the topic discussed is familiar and understood, thus I can follow the chat, giving out opinion[sic].”*

Three (7.50%) students felt motivated when the offshore lecturer paid attention to them or interacted directly with them, two of these three participants also appreciated the ability to clarify doubts with the offshore lecturer as claimed by the following respondent:

- (#17) *“when the lecturer is able to pay attention to me”*
- (#36) *“lecturer’s might personally aim questions to individual students thus students reply. Apart from that I would take this opportunity to clarify certain question with the lecturer [sic]”.*

Three (7.5%) students claimed that the timeliness and instant responses and feedback encouraged them to participate inside the chat room. While four respondents (10%) explicitly related it to the increase of overall student participation being the motivating factor; three of which claimed the active participation of their peers also motivated them to join in, this was clearly described by one of the participant;

- (#29) *“everyones [everyone participate] participation encourage me to, it’s exciting to do online chat, more relax, more confident and dare to talk”.[sic]*

One student mentioned it was the opportunities to contribute within a text-based medium which encouraged their participation.

Another aspect the participants described as encouraging their participation was having this form part of the subject assessment. Students (6, 15%) commented on the external stimuli being marks awarded; three of these six students specifically said marks was the major incentive for their participation as illustrated in the following remark;

(#7) *“the most important point is still the marks, I can get marks for participation”*

Amongst these responses there were positive attitudes toward using the system as a medium for interaction as seven (17.5%) students commented about it being an exciting and interesting experience, five had related to the novelty of the medium being used as a communication tool for learning:

(#1) *“excited, new to me”,*

(#29) *“...it’s exciting to do online chat, ... [sic]”,*

(#35) *“much more interesting, it seems more students are communicate online, got more opinion & ideas [sic].”*

8.2.2 Benefits of Interaction Using Synchronous Chat

In the questionnaire, participants were asked to comment on the benefits of having their discussion using synchronous chat, the exact question reads:

(Q.5) What are the benefits of having a discussion using synchronous chat which have not been mentioned in the previous statements?

It would be logical to expect positive comments to emerge from this question to be similar to the responses seen under the factors that encourage student interaction as in the previous section. As anticipated, this was the case in this first case study.

Educational and communication values again emerged from the perceived usefulness of online chat. Figure 8.C. on the next page shows the strongest theme which was information gathering via the communication medium, this was supported by 11 respondents (27.5%). In forming their attitudes, students tended to provide similar reasons in their feedback to both the perceived benefits of online chat as a channel for exchange and the factors that encouraged their participation.

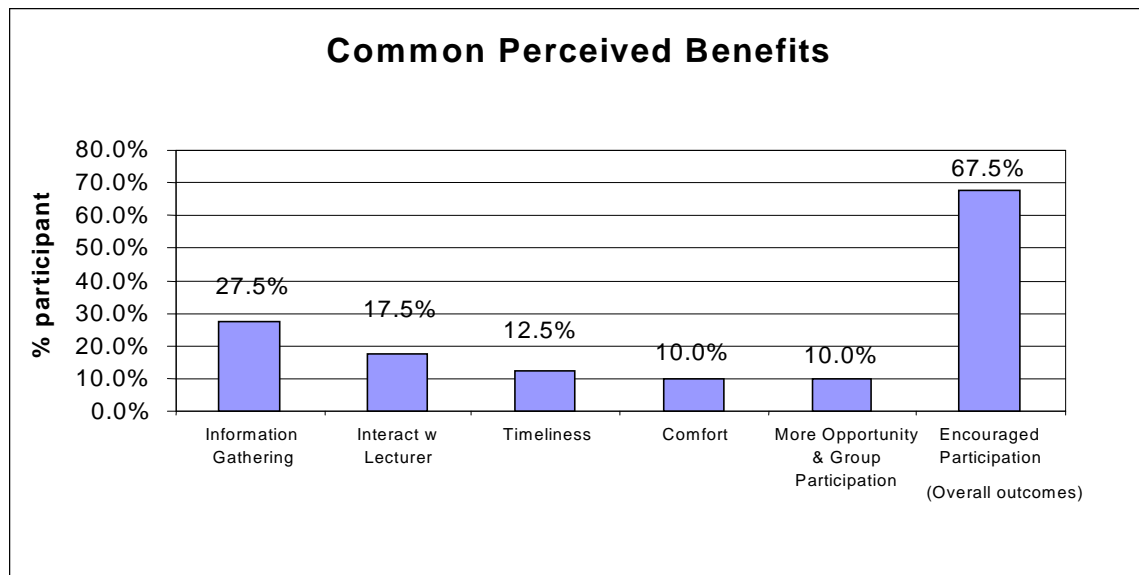


Figure 8.C. Perceived Benefits Amongst The Participants

N = 29. Number of non response = 7

(The clustering of the responses is documented in table A2, under appendix A).

The respondents believed that this channel of exchange along with associated motivational factors enabled the sharing of information and opinions amongst their class. One of the students shared its view by citing that:

(#2) *“it help to gather more information than we do it ourselves with little ideas [sic]”.*

Another respondent noted that:

(#32) *“information are shared, opinions and ideas are exchanged as different people have its own was of thinking. Being able to get information from both tutor and lecturer, two head was better than one”.*

All 27 respondents in this question (excluding the seven who did not perceive any benefits and 7 who did not respond to the question) indicated one way or another the perceived communication value in response to this question. They perceived various underlying variables encouraged them to engage, or to participate in the session, passively or interactively. Aside from the 11 participants who recognized the ability to gain information through human-to-human interactive medium, another 7 (17.5%) students appreciated the interaction with the offshore Australian lecturer, a theme which was identified earlier as falling in the communication value category. Four of these seven participants valued the

opportunity to further interact with the offshore lecturer without her being physically present. The remaining three participants perceived the benefits of being able to clarify any doubts and learn from the offshore lecturer. For instance,

(#11) *“student can interact with offshore [Australian] lecturer directly without the need to present physically [sic]”*

(#28) *“since any doubt I have, I can possibly bring it directly to the responsible offshore [Australian] lecturer”*

The results demonstrated that for six students the chat medium increased their access to participate and they were comfortable to share their thoughts with their classmates via text-based communication. For instance, four (10%) students suggested that the chat sessions provided a comfortable medium to interact, exchange and communicate their opinions and ideas.

Five (12.50%) students valued the synchronous interaction of the chat medium, as they noted that timeliness of the responses was the motivating factor. One such student illustrated in their comments:

(#23) *“able to get questions, answers on the spot, quick.”*

A student had concurring comments stipulated that timeliness of response increased their participation:

(#9) *“fast response from other people more participation” [sic]*

Another spoke of comfort level as a stimulator:

(#29) *“daring, more confident, everyone’s participation” [sic]*

Four (10%) participants explicitly noted that chat session increased peer participation at large, by providing an environment that inspired the students or gave them more opportunity, to participate. This was indicated in their responses:

(#35) *“students have more chance to express out their ideas”,*

(#21) *“everyone can participate”.*

One of the negative aspects a particular respondent indicated was that on one hand the speedy response time was effective, but on the other hand it interfered with the ability to understand the discussion:

(#12) *“sometime it may cause any respond as fast, and can’t really understand the meaning of what has been discussed” [sic]*

Seven of the respondents in fact noted the disadvantages of using the online chat instead of the benefits, some of whom shared common negative perceptions, amongst these responses were associated with technical problems (three respondents), while two respondents thought the medium was not useful and the rest spoke of the difficulties involved in participation, as revealed by the following quotation,

(#37) *“...especially if there are too many people in the chat room and our opinion are not accounted for worse students can be disconnected/banned and be left out of the chat for a while, thus getting lost when they connect again”.*

8.2.3 Discouraging Factors

A close examination of the factors that discouraged student participation is shown below

(Q.1) What factors or activities influenced your contribution to the online chat?

A) The factors that discouraged you from participation

All 40 participants responded to this question and the results were categorized into three key themes which emerged from collating the data. The themes were related to: a) technology issues, b) the interaction or the communication factors, and finally, c) the design factors in administering the case study.

Figure 8.D on the next page, presents the overall underlying factors that had interfered with students’ participation. Twenty eight (70%) of the respondents indicated network instability as the major factor resulting in the strongest barrier identified for this case study; 16 (40%) of the 28 responses specifically articulated the underlying connection problems and 11 (27.5%) comments were in reference to the message transfer rate being a problem.

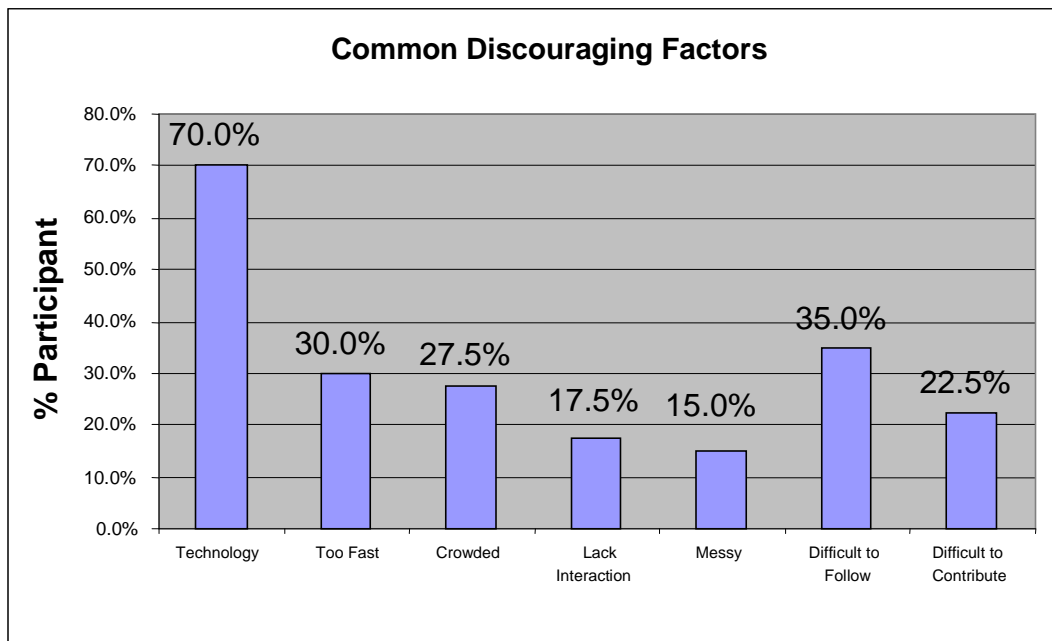


Figure 8.D. Perceived Discouraging Factors Amongst The Participants

N = 29. Number of non response = 0

(The clustering of the responses is documented in table A3, under appendix A).

The spontaneous disconnection of the chat software was also partly due to inactive participation as the external host for this Internet Relay Chat automatically disconnects any users who have not contributed for a set period of time. The heavy network traffic inevitably led students experiencing network lag or slow message transfer rate. These problems created confusion and frustration amongst the participants, typical responses revealed were:

- (#4) *“The Internet connection is always a frustrating matter to be consider [sic]”*
- (#11) *“When I were disconnected then connect again I already got lost [sic]”*
- (#24) *“The needs to wait and often lagged, disconnect etc, questions and answers are very messy, sometimes, question are not answered as lecturer may miss them because questions shoot at the same time [sic]”*
- (#16) *“the chatting gone to fast. It is hard for me to get or read the other questions and answers. ..., but sometime the line is too slow and make the message jamed, I can't see the new message [sic]”*

The two themes, group size and fast pace of the messages flow are very much related to one another, however, they were not grouped under a single theme. This is due to the positive

synchronous nature of online chat. Hence, the speed of the message could result from one or more combination of other factors besides the large size of the group. These variables include the dynamics of the group, the learning and processing speed of the participants and the transfer rate of the network.

In discussing attitudes towards group size, eleven respondents (27.5%) spoke of too many people inside the chat being a discouraging factor. This in part contributed to the fast pace of messages scrolling down the screen, as noted by five of these 11 participants. Respondents indicated that:

(#11) *“when the chat is going on too fast, because too many people on the line [sic]”*

(#19) *“when there's too many people giving their opinion and I don't have the chance to give my opinion as I have difficulty in typing very fast”*

While the other six respondents complained about the speed of the message flow on the screen. In total 12 (30%) respondents found the pace of the online chat too fast. This was clearly described by the following participants:

(#16) *“the chatting gone to fast. It is hard for me to get or read the other questions and answers”.*

(#11) *“the chat is too fast when ever a lecturer issues a question by the time the student finish typing his /her answer, 10-20 lines may have passed. Then they do get lost at one point”*

These 12 participants either spoke about this factor alone, some of who also articulated a combination of one or more additional barriers that interfered with the channel of exchange. These included the technology instability, the allocation of large groups for discussion, and incoherent posted messages made it difficult to engaged in online chat.

A substantial number of students' shared similar views, as highlighted by the following respondent who criticized the fast pace of message flow:

(#34) *“most answer have been posted and we did not realized that we are repeating the answer as many lines of answer appear at the same times”. [sic]*

The unorganized nature of the posted messages inside the online and real time group dialogue was another issue for six participants (15%) as illustrated in following comments,

(#25) *“sometimes it is quite difficult to keep track of the question which the answer is referring to”*

(#6) *“sometimes it’s too messy to read the message post by everyone”*

Seven (17.5%) of the total number of respondents noted the inadequate levels of responses were also discouraging, as indicated by this comment:

(#31) *“it's boring when no one response to my questions”.*

Four of these seven students initially welcomed the opportunity for interaction with the offshore lecturer, but were discouraged when the lecturer did not acknowledge its messages:

(#6) *“lecturer may not have enough time to reply if the message we posted is correct or wrong”,*

(#16) *“...Beside, the lecturer was not responding for my answer”.*

There was another participant who spoke about inability to interact with offshore lecturer due to the speed of messages flow.

Although the themes were separately grouped and counted, it should be noted that many of these obstacles were in fact inter-related as reflected by many of the responses. For instance, respondent #28’s feedback was in reference to the speed, lag time and the disorganization of the messages conveyed in the following words:

(#28) *“too many people in the chat room and the lagging of the connection, both make me lost my concentration, often do not know who is comment about what[sic]”.*

In another case, the following respondents felt that their issues were largely related to size of the group, the speed of the chat session and disconnection with the chat software as quoted:

(#27) *“too many people at one time, too fast, cannot keep up with the speed, always being kick out the channel because too many people (sic)”*.

(#11) *“when the chat is going on too fast because too many people on the line, when I were disconnected then connect again I already got lost (sic)”*.

Ultimately, the perceived outcomes of these underlying factors discouraged their participation, namely interfered with their ability to follow the conversation, and the ability to contribute to the discussion. The common combination of factors identified by participants (five participants) that interfered with their participation were the network issues and speed of the message flow.

It can also be said that the impact that these barriers had a negative affect on the perceived ease of use. This meant much more effort were required for them to participate in the discussion. Fourteen (35%) of the responses reported the difficulty of following the discussion and nine (22.5%) talked about the problems associated with contributing to the discussion. The two themes were not combined as one although they were very much linked in a sense that if students could not follow the discussion, it would make it difficult to provide quality contribution as respondent #16 concluded that:

(#16) *“the chatting gone to [too] fast. It is hard for me to get or read the other questions and answers,...”*.

Conversely, it would be possible for participants who were able to follow the conversation but were not actively interacting as they had difficulties using text-based communication or lack strong analytical skills and general knowledge of the topic.

This case study showed that two respondents found it difficult to express themselves in words; respondent #40 commented that;

(#40) *“slow/lagging, disconnected, difficult to give example or explain, too many participant will confuse the conversation”.*

Four participants were frustrated with the content of the messages posted; three of the four noted that it has an impact on the respondent's perception regarding their ease of participation. For instance, a student felt the casualness and was not impressed with the quality standard of the chat medium of communication:

(#12) *“some of them are typing more faster and can't really concern on what they reply for the question” [sic].*

One of the four spoke on the conflict occurred inside the text-base medium was discouraging.

8.2.4 Disadvantages (Difficulties) of Using Discussion Using Synchronous Chat

A close examination of the disadvantages perceived or the difficulties experienced by student participation as shown in the question below, all 40 participants responded to this question;

(Q.6) What were the disadvantages (difficulties) did you see in having the discussion using synchronous chat which had not been mentioned in the previous statements.

It would be logical to predict similar comments would emerge from both of these questions, one that addressed the underlying factors that discouraged interaction with online chat and the other that requested user comments in relation to the disadvantages of synchronous online chat. Although the question requested the participants to identify factors that were not mentioned previously, however, in response to the negative aspects of online chat, respondents tended to provide similar responses to both of these questions, one that addressed the difficulties and the other referred to discouraging factors (as described in previous section) to synchronous communication.

The following diagram presents the themes identified when the study participants were questioned about the disadvantages/difficulties of using synchronous chat for discussion.

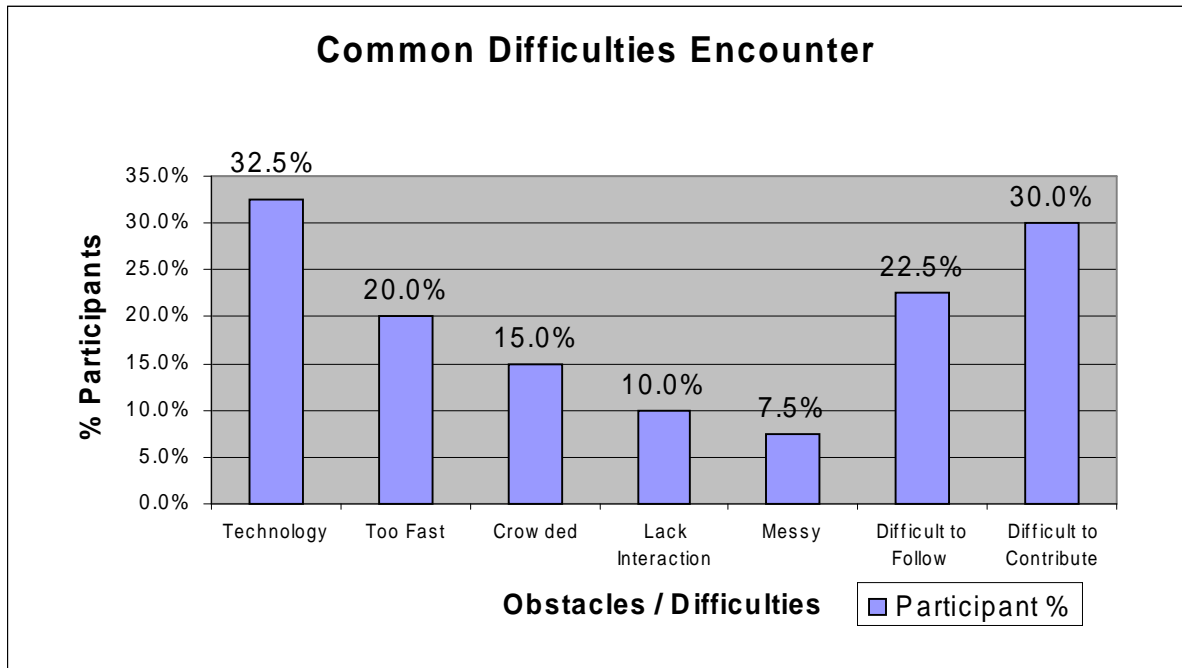


Figure 8.E. Difficulties Experienced Amongst the Participants

Number of non response = 10

(The clustering of the responses is documented in table A4, under appendix A).

The themes derived from the disadvantages of using synchronous chat question were mainly associated with the difficulties of contributing to the chat session, as a result, similar key themes were identified in both opened ended questions. It included participants commenting on issues relating to technology, communication aspects, and the design variables. The content of the messages posted online was identified as a weaker theme.

The Figure 8.E shows that thirteen respondents (32.5%) expressed concerns with technology issues such as, disconnection (9 participants, 22.5%) and lagging (5 participants, 12.5%), and too many people (6 participants, 15%) in each chat session were again identified as major difficulties interfering with their participation as clearly illustrated by the following comments:

(#36) *“unable to express opinion & ideas especially due to the amount of people in the chat. Student may be disconnected/ barred during the chat, thus by the*

time they come back in the world they have been left behind by the fast flow of the chat”.

(#13) *“some people may not able to participate actively in the discussion because of connection failure”*

The data showed that eight students (20%) felt the pace of the messages was too fast and two students indicated that they needed time to prepare. A small number of three participants (7.5%) criticized the unorganized chat messages.

The level of interaction as a theme in this instance related to the inadequate level of contribution, this was supported by four student comments (10%), and was likely due to a lack of feedback received, a lack of user confidence, or simply lack of active discussion. Student comments illustrated that:

(#15) *“the quiet are left out. The good ones continue to talk so much that the weaker one continue to be silent (no opportunity or confidence to participate)”*

(#21) *“the ideas were come out based on our own idea, lack of group discussion”*

One student (#24) apparently found difficulty to answer questions online and indicated that posting of messages could merely be a presentation of information rather than actual interaction, where a piece of information may be revised and review between the participants many times:

(#24) *“some (of the) questions the ideas were come out based on our own idea, lack of group discussion using online chatting”*, but gave no further clarification.

Four (10%) students commented on the content of the messages posted being either irrelevant (2 participants) or conflicting leading to arguments (two participants). One of these participants further related it to a lack of control inside the medium, and another perceived the disadvantages of conducting discussion using chat medium due to inability to draw a specific conclusion based on conflicting arguments. This was supported by the following response, indicating that the participant was confused:

(#25) *“too much conflict. Eventually no definite conclusion, sometimes get lost”.*

Misunderstanding could easily occur with participants who may not be proficient in expressing themselves, one user for instance spoke of difficulty of using text-based for communication.

Once again, it appeared a combination of one or more factors regarding stability of the connection, the speed of the messages scrolling down the screen, the group size, the unorganized nature of the chat medium and the connectivity of the software were obviously interrelated issues. (Refer to appendix C, table C2h). These were the primary reasons that nine (22.5%) students found it difficult to follow the discussion and 12 (30%) found it difficult to contribute to the synchronous communication. The following response clearly highlighted the relationship:

(#33) *“so many people in the one chat room and so many opinions was given from different people, cannot read all opinions was given from different people, cannot read all while it display, no enough time, do not have chance to type my opinion because it connect and disconnect, cannot catch” [sic]*

Other factors that students found made it difficult to participate was the effort required in expressing ones opinion clearly as one of the respondent claimed that:

(#12) *“it may take a longer time to understand one paragraphs has been explained”[sic]*

Another commented on the effort required to contribute to the discussion and that online chat should be conducted with smaller groups:

(#37) *“it can be very irritating for if we have an opinion but are unable to express it. Chat should be held in smaller groups”*

8.2.5 Level Of Comfort For Interaction

In Table 8.A students were asked to provide the reason for their choice in the five point rating scale. The themes that emerged from the content analysis highlighted some positive

and negative comments; and these comments were used to provide a better understanding to respondents' choice in the Likert scales. The questionnaire asked participants the following:

(Q.2) How comfortable were you in giving your opinion over the online chat?
 Not Comfortable Seldom Sometimes Most Of The Time Very Comfortable
 Why?

Table 8.A: Level Of Comfort In Voicing Opinion Over The Online Chat

Likert scales	Not comfortable	Seldom comfortable	Sometimes comfortable	Comfortable most of the time	Very comfortable
How comfortable were you giving your opinion over the online chat?	4	5	15	10	6
	22.5%		37.5%	40.0%	

N = 29. Number of non response = 8

(The clustering of the responses is documented in table B1, under appendix B).

Sixteen students (40%) felt that they (five participants) were able to comfortably participate inside the chat, the comments suggested that it was less confronting and less intimidation, and allow more freedom to contribute to the discussion (5 respondents) for example:

(#3) *“no body laugh at me;,”*

(#32) *“I’m free to give any opinion I think is relevant”; and*

(#36) *“because I’m chatting in the comfort of the PC”*

Three suggested they were comfortable specifically because there was less external interference as revealed by the following participants:

(#27) *“because at the same time I won’t be interrupted by others.”*

(#40). *“I have more time to think before answer”*

One spoke on the timeliness of the dialog (#23), and another respondent (#37) indicated the importance of being open minded when participating in the online dialog.

From the above table, 15 (37.5%) respondents who selected “sometimes”, eight of them mentioned on occasions they faced difficulties using the medium as they could not catch up with or contribute to the conversation. Three said it was due to technological problems such as lagging or disconnection. One participant was able to clearly describe their experience:

(#14) *“not every time participate in the chatting because we can’t catch up the speed sometime we still waiting for the question to prompt out, but others is*

already go to the next questions and the server in college is very badly we have even no chance to answer the question.” [sic]

Two of the eight respondents mentioned concerns about giving the wrong ideas. One spoke of the need to understand the question in order to respond. Another respondent acknowledged the efforts required contributing in the discussion and was frustrated when the peers misunderstood them;

(#25) *“we have to put the opinion in words, sentences and some of them doesn’t seem to understand or get the main point of it.”[sic]*

It was also worth presenting the reasons why nine students (22.5%) strongly felt they were not comfortable participating inside the online chat session, which would be explored in greater depth in the Analysis Chapter. Again, the reasons were mainly due to the instability of the connection as mentioned by five participants, the speed of the discussion noted by one participant, and two participants mentioned the inability to capture the lecturer’s attention as revealed by the following statement:

(#17) *“ the lecturer is not able to pay attention to all the students when there are too many students answering 1 question at a time”.*

A participant did stressed just not being confident with group dialog giving an overall of only three of the 40 participants from this question perceived that their confidence level suppressed their ability to comfortably voice their opinions. Overall common obstacles found in responses to this question included, eight participants commented on the impact of technology, three claimed it was their own confidence level that was the inferior, and two spoke of the inability to capture the lecturer’s attention. All the negative responses were associated with the effort of participation; that was the negative impact to participation in the discussion suppressing the ease of using this medium for instructional interaction amongst group members.

8.2.6 Request for Clarification

Table 8.B documents the results based on whether students would seek clarification during synchronous chat if they were unsure of what was being said. The exact question asked of the participants was as follows:

(Qs 5) When you were unsure of what was being said, did you request for clarification during the online chat?

Never Seldom Sometimes Most Of the Time Always

Explain:

Table 8.B : Students Assessment of Whether They Would Request For Clarification

Likert Scale	Never	Seldom	Sometimes	Most of the time	Always
When you were unsure of what was being said, did you request for clarification during the online chat?	3	3	17	13	4
	15.0%		42.5%	42.5%	

N = 29. Number of non response = 9.

(The clustering of the responses is documented in table B2, under appendix B).

The results were grouped into percentages a total of 17 (42.5%) participants said they would indeed request for further clarification (categories 4 and 5), 13 of them also reflected this in their written responses. These participants indicated that they were inspired to either gather more information, greater clarity and a better understanding, and three spoke about when the questions were not clear during the discussion, as illustrated by the participant below,

(#30) *“we can get more opinion & ideas”*.

Despite that, four participants commented that they still preferred to ask questions face-to-face as clearly identified by the following quotation:

(#37) *“asking for explanation on chat can be done, but is not as effective as asking the lecturer in person and interacting face to face”*.

Interestingly, one spoke of the medium being less intimidating as there was no need to see the reaction of the receiver. Two noted that there was a need to ask questions in order to stay in tune with the discussion. While one participant mentioned that it is less intimidating to ask for clarification online:

(#3) *“I won’t see his or her reaction so doesn't matter”*.

Respondent (#40) who rated four out of five supported oneself by pointing out that it was influenced by the type of clarification,

(#40) *“because if I don’t understand the word I can ask people (tutor) / find it in dictionary while discussing”.*

From the 17 (42.5%) respondents who selected the “sometimes” category, seven commented that they would indeed request for clarification during the chat session. Four of these seven participants were inspired to seek for better understanding and more information, and three claimed it was necessary to seek clarification in order to continue participating inside the chat forum. Amongst these participants, it appeared that the primary reason for this selection was that it was only at times (“sometimes”) applicable when the messages or questions were not clear rather than their overall willingness to ask for clarification during the online chat. For example, one participant noted that:

(#9) *“only if the explanation is not clear”,*

The following respondents suggested that it was necessary to seek clarification in order to continue participating inside the chat forum

(#15) *“if clarification is not done, we won’t know what other are talking about. Thus we can’t participate in the discussion”.*

(#33) *“if the question is not understandable I can’t give my opinion, I can’t think for the question, difficult to analyze’.*

Only a small number of five participants of the 17 selected the sometimes category referred to factors that restrained them to seek for clarification online. One spoke of insufficient time for clarification and another spoke of students deviated from the topic. While three of these five claimed offline as being a more effective medium for such activities; their reasoning was either in relation to minimize any misunderstanding, facilitate a more direct way of communication, or simply provide a more adequate response as highlighted by the following respondent:

(#7) *“I more prefer to oral communication rather than online chat. It's wasting time for us to type the questions and wait for answer. My question may not be answer as too many people”. [sic]*

Six respondents (15%) indicated that they would seldomly request for clarification if needed, two suggested that network lag time and another two spoke of the fast pace of messages leading to lack of opportunity to request for clarification during the session. One claimed it was due too many activities inside the session and too many students answering and asking questions at the same time.

The overall clustering of comments showed that the common reasons that restrained them to request for clarification were, two noted on the fast pace of the messages flow and another two raised the issue of network lag time. The common reasons that participants explicitly noted that inspired them to request clarification online were in relation to information gathering, better understanding and clarity; five respondents recognized of the importance of clarification in order to carry on with the conversation. However, seven respondents noted their preference for face-to-face method to seek clarification.

8.2.7 Effectiveness of The Chat Sessions

Table 8.C presents the data in relation to the effectiveness of online chat along with the exact question that was asked of the participants:

(Qs 6) In your opinion, how effective did you think the on-line chat with the offshore lecturer was in supporting your learning?

Not Effective Seldom Sometimes Most Of The Time Very Effective
Explain:

Table 8.C: Students Assessment Regarding The Effectiveness Of The Chat Sessions

Likert Scale	Not effective	Seldom effective	Sometimes effective	Most of the time effective	Very effective
How effective did you think the on-line session with the offshore lecturer was in supporting students in their learning	5	5	14	11	5
	25.00%		35.00%	40.00%	

N= 29. Number of non response = 6

(The clustering of the responses is documented in table B3, under appendix B).

A significant result worth keeping in mind was that sixteen students (40%) found online chat sessions effective due to a range of reasons; eight students mentioned useful outcomes based on the educational benefits of online chat as illustrated in Table 8.C :

(#19) *“I can express my opinion to during the chat and I get to share others people opinion”* ,

(#32) *“Especially of he/she is very knowledgeable – can learn and obtain a lot of new things from her/him”*

Participants (five) valued the interaction with the offshore lecturer even without her being physically present and acknowledged her advice and opinion,

(#29) *“she does not have to come plus she can give advice and explanation there”*

Students themselves (three of the 16 students) felt that online chat was useful to facilitate increased student participation. They (two students) appreciated the timeliness of the feedback received during online chat sessions, and one (#23) spoke of this method of teaching made students think critically.

Mixed reviews were received from 14 students (35%) who thought online chat sessions were sometimes effective. Some students (four) thought online chat had educational benefits, for gathering information, for example,

(#28) *“If it can work out properly, it will help quite a deal in clarifying and expanding our knowledge of the topic being discussed that we have previously read but might not understand fully [sic]”*.

They agreed however, (three of the same four respondents) that it would be far more effective provided there were no problems with online chat technology or if it was more organized, indicating the impact of technology interfered with perceived usefulness. While two participants indicated that they valued the interaction with the offshore Australian lecturer. One particular respondent found it difficult to catch up with the line of communication due to disconnection.

Six respondents commented negatively relating to the obstacles interfering with participation; they (two) expressed in reference to chat session was too fast and insufficient time to obtain clarification, as noted by the respondent below,

(#24) *“limited time. Therefore, when offshore lecturer explain in a way that’s not clear enough, they are reluctant to further clarify cos time is very limited”[sic].*

Two respondents indicated that the content of the messages were not clear. Interestingly, one participant (#33) acknowledged that online chat was a better option than no live dialogue with the offshore lecturer:

(#33) *“better than nothing carry on while the lecturer is offshore”.*

Ten respondents (25%) felt that the chat session were not effective due to a range of reasons. Four of the ten participants commented on the problem with the online chat network connection. Three respondents stated that they did not gain anything out from it, two further related to the technical problems not giving everyone an equal opportunity to participate, as identified by one of the following respondent:

(#20) *“nothing much can be obtain from it, disconnection / ban from servers may occur to some students”.*

Four respondents thought the effectiveness was either interfered by the fast flow of the messages (four participants) and too many participants in the session(two participants), one of whom commented that:

(#13), *“because too many people are chatting at the same time. Too many opinions are given by them”*

The overall clustering of comments from the written responses for this question, showed that the common perception as to why they did not perceived this delivery method effective were due to a) the connection stability (8 respondents, 20%), b) fast flow of messages (4 participants, 10.0%), and c) unclear content (3 participants, 7.5%).

On the other hand, participants perceived that the positive factors that attributed to the effectiveness of the medium included, a) information gathering (12 participants, 30%), b) maintained contact with offshore Australian lecturer (7 participants, 17.5%), c) encouraged participation (3 participants, 7.5%) and d) timeliness of responses (2 participants, 5%).

8.2.8 Suggestions for Improvement

The final survey question invited students to offer suggestions for improving the participation and the quality of the interactivity for the sessions. The two dominating themes evident in the Table 8.D was the need to reduce the group size for the chat sessions and to improve the reliability of the technology

Table 8.D: Suggestions for Improvement

Suggestions for improvement		n=	40
1	Technology / connection	15	37.5%
2	Group size	8	20.0%
3	More control required	5	12.5%
4	Brief introduction on topic and question before the chat session	2	5.0%
5	Others		
	Attractive topic	1	2.5%

Number of non response = 12.

(The clustering of the responses is documented in table A5, under appendix A).

Fifteen (37.5%) participants expressed the need to improve the technological aspect of the medium with majority of users suggested the need to improve the stability of the Internet connection.

The remaining suggestions were related to the instructional category (Delivery Design). A total of Eight users (20%) stressed the importance of reducing the group size. To eliminate conflict, irrelevant posts, reducing number of concurrent responses, or merely ensure everyone has an equal opportunity to participate, five (12.5%) respondents would like to see greater control inside the chat room. A particular respondent requested for more equality and focused interaction, and another respondent would like to see more marks should be allocated for participation (currently four marks were allocated for the participation) was suggested:

(#15) *“Everyone is given a turn to voice their opinion so that everyone, not only the good ones get to participate”,*

(#32) *“well ppl who misuse the online chat to gossip, spoil others image & reputation, write & post irrelevant issue not regarding to the assignments, play throughout the chat without answering the lecturer's quest, purposely go against 'someone' idea & opinion because of hatred should be penalized &*

kick out of the online chat”, “It is because it is disturbing the whole class not only the person/ppl he/she is attacking - very immature attitude. End results of chat will not be that effective & information retrieved & collected is very limited.”, “Besides, marks or other encouraging stuff should be implemented to get everyone participating” [sic].

Two students recommended the necessity to brief the students on the topics or questions before the chat so that they can be more prepared for the discussion and two-way interaction.

(#25) *“why not the offshore lecturer tell us the topic with the questions to be discussed beforehand so that we can be more well prepared with our answers questions or additional research materials.”, “The situation is not that encouraging as most of us not really fluent yet to relate the topic with other cor-related cases/course in such a short time.”, and “The situation is not that encouraging as most of us not really fluent yet to relate the topic with other cor-related cases/course in such a short time”*

8.2.9 Themes Consolidated Across the Questionnaire

To grasp a more complete understanding of the survey results, this section presents the consolidated results of the above questions. It was found that similar reasons were provided in response to the benefits of online chat along with the factors that encouraged participation. Both questions elicited the values as perceived by participants.

Conversely, similar underlying reasons and the difficulties experienced with synchronous chat were found across two questions within the questionnaire regarding the discouraging factors to online communication and the difficulties with this medium.

Consolidation of the results for the weaker themes showed interesting results. For instance, how students spoke about the value of interacting with the offshore lecturer was not seen to be of significance when examining the results from individual questions, but it was raised as

a key element for interaction during the field observation and was confirmed by a diverse number of students across a broad section of the questionnaire.

The frequencies from related questions regarding the positive and common issues raised by participant were counted. The data was then used to gauge the significance of each theme and aim to provide a clearer distribution of the results across a number of questions.

8.2.10 Positive Perspectives

Table 8.E illustrated the frequency of participants who valued each of these main constructs.

Table 8.E. : Accumulated Percentages from the Benefits and Encouragement Factors to Online Communication

Themes	Encouragement factor	Shared Common Responses	Benefits of online chat	Subtotal	Number Of Respondent %
Information gathering and exchange	12	2	9	23	57.50%
Comfortable atmosphere for interaction	9	2	2	13	32.50%
Interacting with the offshore lecturer	1	2	5	8	20.00%
Increase group/ opportunity of participation	2	2	2	6	15.00%
Timeliness of feedback to queries	2	1	4	7	17.50%

N= 29, (The matrices of respondents by each factor (theme) are documented under appendix C1).

(Refer to appendix C1, tables C1a to C1e for the detail of the calculation and the list participant numbers).

It showed the consolidation results from two related questions in the questionnaire, one referring to the benefits of this teaching mode for student interaction and the other related to the factors that encouraged students to engage in online chat. A combined total of 23 (57.5%) students indicated in their feedback to these two questions were related to value of information gathering and exchange. There was an overlap of two participants who mentioned this construct in response to both of these questions. A subtotal of 14 (35%) students claimed information gathering was an encouraging factor, while 11 (27.5%) students felt information gathering was the main benefit of online chat.

An accumulative total 13(32.5%) participants perceived the medium provided a comfortable environment to voice one's opinion. A combined total of 8(20%) respondents valued the

ability allowed by the medium to interact with offshore Australian lecturer. A consolidated total of 6(15%) respondents perceived the medium increased students participation, and 8(20%) participants welcome the timeliness of the responses and interaction.

The value of the connectivity with the offshore lecturer will be discussed in more detail under chapter 9. It was not obvious from examining each of questions individually that this was considered a major theme. A closer examination using the observation method administered by the local tutor saw many participated to seek the attention of the offshore lecturer. For instance, it could be observed that when the offshore lecturer was disconnected from the discussion due to technical issues, the discussion was of less focus, with students moving toward social dialogs, and others not knowing whether they should continue with the discussion. Hence, figures were combined across all the seven questions in the questionnaire, together this contributed to a total of 17 (42.5%) participants valued the interaction with the offshore instructor in one way or another. Consequently, this was found to be a major underlying theme. (Reference Appendix C, table c3)

In an example one student (#32) thought the online chat was effective and mentioned that the medium was valuable for interacting with offshore lecturer whom they respect and look up to:

(#32) *“Especially she is very knowledgeable – can learn and obtain a lot of news things from her.”*

Those participants who did not manage to capture her attention were disappointed in this regard, as stated by the participant below:

(#17) *“the lecturer is not able to pay attention to all the students”*

The next section sought to investigate the interrelating variables that helped in understanding how students rated their level of comfort in participating with the new mode of learning. The figures in the table derived from collectively summing the benefits of online chat and the factors that encouraged student communicating online. They were then

compared with the Likert scale question which specifically requested students regarding their level of comfort in voicing their opinions.

Table 8.F. : Students' Level of Comfort with Participating Inside the Chat Room

	Encouragement and Benefits	Highly Rated on level of comfort (Likert scales)		Total Number	
		Common Respondents	Additional Participation	Number of Participants	Percentage
Collectively grouping the results based the benefits, the encouragement factors and the effectiveness of online chat	Encouragement and Benefits (Sub Total)				
Number of students comfortable communicating in online chat	13	6	10	23	57.50%

(The clustering of the responses is documented in tables A1 and A2, under appendix A. While the consolidated list of participants is found in table C5, under appendix C).

It could be interpreted that 13 (32%) respondents thought the medium provided a comfortable environment to participate in their response to either encouraging factors to online chat or the benefits valued by the participants using online chat for group discussion (as shown in Table 8.F). 6 (15%) respondents reconfirmed this by selecting the positive ratings on the 5 point Likert scale (category 4 and 5).

The results identified a total of 16 (40%) respondents who had rated very positively on the Likert scale when they were asked explicitly regarding their level of comfort in voicing their opinion publicly inside the text-based chat room. While a collective sample of 10 additional participants supported this concept, but did not acknowledge it in their written comments to the two questions that asked participants regarding the factors that encouraged participation and the benefits of online chat. Hence, it could be interpreted that they perceive it neither an important aspect to encourage participation nor did they believe it was a significant benefit for interaction using synchronous text-based medium. In this scenario, the true value of open ended questions could lead the researcher to find underlying factors which would escape from being found in closed ended responses. Open ended questions were not restrictive allowed the researcher to tap into respondents' insight into the issues of importance to them (Polgar and Thomas, 1995).

On the other hand, there were 3 (0.75%) participants who mentioned the comfort was either an encouragement factor or benefits valued, but had rated low in the comfortable level. Closer analysis indicated that they in fact appreciated the text-based medium being less intimidating and more confident to voice themselves, but the reason why comfort level was rated poorly was due to the connection stability and difficult to capture the offshore lecturer attention.

Overall 23 (57.5%) participants felt online chat less confronting, with less external interference, more confident and freedom to voice their opinion. With this mind, the level of comfort was in some respect interfered by the inability to capture lecturer attention (2 participants), lack of confidence (3 participants) and the difficult to participate as mentioned by 9 participants in their comments. Seven of these nine respondent claimed technology stability was the core obstacles.

8.2.11 Negative perspectives

The figures from the questionnaire results shown in Table 8.G , over the next page, was based on the combined totals of the following two questions, firstly factors which discouraged student participation and secondly participant's difficulty in using the synchronous online chat medium. The results from these two questions showed not only common themes but also significant (overlapping) common response in relation to participants identifying problems associated with the use of the technology. Nearly one third 11 (2 out of the 30 respondents specifically voiced the difficulty with participating online was due to the utilization of an unstable medium and echoed a similar response in their comments in relation to factors that discouraged student communication.

One of the participants (#31) noted that:

“system lagging, it’s boring when no one response to my questions”, and “ very messy.” “Everyone is sending messages instantly, had to catch up system jam” [sic]

Table 8.G: Figures Consolidated Across Discouraging Factors and Difficulties Experienced

Themes	Number of respondent (n=40)				
	Discouraging factors	Difficulties	Both discouraging and difficulties	Sub total	Percentage
Instability with the technology	17	2	11	30	75.0%
Chat room was over- crowded	9	4	2	15	37.5%
The chat dialogue was too fast	7	3	5	15	37.5%
Messiness of the message posted	6	3	0	9	22.5%
Inadequate feedback	6	3	1	10	25.0%
Content quality was an issue	4	3	1	8	20.0%
Overall Negative Impact on Effort					
Overall chat was difficult to follow	9	4	5	18	45.0%
Overall it was difficult to contribute to online chat	4	7	5	16	40.0%

(The matrices of respondents by each factor (theme) are documented under appendix C2, tables C2a to C2h).

The strongest theme was the instability of the technology, which was commented by combined total of 30 (75%) students. This made it both difficult to participate in online chat and was considered a discouraging factor. Six of these students perceived this under a separate question addressing the effectiveness of the medium. It was reasoned that their exposure to an unstable medium meant that it was not a highly (rated 1 to 3) effective medium for student learning. Two additional students totaling of eight cited technology was a barrier for them.

Not surprisingly, a combined total of 15 (37.5%) students expressed quite major concerns in relation to the large group size for this type of online dialogue, with three concluded it as the result in the ineffectiveness of synchronous chat when they were questioned about the effectiveness of online chat.

Equally important was the perceived fast speed of the messages posted which created issues for an accumulated result of 15 (37.5%) respondents, another two additional respondents stated this being a problem when questioned about the effectiveness of online chat.

As mentioned earlier, many of these barriers were interrelated in this case study, the size of the group in affect increased the pace of the conversation and incoherent messages were posted, this was in some instances further complicated by the network lag and disconnection to the chat software. Clearly, a combination of variables created difficulties for participants to not only follow and contribute, but also to reflect and understand the conversation flow while being able to receive sufficient feedback to respond and continue with the conversation.

The results indicated that nine (22.5%) respondents were upset by the messiness in the train of messages For instance,

(#21) *commented, “some times, its make me confuse because automatically all the responds from other friends display/gone very fast until it is hard for me to see and refer” student number 21 commented.*

While ten (25%) respondents expressed concern regarding inadequate feedback or acknowledgement of their posted messages, this could be illustrated by the following response as a respondent identified it being interference to one’s willingness to seek for clarification when required,

(#7) *“I more prefer to oral communication rather than online chat. It’s wasting time for us to type the questions and wait for answer. My question may not be answer as too many people.”*

Eight respondents (20%) felt that the content under discussion could be improved. Three additional respondents clarified this factor suppressed the effective of the online chat when asked about the effectiveness of the online chat. In an example, student #10 stated that,

(#10) *“sometimes not sure about the meaning”*

The unorganized and spontaneous nature of the chat room in conjunction with the difficulty in keeping up with the conversation flow had been acknowledged as a problem associated with synchronous chat Motteram (2001). In this case study, these difficulties were worsened by the impacts of the other obstacles elicited above.

Consequently, this case study also identified a combined figure of 18 (45%) respondents found it difficult to follow the discussion when asked about discouraging factors to online chat along with the difficulties faced when using the medium. Similarly 16 (40%) respondents reflected difficulties in contributing to the discussion, respondents echoed the negative impact based on consolidating a number of questions within the questionnaire. One additional respondent explicitly agreed to this situation when asked to comment about the effectiveness of online chat. The most common reasons respondent's conveyed were in relation to the issues with the technology, speed of the dialog, and large group size. These variables appeared to be inter-related (Refer to table C2g and C2h in Appendix C for details). One participant noted that:

(#11) *“too many people at one time, too fast, cannot keep up with the speed, always being kick out the channel because too many people”*

Hence it was not surprise to acknowledge five participants suggested the need of greater controls inside the chat.

Improved future delivery of online chat needed to be considered, part of this process involved understanding why 10 respondents (25%) felt that the chat session was not effective. A closer analysis of these ten respondents (Appendix C, table C4) was undertaken by examining what and how these students responded to other questions. It showed all of the ten participants experienced with difficulties with connection, nine noted the fast speed of the messages flow, seven identified the large size of the group for the chat session, seven found difficult to participate, and four (#6, #16, #17, #36) found difficult to obtain acknowledgement from the offshore lecturer, as elicited from across all questions in the questionnaire.

Two of respondents conveyed that technical problems with the medium meant that not everyone had an equal opportunity to participate as respondent #20 spoke of

(#20) *“nothing much can be obtain from it, disconnection / ban from servers may occur to some students”.*

Fast speed of the messages flow and too many participants in the session could be illustrated by the following comment:

(#13) *“because too many people are chatting at the same time. Too many opinions are given by them”*

This was the second occasion in which online chat session was conducted with the offshore lecturer. The online chat served to provide a better understanding of the motivation and reasons behind why students made the decision to attend the session and participate when they felt it was not incredibly effective. This could be largely explained by taking a closer examination across several questions within the questionnaire. These questions related to factors that encouraged interaction; the benefits of online chat; the discouraging variables; and the difficulties experienced when using the medium. In depth investigation of these questions showed that these ten students had some common values which were expressed in the extended response to the questionnaire.

The three respondents (#6,#36,#37) concluded that the session was ineffective because they did not gain a greater understanding or knowledge from the interaction during the session; one (#6) confirmed that there were no benefits but were encouraged by the novelty, the two valued the interaction with the offshore lecturer.

The common factors valued by these students included having direct interaction with the offshore lecturer (3 respondents: #17, #36, #37), a couple of students (#16, #6) valued the novelty of using the medium for discussion, while the remaining five students appreciated the information gathering ability (#7, #20, #36, #36, #37, #38). Unfortunately, from their perspective in this case study, the results showed that it was not tremendously effective to engage students to fully appreciate this medium of delivery. This was due to various

barriers such as the technology, the group size and speed of the chat session as they revealed in various parts of the questionnaires.

8.2.12 Results from Observations

The observation method was helpful in complementing the questionnaire technique in generating a clearer picture of the environment in which students was faced with. A number of interesting observations were noted and reported on.

8.2.13 Classroom Discussion And Tutorials With The Offshore Lecturer

It was brought to the attention, during the intensive week of teaching conducted by the offshore Australian lecturer during her visit, not all the students participated in the discussion, and there were always the same students who would volunteer responses.

8.2.14 Online Chat Discussion

It was apparent that students who were inactive during the online session, or in other words they did not post messages within a set timeframe, were automatically disconnected from the system. The lagging of the message flow was not obvious in the initial five minutes before the chat starts, but as more students log onto the system and actively participating, there was delay of messages appearing on the screen. When the messages appeared, they flow rapidly on the screen in blocks.

In observing student interactivity students who needed time to think and those who have trouble to expressing themselves were engross with the online chat. It was obvious with every additional participant contributing to the chat, it inevitably increased the pace of the message flow to the extent that may be difficult for some students to follow the discussion, let alone contribute to or responding to the group dialog. On numerous occasions some students did experience network disconnection however, these students still persisted in their attempts to log back online with several feeling frustrated, and confused. The laboratory tutor would brief them on conversation in order for them to continue.

One experienced participant managed to stay active and remain online by entering dot at different occasion. For those who manage to stay connected, the challenge was the mental effort demanded to provide quality contribution, and maintain two way interactions.

An observation noted by the local tutor involved students with weaker English skills, these students had a tendency not to post their half finish message when they realized that someone else had already posted a response to a question.

Clearly, it was advantageous for participants to think and act fast, being quick witted placed students in a better position to engage in the fast flow of text-based interaction.

Two students were busily occupied in following and reading the conversation but had found themselves with no chance to participate. Eventually, these students only resorted to having adequate time to answer the lecturer's questions and no time to interact with other participants. Online chat inadvertently created a competitive environment with many participants simultaneously posting questions, information and responses, leading to many repetition of messages and questions.

Initially some students were conscious to making an effort to clearly articulate themselves and made sure the conversation flowed. Half ways through the chat session they realize that this strategy was not working effectively disregard the idea of ensuring the dialog had flowed.

During the last half-hour, students found themselves in a routine of reading, posting and responding to queries intermediately and rapidly. They were no longer concerned with whether the conversation flowed or not. Reading through the printed dialogue, it was found that many students also tended to disregard other student's questions and opinions they solely concentrated on replying to the lecturer's questions.

The results showed that students were frustrated if the lecturer did not respond to their queries when it was not possible for the lecturer to respond to all questions within the time allocation. Quick-witted students, and those enthusiastic participants came prepared, were

actively participate in the online conversation interacting continuously and seriously debating the topic in a live environment, and at times even jokingly in a fun manner. It was interesting to note several participants, who would not normally speak out in class, were actively contributing and questioning their peers, and carry on a lively conversation with the offshore lecturer.

Notwithstanding the difficulties, all the students not only continued to attend the subsequent two chat sessions, they were alert and engaged in the conversation inside the chat, with only one participant came late.

In conclusion, the local tutor observed that students were more engross with the live chat environment and were substantially more active than the face-to-face class during week 2 of the semester.

Chapter 9 Discussion and conclusion of Case Study 1

9.1 Introduction

This chapter discusses the overview of the findings from students' perception and attitudes toward participating in an online discussion through synchronous chat. It begins by describing the well-established theoretical frameworks on perceived usability and users attitudes. The theoretical framework was adopted as a model to explore specific factors that influenced the perceived ease of use with the medium based on students' experience and their perceptions. The findings will assist to improve the future delivery using this medium, and in turn improve students' learning outcomes.

This case study has shown that a number of students experienced positive attitudes towards synchronous chat. The model aims to provide a platform to create a learning environment that encouraged group interaction and information sharing, in a captivating setting. Participants have also found it comfortable communicating online using this almost real time communication. An analysis of the case study also have found a number of constructs that hampered students' experience with the synchronous chat medium limiting its useful outcomes. Based on participant feedback in the study key aspects included issues with technology, the large group size, and the fast, incoherent flow of the messages.

9.2 Background

The purpose of this first case study was to incorporate the online chat under a transnational education to encourage students to interact with one another and remain contact with the offshore Australian lecturer. This would allow the offshore lecturer and the local tutor to identify, the strength, weakness and the needs of the students during their discussion with their peers.

Hence it was important that the medium of delivery and the underlying instructional setting was accessible for student participation and engaging to their learning. This was in conflict with some studies that acknowledged Asian students preferred teachers to be the information

provider rather than a facilitator (Samuelowicz, 1987; Ballard and Clanchy, 1997) correcting them only when it deemed fit. This was also the situation in this case study.

This research was administrated in a private college where students were the paying customers. Hence, it was paramount that students' attitudes towards participating in online chat were positive and any controllable obstacles were addressed.

In this respect, ISO9241-11 (International Standard Organization) was used in conjunction with TAM (Technology Acceptance Model), providing a good theoretical framework and definition for further exploring the context of synchronous chat. Both models identify three similar constructs that are commonly known in usability research. The ISO9241-11 theoretical definitions on usability; namely effectiveness, efficiency and satisfaction have been very broad allowing it to apply to a variety of product oriented systems constructs (in Bevan et al., 1991). Comparing the two models, TAM provides greater emphasis on user perceptions and attitudes towards participation and using the system with more guidelines to determine general usability.

The ISO9241-11 variables fit well with the key constructs in TAM that has been used to determine user perception toward accepting the information system. This case study refers to the three key TAM constructs that resembles the three ISO 9241-11, these are:

- Perceived Usefulness (PU) which resembles closely to effectiveness in ISO 9241-11, in that it covers the outcomes of the interaction;
- Perceived Ease of use (EOU) which denotes the process leading to the outcomes. Consolidating the idea from Dolen & Ruyter, (2002) EOU in this case study relates to the physical and mental effort exerted in the process of adapting to the environment offered in this delivery medium to achieve the desired benefits and outcomes
- User attitudes, this is closely related to satisfaction in ISO9241-11, in that it refers to the positive attitudes toward using the system, which are influenced by the previous two constructs, that is a fail system could lead to undesirable outcomes.

(For greater details refer to ‘Usability Measure’ in Part 1, chapter 2, section 2.8)

Within the context of this case study, the definitions from which these theories derived were explored and tailored to synchronous chat used for group discussion. It was further used to investigate the underlying factors that assist in understanding user perception and attitudes. A context that is different to the usual information system in which these frameworks have proven themselves. This case study investigated:

- a) South East Asian students’, mainly from Malaysian and Indonesian backgrounds, perceptions of usability and attitudes towards participating in the online chat.
- b) It sought to provide an insight of specific aspects valued by participants and the difficulties encountered in using this medium which supplemented their usual classroom activities. This in turns helped to ascertain whether students perceive online chat could foster interactive class communication facilitated by the offshore lecturer.
- c) The possible attributes or constructs that might influence the usability in synchronous chat environment under this context with a view to improve the design in future studies.
- d) The stability and an evaluation of the system to support such communication.

9.3 Discussion

The diagram, in Figure 9.A over on the page provides a summary of the findings from case study 1 commencing from the three key Technology Acceptance Model (TAM) constructs. The direction arrows merely indicate its association, while the lower layer depicts the findings based on the underlying aspects and variables of these constructs, as elicited from participants and further supported in the literature. It was not within the focus of this case study to validate the strength of association between these constructs.

The diagram presents below an overview for each of the three usability constructs, and shows the connections and influences for each of the key variables affecting the usability of online chat.

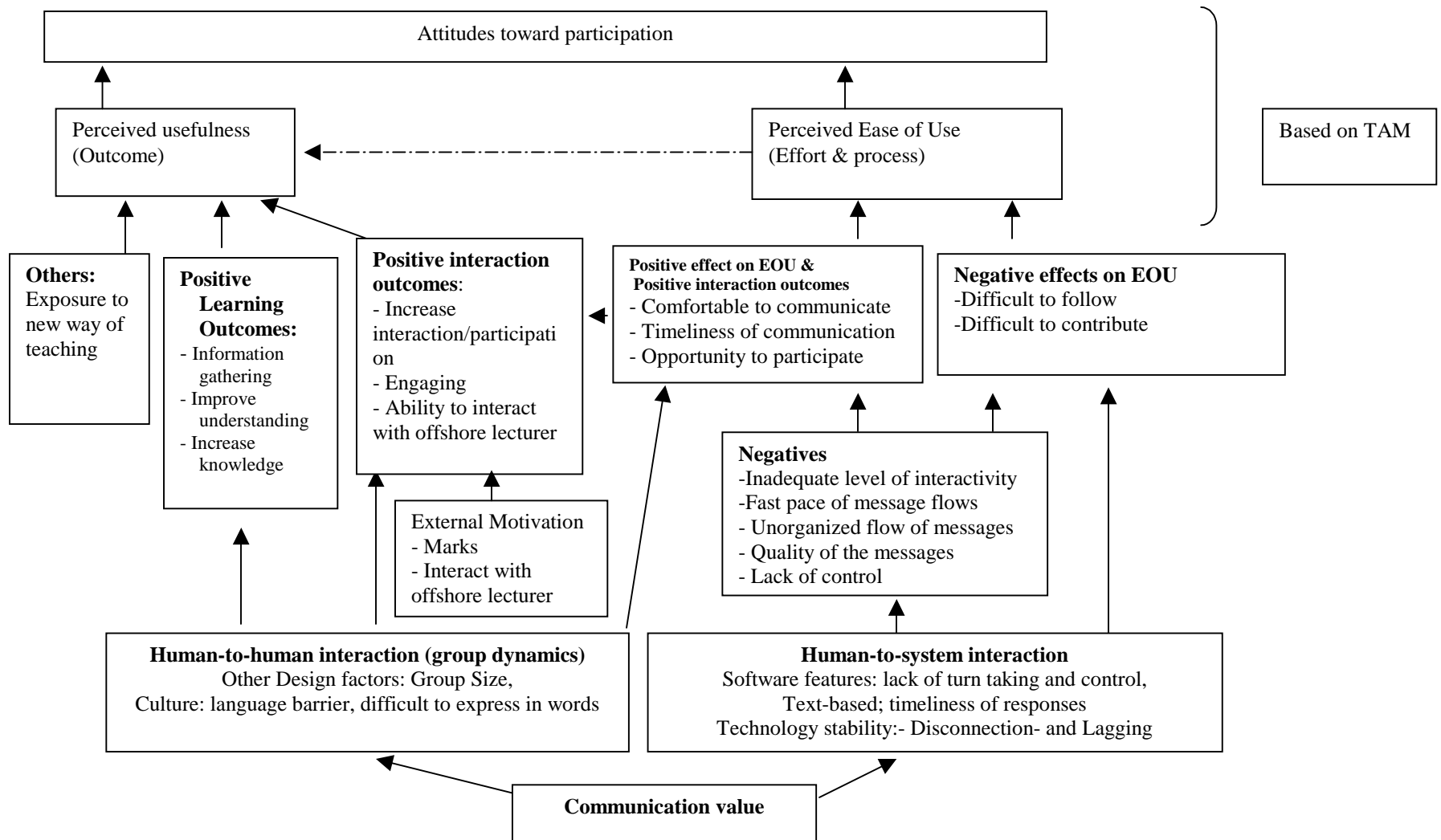


Figure 9.A User Perceptions and the Underlying Factors that Influence Usability of Synchronous Chat

9.3.1 Overview of EOU

Perceived ease of use (EOU) denoted by TAM as “the degree to which a person believes that using a particular system would be free from effort”, Davis (1989), that is free from physical and mental effort. Consolidating the idea from Dolen and Ruyter, (2002) in the context of online synchronous chat, and the definition of usability, EOU in this case study relates to the physical and mental effort exerted in the process of adapting to the environment offered in this delivery medium to achieve the desired benefits and outcomes.

The results revealed in this explorative case study describe EOU construct in relation to user engagement and participation efforts. It concentrated on the users’ ability to follow the conversation, secondly the ability to contribute to the discussion mediated by the synchronous chat medium to foster such interaction.

Unlike the traditional information system in which TAM and ISO 9241-11 tested, the major finding derived from this explorative approach highlighted features which were different and particularly unique to the ease of using synchronous chat to mediate open dialog amongst the students and the facilitator who was geographically apart.

A comprehensive review of the data showed that this construct was not only influenced by the physical and mental effort expended operating the system including the effort involved interacting with the system as identified in ISO 9241-11 and TAM. EOU also involved additional effort expended interacting with one another, which was the human-to-human interaction in the context of synchronous chat for group interaction in this study.

This aspect of the case study was consistent with Preece (2001) and Andrews and Haworth (2001) view on synchronous communication tools, whose works indicate the need to address the technical and sociability issues to facilitate a successful online community. These variables were separated to enable the academic staff to rectify specific problem areas in the future deliveries, and for the next case study.

In this case study, the findings in relation to EOU is illustrated in the Figure 9.A. Its primary findings revealed the underlying factors that had negative impact on the Perceived ease of use (PEOU) related to technological aspects, which supported human to system interaction. These included the following:

- Technological factors such as disconnection and messages transfer (system lag); and
- Software features such as timeliness, lack of turn taking and control.

Whilst the EOU stemming from the human-to-human interaction, was essentially in reference to group size and group dynamics, such as the level of interactivity amongst the users, affected by the participants' individual characteristics. These factors in turn, had negative impact on the human to system interaction. For instance, the number of messages posted by the participants affected the rate of messages transferred in the limited bandwidth of the network.

EOU highlighted a combination of both human-to-human interaction and human-to-system interaction that had negative impact on perceptions, this included the following:

- Speed of the message flow, which has either been perceived as a positive aspect allowing real-time responses or as a negative aspect when messages flowed too fast, at an uncontrollable rate;
- Unorganized flow of messages refers to messages presented in an incoherent order on the users' screen, making it difficult to follow the discussion;
- Level of Interaction with their peers and with the offshore lecturer needed to be taken into account. This factor had currently been perceived as inadequate by some participants mainly because not all the participants will get a response in these busy chat sessions; and
- Quality and the content of the messages being hampered by the above factors.

Respondents identified these features being associated with the negative impact in relation to the stability of the technology, the online chat software features, and the group size. Ultimately this demanded much effort required to participate; such effort included the ability

to follow messages and indeed the conversation, and contribute to the text-based communication, making it more difficult to participate.

On the other hand, the environment allowed in text-based communication, was a level of comfort for interaction, a greater opportunity to participate, it allowed users to stay engaged in conversations.

These features have been discussed in detail below, not in any particular order, as it can be said that all these factors are interrelated and contribute to the efficiency of chat in a positive or negative way. According to the literature (Motteram 2001, Mercer and Davie 2002), the live chat environment aims to move participants beyond passive learners and become dynamic participants in an interactive atmosphere. In theory, it provides respondents' exposure to effective management and the ability to develop a collection of cross-cultural skills (Motteram, 2001).

9.3.2 Discussion on Ease of Use

a) Level of Comfort Using Text-Based Medium

Positive reactions were noted from student perceptions towards the ease of using the medium; this could be observed by their level of comfort in providing their opinions as well as appearing to be engaged during the online chat discussions. This was consistent with Wang and Newlin's (2001) work whom expressed affirmative elements of live chat as an instrumental tool in engaging student learning and could work well in facilitating a positive environment for interactivity. An overall of figure of 23 (58%) participants echoed similar thoughts regarding online chat being less demanding, less intimidating, and less interference, it allowed more freedom and greater opportunity to contribute to the discussion, and giving students more confidence to participate. One participant claimed that text-based medium alleviated external interference and enabled respondents to clarify their thoughts before responding to queries:

(#25) *"it's interesting and gives us time to think before asking a question (sic)"*,

(#29) *“everyones [everyone participate] participation encourage me to, it’s exciting to do online chat, more relax, more confident and dare to talk (sic)”.*

This overall figure was derived from a combined total of 13 (33%) respondents who agreed that the online chat for group discussion was a comfortable environment for interaction. It was based on student’s feedback on the encouragement factors along with the benefits perceived from using the online chat medium for group discussion. As these two questions were open-ended with no restriction to the responses, it highlighted the significance of this value to the participants.

Six (15%) of these 13 participants, reflected and reconfirmed their view, by rating online chat sessions were “very comfortable” or comfortable “most of the time”, in a separate question specifically asking student’s assessment in regards to their level of comfort giving their opinions over the online chat, using five point Likert scales.

While a collective sample of ten additional participants supported this concept, in response to other opened ended questions in the questionnaire but not necessarily under the benefits or factors that encouraged online chat. Hence, it could be interpreted that they perceived it neither an important aspect to encourage participation nor did they believe using synchronous text based medium was beneficial for interaction. This scenario revealed the true value of open ended questions, that it can lead the researcher to find underlying factors which would escape from being found in closed ended responses. Open-ended questions were not restrictive, allowing the researcher to tap into respondents’ insight into the issues of importance to them (Polgar and Thomas, 1995) as in this case study.

On the other hand, there were three participants mentioned ‘comfort’ in the response of the open-ended questions that sought for encouragement factors and benefits that they valued, but had rated low comfort levels in the Likert scale question. Closer analysis from the written comments supporting the rating scale selection indicated that participants in fact appreciated text-based medium as a less intimidating and more confident medium to voice

themselves. One of the reasons why users' comfort level was not well rated was likely due to the instability of the network connection and the difficulty in capturing the offshore lecturer's attention.

Given the environment combined with the amount of interaction which was occurring inside the synchronous text-base communication, this medium was comfortable and inspiring for participants to voice their opinions and relatively effective in engaging students interact. Such findings was consistent with Balazs' (2002), and Chester and Gwynne's (1998) work indicating that text-based medium could provide a more comfortable environment for participation, it was also reflected in terms of student participation with their peers as well as cross cultural communication with the academic staff.

Only nine participants (23%) were not comfortable with this medium. One of the underlying difficulties was related to the inability to seek offshore Australian lecturer attention (two participants) leading to difficulties engaging in online chat. Eight of whom experienced difficulties in participation associated it to the instability of the network connection. The instability of the chat connection and the speed at which the conversation flow was occurring made it challenging for these participants to effectively interact.

While two respondents spoke of the need to understand the post in order to carry on with the discussion, and three participants commented on their low comfort levels was due to a lack of confidence to voice their opinion publicly. Respondents also indicated that their comfort levels were also undermined by a lack of two way interaction. Consequently, one of the primarily concern was associated with the difficulty in participate in the discussion.

The nature of the standard online chat messages used for group discussion, such as MICR, was often disjointed and at times chaotic, hence can be rather confusing with an increasing number of participants contributing at once. Amongst the various determinants Preece's (2001) suggested for measuring the success of online communities included the aspect of human-to-human interaction such as "the number of participants in a community", and "the number of *messages per unit of time*". The impact from both aspects was revealed as shown

in this Case Study 1. The findings of the first case study showed that these features were made obvious by the technology selected and group size, which negatively affected students' attitudes to using this medium of delivery.

However, the findings also further indicated the engagement level could be understated based on the mere "number of message per unit of time". There was evidence from the observation method that participants who could not catch up gave up their turn. Furthermore, the instability of the network meant that some participants were unexpectedly disconnected from the chat session, consequently these participants who would otherwise been able to submit their posts could not do so. Under such circumstances, the observation technique served a valuable tool to provide a clearer perspective of the scenario in understanding student's true level of engagement.

b) Technology (Network) Stability

To best test the system for group interaction was to conduct a live chat session with the actual users (Herbsleb, 2002). Hence an initial training session with the local tutor was conducted, another trial session was also conducted with the offshore Australian lecturer, prior to the first case study, to ensure the stability and familiarity of the medium. But, the problems of system lag and disconnection were not obvious until the live sessions in the first case study. This was based on the fact that practice sessions held for only a short duration of 30 minutes, in the early hour of the day when the network traffic was not heavy. Furthermore these trial sessions were based on social dialog and informal where everyone was actively interacting with one another in a fun and casual manner.

The Microsoft Internet Relay Chat (MIRC) utilized in this case study was hosted by an external server, located in a foreign country, and was intended for the public use in general. The offshore lecturer had minimal control to instigate changes or fully understand the software's technical specifications, capabilities and limitations. The readily available and free hosting service offered by this site was mainly targeted for individuals to create their own social community for social interaction not customized for the purposes of educational learning. For this reason, the hosting system would automatically disconnect inactive members; this disconnection was a constraint not made known to the academics when the

software was adopted for conducting online chat. However, there are also other possible factors as documented by Carlillos (2002) and DALnet IRC Network (2005), it could be due to overloading of either the client or the server, and unreliable connection. In this case, it would be the overloading of the network line, hence the cause of slow transfer rate.

The field observation confirmed a core problem with the system was that it would disconnect participants who did not post inside the chat after a short period of time, a message of “Ping timeout” would appear. DALnet IRC Network (2005) had also noted this could happen to everyone, and explained that it was a process in which the client computer would automatically disconnect the user when it did not received a timely response from the client computer upon its request. Consequently, an accumulative total of 16 (40%) of students spoke of the disconnection problem when asked about the factors that discouraged student interactivity as well as the difficulties participating in the online chat. Some students found that they were left behind from the discussion once they were disconnected.

One disadvantages of online standard, Internet Relay Chat features, was that messages were not available or delivered to those who were not connected into the chat, and messages were lost if they were not saved. As observed, a couple of experienced IRC users were fast to adopt a mechanism, by posting irrelevant items such as “dot”, merely to stay connected.

Ping timeout could partially also explained by network lag caused by heavy traffic in the college during the peak hours, which coincided with the time online classes were conducted. As a consequence large blocks of incoming messages came flooding in at a rapid pace rather than an instantaneously flow of messages displayed live as participants posted their messages. Downes (2002) and Pallof and Pratt (2001) found that the rate of transfer with Internet connection had negative implications on the delivery of a live chat. In line with the researchers’ findings, a combined total of the discouraging factors and the difficulties experienced with the online medium showed 18 (45%) participants perceived the lagging of the system was an obstacle to their participation. The field observation confirmed users could not maximize the interactivity inside the group session but instead focused their attention on the problems with technological barriers. This created most frustration amongst students who were most enthusiastic to participate.

In this respect, a major finding in the initial, live case study, was that a total of 30 (75%) distinct number of participants noted the technological aspects (one or more combination of lag and disconnection issues) were the underlying barrier to the ease of use. This was in response to providing their feedback to factors, which discouraged participation combined with the difficulties with the online chat. The success of the tool was hampered, with 70% (28) of respondents identified it as being a factor which discouraged interactivity. Several (three respondents) students concluded it being the underlying factor to the ineffectiveness of the chat session. Students (15 participants, 37.5%) expressed the need for the college to improve the technological aspects of the system when asked to provide suggestions for future improvement with the delivery of online chat. In summary, these features created a negative impact on student attitudes and were further complicated by the size and the nature of the synchronous chat features.

c) Group Size

Consistent with past research, it was evident in this case study that a large group size totaling 57 participants, one group with 28 participants and the other with 29 participants , was a key contributor to difficulties in participating inside the online chat. This was reflected in the results by combining the frequencies of two related questions in the questionnaire asking participants regarding the discouraging factors and secondly difficulties experienced interacting inside the chat room. It showed that a total of 15 (37.5%) respondents (19 commentaries were documented) regarding the issue of large group size interfering with participation. Thirteen respondents suggested it discouraged interactivity; four respondents mentioned a similar problem in response to being questioned about the difficulties with online chat; and two respondents noted the “large group size” was both the cause of discouraging and difficulty experienced inside the chat. Hence, was not a surprise when eight (17.5%) participants concluded this was the reason for the ineffectiveness of the chat sessions.

These two issues were the dominant factors that contributed to the subsequent difficulties for human-to-human interaction mediated by human to system interaction. The results, as illustrated by the following themes, not only revealed that the ease of human and computer

interaction is based on and linked to human-to-human interaction, but technology also played a vital role in supporting the ease of human-to-human communication. It could be said that sufficient discussion was only possible when the system was working efficiently. On the other hand, the field study observed that some participants found the system easy to operate, but were not easy for detailed and in-depth discussion.

d) Others Underlying Factors Influence the EOU

The timeliness of responses being a desirable feature of synchronous chat in engaging students and promoting interaction was acknowledged in the literature notably in Wang and Newlin (2001). This was reflected by seven (17.5%) participants as an encouraging and a beneficial aspect of online communication, similarly active participation from their peers worked as a source of motivation. In theory, these variables alone would be considered strongly positive and convincing in achieving the desired student perceptions. But, again its success and potential was not fully recognized in this case study simply due to the large group size for the activity.

In Case Study 1, students reflected on the timeliness of the synchronous online chat had an uncontrollable impact on the fast pace of messages scrolling down the screen partially caused by the large number of participants. This could also be partly explained by the lack of turn taking control in standard MICR software features, coupled with the large chunk of messages flow due to the network lag, which was affected by the insufficient network bandwidth. Multiple and many interwoven conversation and messages on the screen resulted from group discussion, alongside baffled participants over the amount of activities struggled to keep up, and found it challenging to participate. One particular student stressed the lack of opportunities to provide input to the discussion.

Subsequently, 15 (37.5%) participants reported concerns over the “fast pace of messages posted”, in relation to factors which discouraged participation and difficulties experienced during synchronous online communication. It was common for the literature (Downes, 2002, Smith et al., 2000) to suggest that the content was delivered at a speedy rate during a live chat session have some students feeling left behind or being ignored as a result. The

following respondent, who did not perceived there were any benefit using the online chat for group discussion, clearly supported their view in noting that:

(#19) *“well, when everyone is giving their opinion, I need some time to read and whenever I want to make some contribution, the topic already change so this never get the chance to contribute”.*

Nine participants (22.5%) were upset by the “disorganization of the chat messages flow” and expressed it as an impediment to their participation in the online chat session, this was consistent with Motteram (2001) findings. The issues were in relation to standard chat software which lacked the ability to control turn taking, short delays would meant an increasing number of users would likely to send through additional turns. Furthermore, messages were organized and displayed according to the sequence of messages arrived to the centralized server, resulting in a disorganized flow of messages and confusion amongst the users. Indeed one of these nine participants concluded it was a hindrance to the effectiveness of the chat session. One participant also suggested that it could be partially explained by the system lag,

(#35) *“I'll be most happy if the computer doesn't lag. It's quite irritating to get half of your sentence send out & the other end get stuck due to laggin people might get the wrong opinion”. [sic]*

Therefore not surprisingly students commented on misunderstandings and unclear messages posted. Hence, the quality of the discussion online was raised in research undertaken by Smith et al. (2000) when it involved a race to respond.

The online chat was planned to be semi-structured enabling the offshore Australian lecturer to direct and facilitate the discussion, and it was free flowing in that students spontaneously responded. Neither the level nor the amount of interaction that students would have with one another could be predicted. In some instances, there was an inadequate level of responses and on other occasions the line of communication was confusing with many students posting at once. Not all questions posted could be responded to, leaving some students feeling left out.

This could be partly explained by Downes (2002) experience, who identified the increase group size could lead participants to present information rather than engaging in actual interaction. Indeed as found in this case study that a large group size together with other identified obstacles played a fragile role in limiting the success of the study. Furthermore, a combined total of 10 (25%) respondents felt isolated by the inadequate level of feedback and a lack of interaction. This figure was compiled from questions that sought to identify discouraging factors and difficulties experienced during synchronous chat. Four (10%) of these students indicated in their comments to discouraging factors that they valued the interaction with the offshore lecturer and the attention they could receive being geographically apart. At the same time the students were disappointed when they acknowledged that it was not possible for the offshore lecturer to reply to all their queries/questions.

This was also confirmed from the field observation that some of students were merely presenting information rather than interacting in the discussion, and several students emphasized responding to the offshore lecturer's questions. For instance, respondent #29 indicated a lack of group interaction when questioned about the disadvantages of the medium to foster communication:

(#29) *"lack of group discussion - only based on own ideas"[sic].*

It was apparent in the literature study on text-based communication, such as Klemm's (1998) study on asynchronous discussion, and in this research on synchronous discussion, that active participation required a combination of skills and effort, not limited to interaction and comprehension skills. This first case study along with past research (Simonson et al., 2000) and Klemm (1998), affirmed that time was required to understand and absorb the messages and that from Klemm's study. Students in the case study were expected to read the posted messages, absorb and understand what has been conveyed, articulate a response and idea, and physically type out the message as they interact with one another. Simultaneously, many more messages were being posted whilst this was occurring, setting a

very demanding environment for the participants. Such complexities for participants being heavily involved in online chat was not acknowledged in some research as often it was a perception that students would have well developed skills without needing assistance.

Only three students in this case study explicitly cited the difficulty in expressing themselves using text based communication as illustrated by two of the participants:

(#14) *“some question cannot be answer using online chatting”[sic],*

(#37) *“it can be very irritating for if we have an opinion but are unable to express it. Chat should be held in smaller groups”.*

While another participant spoke of time needed to prepare an adequate response as participant (#12) noted :

(#12) *“it may take a longer time to understand one paragraphs has been explain[sic]”*

Furthermore, the content of the topic impacted participants' ability to interact, and the need to understand the conversation before they could contribute was noted. Three participants concluded the ineffectiveness of the online chat because it was difficult to participate when they did not understand the dialog.

Given that English was a second language for all the participants involved, language barrier may have been thought to be a bigger issue as indicated in some of the literature reviews. This was not supported to a large degree for this case study. This could be due to many possible explanations, perhaps other obstacles previously described had a greater influence and focus for the study group, which over shadowed these barriers or alternatively, the perceived usefulness of the medium outweighed the obstacles.

The common concerns regarding the content of the messages were being either described as irrelevant or disruptive messages (two participants), and there was a conflict of views amongst the participants (two participants). These two participants were unclear as to how to deal with differing views conveyed during the live session. Vronay et al. (1999) and

Smith et al. (2000) suggested this was often due to a lack of control “conflict and argument”, inability to orchestrate turn taking, and “flamming” could be evident (Handel and Herbsleb, 2002). Balazs (2002) also showed support that chat medium provided an environment to allow participants to be more daring to voice their opinion, yet at the same time, ways to overcome misunderstanding resulting from using solely text base communication was another issue. One participant explained the casualness of the chat medium for communication was the problem. In fact, six students suggested more controls mainly to enable all to have greater “interaction” to the discussion, and provide a more organized and less confusing environment for the online chat to take place as described by respondent #32,

(#32) *“well ppl who misuse the online chat to gossip, spoil others image & reputation, write & post irrelevant issue not regarding to the assignments, play throughout the chat wifout answering the lecturer's quest, purposely go against 'someone' idea & opinion because of hatred should be penalized & kick out of the online chat.”, “It is because it is disturbing the whole class not only the person/ppl he/she is attacking - very immature attitude “, “End results of chat will not be that effective & information retrieved & collected is very limit” [sic].*

It was noted during the observation of the field study that the environment under this case study was quite demanding. One participant elaborated this further by illustrating their frustration and effort demanded of participants to stay on top of session and to stay on top of session to overcome barriers such as interacting within a large group size:

(#37) *“it can be very irritating for if we have an opinion but are unable to express it. Chat should be held in smaller groups” [sic].*

It appeared also from the observation method that there were students who attempted to understand the content of the conversation found insufficient time to contribute themselves. One participant added that being unfamiliar with the discussion topics could also be a reason, participant #25 also recommended:

(#25) *“why not the offshore lecturer tell us the topic with the questions to be discussed beforehand so that we can be more well prepared with our answers*

questions or additional research materials. From previous chat, I noticed that most of us only point out and mainly discussed on the topic/case provided - not much opinions can be said when being asked. The situation is not that encouraging as most of us not really fluent yet to relate the topic with other cor-related cases/course in such a short time.”[sic]

However, it could be observed that participants with domain knowledge, capable with fast thinking skills and familiarized themselves with the supporting reading materials, appeared to dominate the dialog and contributed to a lively interaction with their peers in a fun and relaxed manner.

Overall, it can be said that all these factors were interrelated, problems associated with technology, size of each case study group and the timeliness of the chat medium, played a significant role in contributing to the limitation of the chat medium for online dialog. These underlying factors interfered with the ease of use, and affected many of the students' interactions with one another, which in turn had an impact on the usability of such medium for online group communication. Subsequently, the findings showed that 18 (45%) students found it difficult to follow the discussion while 16 (40%) found it difficult to contribute to or respond to the group dialog.

9.3.3 The Overview Of The Findings In Relation To Usefulness

Perceived Usefulness is defined perceived usefulness as “the degree to which a person believes that using a particular system would enhance his or her job performance.” (Davis, 1989). Perceived usefulness is also subjective to EOU with other factors remain equal (Davis and Venkatesh, 1996). Usefulness refers to the outcomes of the usage (Childers et al. in Dolen and Ruyter 2002). Findings in this explorative case study on synchronous chat illustrated the outcomes could be information and (or) communication value, which aligns with Dolen and Ruyter (2002) study of online medium to support commercial customer services.

Figure 9.AJ illustrates perceived usefulness in the context of synchronous chat in this case study, is linked to the two main themes: firstly information and educational value, and secondly the communication value.

The information or educational value referred to students' perception of their ability to obtain information, gain knowledge, enhance their skill, or develop a further understanding of the topic, by participating in the online chat discussion. Perceived educational or informational benefits as a parameter of usefulness found in this case study were:

- Information gathering through human-to-human interaction, which was perceived to lead to greater understanding and knowledge
- Exposure to a new medium of delivery

The second major theme identified in the results was the communication benefits, this specifically referred to the student's ability to interact, share or exchange information and ideas regarding the discussion topic via a computer system with other students in their class. The value of communication included elements of perceived usefulness of online chat as a tool designed to foster student interaction. This case study found one of the useful outcomes of the delivery medium, as perceived by the participants, was the value of human-to-human communication aspects. These included the engagement in the activities, and "increased and encouraged participation of members" as consistent with Wang and Newlin (2001) research findings. It was found that the communication values were inspired by various motivation factors including the educational benefits mentioned earlier and other motivation aspects set up this context, including marks.

Aside from the creating an environment for information sharing, the results in this case study revealed the following specific communication factors supporting the communication value:

- The ability to interact with offshore Australian lecturer (the subject coordinator);
- The timeliness of the interaction; and
- A comfortable atmosphere for student interaction.

Communication value also relates to the process and the effort of using the chat software services that the participants apply in order to gather information from others. Hence it is also associated with the ease of use; for instance the ease in the process of asking questions, providing responses, presenting opinion that could lead to further interaction and or receiving information from others. Furthermore, according to TAM, the easier it is to use the system, the easier it is to interact with one another, and therefore increase the likelihood of perceived usability to foster participation.

9.3.4 Discussion on Perceived Usefulness

There have been continuous debates in the research arenas about the roles of computer mediated communication for supporting learning. The values of the asynchronous discussion had been well established for its in-depth coverage and ability for participants to process their thoughts prior to contributing to the discussion. However, the value of the synchronous chat had not been explore in great depth in this context, Wojnar (2002)'s study indicated that online chat may possibly be understated, on the other hand, Downes (2002) did not have similar positive attitudes toward its use.

In this initial case study, students perceived the online class dialog facilitated inside chat sessions was useful as they valued the educational (information) and communicational benefits derived from participating in the online tutorials. This was consistent with Ruyter and Dolen (2002) who noted information and communication value but in a different context where the chat medium was used to support commercial customer services. In effect, these two themes, educational and communication benefits were very much interrelated, as it was the process of student interaction that guided them to value the benefits of information exchange. However, the two themes were not grouped together, as there was no substantiated evidence that increased communication value led to improved student information sharing. In essence, a highly interactive environment did not imply quality communication, as in some instances irrelevant messages or dialog that deviated from the topic were posted by participants as discussed under EOU.

Two important sub-themes were found in relation to the educational benefits of online chat. One of these sub-themes was the exposure the participants to the innovative medium of

group discussion. The medium was a new and different way of learning for the participants. A combined total number of eight participants reported that it provided a useful outcome and felt it was an encouragement factor for interaction. This combined figure was derived from questioning participants on the factors that encouraged their participation and secondly the benefits of synchronous chat as perceived by participants. It was beyond the scope of this research to determine whether student perceptions regarding the novelty of the new technology would wear out over time through regular use as suggested in the literature. Furthermore it was not possible for the academics to organized more than three online chat, due to the time and resources demand.

a) Useful Learning Outcomes (Educational Benefits)

The findings revealed the ability to gain further information and understanding was a core sub-theme. It was through the ability to exchange and share opinions offered inside the chat software that the top responses were found in questioning students about the benefits of online chat. A combined total of 23 (57.5%) participants valued the information gathering ability inside the chat. Respondents reported that the reasons included a better understanding, better clarity, and improved knowledge by gathering, sharing and exchanging opinions and ideas amongst the group of classmates, as revealed by the following responses:

(#32) *“information are shared, opinions & ideas are exchanged as different people have its own ways of thinking ...”*

Seven of these 23 participants reflected in their written responses that information gathering was the reason they perceived that this online chat for group discussion was effective. Together, a total of 10 (25%) who in fact claim information gathering feature was an important element to the effectiveness of online chat under this learning context. This indicate information value was not only an encouragement factor, a benefits valued by participants, but also a useful outcomes of online chat sessions.

Another aspect of educational benefits was indicated by 20% of the participants, who acknowledged the innovative value of this modify delivery using online chat to encourage

interaction. It was perceived as an encouragement factor as they found novelty in using the medium for interaction.

Overall, information valued by students was a central focus and motivation irrespective of whether the student were present online as observers passively reading and collecting the information or whether the participants were actively engaged in sharing and debating the topic. However, Klemm (1998) alerted researchers that too many passive participants could result in an inactive online learning environment. This could create a barrier for students to set back opportunities to enhance student interaction as seen in this study.

b) Communication Values and Other Underlying Factors

Communication values were suggested as the key benefits of online chat amongst all the 27 respondents (except the seven who spoke of disadvantages and six did not provide any response), in their response to the question, which sought the benefits of online chat session. It was based on interaction within the delivery medium and the environment, which encouraged and increased overall participation of members. This was also confirmed by field observation as students were intensively engaged in the discussion.

Cited as the benefits and the encouragement factors of this mode of delivery, the interaction value was fostered by the following aspects:

- being comfortable to participate online;
- real time communication;
- ability to interact with offshore Australian lecturer; and
- increase peer participation and greater opportunity to participate.

As discuss in the earlier section, under the ease of use, 13 (32.5%) participants perceived the environment offered in a text-base medium fostered a level of comfort that encouraged and increased their participation. This would be particularly relevant to passive students to participate as it made it less intimidating, less demanding and more confident to voice oneself. In respect, a total of 16 (40%) participants were willing to request clarification online using this text-base medium, nine of these participants specifically related the comfort of the medium to their willingness to request for clarification when required. There

were indications that the environment of the online chat put them in a position that they are to participate to remain inform or in order to carry on with the discussion.

It has been a long standing argument in the literature that the benefit of synchronous online chat provided users with the timeliness in communication, the ability to question and receive instant feedback increased the users social presence and sense of belonging to the learning environment (Mosher, 2003; Wang and Newlin, 2002). It provided a positive environment to encourage students to stay engaged with their peers. These benefits were not different to those expressed in Case Study 1.

Herring (1999) argued that misunderstandings during the live chat were more likely to be resolved on the spot, researchers such as Horton (2000) reminded that this could be agreeable to a certain degree, however, online chat medium may not provide adequate opportunities for in depth discussion.

On the other hand, as observed the rapid flow of messages inside the chat was usually short and brief, usually in one or two lines, and were informal, spelling and often abbreviations and English grammar was not a high priority as participants attempted to keep up with pace of the conversation. Ambiguity and misunderstanding could increase limiting the quality of the returning posts. Without comprehensive planning, online chat runs the risk of users losing focus and direction, posting irrelevant messages, resulting in a lack of quality discussion (Mercer and Davie, 2002; Downes, 2002). This was recognized in Wojnar's pilot study (2002), in which the author recommended consideration was required in planning online chat sessions to facilitate quality discussion questions, the author suggested a more challenging cognitive level design be instigated.

The immediacy of the response was valued by a combined total of seven (17.5%) of the students. This low figure did not come as a surprise, as mentioned under EOU, the fast flow of messages, and the occasional system lags, together with various others barriers, had dampened the value of this feature, as not all were able to realized the benefits from this almost real-time chat. It proved challenging when discussing participant's subjective

experiences as some respondents would be drawn to a fast pace environment where responses and information exchange was immediate while this experience may be perceived by other respondents as being too much activity occurring simultaneously to appreciate the benefits of the software medium as a learning tool. Other respondents may simply require more time to ease into the discussion only to discover that they were left behind or struggled to contribute to the discussion.

While, Sternfield (1992) identified those who already had regular access to the offshore lecturer or resources may not felt a need to participate therefore placed less value in participation. Although participants had regular contact with one another and also with the local tutor, they felt it was important to maximize their opportunities to interact with the offshore lecturer. Glancing at the figures for each question in the questionnaire however, a combined figure across all the relevant questions provided a total of 17 (42.5%) participants who valued the interaction with the offshore instructor. Students believed that it allowed them to clarify doubt, appreciate and respect her knowledge and express that they could learn from without her physical presence. Three students felt motivated when the lecturer paid attention or interact directly with them, while others indicated their disappointment and considered it as a discouragement when the lecturer was unable to acknowledge their messages.

Furthermore, students anticipated the offshore lecturer to provide timely and constructive feedback in their online discussion. At the same time, there was an expectation for the offshore lecturer to have a continuous facilitation role during these chat sessions. Consistent with this, it was observed that when the offshore lecturer was disconnected from the discussion due to technical issues, the discussion was of less focus. Instead of carrying on with the conversation as normal, students were moving toward a social dialog, and others were confused, not knowing whether they should continue the discussion, and the local tutor had to step in to guide participants back in focus.

It appeared many students were inspired to participate inside the chat session with overseas Australian academic present. One respondent felt more confident talking to the offshore

lecturer without the need to see her reaction but was later discouraged when the offshore lecturer did not have a chance to acknowledge his comments.

In fact five participants perceived the online chat sessions with the offshore lecturer were effective in supporting students learning outcomes. In facilitating group learning, the online instructor has a role in facilitating the discussion and encouraging student interactivity. Balazs (2002) and Kearsley (2000) acknowledged that student's online experience was reliant on an online instructor with strong facilitation and conversation skills. Without guidance students did not actively seek for solution, those who gained the knowledge did not know how to apply or build their argument. Students interaction with the offshore instructor in itself was crucial (Phipps and Merisotis, 1999), it also increased student motivation levels and they were more likely to stay engaged with the discussion topic (Mosher, 2003).

Another sub-theme identified under the value of communication was that a combined total of six students (15%) explicitly related to the increased participation of others or the greater access to participation allowed by this text-based medium, inspired greater participation to all members in the chat room.

It was evident in this research that the perceived usefulness and ease of use cannot be discussed in isolation. According to students in the first trial, the obstacles that were identified earlier hampered ease of use, also limited the perceived usefulness of the medium. These obstacles related to the brevity of the content; irrelevant or unclear messages, communication problems; inadequate level of feedback, lack of opportunities to participate, the effort required to participate, and finally the inability to contribute and follow the conversation. As the participants pinpointed in their response, the comfortable it is to participate, and receiving timely feedback from each other encouraged greater interaction and perceived usefulness of the chat medium.

Along this line, there were a group of seven students whom did not perceived any benefits of the session because they experienced difficulties in participation. In depth analysis showed that three concluded this method of class dialog was not effective, the rest claimed the

disadvantages of this medium was that at times it was difficult to participate, but most of them valued the information sharing amongst their peers.

After taking a thorough look at the data, 10 (25%) users in the first case study concluded that they were unable to gain positive outcomes and found the delivery medium ineffective in supporting student learning. Fourteen (35%) had mix reactions and a higher number of 16 (40%) in fact thought the online sessions were effective. In this respect, it was similar to Balazs (2002) whose study participants also experienced technical difficulties with online seminar, but with sufficient motivation users enjoyed the engagement, valued the accompanying teaching materials and the interaction with their peers.

9.3.5 Attitudes Towards Participation

Attitudes relates to satisfaction levels in using the online chat medium to foster communication in the context of this case study. In accordance to the original TAM and the ISO 9241-11, attitudes are influenced by both the perceived ease of use and perceived usefulness constructs. Applied within the context of this case study, it included the element of enjoyment, free from discomfort and positive attitudes towards participating in this delivery medium. It has an impact on the ongoing group dialog amongst the students and the offshore Australian lecturer.

Much debate has been documented in the literature in reference to students from an Asian backgrounds were not being typically proactive in participation. As reported by some researchers through their experience teaching Asian students, Samuelowicz (1987), Ballard and Clanchy (1997), Watkins and Ismail (1994), that Asian students come across as passive learners, possess insufficient experience in critical analysis. In addition, Ballard and Clanchy (1997), share their experiences of Asian students in their case study who displayed silent faces with no reaction, waiting for their lecturer to provide the best possible explanation and answer without wasting any time. Such reactions are results from their previous educational experience, hence, it is unexpected to find this study group consisted of mainly Malaysian students to be highly interactive and actively contributing in real time chat.

While Klemm's research (1998) which found that participants with long term exposure to a traditional classroom method of learning had a tendency to observe and read the posted messages rather than actively interact inside the online chat. However, Chester and Gwynne (1998) argued that text-base medium enabled quieter students in a traditional classroom to voice themselves and were supported with an enormous amount post during the discussion. Consistent with the literature outlined in Chester and Gwynne and particularly in Mercer and Davie (2002), it would be fair to suggest that online chat provided many participants in this research opportunity to interact and clarify issues. There was less resistance to participate as the students already know each other this issue was also acknowledged in Motteram (2001). More importantly the delivery designs in this case study provided many participants, from South East Asian background, sufficient incentives to engage and proactively participate in the online chat session, fostering a positive attitude toward participation.

Unlike the some of the literature findings mentioned above, which found that many Asian students rarely spoke unless they were specifically called upon, the local tutor was also able to observe the pattern of activity within the live chat room and witness a large amount of interactivity during the session. It could be said that with the amount of posted text online, students were relatively comfortable interacting amongst their peers and their offshore lecturer.

The level of participation for many was not only to voice their opinion as mentioned earlier, but to take their understanding to a higher level which meant students were encouraged to proactively request for clarification all or most of the time, (17 participants, 42.5%) despite the difficulties experienced. These participants also tended to have positive views on the usefulness of chat for fostering communication. One of the common factors identified under this question, was that participants (overall five participants) elicited that clarification was required in order for them pursue the conversation. This demonstrated a certain degree of commitment to the discussion, and highlights the importance of human-to-human interaction and the effort needed to carry on the conversation. A participant #33 cited that;

(#33) *“if the question is not understandable I can't give my opinion, I can't think of the question, difficult to analyse” [sic].*

According to Klemm (1998) and similar to this case study, online chat required much effort and time to engage, to understand and to contribute to the topic. Hence, there were a number (17 participants, 42.5%) with mix reactions in response to this question of seeking clarification online with six (15%) respondents indicated that they would seldom or not ask for clarification. The reasons provided by respondents reflected similar obstacles to those identified under the ease of use section in this chapter. Besides the dominant themes identified being network connection, speed and large group size, participants (seven participants, 17.5%) indicated their preference of using face to face over the online medium for such activity and felt it was more effective in response to the difficulties with synchronous chat, interestingly one respondent commented that,

(#7) *“ I more prefer to oral communication rather than online chat. It's wasting time for us to type the questions and wait for answer. My question may not be answer as too many people” [sic]*

Chat was spontaneous in nature it was difficult to control the type of messages posted online aside from giving a stern warning and perhaps a mutual understanding or terms of reference should be conveyed before the commencement of the session. Degrees of frustration have been experienced as four respondents requested more control to minimize conflict and irrelevant posts or merely to ensure everyone had opportunity to participate. While two participants suggested that the topic for discussion could be provided before the class commenced to enable more preparation time for the two-way communication.

In fact many of the students were faced with obstacles to online communication and felt frustrated, however this did not phase them as many of these students were persistent in continually attempting to log on, or cope with the system, after being disconnected or had experience Internet lag time. It demystified the common belief that Asian students were generally passive and not active participants contributing to their learning. It could be argued that in this case, the issue would be whether the environment and instructional design

provided them with sufficient encouragement and comfort to participate rather than a general conclusion that Asian students were not proactive.

It was noted in the introduction that without some additional motivation to stimulate students' usage of the communication tools, only a small number would participate. Students who were not familiar with discussion in class would not seek it online (Mock, 2001 and Balazs, 2002). The primary sources of motivation encourage participation from the respondents' viewpoint were in relation to, sharing of ideas and knowledge with other participants (35%), a comfortable environment offered by text-based medium (27.5%), and the novelty (20%) of online chat. Several (15%) noted marks (being only minimal of four marks) awarded for participation was the incentive. Other sources of motivation commented included interacting with other classmates online and in particular their offshore Australian lecturer whom was geographically apart.

It was observed that the ability of the offshore facilitator to encourage students to discuss and question the issues was considered crucial to the success of the trial. Literature had long established the importance the lecturer's role on influencing student participation in the online community. For example, Mazzolini and Maddison (2003) reported students valued lecturer contribution a great deal more, and minimal input from the lecturer were thought of negatively. This in part meant that students not only had different cultural attitudes but also had different perceptions of the role of the instructor and what was expected of them as learners.

In line with this, the case study revealed frustration amongst those participants who did not manage to capture the attention of the lecturer. They were informed of the offshore lecturer's role with this mode of learning, however, once the online chat proceeded, some participants naturally reverted to heavily dependent on the offshore lecturer to provide direct answers to the discussion topic rather than debating the issues with their fellow students. This perception could partially explain why ten students did not find this case study effective. These participants could become more frustrated if consideration had not been

given to identifying efforts and possible solutions to convert passive student to active participants. Participants felt that it could be further improved.

Klemm (1998) also identified the efforts and possible difficulties involve converting passive students to active participants, on top of the identified barriers found in this case study. It could lead to frustration amongst the participants. This perception could further explain the frustration.

An in-depth analysis of these ten participants showed half of these students did not perceived any value or benefits participating online, all had experienced difficulties with the network connections and a majority (seven) mentioned the difficulty to participate online, some of whom were frustrated with the inability to capture offshore lecturer attention (four participants). Students also spoke of dominant obstacles such as speed of the message flow (nine participants), and the crowded online session (seven participants).

Regardless, it was observed that all ten participants continued to participate in subsequent online classes, as there was no absenteeism. All students attended the online chat class, most were on time and were immediately engaged with the chat discussion as opposed to their traditional classroom discussion conducted with the offshore lecturer in week two of the semester. All students were participating or attempted to participate in both the trials and the first moderated and assessed, live chat session with their peers and lecturer alike. They continued to do so in the two subsequent synchronous chat sessions. It could be said that instructional design and the discussion environment offered inside chat provided them with sufficient encouragement and comfort to participate, rather than a general conclusion noted in some past research that Asian students were not proactive in their learning. It was more than just an obligation to attend and participate in the discussion, in comparison full attendance was not always observed in their usual class-based tutorials.

The first case study found that the application of the original model of TAM and ISO9241-11 on synchronous online chat had its limitations, however, it provided a good foundation for this research and also to further devise a method that takes account of student's

perceptions regarding the usability of online chat and factors that encouraged or discouraged their participation.

9.4 Conclusion To Case Study 1

The qualitative approach to this research reported and discussed students' perceived usability (effective) and ease of use (efficiency) based on a modified delivery of class discussion using online synchronous chat. The initial case study revealed some promising approaches to encourage students to actively participate in the synchronous discussion forum, and uncovered various factors that caused difficulties for these students. The attitudes toward participation in the study were divided, with some students perceiving it positively and effectively, while others felt it was confusing and lost track of the conversation flow.

The perceived usefulness of the medium of delivery was the positive interaction outcomes and the value of information sharing. Its ability to encourage and increase student participation was influenced by the following underlying factors: the information gathering, the online chat medium provided a less intimidating or a more comfortable environment to contribute to the discussion, the ability to maintain an ongoing contact with the offshore Australian lecturer, and timeliness of response. In contrast the difficulties experienced were believed to be the inability to follow and contribute to the dialog. They could be explained by the following underlying factors, such as large group size of 28 students or more, access and instability of the network connection, the limited controls and text-based features of the standard chat software. Subsequently, these factors led to incoherent fast pace and a high volume of messages placing an undue burden on the efficiency and ease of using the medium for group communication limiting users' ability to follow and contribute to the dialog.

These obstacles had suppressed the perceived value and the attitudes of participants with this modified form of delivery. Consequently, 40% perceived the effectiveness of the online medium for students learning, and 25% did not think it was effective. The suggestions

illustrated that the participants placed value the benefits offered by this delivery medium, and claimed that it could be better perceived if not for the identified barriers.

Despite the regular face-to-face students had with their peers and their local tutor, and the obstacles experienced, all students participated inside the chat and the subsequent chat sessions. Hence, it could be said that instructional design and the delivery environment provided inside the online chat, in this context, allowed them with sufficient encouragement and comfort to harness students' participation and involvement. Contrary to past literature (Samuelowicz, 1987, Watkins and Ismail, 1994), this case study demonstrated that South East Asian students were proactive participants in engaging in live chat.

9.5 Limitations

Technical issues posed difficulties during the trial sessions for various users during the online chat such as disconnection and internet lag, hence to a certain extent it restrained appropriate evaluation of the various variables that may affect their overall perception of the online chat used for mediating communication. However, based on students' feedback from the broader perspective of the open-ended questions, there was sufficient information to identify key factors that students valued, and the major difficulties and barriers that hindered their engagement with online chat.

Indeed synchronous chat lack visual cues and body language which cannot be seen during a live chat session. Participants were dependent on text-based communication and they did not have ample experience in using the new medium for communication and interaction with others.

9.6 Implications And Recommendations From The First Case Study

The initial case study revealed some promising approaches to encourage students to actively engage in the synchronous discussion forum, and uncovered multiple variables and underlying themes associated with difficulties for these students.

One of the objectives of the initial case study was to identify student's perceptions and the difficulties experienced towards using the synchronous online communication tool. An evaluation of the first case study would provide valuable information for the planning of the second case study.

Another objective of this case study was to identify the themes that emerged from the first case study to derive more refined questions to gather mass opinions to the issues and feedback.

Clearly, in Case Study 1 participants perceived the difficulties experienced were in reference to the large group size for communication and the problems associated with accessing the network. According to a number of students, the large group size and the instability of the system were the primary contributors to the fast pace of messages posted during the chat sessions.

The inter-related factors had suppressed participant's perceived value and the attitudes with this unique form of delivery. Consequently, 40% perceived the effectiveness of the online medium for students learning, and 25% did not think it was effective. However, the suggestions illustrated that the participants placed value in the benefits offered by this delivery medium, and claimed that it could be better perceived if not for the identified barriers.

Many students perceived the usefulness of synchronous online chat was related to the positive interaction outcomes, the sharing of knowledge and the different perspectives of the same topic. The observations and the questionnaire results indicated that participants valued the ability to voice their opinions, and engage in interaction with their peers and the offshore (Australian) facilitator in a less confronting environment supported by their local laboratory tutor. The model assisted in encouraging and increasing student participation which was influenced by the following underlying factors: information gathering, once again the online chat medium provided a more comfortable environment to contribute to the online chat, the ability to maintain an ongoing contact with offshore Australian lecturer, and timeliness of responses.

Mixed reactions were noted in relation to whether participants would seek further clarification if they did not understand the question during the synchronous chat session. Several participants noted that in fact they needed to proactively ask for clarification before they could carry on with the conversation.

Based on the analyzing the questionnaire in Case Study 1, student's perceived usefulness together with their motivation to participate inside the synchronous chat room meant that they have been observed to continue participating and appear to tolerate the deficiency with the technology.

It was reported from the observations within the chat room that students were actively engaged with the interactivity inside the chat room and were either attentively reading responses on the screen or furiously typing their question or responding to a query. This was not consistent with the reported literature on Asian students being generally passive and not prepared to publicly express their opinions.

Consequently, the following were the improvements devised to overcome the issues identified in case study 1. These include:

- The group size was reduced from groups of 28 -29 participants to 9 -10 students per group
- Hosting the online chat server locally, at the college, as oppose to external source to improve on the stability of the network and access issues.

It would be expected that upon implementing these strategies that students would be provided with a more stable environment to follow the discussion.

It would be interesting to know whether students would be more comfortable giving their opinions over the chat room once the barriers to participation are either minimized or alleviated in the final case study. With the advancement of technology, researchers still

raise issues (Mercer and Davie, 2002) with online chat technology having a negative affect on maximizing student collaboration and participation.

As a result of redirecting the group's emphasis from solely interacting with the offshore lecturer some students felt frustrated when they were not able to receive direct responses to all their queries. Students' role play was an initiative piloted in the second case study to encourage peer to peer interaction.

In fact, further testing of the technical aspects of the medium was conducted with another class as a trial, before the commencement of Case Study 2. The results provided a more stable connection; however, the lag time between messages still occurred occasionally. Subsequently, the original network bandwidth was doubled to provide a stable environment for the second case study.

Case Study 1 provided the opportunity to pretest the questionnaire that had been revised to include the Likert scale questions, in preparation for the second case study. This would provide a collective measure of perceived usability of the chat medium to support group communication. The literature recognized the likely success of groupware was dependent on the perception of the group at large (Preece, 2001), yet little had been documented.

The Likert scale questions were derived from themes and findings elicited from Case Study 1 as well as supporting evidence in the literature; this included the decision to adopt the Technology Acceptance Model (Davis, 1989) and ISO 9241-11. Indeed, several questions were directly modified and taken from TAM and customized for the questionnaire in case study 2 to reflect the context of use and to modify the questions to cater for local respondents from South East Asia. Students from the pilot test responded to the questions also offered constructive suggestions that enhance survey's relevancy, the questionnaire was customized to suit the style of the respondents. Peer review from the two academics, assisted to offer independent advice to enhance the clarity of the questions particularly targeting students from non English speaking backgrounds.

In conclusion, while network stability issues were in the majority outside the control of the users, some participants were unaware that if they remained idle for a period of time the software would disconnect them limiting their ability to fully participate in the discussion during the live chat session. This issue was identified during observations of the live chat session as well as in the written responses in the questionnaire.

Chapter 10 : CASE STUDY 2 - OVERVIEW

10.1 Introduction

The initial case study revealed a promising approach to online learning that encouraged student engagement and their active participation. The findings showed that there were sufficient positive student perceptions and perceived usefulness generated in the study which would increase its overall potential of being a successful online communication tool.

Given that it can also be ascertained that with sufficient motivation, students from South East Asia would readily participate in an open dialog. Therefore, it would be worthwhile to iterate the research with further improvements to the settings methodology for optimal interaction and perceived outcomes.

Usability of the new technology is more complex than the Technology Acceptance Model as acknowledged by several researchers Davis and Venkatesh (1996) and Malhotra and Galletta (1999). It is dependent on the context of use and the focus is not solely in relation to the technology and the hardware alone, the initial case study has revealed that user-to-user interaction and their perceived value are also considered as encouragement factors. Users' perceptions have been influenced by multiple factors as unveiled under this blended learning environment study for a culturally specific group in which students have been exposed to face-to-face interaction for the same subject. These factors have been accounted for in the designing the questionnaire to gather the mass student perceptions applicable to this study, where group perception is considered an important aspect to the success of the interactive sessions.

Triangulation principles have been adopted for this research which involved multiple data collection methods and probing for more in-depth understanding of the scenario and the data collected. Mix reactions have been reported on in the initial case study in relation to the perceived effectiveness of the online chat session, on one hand students perceived the potential usefulness of online chat, on the other hand the effectiveness of the medium has been suppressed by the instability of the network and the access to the system. In the

planning of Case Study 2, strategies have been employed to overcome the issues and improve the delivery of this trial. With measures in place it has been expected that an optimal environment present for evaluating the operational usability of the participants for interaction using the live system.

This chapter presents the specific objectives, discusses the study design and the methodology based on students' perceived usability under an improved setting and design for online chat.

10.2 Objectives Specific To Case Study 2

This second case study re-examines the perceived usability of the online chat sessions after implementing various measures to minimize the key barriers and deficiencies interfered with students' participation under the initial case study.

In recognizing usability has a range of meanings for people with diverse agendas and priorities. The themes elicited from Case Study 1, for the same cultural group of students, were used as a basis for developing additional Likert scale questions to gather group perceptions in this case study. The aim of Case Study 2 is to explore the overall trends and representative themes along with noting some exceptional cases worth noting.

Focus group interviews, questionnaires along with observations were the data collection methods adopted for Case Study 2. Its primary objectives are to draw extensive detail accounts of the overall perception and its underlying factors for individuals and amongst the group of participants at large. The second case study covers the three usability constructs including:

- a) Perceived ease of use;
- b) Perceived usefulness; and
- c) Overall attitudes towards participation inside the online chat sessions, more specifically their perceived satisfaction and the value of synchronous online chat.

10.3 Study Design for Case Study 2

Chapter 5 of this research provides the common approach applicable for both Case Study 1 and 2. This section describes the specific designs and instructional strategies that are specific and unique to Case Study 2.

10.3.1 Incentives

The marks allocated for each of the two live trials was 2%, giving a total of 4% of the overall assessment. Marks were awarded based on quality of student participation using the following assessment scale: 1) zero marks for no participation at all, 2) half a mark to one mark for minimal participation with messages that showed little evidence in understanding the discussion topic, 3) one mark to one and half marks were awarded for participants' with sufficient contribution as messages posted were relevant and showed some knowledge of the issues, and 5) full two marks for participants whose messages indicate full competence and understanding of the topic.

10.3.2 Number of Online Sessions And Its Duration

Four online chat sessions were conducted with students participating inside the college laboratory and was administered by the local tutor. Only participants present at the live sessions had marks allocated for participation, and the two initial sessions were practice sessions to familiarize students with the system.

10.3.3 The Implication of Case Study 1:

The implications of the initial case study meant that the following strategies described in the sub sections below were implemented to the settings and methodology for Case Study 2 aims to increase student usability to online chat:

- The reduction in the group size of participants;
- Students were now involved in role play;
- Improvements to the technology and the stability of the system.

10.3.4 Group Size

A class of 29 computer science students was voluntary participants of this study. The class was divided into two groups of 10 students and one group of 9 students for conducting the online chat discussion. The offshore lecturer facilitated each online chat session with the

support of the laboratory tutor. Accordingly, this was considered an optimal number of participants per group to enable sufficient opportunities for participation based on the learning from the initial case study.

Combining the results with the observation techniques and the results from the questionnaire and the analysis of the number of posted messages, provided a more holistic approach and a greater understanding on what was considered fast based on student perceptions. These findings allowed for future comparisons and improvements in the design of future online chat.

10.3.5 Student Role Play

Unlike the first case study, students were asked to engage in role play as a mechanism to stimulate active participation amongst their peers through debating of the topic. Half of the group had the role to provide supporting comments to the topic, the other half had the role to offer different and or opposing arguments to the same topic. Similar to the first case study the offshore lecturer also played the facilitator role as originally planned.

10.3.6 Technology

Significant improvements to the technology were administered for Case Study 2, the bandwidth of the network connection had been doubled, and the hosting of the services was localized using the already available college computer equipment. These two strategies alone created a more stable system for synchronous online chat to be administered in comparison to Case Study 1.

10.4 Instrument And Procedures For Case Study 2

10.4.1 Definitions Of The Measurements

In the initial case study respondents indicated the inter-related effects of “perceived ease of use” on the “perceived usefulness” in conjunction with their overall attitudes towards participation. The associations amongst these constructs meant that they should be extensively investigated when considering user satisfaction. Together these parameters increased the likelihood of providing a true indication of usability while minimizing false

impressions. The three parameters taken into consideration to measure students' usability towards online chat that relate to Case Study 2 were:

Perceived ease of use (PEOU) in this case study related to the physical and mental effort exerted in the process of adapting to the environment offered in this delivery medium to achieve the desired benefits and outcomes. As identified under the initial case study, perceived ease of use for online chat sessions involved, firstly, the ease of operating or using the online chat software through the supporting technology, and secondly, the ease of participate in the online chat sessions.

Perceived Usefulness: refers to the outcomes of usage (Childers et al., in Dolen & Ruyter & 2002), the findings in the initial explorative case study illustrated the outcomes of the online chat sessions could be information and (or) communication value. More specifically it could lead to improved performance, understanding, and increase communication outcomes amongst students.

Attitudes – this refers to student attitudes towards participating in the online delivery medium, in particular, their perceived satisfaction and value of the chat sessions for interaction.

10.5 Data collection method and administration

Apart from the questionnaires and the observations which were the common data collection techniques for both case studies, focus group interviews were conducted and field notes were also collected for Case Study 2. The triangulation method in this case study would be able to furnish greater clarity, collect comprehensive information from various data sources, and confirmation of the data. Subtle differences in student perceptions could be lifted out from each data source and the evidence of the varying level of user participation could be detected.

10.5.1 Questionnaires and Observations

The objective of direct observations was similar to the first case study. The learning from the first case study meant that on this occasion special consideration was paid in regards to

any difficulties students encountered with the technology. In this study, additional close-ended questions, open-ended questions, along with close-ended questions with follow up complementary open-ended questions were added to the questionnaire. Close-ended questions were mainly five point Likert scale questions with two selective type (yes-no) items. They were intended to gather students' perceptions at large on the themes found from the initial case study. One of the aims of the questionnaire was to determine if the chat software and the instructional design were usable for the intended students at large. It was an important consideration for systems that require group work to have the critical mass of users choosing to use the system (Brinck, 1998).

Participants were asked to comment on questions directly related to each usability construct. This was essentially achieved by designing a series of five point Likert scale questions with its own accompanying open ended question requesting further explanation, it aimed to provide contingency and elicit further clarity from respondents. This was acknowledged as a precious instrument to enhance the quality of data gathered (Fraenkel and Wallen, 1990). Open-ended questions continued to be applied in this study to identify themes in relation to users' perceived usefulness and difficulties contributing to the online chat under this context.

It was acknowledged that the system cannot be studied in seclusion without entailing the human factors in such technology which facilitates the human-to-human communication mediated by the technology. The questionnaire was structured to account for the sociability of online chat, refer to appendix CC for a sample copy of the questionnaire and the diagram showing a breakdown of the various sections.

The questionnaire administered for Case Study 2 (shown in Appendix CC) was structured to contain questions based on the following elements: perceived usefulness; perceived ease of use; the extent of user's willingness to participate in online chat; and their overall enjoyment and satisfaction with the synchronous chat sessions. Questions around motivation were also included to the final questionnaire; it was, however, outside the scope of this context. The data was conveniently collected for teaching academics to enable them to analyse the information for the future delivery of the subject.

The feedback from the participants in the pilot study and three other academics, resulted in further clarity and refining of the questions to suit the cultural group of users in this study. The feedback received assist in enhancing the reliability and removing any problems before the delivery of Case Study 2.

10.5.2 Log Files, Participation Marks, And Assignment Results

The log files from the final online chat session for each group in conjunction with participation marks, and student's final assessment marks for their assignments were analysed. Participants' log was in fact a technique used to not only elicit information about level of participation among the students within the group but also the volume of message flow, which provided a baseline for understanding and determining whether the perceived chat speed was too fast or too slow for interaction.

Preece (2001) suggested the number of post could provide an indication of students' engagement of the online chat session. However, as indicated under Case Study 1, this was not sufficient without the use of field observation, particularly in the situation when the messages fail to submit to the chat server due to various obstacles, including technology instability or participants gave up posting up messages when they found the conversation topics has changed or others had already posted similar ideas to theirs. While participation marks provided an indication on the quality of participation.

Handzic and Tolhurst (2002) have found that participants tended to learn better and faster when they were encouraged to interact with other. A comparative exercise of three sets of students' assignments results were reviewed, one assignment was completed without online chat discussion at all while the other two assignments were submitted on topics debated inside the online chat sessions. This helped to indicate whether there were any improvements in performance.

10.5.3 Focus Group Interviews

Unlike the first case study, focus group interviews were implemented in the second case study, it was a qualitative approach to collect information and probe study participants on unexpected and abnormal responses from the open-ended questions in the questionnaire.

The two focus group interviews were conducted two weeks after the participants completed the questionnaires. The objective of the focus group interviews was to follow up and clarify any unclear or incomplete responses and to confirm findings from the questionnaires.

With the presence of a small group of participants in a dynamic group guided by the interviewer, focus groups promoted the emergence of variety of responses, it encouraged further reflections and discussion of the focus topics. Focus groups helped to reduce bias found in individual interviews (Dreachslin, 1999). Simultaneously, it allowed the interviewer to explore the meaning of what was being said if it was not well understood, and tested the interviewer's understanding through summarizing what was been said (Dreachslin, 1999).

Despite the benefits of the focus group interviews, its strength of having group interaction may also encourage bias when group composition is dominated by a few, and the pressure of conformity, leading to a lack of opposing viewpoints. Carey in Dreachslin, (1999) has been able to justify that focus group tends to magnify negative rather than positive effect; therefore it may overemphasize the actual changes that are essential in teaching methods (Dreachslin, 1999). Dreachslin further recommends that findings from focus group be balanced with information from other stakeholders.

Therefore, it appeared the combination of focus group approach together with the questionnaire method could provide invaluable information for Case Study 2. The focus group approach was used as a way to gather insight into the attitudes and opinions of participants, it provided additional perspectives from a diversity of participants for decision-making. As supported by Dreachslin (1999), focus group interviews have a valuable place when it formed part of other traditional methods of qualitative measures of student satisfaction.

Furthermore, by integrating more than one method of data collection to strengthen the internal validity of the study (Miles and Huberman, 1994), known as methodological

triangulation as discussed in part 1 of this section. The weakness of questionnaire can be complemented by the strength of focus group interview sessions. By having multiple methods this enabled confirmation of results against one another, hence increase the reassurance of the findings.

It is important to recognize that inconsistency or opposing viewpoints drawn from the focus group interviews might not be refutation. Comprehensive interpretation of the results may indicate that alternatives and a broad range of different perspectives tell a more holistic picture of the event of equal validity (Popay, William, and Rogers in Barbour, 2001). Recommendations from such outcomes could mean further elaboration or examinations from different perspectives of the topic (Rossman and Wilson, in Miles and Huberman, 1994).

In deriving statistical figures for the number of posted messages, combining the results with the observation techniques, the focus group interviews, and the results from the questionnaire, provided a more holistic approach and a greater concrete understanding of student perceptions towards online communication and interactivity. Results could be checked with one another to confirm or note any differences (Jakob, 2001). These findings allowed for future comparisons and improvements in the design of future online chat.

10.5.4 Participants In The Focus Groups

Twelve participants consisted of five females and seven males, were fairly evenly distributed between two focus groups. Of the 12 participants, eight students were randomly selected while the remaining four students were purposely sampled and were equally divided into two separate groups, with each group consisted of one less active and one highly active participant. The motivation of selecting this sample was to allow multiple and variety of views (McMillan and Schumacher, 1993). Although the some of the participants are purposely sampled, they were all informed that the participation was voluntary, and that they could withdraw from participation any time.

10.6 Administration Of The Observation, Questionnaire, And Focus Group Interviews

The observation method was conducted on the last of the online chat session and the notes were compiled at the end of the last online chat session. The observation method was focused on observing and gathering information regarding the three parameters of usability while playing the role of the laboratory tutor.

The questionnaire was distributed to students at the end of the series of live chat sessions this was in week 12 of the semester. It was felt that this would be most appropriate to collate the data in which the observations would be more relevant to the responses in the questionnaire. The questionnaire took participants between 30 to 45 minutes to complete, but the students were given ample time of one hour to fill in the questionnaire. The questionnaire was administrated during class time, so students were encouraged to ask for clarification with any unclear questions and to provide constructive feedback suggesting improvements to the questionnaire.

To avoid interference with students' workload, focus group interviews were conducted at the end of week 14 after all the classes were over. The groups were given assurance about the confidentiality and the purpose of the interview before participants confirmed their participation, and were reminded once again at the start of their interview. All interviewees were asked to complete and sign off informed consent form (as in Appendix cc), they were made aware that participation was purely voluntary.

The two focus group interviews were conducted in a relaxed environment in an informal discussion setting where participants sat in a circle around a table. The interviews were tape recorded, and the key points were pencil noted by the interviewer to safe guard any mishap that may occur with tape recording, such as end of tape, or the respondent's voice sounding too soft during playback.

The themes of focus group questions were derived after reading through the individual responses to the questionnaires. The flow of the two interviews was semi-structured and

open ended with the aim to further explore what was not well understood from the questionnaire responses. The interviews commenced with an icebreaker exercise and an informal chat followed by a discussion with the group regarding the purpose of the session.

To ensure members had a fair chance of contributing, the interviewer occasionally sought comments from the quiet and less assertive participants. It was challenging for the interviewer to manage the process, evaluate what had been said, and at the same time note down the key points, this may have affected the quality of the discussion.

It appeared there was no pressure of conformity in the group discussion; differences in opinion and new ideas were derived from the interviews. However, as English was a second language for the majority of the interviewees, occasionally, the interviewer had to seek further clarification, rephrase and summarize to ensure the true meaning had been captured. This was in particular so in relation to one of the groups, where majority of the participants were generally quiet and very soft spoken, hence more probing questions were asked to encourage participants to speak their thoughts.

10.7 Data Processing And Analysis

10.7.1 Observations And Questionnaire Techniques

The observation method applied to this case study was similar to the first case study in chapter 5 under part 1. Unlike the first case study, descriptive statistics was also used, together with frequencies for all the figures derived from the close-ended questions, to show the central tendency and the spread of data in Case Study 2. A summation of the mass participants' response to the Likert scale questions in relation to their perceptions and attitudes toward the usability of online chat under this pedagogy was obtained.

The themes that emerged from Case Study 1 provided the basis for further comparison and categorization of the data into themes and sub-themes. Hence, the iteration process for Case Study 2 involved reading and re-reading each open-ended question and the grouping of similar themes together. It also involved identifying appropriate inter-relationship between

categories, as well as analyzing possible explanations for new and or strong emerging themes and patterns along the way (Taylor-Powell and Renner, 2003). Similar to the initial case study, the process involved grouping and regrouping of the responses as the theme and sub-themes were being refined, and comparing these responses with the responses under Case Study 1 until clear categories and sub categories emerged for all student feedback. The categories were then documented for each question in matrices found in appendix G and H. Themes were then analyzed across questions to identify patterns and consistency.

As direct comparison between the two case studies on students' satisfaction and attitudes was not possible, as in the first case study was purely exploratory with questions focus on using non structured open-ended format to draw out the participants' value and difficulties. Hence, Nielsen and Levy's work was referred to as a practical benchmark for comparison on participants' preference in this case study. Nielsen and Levy (1994) meta-analysis study used a large number (127) of systems to measure users' subjective preferences on a 1 - 5 rating scale, 5 being positive and 1 being less positive attitude towards the system. The analysis of their study indicated that the median was 3.6 and the mean rating was relatively positive at 3.55 ± 0.12 (95% confidence interval).

10.7.2 Review Of The Field Notes

Review of the field notes namely the log of the online chat sessions and the assessment on student's written deliverables were conducted. Firstly, an examination of the log file for the final chat session for each of the three groups enabled the speed of message flow to be calculated. This was shown in terms of the number of messages posted per minute, and was used to support participants' view regarding the speed of message flow.

Secondly, the level of participation was calculated by counting the numbers of posted messages per person in the each of message log, for both sessions, for all of the three groups. As the questionnaire was being administered at the last session of the online chat for each of the three groups, logically this was also thought to be the most appropriate chat session for calculating the message log. The calculations commenced from the first question the facilitator submitted. Descriptive statistics was used and applied across the three groups

of participants involved in the synchronous online chat. Together with the observation it would provide a good indication of participants' intensity of engagement to the discussion.

While student's assessment results were compared, two separate assignments submitted upon completing the online chat discussions were compared against the submission, which was completed with no online chat discussion. All three-assessment components were marked by the same offshore lecturer, a comparison was carried out to determine whether there would be any difference or increase in student performance with or without online chat.

10.7.3 Focus Group Interview

Themes were elicited from the focus group interviews along with interesting and value-adding selection of meaningful quotes from the interviewee were carefully noted, this was used to clarify, confirm, and offering better understanding of the issues raised.

10.7.4 Codes Used To Protect Participant's Identity And To Identify The Source Of The Information

To maintain student confidentiality, each participant of the questionnaire, and interviewee of the focus groups were assigned with a unique identification to note the origin of the responses. A code was used to represent the respondents when their quote was used inside the thesis, different numbering codes were used to denote the different data collection techniques and different source. For instance, participants in the questionnaire for Case Study 2 were denoted by #a1 to #a29, as opposed to Case Study 1 which used #1 to #40, while participants in the focus group were identified by #A to #L.

10.7.5 Triangulation Of The Data

The data collected for the questionnaire responses were cross checked and comprehensive processes were in place to verify the themes across a range of questions. In essence, the checking process involved identifying patterns and connection between categories (Taylor-Powell and Renner, 2003). Likewise, the data was analyzed across the different data collection methods, to identify consistency, associations, and refining the meaning of the

responses. Matrices were compiled to ensure consistencies amongst the themes, and along the way relevant quotes were identified. This provided further confidence and credibility in the responses as well as identifying areas worthy for future research.

Themes derived from the questionnaire were the basis for comparison with the observation and focus group interview. Field notes such as the logs of the chat sessions, the results of the students submissions, together with field observation were gathered for triangulate some of the data in an attempt to validate the data from different sources.

10.8 Participants' Demographic profile

Participants' profiles have been collected to enable academics to use the data in this research to establish the likeness of the groups and potentially as a basis for the future studies. There were no attempts to use the collected data in relation to participants' preconceived views of group discussion and online chat in general, these aspects could be a part of or an extension to future research work.

The second case study was executed during first semester, with a total of 29 participants, from South East Asia, with 72% (21) Malaysians as in Figure 10.A. in the study:

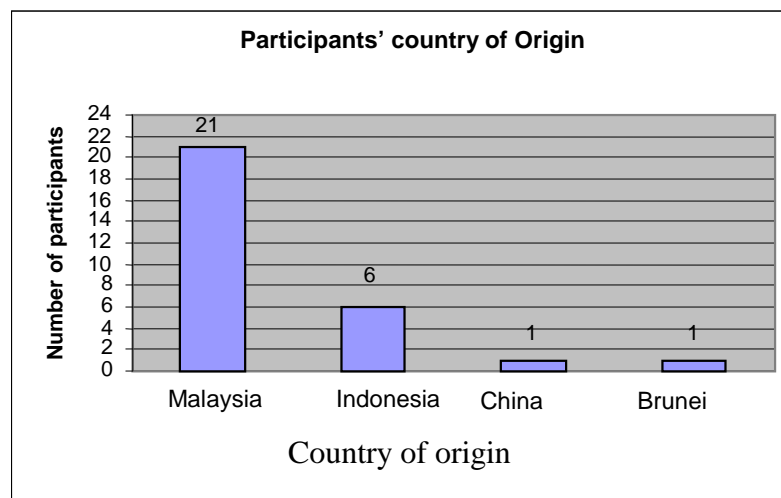


Figure 10.A. :Number Of Participants For Each Nationality

N=29,

The participants age group ranged from 19 to 25 years old, with the majority (9 students) 22 years of age is shown in the Figure 10.B below:

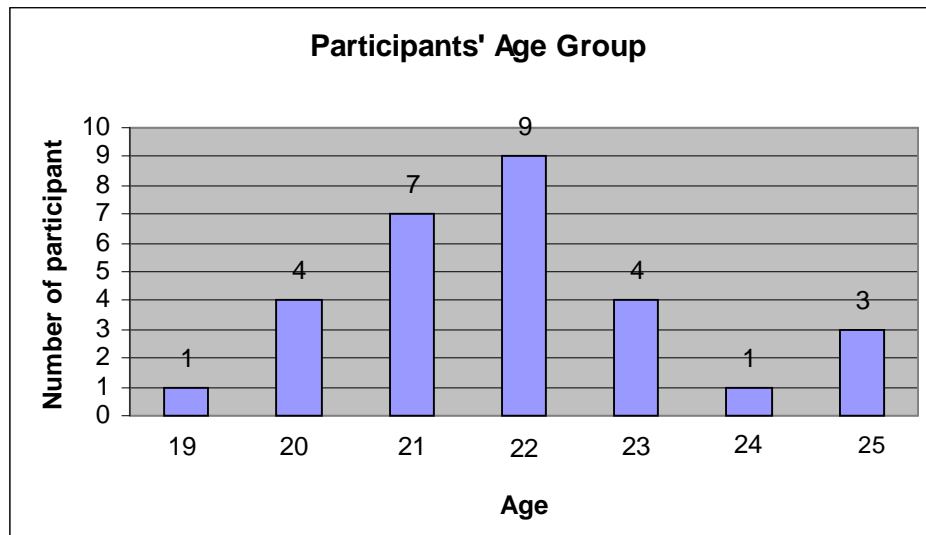


Figure 10.B. Participants' Age Group

N=29

The class consisted of 72% (21) males and 28% (8) females, with 79% of participants undertaking their semester 5 which would be equivalent to first semester of third year undergraduate degree, and 21% of students were enrolled in their final semester of their undergraduate degree. All participants except one had previously experienced with the online synchronous tools.

The study acknowledged participants typing speed and language proficiency could also influence the perceived ease of participating inside the chat session. Given that all participants were in their final year of their degree, it was expected that a minimum standard of language proficiency and typing skills have been acquired during their university education.

10.9 Limitations for Case Study 2

The common limitations of the two case studies that have been documented under chapter 6, part 1 of this research. It included the risk of users not being honest with their responses to the questions or provides feedback that they believe the academic would like to hear rather than their genuine experience.

This section documents the limitations specific to Case Study 2, this related to the limitation of the focus group interviews. For contingency purposes, the interviewer took notes of the important themes during the course of the discussion as it was acknowledged that some of the participants had very softly spoken tone of voice. The interviewer noted that in the play back of the tape recording of the focus group interviews that indeed there were occasions in which it was difficult to hear out or comprehend the exact words that have been conveyed by several soft spoken participants. On one occasion, there was a short ten minutes break in continuity of the tape recording as the tape had ended during the interview. In this situation, the interviewer could only rely on the notes taken during the discussion and comprehensive notes at the end of the interview.

Due to budgetary constraints it was not possible to extend the duration of the online chat sessions for a longer period of time to enable more in depth analysis and debate of the topic. According to student's perceptions, the quality of the message posted was an issue but it was not extensively analysed in this case study. It was unclear in this case study the extent in which participants' felt that the quality of messages could influence and lead to enhanced learning outcomes, improve participants' understanding or their overall performance. Further research and information in regards to the quality of the messages posted could also be obtained from the log files which could certainly help to provide a more complete picture of quality interaction inside the synchronous online chat session.

Logically, evaluating the marks given for participation would provide a good indication of quality of the post. However, given that the assessment marks allocated for this case study was minimal, evaluating the participation marks could only provide an "indication" on the relevant of the posts, the general understanding of the topic, and the level of participation rather than the rich detail on the extent of interaction and the quality of the interaction.

Chapter 11 RESULTS OF CASE STUDY 2

11.1 INTRODUCTION

Having minimized the significant barriers discovered in the initial case study, this case study evaluates operational or quality of usability as perceived by actual users on a more stable environment. The chapter presents the results emerging from several data collection techniques namely questionnaire, field notes and focus group interview. A descriptive approach was undertaken to organize the data and probing for further in-depth understanding of the situations.

11.2 RESULTS OF CASE STUDY 2

The results were documented for each data collection methods; the themes from the questionnaire was used as the basis for comparison with other data collection methods highlighting consistencies, differences and brought out greater clarity in the data.

Class room observation had proven a useful tool to gather overview of the participants perception at large including information that students themselves might not be aware in the midst of trying to keep up to pace with the conversion. Questionnaires provided a useful basis for comparison and to elicit wide variety of possible themes from the class at large in relation to perception and satisfaction. Focus group interviews were particularly useful for seeking user perceptions on the quality of the session and provide further clarity on the meanings found inside the other data collection tools. Review of the field notes provided some indication of the outcome of the chat session.

11.3 RESULTS FROM THE QUESTIONNAIRE

All 29 (100%) students volunteered to fill the questionnaire that was administered at the end of the class, they were encouraged to provide feedback on any problematic or unclear questions. Participants did not find any major issues with the questions or the structure; the written comments on some of the Likert scale questions confirmed that they students understood the questions.

The results of each of the Likert scales and it complementary open-ended questions were reported in turn, that way a clearer understanding could be observed as the reasons why the

category had been chosen. It would be interesting to identify the participant's rationale for Likert scale selection and whether any common themes could be gathered from such analysis. This was then followed by an overall consolidation of these themes based on each usability construct.

11.4 PERCEIVED EASE OF USE (EFFICIENCY)

As elicited from the initial case study the overall impact of mental and physical effort in relation to EOU in context of chat primarily relates to the ability to follow and contribute to the content. Figure 11.A. presented the participants perceptions in relation to factors that impact on ease of use.

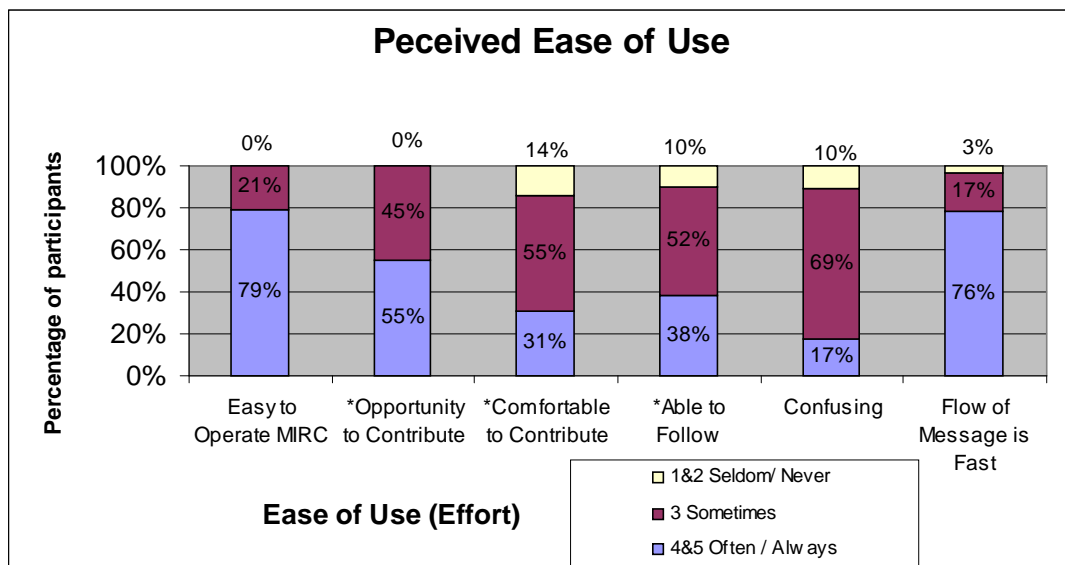


Figure 11.A. Perceived Ease Of Using The Online Chat Medium For Supporting Group Interaction

* denotes questions that had supplementary comments

(Table of results of the Likert scale questions can be found in Appendix D, E, and F. The clustering of the responses is documented in tables under appendix G).

The overall ease of use related to the ability to operate the online chat, users comfort level, the opportunity to contribute online and ability to follow the conversation or the discussion online.

When questioned specifically on the operational aspects of the technology, the ease of how users interact with technologies. There was certainly strong support for the ease of use with

79% of the participants without any difficulties operating the online chat software, the remaining 21% (6) selected “sometimes” easy to operate the chat software, and none of the participants thought it was hard to use the chat software.

Fifty five percent (16) of the participants thought the online chat sessions often provided them with the opportunity to contribute to the discussion, none of the participants denied this, the rest of the 45% selected sometimes.

Amongst the four supporting comments, that noted the barriers limiting their chances of participation included the difficulty in following the discussion along with not being acknowledged amongst the chaos of multiple posts during the live chat sessions.

On the more positive supporting comments, majority (11) of the participants merely confirmed their participation or re-emphasize the usefulness of the online chat which in turn encouraged their participation,

(#a21) *“During the chat session, not only the lecturer can solve your doubts students actually does provide some useful information inorder for me to contribute in the discussion”[sic]*

(#a17) *“student can easily point out the question and misunderstand with lecturer. Besides that, lecturer can easily and response fast to the student”[sic]*

Based on the questions relating to the ease of use constructs, this was the common themes that emerged from questioning participants, this included a question regarding their comfort levels in contributing to online chat medium (8 participants).

They (8) spoke of it as being a free and less confronting medium to contribute to the online chat:

(#25) *“ya, everyone can given their opinion and no one can stop you”*

(#a6) *“It's good that we can share our ideas with each other without worrying what other people think as in face to face”*

Two specifically indicated they were put in the situation that they were encouraged to participate, as addressed by the following comment;

(#a10) *“Because in the online chat, the students give their opinion about one thing so we tend to respond what they write”*

However, in this communication context, a less favourable view perceived was in terms of the level of comfort in contributing their opinion inside the computer mediated communication. On most occasions only 31% (9) participants thought it was comfortable, at the same time only 14% (4) thought they were seldomly comfortable voicing their opinion inside the chat. More than half of the participants actually selected “sometimes” comfortable. Interestingly, for the written responses that was able to draw out the reasons for this unexpected outcome.

Five of the sixteen students chose the “sometimes” category comfortable related this to the unpredictable pace of the messages flow, students thought, at times the pace of the messages flow was too fast for them to keep up which in turn impacted on their comfort levels:

(a#5) *”sometimes, the online chat was too fast”*

(#a23) *“too fast when finish type the opinion, there are already pass and the new question is on”[sic]*

(#a24) *“it is too fast via chat, cannot concentrate on the word appear”[sic]*

Three respondents spoke of the concern that at times there was lack of feedback, the relationship between the speed and lack of feedback was well illustrated by the following response;

(#27) *“The chat is too fast and so some of my message are ignored or not noticed [not noticed means that before a reader can read the message, it had already been moved off the screen due to the number of posts occurring at a rapid pace]”*

While others (3) articulated the lack of domain knowledge or opinion made them felt uneasy contributing inside the chat. The following comments illustrated some of the concerns:

(#10) *“because sometimes I don't know what to talk about, what response I can give to the other chatters”*

Interestingly, one of the respondents articulated that the individual's comfort level was influenced by various aspects not only in relation to the unpredictable speed of online chat, nor the content of the message, but the fact that it can be confronting when questions were directed to an individual possibly with language difficulties. Under these circumstances, this could easily hamper their confidence and subsequently negatively impact on their overall comfort level in voicing their opinion online as quoted:

(#17) *“it is sometimes comfortable . Because sometimes the chat session is too fast which make me lost the chat topic. Sometimes chat until out of topic/scope. I am a shy person, it makes me do not feel uncomfortable to face other when question in chat. It is the comfortable me to sound out. But because my grammar and vocabulary not well so I afraid that the chat making other misunderstand my point” [sic]*

The overall responses to this question showed that some respondents (3) articulated not being confident with their level of knowledge or understanding of the topic could be a barrier to contributing online, respondent # a28 noted that:

(#a28) *“is good to give opinion but sometimes just dare not to give opinion when not sure about it”*

While those who commented positively in relation to being comfortable communicating (2 participants) also acknowledged the need to keep up with the pace, as illustrated by the comment;

(#a21) *“I can keep up the pace of chatting, so no problem for me during chatting to give my opinion. Sometimes, face to face with lecturer are hard for me to come out with my doubts, but chatting solve this problem of mine”*

(#a19) *“quite comfortable, just need fast typing skills”*

A number of participants (38%, 11) selected “always” or “often” able to follow the discussion and only 10% (3) thought otherwise. The remaining 52% (15) participants elected “sometimes”. In reviewing their written responses, similar difficulties that interfered with the comfort level of contributing online were also found in responses to this question. The fast pace of message flow remained the main cause and the key barrier to their perceived ease of use, with a total of 15 participants felt it being a problem. The following responses highlighted its impact, as the participants identified the time needed to read, think, questions, and type but with the speed of the conversation flow at times, it made it difficult to follow,

- (#22) *“because sometime the chat session is fast until I can't really capture what the student said or what the lecturer explained”*
- (#23) *“Chatting too fast, not time to review the answer or question post by the other” [sic]*
- (#a17) *“sometimes, because their (student) are too fast because I poor in typing and think too slow to response”[sic]*

One of the participants who was able to follow the conversation explained the reasons was particularly because of their language proficiency, reading, and typing skills;

- (#a21) *“I think the most important during the chat is English and the speed of typing and reading. SO for me all this is OK, so I can follow up the pace during chat”*

Another participant spoke of the ability to ask the laboratory tutor questions which enabled users to follow the discussion.

The ability to understand the messages was another point brought out by participants (3), with three additional participants who selected they were able to follow most of the time, merely because they were prepared before the session,

- (#a12) *“yes, because we know what the topic is going to discuss in chat from and we research in the net before it”*

Hence, in response to the question seeking for their thoughts on the speed of the messages flow, 76% (22) of the participants thought at the flow was fast on most occasions, with only one did not agree. Discussion amongst the groups could result in users feeling more confused after the online chat session. 69% (20) of the participants selected “sometimes”, and only a small number of users (3) felt online chat sessions were seldom confusing.

In the context of users’ perceived ease of use, the results in the Table 11.A below showed an overwhelming strong agreement a fast flow of messages for the average user with a mean of 4.31 and a median of 5 in a 1-5 scale with 5 being the “always” category. Under these circumstances, a mean of 4.17 showed that participants found the medium easy to operate and a mean of 3.72 related to the opportunity to contribute to the discussion. A median of 4.0 for these two variables were substantially higher than the midpoint of 3 on a 1-5 scale. The mean for the following three variables: the participants ability to follow the discussion (3.34), their comfort levels in giving their opinions (3.24), and whether they found the system confusing (3.24) was rated slightly positive than the midpoint of 3 on the 1-5 scale.

Table 11.A Descriptive Statistics for Perceived ease of use

Perceived Ease of use	N	Mean	Std. Deviation	Median
Easy to Operate	29	4.17	0.76	4
Opportunity to Contribute	29	3.72	0.75	4
Comfort in Giving Opinion	29	3.24	0.91	3
Able to Follow	29	3.34	0.77	3
Confusing	29	3.24	0.87	3
Fast Flow of Messages	29	4.31	0.93	5

The other underlying factors which affected the ease of use were the people factors and the social aspects of the computer mediated communication (CMC). It entailed how users communicated with one another in the community through the support of the technology, the open dialog between the students and their peers, being moderated and directed by the offshore lecturer.

11.1.1 Overview Of The Ease Of Use

Clearly there was much consistency in the themes drawn out across the questions in relation to the ease of use constructs. These themes and sub-themes were consolidated to illustrate the overall difficulties participants experienced and its significance. They have been summarized in the Table (refer to appendix J for details in relation to the percentages of each theme).

The question on the difficulties of using online chat was relatively similar in nature to another question on the disadvantages of having online chat. It was intended that users would also comment on the overall disadvantages of online chat. Overall, the results revealed common themes which hampered student participation.

Table 11.B : Similar Themes Found Across the Ease of Use Questions

		Q4	Q2	Q6	Q10	Q11	Q20
		Opportunities to participate	Comfortable to voice opinions online	Able to follow the discussion	Disadvantages of online chat	Difficulties with online chat	Suggestions
	Themes	Number of respondents					
*1	Difficult to follow	1	-	-	6	18	-
*2	Difficult to contribute	-	-	-	7	9	-
a	Too fast	1	7	15	11	19	-
	Seek control in the speed of conversation	-	-	-	-	-	4
b	Too many people concurrently participate (higher volume)	-	-	1	5	4	-
c	Reduce group size	-	-	-	-	-	3
d	Too many topics/questions	-	-	3	-	1	1
e	Lack feedback and acknowledgements	-	3	-	3	2	-
	Message content						
f	Irrelevant (Deviation of) messages	-	2	-	6	1	1 Do not deviate
g	Clarity & misunderstanding of messages (effected by ability of individual or of their peers)	-	-	3	2	3	-
	Skills required to participate:						
h	Lack domain knowledge (understanding)	1	3	3	-	1	-
i	Lack confident/feel inferior	-	3	-	-	-	-
j	language Skills	-	1	1	-	2	-
	Need more time in general/ longer chat session	-	-	-	-	-	5
k	Time needed for thinking (understanding, applying knowledge)	-	-	-	-	1	1

		Q4	Q2	Q6	Q10	Q11	Q20
I	Time needed for reading	-	-	2	-	4	2
m	Ability express clearly/ response quickly	-	-	-	3	-	-
n	Slow typist		1	3	2	7	-
o	Difficult with text-based	-	-	-	-	-	-
p	Need focus on which to answer first	-	1	-	-	-	-

(The clustering of the responses for each question is tabulated under appendix G and H).

* Denotes the overall impact on ease of participating, while others are the underlying factors likely to have an impact on them.

It was also noted that in both the Likert scale questions and the open-ended questions were in alignment across a range of similar questions. This was in particular in relation to the three themes consisting of the online chat being too fast, difficult to contribute and challenging to follow the discussion. This showed internal consistencies within the questionnaire.

The key triggers noted were related to the speed of the conversations being too fast having impact on the overall ease of participation, sometimes it was difficult to follow and to contribute to the online chat. Consistent to Case Study 1, many of these factors as noted under Case Study 1 were inter-related, not limited to speed on the messages flow, the group size, the number of concurrent conversation, and the capability of the participants and the members in the group affecting their ability to keep up with the pace. A number of users' spoke of the difficulties in understanding the messages and reasons suggested was that they did not fully understand the questions or the content of the messages. Another barrier to participation was unfamiliarity with the topics and language barriers namely the clarity of the messages or the individuals' English proficiency, for example:

(#a11) *“not understand the answer or question which is post by other students, sometime they also type the answer or question so fast make me can't follow”*

(#a4) *“sometimes I can't understand what the other user's and lecturer's question”*

(#a20) *“sometimes didn't understand what they are trying to discuss, the question is confuse and hard to contribute ideas”*

(#a14) *“spend time when translating chinese ideas to english. sometimes I get the points but I don't know how to explain”[sic]*

Participants also claimed the difficulties to receive acknowledgement of their messages from others inside the chat forum, for example:

(#a5) *“difficulty to catch the topic discussed, sometimes, what we are trying to say was ignored from the discussion”[sic]*

In examining the open ended responses, users' suggestions to improve the quality of the messages posted inside the chat session and subsequently assist to minimize the difficulties users experienced were considered. From the users common responses, the impact of speed and volume of the message flow were obvious participants felt that a solution might be to run a longer chat session (5), three respondents re-emphasized the need for smaller group size, indeed participants (4) recommended more controls inside the chat medium, in which three suggested that the pace should not inhibit their participation. Users also raised the idea of having a mix active and inactive participants for each online chat group as noted:

(#a6) *“ensure a good mix of people, active and not so active”*

Several (3) respondents also commented on the preparation required before the chat sessions. The results generated indicate technical problems presented in the initial study were no longer an issue. However, the demand on participant mental efforts involve in participating were more apparent, as human aspects and facilitation skills play a greater roles on students participation, and their overall perception of the modified online dialog.

The positive aspects included the communication value, and the comfort level offered inside the chat session being less confronting medium for participants to freely engage in the conversation.

11.2 Perceived Usefulness (Effectiveness)

One of the key goals to integrate the online chat session was to encourage interaction amongst the users facilitated by the offshore (Australian) lecturer to achieve an improved

understanding and critically analysis of the reading material. The system assisted the participants to voice themselves openly and this in essence also enabled the offshore lecturer to receive feedback regarding students' level of understanding of the discussion topic and tailor the teaching material as well as the duration required for each topic. However, before these could happen, students need to perceive the value and satisfied with the use of such medium for discussion that had been integrated to supplement their usual face-to-face classes.

As part of the questionnaire for Case Study 1, students were first asked about the benefit of the online chat sessions for achieving various learning outcomes. The results were collated then grouped into two key aspects of learning outcomes. The valuable outcomes of user interactivity are both the information and the interaction values. Hence, the usefulness of online chat is divided into the overall information outcomes and secondly the communication outcomes for the second case study.

In the context of communication, Case Study 1 was able to further establish the underlying reasons why they were two separate factors. Firstly, online chat tool provided a mechanism as in that it created a comfortable environment for students to contribute their thoughts, voice their opinion and feel more satisfied in the process. However, given the nature of synchronous chat was not a rigid structure but rather dynamic, where the flow of conversation may end up during the course of conversation flow, therefore communication outcomes may not always result in users gaining substantial information and learning outcomes.

The key themes found from questioning participant's perceived benefits of the online chat (refers to Appendix H-1 for clustering of the written responses) as outcomes of online chat discussion in the current study, aligned with Case Study 1, it also drew out the themes from the Likert scales questions. Firstly, the students valued *information gathering* features (59%=17 participants), including the belief that it could lead to improve understanding, knowledge and clarifying doubts, and helped with their assignment (4) as supported by the following response:

(#a29) “*expand the knowledge and add up the opinion for us to do the case study*”

Secondly general *communication value* of the online chat (72%=21); including the value of the ongoing interaction with the offshore (Australian) lecturer (9 participants), the less confronting and a comfort medium of communication (6), the immediacy of the interaction (6), a comfort environment for participation (6) and increase students' participation (4). For example, the following participant acknowledged the activeness of the class together with the benefit of having further interacting with the offshore Australian lecturer was inspiring.

(#a25) *“communicate with the offshore lecturer encourage us to interact more, more thriving than normal class”*

Three spoke about it being fun and interesting.

11.2.1 Perceived Learning Outcomes

Figure 11.B. below, illustrated the general perceived learning outcomes, namely online chat sessions perceived as being (A) useful for supporting student learning, (B) it improved their understanding of the topic, and (C) online chat helped them with their performance of their written submissions. The other two, were more specific, underlying factors that impacted on their learning outcomes.

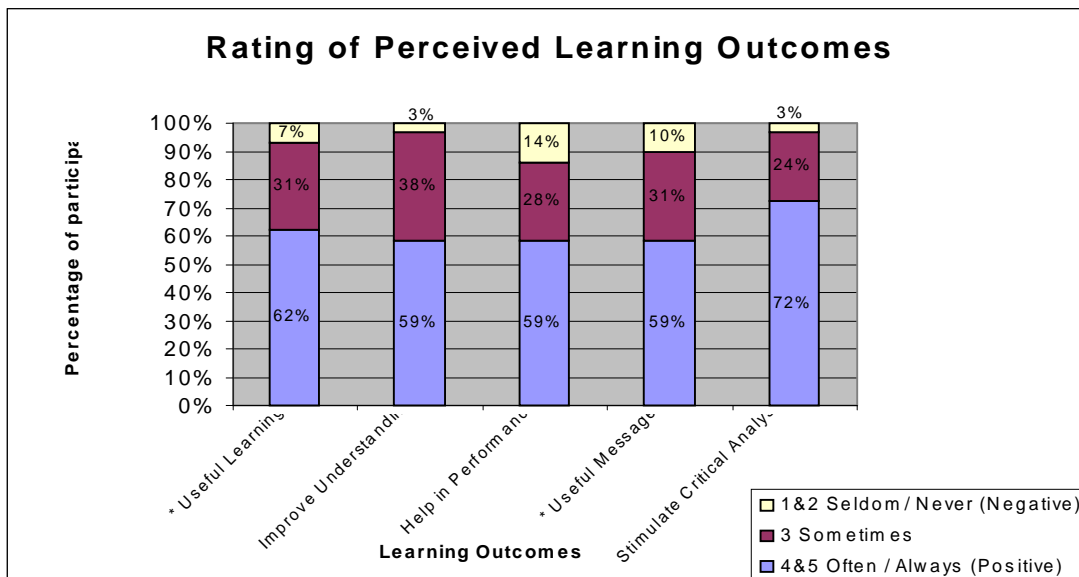


Figure 11.B. Perceived Overall Information And Learning Outcomes Of The Online Chat Medium For Supporting Group Interaction

* denotes questions that had supplementary comments

(Table of results of the Likert scale questions can be found in Appendix D, E, and F. The clustering of the responses is documented in tables under appendix G).

Firstly looking at the question aimed to elicit student general perceptions towards the usefulness of the online chat in “supporting student learning”, had 62% (18 participants positively perceived this outcome. The supporting comments were grouped into two main themes, firstly, the information (learning) values and secondly, the communication values. This being consistent with Case Study 1, as the two outcomes were very much interrelated when Computer Mediated Communication (CMC) were used to facilitate communication (refer to Case Study 1 results for detail). The accompanying written comments showed 14 (48%) participants valued the information gathered with some stating that it helped their understanding (5) and (or) eventual write-up for their hand-up assignment as identified by the following respondent (4):

(#a6) *“help students in getting more guidance and useful information. Help with doing the case study and close the gap between students and the lecturer. Some students are shy to speak in front of the class. It's useful cause I like everyone contributing” [sic]*

Participants conveyed that the value of information gained as well as the benefits of communication (8 of the 14 participants) was mainly triggered by the outcomes of user interaction via CMC. Communication values were not limited to more daring to speak, it allowed questioning, and exchanging ideas, engaging and stimulate thinking, as illustrated by participants below:

(#a3) *“student can think and discuss their problem online and chat with other people”*

(#a11) *“cause it can let us more understand. All sort of ideas pop up with online chat. We are more daring to speak our ideas. A wide range of ideas pop up that enhance our understanding of the topic” [sic]*

Three users appreciated the ability to interact with the offshore lecturer.

There was strong preference for the learning outcomes of online chat to stimulate critical analysis with 72% of participants nominating this as their preference.

Interestingly, 59% of these students (17) also suggested that online chat sessions improved their understanding toward the topics, while only one student did not perceive this. Similarly, 59% (17) of the participants thought online chat sessions helped with their performance in their assignment (known to student as case study). The assignment was the written report summarizing the issues in relation to the topic that students were required to submit soon after the chat sessions came to an end. However, in the case of 14% (4 participants) did not perceived it being useful for assisting their performance in their final submission of their assignment.

More specifically, 59% (17) of participants thought the messages posted by their peers were useful while a small number 10% did not agree. When openly questioned about the factors that were likely to influence the quality of their posts, the factors collected portrayed many of the underlying elements identified under the ease of participation indicating their association. Factors included the clarity and content of the messages (10 participants); influenced by their individual language barrier and that of their peers, including the questioning or interaction skills amongst their fellow participants, were seen as major triggers impacting on the quality of the messages posted. Groups of students that could not understand the messages or questions were challenged to provide quality replies or comments as illustrated below:

(#a24) *“hard to understand the post - English, hard to explain”*

(#a7) *“no useful question given could be raised from the discussion topic, the group is not suitable, lack of participation”[sic]*

Again, students (6) responses suggested messages deviated from the topic or were irrelevant, this included:

(#a4) *“The attributes of the students. Some students only post some useless or unrelated message to show off only. Some messages that posted are not quality” [sic]*

Eight participants acknowledged the need of preparation, research and understand to ensure understanding of the conversation;

(#a21) *“research on the question and the case study is very important facts that affect the quality of the message posted. The message posted by fellow students can be useful to give you more ideas. However, need to understand study well the case study or scenario, so that can produce the good quality message”*

(#a2) *“if students understand the case study they read”*

Participants (2) reported the quality of messages being negatively impacted upon by the speed of message flow. One spoke of the pressure and the sense of competitiveness amongst the participants,

(#a27) *“the speed is too fast and so when every one is nervous on posting afraid of being slower than other students and being not the first one to post up the answer/definition/explanation”[sic]*

Others include speed of messages flow, the need of knowledge domain and the number of people involved. This corresponded to participants who responded negatively on an alternative question to the reason why they felt online chat did not ‘*support student learning*’. One of the similar themes included three participants that mentioned the deviation of messages and a participant who commented student’s insufficient preparation impeded on the usefulness of such medium to support student learning:

(#a22) *“...they seldom do enough research on the chat topic”*

These factors found to interfere with their participation and had impeded with the quality of messages posted, aligned with the factors drawn from previous section covering the ease of use constructs, indicated the impact of ease of use (participation) on perceived usefulness.

An examination of the descriptive statistics for perceived learning outcomes showed positive student ratings. In Table 11.C below, the median for all of the main triggers was 4 on the five point Likert scale. The three strongest triggers had a mean rating of 3.72 on a 1 - 5 scales, these were: online chat was useful in supporting learning, it improved user understanding of the topic and it encouraged critical analysis. As shown in the standard deviations for each of the variables, there were no apparent outliers, the standard deviation were fairly consistent amongst all the variables.

Participants were fairly positive about synchronous chat providing opportunities for improved performance and the posted messages were useful.

Table 11.C : Descriptive Statistics for Perceived Learning Outcomes:

Perceived Learning Outcomes	N	Mean	Std. Deviation	Median
Encourage Critical Analysis	29	3.72	0.59	4.00
Useful in Supporting Learning	29	3.72	0.84	4.00
Improve Understanding	29	3.72	0.80	4.00
Improve Performance	29	3.48	0.78	4.00
Messages Usefulness	29	3.62	0.86	4.00

a) Perceived Communication Outcomes

The communication value was the other useful outcome of online chat based on the 5 point Likert scale, 66% (19) rated highly (rating 4 and 5) indicated that the online chat sessions often, if not, always encourage them to actively participate on the online discussion, with only 10% (3) of the participants perceived otherwise. While 52% (15) thought the online chat was often engaging, and 14% (4) of the participants felt that the online chat seldom captured their attention (as illustrated Figure 11.C)

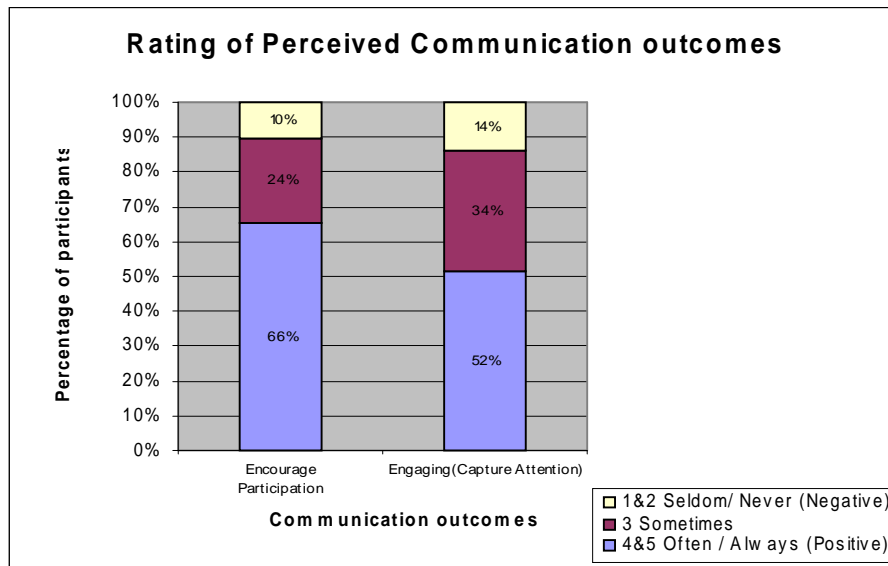


Figure 11.C Perceived Communication Outcomes of The Online Chat Medium For Supporting Group Interaction

(Table of results of the Likert scale questions can be found in Appendix D, E, and F. The clustering of the responses is documented in tables under appendix G).

Similar themes were drawn from the various open-ended questions in the questionnaire including worthiness of the online chat session. Accordingly, based on the perceived communication outcome, Table 11.D showed that the mean was 3.72 ± 1 on a 1-5 scale in relation to the variable that encouraged participation and was 3.6 ± 1 for the factor that captured users' attention. A median rating of 4.0 for both factors was considerably higher than the mid point 3 ("sometimes" category). In comparison, users were relatively comfortable in giving their opinion with a mean of 3.24 and a median rating of 3.

Table 11.D : Descriptive Statistics For Perceived Communication Outcomes

Perceived Communication Outcomes	N	Mean	Std. Deviation	Median
Encouraged Participation	29	3.72	1.00	4
Capture Attention	29	3.62	1.01	4
Comfort in Giving Opinion	29	3.24	0.91	3

b) Overview of Usefulness of Online Chat

The overview of the online chat was established from the three open-ended questions, namely factors which had impact on the quality of messages posted, their supporting reason on their thought about the perceived usefulness of this mode of learning, and the benefits perceived. The Table 11.E on the next page, summarized the themes found, and illustrated the internal consistency amongst these themes and across to the Likert scale questions as well. The negative aspects of the suppressing the usefulness also aligned with the difficulties noted under the ease of use constructs, establishing the relationship between the ease of use and usefulness constructs.

Table 11.E Summary of Useful Outcomes from Written Comments

	Question		
	Q9	Q1	Q8
Themes	Benefit	Useful for learning	Factors affect the quality of messages
Positive outcomes			
Information gathering (increase understanding/ knowledge/ clarify doubts and increase performance)	(17)	(14)	-
Helped with assignment	4	4	-
Communication value (and /or encouraged participation)	(21)	(10)	-
Comfort, Free & less confronting	6	1	-
Increase communication	4	2	-
Capture attention	-	1	-
Stimulate Thinking/analysis	-	1	-
Contact with offshore lecturer	10	3	-
Timeliness of responses	6	1	-
Interesting (fun)	3	-	-
Preparation helps	-	-	8
Negative impact on outcomes			
Too fast	-	1	2
Too many people concurrently participate (higher volume)	-	1	1
Session too short	-	2	
Irrelevant (Deviation of) messages	-	3	6
Clarity & misunderstanding of messages (effected by ability of individual or of their peers)	-	-	10
Lack language Skills	-	-	2
Lack preparation	-	1	-

(n=29). Number within the brackets indicate the main theme as oppose to sub themes, its sub-themes are indented. (The clustering of the responses for each question is tabulated under appendix G and H).

11.2.2 General Attitudes To Participation

Accordingly, the questionnaires were designed to ascertain whether the conversation inside the chat room were merely presenting information, answering questions or were they prepared for facilitate in depth discussion of the topic. Shown in Figure 11.D were the variables, which present users' willingness to challenge the message, the request for clarification along with the perceived comfort of participation and finally their satisfaction with the level of interaction with the offshore Australian lecturer.

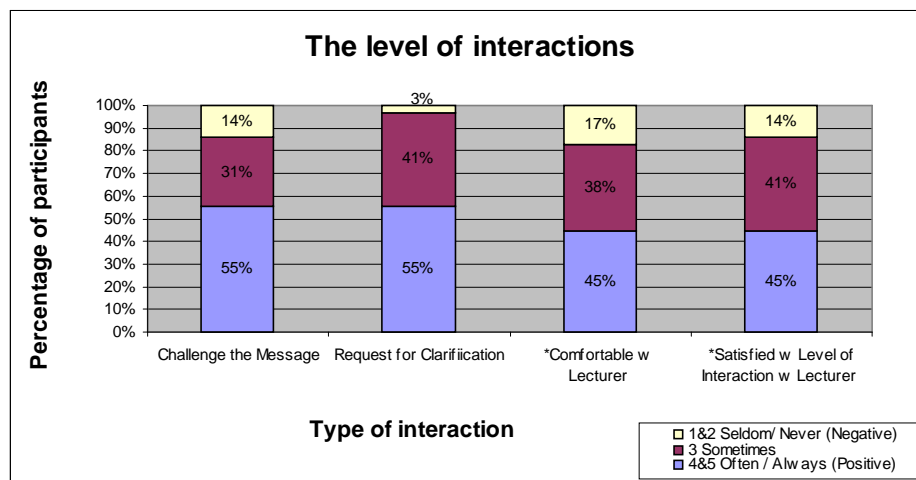


Figure 11.D. The Attitudes To The Extent Of Interaction Inside Online Chat Medium

(Table of results of the Likert scale questions can be found in Appendix D, E, and F. The clustering of the responses is documented in tables under appendix G).

In relation to the extent of participation, 55% (16) of the participants claimed that they would “always” or “often” willing to challenge the message if they disagreed with it, with four (14%) stated otherwise. Similarly, 55% indicated that they would request for clarification if the messages were not clear, and only one participant said they would not seek for clarification online, the remainder of participants (41%) chose the “sometimes” category.

The objective of the online chat sessions was merely to encourage students to communicate with one another, the offshore lecturer role was to guide the students, facilitate and stimulate further interactions when necessary. In identifying whether students felt comfortable in

situations where they were required to interact with the offshore lecturer, 45% (13) said they were “often” comfortable interacting with the offshore lecturer online, while 17% (5) found it seldom comfortable. Secondly, whether users felt the level of interaction was sufficient for having the offshore lecturer as a facilitator rather than a presenter of information.

In reviewing the feedback, many of the key factors aligned with the general question participant’s level of comfort in voicing their opinions online. Students thought that the reasons that interfered with their comfort was a lack of confidence (2), a lack of direct responses (4) to their queries as they spoke about difficulties in capturing the offshore lecturer’s attention due to the fast speed (2) and respondents (2) felt uncomfortable when they found out that the lecturer was not to give direct answers to the discussion.

(#a3) *“the lecturer only give opinion and question - sometimes the lecturer does not reply what we want the answer”*

One participant (#a24) spoke about the challenge in using text-based communication.

While five others in fact valued text-based medium of communication, (2 of 5) stating that it was more comfortable than face-to-face. Five respondents found it comfortable communicating with the offshore lecturer, they commented that she was able to clarify issues and provide guidance; this was highlighted in the following comment:

(#a28) *“[Offshore lecturer] was good in answering our questions and she will let us think more with her guide or opinion”*

Three claimed that the lecturer was approachable and friendly which made it easier to interact with, for instance:

(#a21) *“Ms (offshore lecturer) is very easy going person. She's very friend[ly] so communicate with her is not a problem”*

Of interest, one respondent spoke about the laboratory tutor made it more comfortable in providing additional assistance with students understanding on the issues.

In respect to whether the participants were satisfied with the level of interaction with the offshore lecturer, 45% (13) of the participants were “often” or “always” satisfied, 41% (12) felt “sometimes” satisfied, while only 14% (4) of the participants were not satisfied.

As illustrated in the student’s written comments those who spoke about the dissatisfaction with the interaction related this to difficulties in contributing to the discussion or problems interacting with the offshore lecturer. Participants either did not understand the topic or were not able to clearly explain themselves (2 participants). Many participants responding to the posted messages simultaneously which made it difficult for direct interaction between students and the offshore lecturer. Overall, a total of four participants acknowledged this in their responses, and attributed to the number of questions directed to the lecturer and the speed of the messages flow for instance:

(#a15) *“too many question was issued to lecturer at the same time, sometimes lecturer will not have time to answer”*

Those who were satisfied with the level of interaction with the offshore lecturer confirmed that the interaction was a main trigger that encouraged their participation (11), as they perceived the useful outcomes and the communication value of such interaction,

(#a4) *“It can increases the level of interactivity between them, lecturer also can know student more”[sic]*

(#a21) *“(offshore lecturer) good in explaining and clear my doubts. She’s good lecturer and capable at provide me useful information “ [sic]*

Table 11.F. : Descriptive Statistics on the Attitudes to Participation

The Extent of Communication	N	Mean	Std. Deviation	Median
Comfortable interact with lecturer	29	3.45	0.99	3
Satisfy with level of lecturer interaction	29	3.45	0.91	3
Will Challenge others' messages	29	3.59	0.95	4
Will request for explanation	29	3.62	0.86	4

In the context of communication values a mean of 3.62 was considerably good in terms of the participant’s willingness to request for clarification, refer to Table 11.F. The second highest mean was 3.59 this related to the participants willingness to challenge other users

messages during the live chat. These two variables had a median rating of 4 on a 1-5 scale. With a mean of 3.45 and a median of 3 for a 1.5 scale, users were relatively satisfied with the level of interaction with their lecturer.

11.2.3 Attitudes (Perceived Satisfaction) Toward Participation

As part of Case Study 2 trial, the questionnaire explored the attitudes toward participating in the online chat sessions, such as whether participants found online chat sessions enjoyable, interesting or even stimulating. The graph below illustrated the rating of various user general attitudes toward participating online. Consistent across all of the four bars in the chart was very minimal participants (7% to 14%) had negatively attitudes toward the online chat.

Participants (41%, 12) “always” or “often” thought the chat sessions were stimulating, while only 7% (2) of the participants did not find it stimulating.

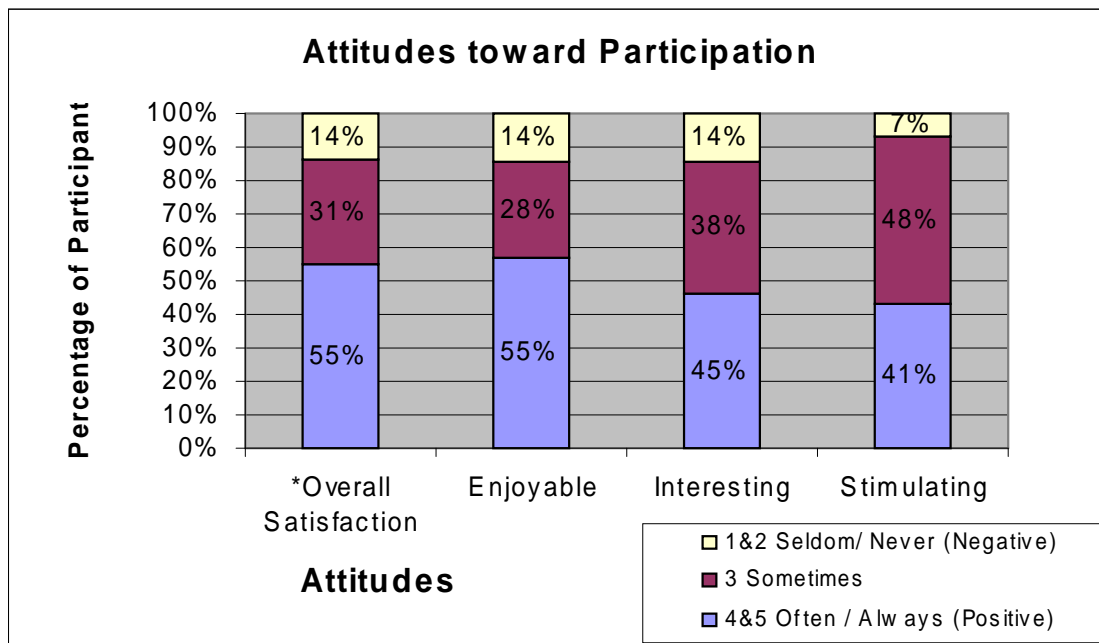


Figure 11.E. Overall Attitudes of Participation Inside The Online Chat Medium

(Table of results of the Likert scale questions can be found in Appendix D, E, and F. The clustering of the responses is documented in tables under appendix G).

Accordingly, a slightly greater number of participants (45% = 13) thought the online chat sessions were interesting, while 31% of the participants “sometimes” enjoyed the experience. More than half of the participants (55%=16 participants) were overall satisfied with the online chat, similarly the same proportion also found the experience enjoyable (as indicated in Figure 11.E.)

A specific question was asked of participant’s satisfaction with the time allocated for online chat sessions, 24% (7) of users were not satisfied, while 45% (13) were satisfied with the duration of online chat. Almost one third selected the “sometimes” category. It seemed that a number of participants would sometimes or more often rather a longer duration for the chat session.

Shown in Table 11.G below, participants’ enjoyment towards the medium had the strongest mean with a rating of 3.66 and a median of 4 on a 1-5 Likert scale. This was closely followed by a mean of 3.59 for participants who thought online chat was interesting and a mean of 3.55 which related to participants view that online chat was stimulating. The median for both variables was 3 at the midpoint category.

Table 11.G : Descriptive Statistics for the Overall Attitudes to Participation

Enjoyment & Satisfaction	N	Mean	Std. Deviation	Median
Stimulating	29	3.55	0.91	3
Interesting	29	3.59	1.15	3
Enjoyment	29	3.66	1.01	4
Overall Satisfaction	29	3.48	0.83	3

Figure 11.F. below showed that an overwhelming 90% (26) of respondents perceived online chat experience with the offshore lecturer worthwhile.

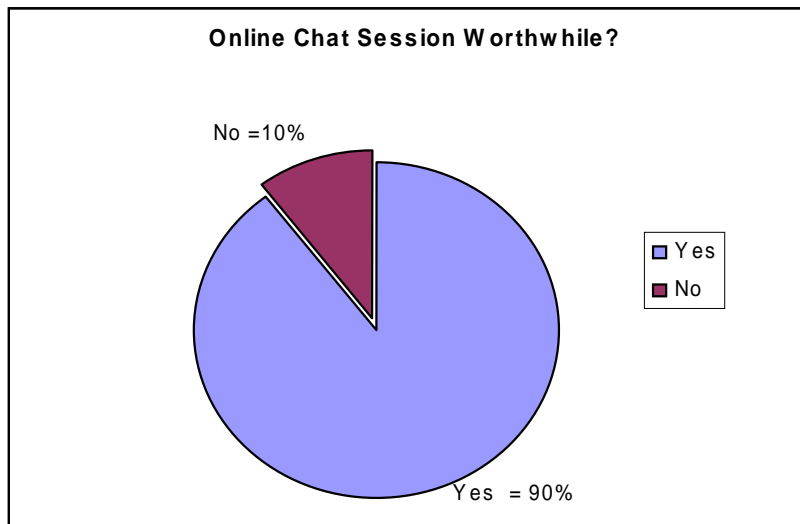


Figure 11.F. : Perceived Worthiness of Online Chat Medium in Supporting Group Interaction

(Table of results of the Likert scale questions can be found in Appendix D, E, and F. The clustering of the responses is documented in tables under appendix G).

From the 26 participants who thought it was worthwhile, ten participants verified their choices with written comments explaining that it was due to useful outcomes for learning (6) such as clarifying doubts and gaining a better understanding of the topic. One valued the communication aspect and another valued the knowledge of the offshore lecturer, for example;

(#a21) *“can gain depth knowledge about the topics discussed”,[sic]*

(#a18) *“can contribute effectively”*

One participant who gave a negative comment regarding this medium for learning had a preference for face-to-face and did not perceived any value of the online chat:

(#a24) *“actually is waste time, face to face communication more important/ helpful”. [sic]*

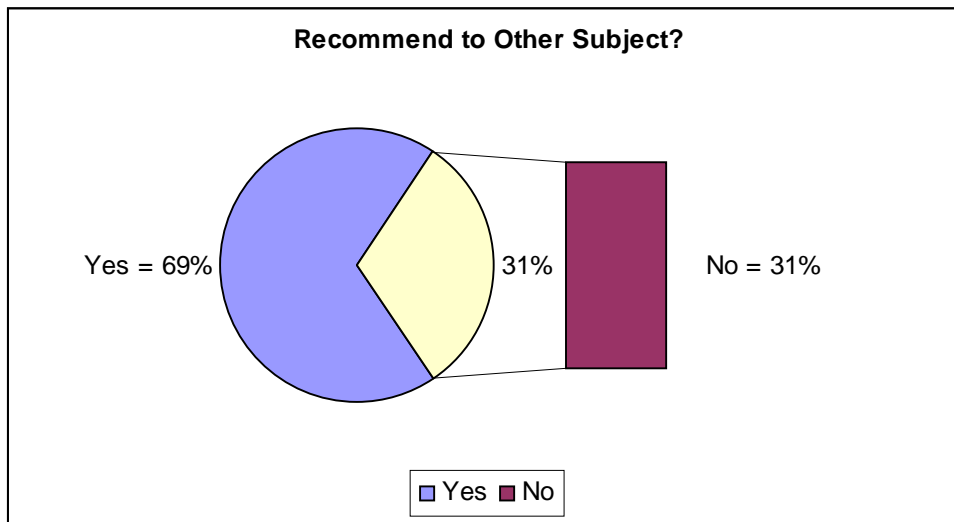


Figure 11.G. Recommending The Online Chat Medium To Other Subjects

(Table of results of the Likert scale questions can be found in Appendix D, E, and F. The clustering of the responses is documented in tables under appendix G).

A majority of participants 69% (20) would recommend this mode of learning to other subjects while 31% (9) would not as some users felt it depended on the subject, as illustrated in Figure 11.G. The intention of this question was to seek how their satisfaction influences their intention to use it again, their true satisfaction. The figure was in between their satisfaction of the online chat and the worthiness of the current online chat. Perhaps this question could have been better worded, to capture their views on having this learning model applied to a subject of similar nature to ascertain true satisfaction.

Five of the 20 participant chose "yes" for recommending this style of learning to other subjects recognized the useful outcomes in term of greater understanding presented from the chat session. One participant noted that there should not be too many participants per group due to the competitiveness inside the chat session:

(#a17) *"Not too many, the chat session making me heart attack, it is too fast, the other having a fast typing"[sic].*

In response to the last question in the questionnaire that allowed participants to freely contribute their opinion regarding their experience with the online chat, the results were consistent to themes found under usefulness outcomes of online chat. The key theme in this

question was once again the useful outcomes of the online chat, with eight participants mentioned either as learning or communication value;

(#a25) *“we interact more in chat than we do in normal class. I think chat should continue, it provides more information than normal class”*

(#a21) *“for me this is the first time ever I use the MIRC as the medium for learning. So I found that this is very interesting and very effective way for me to learn something new.”, “sometimes, words can be hard to be express during face to face with the lecturer. However this chatting session have solve my problem”, “it actually quite fun to have this kind of discussion, and for extra, I've sharpen my skills in reading and typing”.*

Some participants (5) commented that the chat sessions were interesting and fun, and others (2) valued the interaction with the offshore lecturer, the following participant commented on both aspects:

(#a6) *“it's challenging & I enjoy the experience, I like the way Ms (lecturer) correct our mistake , it is encouraging, I like to talk to her inside the chat than face to face”*

- **Summation Of The Attitudes And Satisfaction To Online Chat**

Participants displayed positive perceptions to online chat which was demonstrated in various questions within the questionnaire. They articulated the value of information sharing through increased understanding and knowledge gained and of equal importance was the benefits of the medium for communication enabling participants to interact and recognize a divergence in opinions.

The results showed more than half of the participants had positive attitudes to participating in the online chat, and an overwhelming majority of students acknowledged that online chat was worthwhile and many would recommend the medium other subjects. The comments highlighted useful outcomes of the chat sessions which supported the themes found under the perceived usefulness section. Some participants described the experience as relatively comfortable, less confronting, others thought it was interesting and fun, some conveyed that

they valued the interaction with the offshore lecturer. A few participants felt it was confusing to follow the discussion.

Positive themes are aligned with the perceived usefulness outcomes, while difficulties aligned with the ease of use.

11.3 Summary of the Questionnaire Results

The internal consistency was found across the Likert scale questions and their complementary comments (refers to appendix G and H for details of the clusters). Overall, consistent themes were also observed across the open-ended questions in relation to positive and negative perception to the online chat amongst the participants; refer to appendix J for further details. The themes of the open ended questions aligned with the themes in the Likert scale questions.

Positive perceptions could be drawn from useful and satisfaction constructs namely, the value of information gathering, and leading to perceived useful outcomes such as (a) an improve understanding, knowledge, and (or) (b) assisted with their assignments and hence, (c) improved performance.

Secondly, the communication values: beside the (a) general ability to interact with one another and (b) with the offshore lecturer, they also perceived that it being (c) less confronting and free to contribute, (d) increase communication and (e) engagement, (f) stimulate thinking, and (g) appreciate the immediacy of the communication offered inside the online chat.

Appendix K showed the key themes that emerged from both case studies from the open-ended questions in the questionnaire which have been clustered and shown in a matrix. The matrix illustrated some differences and many similarities between the two case studies, for instance, one third of users found it difficult to contribute to the online chat.

A direct comparison of the two case studies was not feasible due to the changes to the methodology and setting for the second case study. However, a rough comparison of the

studies could draw out likely problems and values that could apply to both case studies Stake (1995) in Merriam 1998, Stake (1990) in Burke (1997).

Accordingly twice as many students feel Case Study 2 has been useful in comparison to Case Study 1 particularly in terms of valuing the ability to share information, voice their opinions, and engage interaction with their peers and the offshore (Australian) facilitator in a less confronting environment.

11.4 Log Files

According to Preece (2001), field observation together with the number of posts can be used to measure the overall student engagement and set a benchmark for future studies. Upon the offshore lecturer's welcoming and brief introductory comments addressing the participants during the first 5 to 10 minutes, the counting of the number of participant messages posted was calculated at the end of the first question posted by the offshore (Australian) lecturer. In examining the descriptive statistics the overall median was 33, based on group results from both case studies, with a minimal value of 16, and a maximum value of over 100. In one extreme case (outlier) a participant posted over 100 messages in approximately an hour.

Table 11.H. Number of Posts per Person

	N	Minimum	Maximum	Median	Mean number of posts per person	Standard Deviation	Number of post by the facilitator
Group 1: Chat Session 1	10	20	124	38.0	47.00	30.43	57
Chat Session 2	10	31	107	44.5	49.30	21.15	64
Group 2: Chat Session 1	9	18	62	42.0	40.89	15.25	56
Chat Session 2	9	23	58	45.0	43.33	11.22	63
Group 3: Chat Session 1	10	22	62	47.0	43.70	12.03	49
Chat Session 2	10	16	67	33.5	34.00	15.76	54

Details of the posts per person for the duration of the chat are documented under appendix I, in Table I-2.

Table 11.H showed the spread of results, and in Chat session 1, group 1, the minimum number of posts was 20 compared with the maximum post of 124 per person. The standard deviation and mean was largely affected by outliers in this case and as a result, it was represented with a large standard deviation. This indicated that the results were widely spread out in comparison to Chat session 2, group 2 where the results were more consistent

with mean of 43.3 and a 95% confidence level that the number of posts per person fell between 32.1 and 54.6. The mean number of posts for the groups was generally more than 40 posts per person except Chat session 2, group 3 had a lower number of posts (34) person than the other groups.

The offshore lecturer was consistent with her number of posts for each of the group sessions ranging between 49 to 64 posts for each session, with a median of 56.5.

Table 11.I below provides an indication of the volume and the level of activity inside the online chat session, for full detail refer to appendix I.

Table 11.I. : Number of Posts Per Minute For Chat Sessions

	Total number of posts for 1 hour session	Lowest no. of posts per minute	Highest no. of posts per minute	Mean no. of post per min	SD	Median	Mode
Group 1	534	1	19	10.3	3.6	10.0	12.0
Group 2	458	3	17	9.2	3.2	9.0	7.0
Group 3	396	1	15	7.2	2.8	7.0	7.0
Total	1388	1.7	17	9	3.2	8.7	8.7

Details of the posts per minute for the duration of the chat are documented under appendix I, in Table I-1.

The results of the real time chat sessions showed that the mean was 9 posts per minute across all six chat sessions with a standard deviation of 3.2. For each of the three groups, the mean was between 7 to 10 posts per minute. While the median and mode was 8.7, which was very close to the mean indicating a normal bell shape distribution. The lowest number of posts was one post per minute for group 1 and 3 and the highest was 19 posts per minute. Interestingly, group 1 had a mode 12 which was relatively higher than the other two groups.

A review of participant's assessment marks indicated that the majority of the students had been awarded more than one mark as in Table 11.J this suggested their messages were relevant and showed some understanding on the topic discussed. Given that only minimal marks were allocated for these assessments therefore, it was not intended that the assessment be directly indicative of student performance nor provide sufficient information regarding the user's level of understanding and knowledge of the discussion.

Table 11.J. Marks Awarded For Participation

	Chat session (1)	Chat session (2)
Marks for participation (out of 2 marks)	Number of students	Number of students
1	6 (20.7%)	1 (3.45%)
1.5	13 (44.83%)	4 (13.79%)
2	10 (34.48%)	24 (82.76%)

It provides one perspective regarding the unpredictable speed of online chat that fluctuated dramatically in an online session. The irregular pace of online chat meant that it was difficult for participants to clearly indicate whether it was too fast for them to follow and contribute to the interaction, given that the speed can vary considerably. This could partially explain that 52% (15) of participants selected the “sometimes” category in response to whether they could follow the discussion.

11.5 Results from the Observations

The observation during the last session for each of the six chat sessions were reported on. From the field observation the laboratory tutor noted that all students were engaged with the messages posted inside the chat room. There were no difficulties observed in relation to connection stability, in comparison one of the three groups were more informal and lively than the other two, with everyone attempted to discuss with one another, users were more daring and open to discussion. In reviewing the log files, it was verified that students were evidently highly engaged with the live chat session.

It could be observed that as more students logged in the online chat, this directly resulted in an overall increase in the volume of posts as each participant contributed to the discussion leading to an increase in the speed of messages scrolling down the screen.

In comparison to the initial case study, it can be observed in this second trial that students had more time to process and think of and prepare their responses. The local tutor reported

that the laboratory was quieter as users were seen concentrating, following and contributing to the online discussion.

On several occasions, several users from all three groups openly verbally sought help from the local tutor in relation to clarifying expressions, querying the meaning of certain questions, or definitions of words used during the discussion. This second case study had the advantage of smaller group sizes, it enabled students an opportunity to ask the local tutor to set the scene or describe the circumstances as required. The local tutor was able to encourage participants to explore the topic rather than expecting answers straight away.

It was observed participants who were not well prepared showed signs of frustration as they would regularly interrupt the conversation flow to ask for an explanation of the terminology in the reading material.

As expected, the offshore lecturer clarified any misunderstandings and encouraged student's contribution by personally acknowledging their well thought out messages.

Upon informing students to learn and interact amongst their classmates, the majority of students were aware and responded to this request, several students still continued to seek the attention of the offshore lecturer for direct answers. The local tutor had occasionally reminded participants to discuss with one another and that the offshore lecturer would intervene and add in her comments when there was a need.

Students with strong English proficiency were very vocal inside the chat, interestingly, several students who were rather quiet in a traditional classroom setting were particularly outspoken in the chat room, and this was also confirmed in calculating the high number of posts in the log file. It was noted that several students with English difficulties were more active than in a face-to-face classroom, they occasionally showed signs of hesitation as they tended to observe the conversation.

11.6 Comparison of Assessments Marks Between The Submissions (With And Without Online Discussion)

Students' performance in their assignment with no online chat at all was compared with two assessments (Assignment 1 and 2) that were completed with online chat dialog. Participants' who had to submit their assessment at the end of the one week intensive face-to-face lectures without online chat discussion were left to complete their assignment in their own accord. The offshore lecturer introduced the topic area to the class and there was no mentioning of group work. Once all the assessments were finalized, a class session was held to discuss the submission topic which was dominated by few vocal students and the offshore lecturer.

This was compared with the two submissions in this blended learning research that combined a week of face-to-face lectures followed by online chat tutorials. Participants involved were provided with accompanying reading material to prepare them for the online discussion. This process entailed participant's comment on the rationale and conclusions drawn from the discussion to demonstrate a level of understanding of the topic.

Table 11.K on the next page shows the outcomes of the two submissions with online chat compared student performance with no line chat. It can be seen that in the first assignment, 20 (68.97%) participants showed improved performance with online chat discussion compared with no online discussion. Only three (10.34%) participants were assessed with lower marks based on using online chat while six participants did not show any change in performance.

Again, in Assignment 2, participants involved online chat showed similar results in that 18 (62.07%) of them were awarded with higher marks as oppose to student performance with no online interaction with their peers. Some students had a decrease in marks awarded in the second assignment, while only two participants had no change in performance.

Table 11.K. Outcomes of Students' Performance in Each of the Two Assignments with Online Chat Compared to the Assessment with No Online Chat at All.

Assessment Rating	Student's performance in Assignment 1 (compared with assignment with no online chat)		Student performance in Assignment 2 (compared with assignment with no online chat)	
	Number of participants	%	Number of participants	%
Improved performance	20.00	68.97%	18.00	62.07%
No change in performance	6.00	20.69%	2.00	6.90%
Marks deteriorated	3.00	10.34%	9.00	31.03%
Total	29.00	100.00%	29.00	100.00%

Overall, the results illustrated an improvement of student performance in their submission with the online discussion in comparison to no synchronous online discussion in a study of similar nature.

11.7 Focus Group Interviews

Two focus groups were conducted which consisted of a total of 12 students with six students per group. The focus group design also intentionally planned for each group to contain one active and one less active participant. The active student was selected on the grounds of past performance based on the high number of messages posted and the other less active student was intentionally chosen to partake to enable a more diverse range of opinions to be captured. The remaining interviewees were randomly selected.

The idea of focus group discussion was to confirm and clarify some of the responses in the questionnaire, at the same time it provided more in depth understanding of user perceptions. The focus groups session was successful in engaging all interviewees to elicit a vast range of views from different perspectives.

The key themes were uncovered and grouped in relation to usability constructs – usefulness, ease of use and user satisfaction and attitudes to online chat for discussion in the below sections.

11.7.1 Ease of Use (Level Of Comfort And Difficulties Experienced)

The focus group discussions lead to common themes which added to the validity of the questionnaire findings in relation to the ease of use in participating inside the synchronous

chat room. Participants of the focus group were probed during the interview to further clarify particular challenges experienced in respect to the ease of use.

Accordingly, the focus group interviewees noted that it was easy to use the chat and but hard to understand or catch that the conversation flow had diverted or move around to another discussion topic, a participant reported that:

(#A) *“it’s easy to use, it’s hard to catch”*

They acknowledged that the clarity of messages and languages barrier (as mentioned earlier) was also a concern which made it difficult to carry on with the conversation.

Furthermore, the quality of the chat and interaction also relied on the proportion of students who were prepared to participate and have done their homework prior to the chat session.

Preparation is the key to having a more effective and interactive live chat session as supported by respondent who was not so active in the chat:

(#G) *“if not prepare...then don’t know what to write”*

For some of the users the fast pace of the discussion caused confusion, participants also recognized the need for a combination of fast typing and reading skills, well developed thought processes and the ability to express oneself. During the course of the interview, many of the participants identified one or more of these attributes added to the difficulties experienced inside the chat room. Participants noted that:

(#H) *“ cannot respond as fast – not fair”, “don’t know how to express my answer”*

(#G) *“even though prepared, but were still not able to answer”[sic]*

(#L) *“ by the time come back people already answer the question” [sic]*

For others, the active and fast pace of online chat sessions motivated users’ eagerness to partake in the session and not miss out in contributing to the dialog.

The quality of the questions and content of the messages was an important aspect to facilitate interaction, for example, one interviewee shared her experience of not being able to collect her thoughts together to raise questions made participation quite challenging. Another participant added that “we don’t know what to ask”

Without the need for probing, several focus group members were quick to articulate that it was relatively hard to identify the owner of each messages as well as which message did the comment relate to. Several participants felt that it can be annoying if their peers did not respond to their query, while others indicated that they were (#C) “.. *too busy reading other comments*” this was also echoed by one of the more vocal participant purposely sampled.

Participants agreed that the chat session was short in duration as they felt there were a lot more questions to ask but there was insufficient time allocated.

Generally, the focus group sessions found that there were too many people participating at once with too many conversations and topics being discussed simultaneously. For this reason, the active participant purposely sampled advised that she resorted to replying to the first posted question rather than attempting to respond and answer to all comments. One participant recommended creating smaller groups of 4 to 5 students for discussion could alleviate some of the issues.

The focus group discussed an array of positive aspects to the ease of use with the medium, participants were said to be less likely to be sensitive when being challenged during the course of a chat session compared with the face-to-face interaction. Similar to the results in the questionnaire for the case studies, interviewees also spoke about passive students being more daring to contribute during the online synchronous chat as there were opportunities to proof read the post before sending a message. Others reported that though passive participants could readily contribute to the discussion, it also depended on their confidence and in turn their willingness to post messages in a live session. In essence, there were two aspects to the ease of use, the ease of use with the system and the ease of participation in the dialog.

Overall, interviewees agreed that synchronous online chat created an environment for more open discussion and importantly, it enabled the offshore lecturer to clarify doubts, inspire and maintain active and more focused participation.

It was acknowledged in the focus group discussion that the laboratory tutor was able to assist, guide, clarify questions and queries which they felt was inappropriate to post online, for example:

- (#H) *“English not so good, sometimes hard for us to understand some word ... difficult to show you don’t understand online”*
- (#B) *“can’t ask all the time, especially for small thing...”*

It was easy for the focus group interviewees to concentrate on the negative aspects of the medium rather than the positive perspective. It also appeared that the questionnaire had covered many of the issues raised, both methods allowed for verification of results and builds on the strength of the arguments.

11.7.2 Usefulness (effectiveness)

The themes which emerged from the focus group discussion indicated similar results to the questionnaire. In brief five key areas identified from the discussion reported that online chat was a medium that assisted individual to gather information and learn from their peers. During the process, students were placed in a situation which stimulated critical thinking and were likely to be engaged with the discussion. Students placed high value with this mode of teaching as it served as a mechanism to receive direct feedback from the offshore lecturer.

Students were able to reflect and perceived that it was a comfortable environment to exchange dialog and contribute to the discussion. Clearly it was successful in encouraging participation as every participant in the class was posting their thoughts online.

Consistent with the questionnaire findings, many of the speakers confirmed the usefulness of the online chat and valued the ability to gather information from their peers and in particular the feedback from the offshore (Australian) lecturer. One of the following interviewee supported this with a comment:

- (#I) *“..... she mentioned who’s right and who’s wrong, point out errors. You are more open up inside”*

It encouraged communication as users perceived themselves more confident to engage in online chat, compared with face-to-face environment, students found this experience less confronting. In interesting remark, one participant explained that the chat session appeared not particularly active:

(#D) *“Its useful for communication ... we can express using word, can ask lecturer questions, give you time to think”, “ it make you alert”*

Another student (#A) described the process frustrating as there were no concrete responses or solution to the issues. He concluded that though the new initiative not only stimulated one’s thinking, it assisted users to gain knowledge regarding how others think of the topic and process their information, however, in summation online chat was still not valuable. He quoted that:

(#A) *“I don’t find any valuable .. I can learn about everyone, how they think.. it makes you think”, he later elaborated further by stating, “ Make you guys think even though you may not get what you wanted” [sic]*

It showed that this student had different expectations regarding the outcomes and the objectives of online chat and because these expectations and needs were not met, the entire process could not have been valuable.

Students suggested that the usefulness of the online chat sessions were limited by the language barriers and the level of user preparation prior to the chat session. Others noted that the clarity of the messages and questions asked could be misunderstood or challenging. This could be further complicated in situations when students made attempts to clarify ambiguous comments without any success, as a result the online conversations cannot progress any deeper. A participant reported that those who did not prepare for the live chat often made general comments which were neither specific nor focused.

11.7.3 Satisfaction (Attitudes)

The responses in the focus group provided a clearer picture of student attitudes and frustrations experienced, the themes were categorised as follows:

- Sharing of ideas by interacting with others

- A different and new way of learning – it was described as not so boring, and much more challenging
- Being able to add in some humor occasionally
- Interacting with the offshore (Australian) lecturer
- Pressure to contribute as marks were allocated for participation

All interviewees agreed that online chat was worthwhile, even from three students who felt they did not gain “concrete solution” to the discussion topic: as illustrated in the following quote:

(#A) *“Final and assignment is marked by her, it is better to have some kind of discussion get some feedbacks, [to] see what she is looking for”, “interesting, those who use MRC for chatting, the fun is brought into the class”*

Others echoed similar remarks that related to the usefulness of the chat sessions, with the majority of participants in the group re-emphasized and appraised the role of the facilitator offshore (Australian) lecturer.

Many of them were satisfied with the chat sessions, stating that it was fun because it was less formal and more interesting when compared with their classroom setting, a participant noted that:

(#H) *“Don’t feel boring, put in some jokes... sometimes teaching on the board students feel bored”*

One interviewee indicated that online chat was “okay” but were uncomfortable with the pressure placed upon them to perform well to pass the assessment. Overall, these students felt synchronous chat sessions interesting, challenging, and a good way to interact with others to share ideas and information

The literature (Preece, 2001), and Andrews and Haworth, 2001) also provided some useful variables that were also consistent with the results of the overall satisfaction with the synchronous online chat medium. These included:

- People factors: different interaction styles, personal characteristics;
- Technical design and accessibility factors: limited controls, free flow of message, pace of the messages, unorganized flow of messages, connection stability, and the idea that text-based can provide a more comfortable environment to interact; and
- Overall effect of people and technical factors: not easy to read, understand and contribute,

Summation of the Focus Group Discussion

The results of the focus group discussion confirmed the results in the questionnaire in relation to the perceived usefulness and the ease of use constructs, it drew out the underlying factors and probed participants regarding their opinions that were not apparent in the questionnaire results. Participants views on difficulties and their frustration with online chat for instance, was more thoroughly explored in the focus group discussion. It was found that even though participants came prepared for the online chat it did not necessarily mean that they could contribute to the discussion.

Focus group interviewees felt the process was worthwhile and thought it was easy to use the medium while it was more difficult to participate due to various barriers. For example, it was supposedly easier for passive users to be engaged with online learning however, a range of other interrelated factors were also involved including their confidence and motivation to contribute to the discussion.

Chapter 12 ANALYSIS, DISCUSSION AND CONCLUSION

12.1 Introduction

This chapter presents the analysis of the results and the findings of the research for Case Study 2. The themes from the questionnaires, focus group interviews and the observation data collection methods are discussed and concluding comments are made. The triangulation method has been applied to this study to effectively draw out consistency and enhance the internal validity of the dominating key factors. Case study 2 considers an evaluation of the usability measures for online chat under a more stable environment. It unleashes rich findings with an aim to further strengthen the future delivery of online chat for the subject.

12.2 Background

The implications of the initial case study meant that changes were implemented to the settings to Case Study 2. This involved decreasing the size of each group, engaging students in role play while the offshore lecturer remained as the facilitator. Of significance was that the bandwidth of the network connection had been doubled and the server hosting the services was localized, thereby eliminated the connection problem experienced in the earlier study.

The main purpose of this modified delivery was to encourage students to learn from each other, to promote their communication skills and critical thinking without jeopardizing their satisfaction. This research attempted to fill in the gap in the body of knowledge on controllable factors by establishing the practicality of using IRC for group discussion. It would provide specific guidance and information for future delivery in the college and also offered sufficient details for other institutions of higher learning to compare and apply to similar context of use.

While the aim of the second case study was also to evaluate the operational usability of the online chat session, but under a more stabilized environment with a purpose to gather rich

information in regards to learners perception of this learning environment. It assesses the views of the class as a whole on the usability themes elicited under this case study. This chapter analyses the implications of the following usability constructs of synchronous chat:

- a) Perceived ease of use (efficiency),
- b) Perceived usefulness (effectiveness)
- c) Attitude toward participating in the online chat session, including their overall satisfaction.

Similar to Case Study 2, the initial study also confirmed the impact of ease of use on perceived usefulness and satisfaction constructs, furthermore the perceived usefulness also had an effect on satisfaction in this context. The possible associations between these constructs meant that all these variables should be employed to gather the true indication of user satisfaction and in depth details for further improvement, and avoiding false impressions.

12.3 Analysis and Discussion

Several literature reports including the initial case study acknowledged the impact of the combination of technology and human factors, both individual and collective behavior the ease of using a system (Andrews and Haworth, 2001; Preece, 2001; Brinck, 1998) and the potential influence on both the usefulness and the satisfaction, therefore the overall success of the online technology for mediating group forum. In this respect, the results confirmed with the literature studies which argued the significance of social design and management to cater for the user satisfaction constructs and the success of the online chat for supporting open and effective group dialogs.

12.3.1 Perceived Ease of Use (Effectiveness)

It was found that the ease of use for both case studies conducted involved not only the physical and the mental effort of operating the technologies, such as access and working with the software, but also the efforts expended to facilitate the human-to-human dialog, such as ability to follow and contribute to the discussion.

Compared with Case Study 1, the technical concerns as revealed in the initial case study were no longer an issue as synchronous chat was being held locally and the bandwidth of the communication line increased. The perceived difficulties were in relation to an integral part of following elements such as inherited standard design of the online chat, the learner attributes (skills and interaction styles) and hence the overall dynamic and behavior of the group. These factors aligned with the general concepts in Preece, (2001); Andrews and Haworth (2001); Balazs (2002) papers. They managed to differentiate the sociability aspects from the technological aspects potential factors influencing the overall usability and the success of using synchronous chat for facilitating group dialog. Aside from the ease of learning and the use of the product, Preece (2001) further suggested the effects of the learning speed of the users including reading and sending messages, and the responsiveness of the community. The case study confirmed recommendations were yet to be thoroughly tested, it could potentially draw out underlying difficulties as well as fill in the gaps between the general perception on usability and the technical aspects of online.

a) Ease of “*Operating*” the System

New initiatives were implemented for this case study, the local server was used to host the chat and the bandwidth of the Internet connection was doubled. No obvious technical issues were reported or observed unlike in the initial case study. This was further supported by 79% of the participants in this trial who felt that the online chat software was easy to operate (mean =4.17, Median =4, Standard deviation (SD)=0.76, 5 being “always” easy to operate and 1 refer to the category “never” easy to operate, n=29), and no participants disagreed.

The results of the triangulation method clearly demonstrated that participants felt the system was easy to use and more complex to follow the conversation flow in light of the group setting in a synchronous chat environment. It was recognized that contribution to the dialog involved debating of the topic of discussion rather than merely presenting information. In a group situation the dynamics could vary and the activity inside the chat room can fluctuate as there was no turn taking control built into the software. This could inevitably result in an often large volume of posts delivered at once and was perceived to challenge participants in being able to follow the discussion. One example from an interviewee confirmed that:

(#A) “ *it’s easy to use, it’s hard to catch*”[sic]

b) Ease of Participating in the Open Dialog

Responses from the data collection techniques including the focus group interviews, questionnaires and observations indicated that the quality of online chat and the activeness of user interaction relied on multiple factors.

The results showed that the difficulties experienced were associated with the ability to follow and or contribute to the discussion.

They were affected by the underlying system design of the online chat software being used for group interaction. The technology design and the human factors were interrelated creating the atmosphere for open dialog. The ease of participation is reflected by the pace of the messages posted, the characteristics and skills of the individual and the group.

c) Pace of Message Flow

The foremost important finding for both case studies and the most dominating themes in the initial case study was the fast speed of the chat messages scrolling down the computer screen. In an attempt to improve the design for the second case study, the class was divided into two groups of 10 and one group of 9 participants plus the offshore academic. Participants in the second case study were still commenting on the fast speed of the message flow for open group dialog, which could be partly attributed by the volume of messages posted. The almost real-time nature of online chat for open group dialog, together with some active participants meant the messages flow had a mean of 9 posts per minute for the three groups and a standard deviation of 1.6. The figures showed that each of the three groups were relatively consistent in terms of level of activity inside the online chat dialog. In addition, the minimum and maximum number of posts per person varied between groups. It can be confidently said that the live chat for the majority of the groups were active with a mean number of posts per person exceeding 40. A substantial proportion of students (76%, 22) perceived the speed of the online interaction was too fast.

Aligned with the initial case study, the lack of control inside the chat for facilitating the group dialog in an open manner had an unpredictable impact on the number of activities, the number of conversations, which led to different topics occurring at the same time. This was more apparent under this case study without the interference of the network connection as in the initial case study. A lack visual cue was partly responsible as discussed in Case Study 1, this includes the inability to identify the status of the messages in the process and the inability to manage interruption or turn taking. Although the group size had been reduced for this case study, any delays experienced such as lack of movement of the messages posted on the screen due to short delays with the technology transfer rates, individuals with slower typing speeds or those who were simply reflecting on the comments made. Instead of waiting for the return post, participants concurrently composed and posted more messages. Participants in Andrews and Haworth's (2001) research found that silence or pauses in conversations could create an atmosphere of discomfort and dissatisfaction, given there was a lack of indication regarding the status of the conversation. Wiemann and Knapp in Vronay's (1999) paper on face-to-face conversations, silences or pauses in conversations were in general also perceived as being uncomfortable and awkward. Therefore it was not clear whether or not participants were obligated to post messages to fill in the pauses, regardless, at various times during the live chat when there were low volume of messages posted in one instance were followed by a sudden large influx of messages appearing simultaneously.

Hence it could be said that the uncontrollable rapid speed of message flow was also related to the number of people in each online session and the proportion of active participants within the group. Students in both case studies perceived this when they spoke about the high volume of messages and too many people contributing at the same time interfered with their ability to participate:

(#a22) *“typing skill and too many student post the message make the chat session fast then have not enough time to read through it to understand the question asked”[sic]*

This was considered relatively demanding for participants being unfamiliar with this model of interaction and learning and remained a challenge for the facilitator to control. Students with practice, could be increasingly skilled in keeping up with the conversation flow, and with more preparation on the topics in discussion, combined with facilitating strategies, could assist in tackling this concern. When asked whether students would recommend online chat to other subjects, one of the participants conveyed it being a competitive experience. The value of conducting too many online sessions was discouraged:

(#a17) *“Not too many, the chat session making me heart attack, it is too fast, the other having a fast typing”.[sic]*

Many participants in this case study experienced the fast pace of online chat (22, 76%) and also thought there was insufficient time to follow and contribute to the discussion. Participants' comments noted that the speed of the message flow had an impact on the group dynamics, the quality of the messages posted, demanding skills of the participants, and in turn affected their ability to participate:

(#a11) *“not understand the answer or question which is post by other students, sometime they also type the answer or question so fast make me can't follow” [sic]*

(#a22) *“typing skill and too many student post the message make the chat session fast, then have not enough time to read through it or understand the question asked” [sic]*

Respondent (#a17) selected “sometimes comfortable” in voicing their opinion of online chat, this was summarized as follows:

(#a17) *“it is sometimes comfortable . Because sometimes the chat session is too fast which make me lost the chat topic. Sometimes chat until out of topic/scope. I am a shy person, it makes me do not feel uncomfortable to face other when question in chat. It is the comfortable me to sound out. But because my grammar and vocabulary not well so I afraid that the chat making other misunderstand my point”[sic]*

This was also consistent with the views expressed by some participants in the focus group interviews of which two focus group participants spoke of the casualness of the messages composed as students struggled to keep up with the pace this in turn made the content of the messages difficult to understand. The following comments illustrated their frustration:

(#H) *“cannot respond as fast – not fair”, “don’t know how to express my answer”*

On the contrary, the volume of activities inside the chat could stimulate engagement to the activity; an interviewee noted the pace of the online chat being a motivation factor to maintain their attention.

d) Participant’s Skills and Characteristics

Current literature presented mixed views in relation to the pace of online communication, in Klemm (1998) and Balazs, (2002) studies on asynchronous forum, it was not an issue. While other researchers (Lawrence-Slater, 2002; Motteram, 2001; Downes, 2002; Department of Education and Skills, nd.) were aware of the potential problems leading to inability for users to keep up with the pace of conversation due to the speed of online chat. Current literature indicate individual characteristics such as possessing good typing skills and the attributes of a fast learner were likely to maximize the effectiveness of the interaction. For instance, Pallof and Pratt (2001) found that those with fast typing skills dominated the chat discussion.

As with the initial case study, this trial was able to establish more specific attributes that would likely enhance the effectiveness of the synchronous chat experience. Clearly, the responses from results of the two case studies illustrated not only do participants need to possess fast typing and reading skills, but also a combination of thinking and analytical skills; the ability to apply their knowledge and ideas; creative thinking; and express themselves clearly in written communication. Therefore, inadequacies or weaknesses in one or more of these skills were likely to have an affect on participants’ attitudes and their online experience in relation to the delivery of online chat. To a certain extent these attributes and skills could be applicable to all forms of group communication in one way or another including Klemm(1998) and Balazs (2002) studies on asynchronous discussion.

In effect, these attributes become critical in synchronous communication, as it demanded the “speed of these processes” to occur in pace with the discussion flow. In principle, this meant participants needed to feel there were ample opportunities to contribute until the facilitator changes the discussion topic or direction of the conversation. However, online chat being unstructured was likely to lead to other topics of discussion making responses seem out of place, and often incoherent conversation flow placing further demand on the participants who wish to follow and contribute to the discussion. Findings of this trial aligned with Motteram’s (2001) research in revealing that some participants noticed that if messages posted online were unclear, it was likely to be ignored, alienating the author of the message from the discussion.

Lawrence-Slater’s paper (2002) of online tutorials stressed the significance of language skills as an interference with students’ participation without offering any further details. This study managed to identify the skills needed to participate in online chat were not only limited to the ability to express quickly and be quick witted, members needed to possess good language proficiency, an adequate level of domain knowledge, and good facilitation skills. Those who were able to keep up with the chat, and had no languages barrier such as respondent (#A21), found it a comfortable environment to voice their opinion as illustrated below in response to two separate questions in the questionnaire:

(#a21) *“I think the most important during the chat is English and the speed of typing and reading. SO for me all this is OK, so I can follow up the pace during chat”*

(#a21) *“I can keep up the pace of chatting, so no problem for me during chatting to give my opinion. Sometimes, face to face with lecturer are hard for me to come out with my doubts, but chatting solve this problem of mine” [sic]*

The analysis of the observation technique, focus group interviews and the findings of the questionnaire found that one of the common themes was that on many occasions, students would openly seek help from the on site laboratory tutor. Students would query issues relating to terminology and definitions, clarification of the offshore lecturer’s questions,

assisting in keeping students in tune with the discussion topics. In this regard, to a certain extent, this alleviated some of the concerns around language barriers for participants of this case study.

Interestingly, some students reported in the focus groups and in the questionnaire results that a range of interrelated issues also challenged them. Few participants raised the issue of insufficient time to seek assistance given the amount of activities occurring simultaneously during the online chat session, and felt that it was easy to seek the on site tutor's assistance for simple queries and questions regarding terminology. During focus group interviews, respondents noted that:

(#B) *"can't ask [questions online] all the time, especially for small thing..."*

(#H) *"English not so good, sometimes hard for us to understand some word ... difficult to show you don't understand online"*

These two case studies demonstrated strong evidence that to increase the chance of more effective and interactive online session's students had to be prepared (or have done their homework) and or at least have the domain knowledge upon attending the chat session. For example, two participants during the focus group interview session commented that:

(#G) *"if not prepare...then don't know what to write",*

(#a12) *"yes, because we know what the topic is going to discuss in chat form and we research in the net before it"[sic]*

While another spokesperson from the focus group, added messages being "too general", and "not specific", tend to associate with students who were not prepared, which hindered the effectiveness of the interaction.

A less active participant of the focus group also supported the importance of prior preparation. It was interesting to note that another claimed that domain knowledge and being able to contribute to the online chat was one matter which did not necessarily equip participants to effectively respond to the spontaneous questions posted on synchronous chat.

This reinforced the idea regarding the dynamic environment of live chat and not being able to predict in advance where the conversation may end.

(#G) *“even though prepared, but were still not able to answer”*

Furthermore, Balazs (2002) literature review that on many occasions students did not have the capability to identify their knowledge to analyze and solve problems. It was argued that some participants having acquired the knowledge still may not be able to apply it or lack the ability to build on their own arguments. In addition, Klemm (1998) acknowledged the effort involved in participation in general does not occur naturally. It was not a straightforward process to change participants from passive to active contributors as it could easily lead to dissatisfaction with their online communication experience. Similarly, Preece (2001) recognized that characteristics of a learner have an impact on user satisfaction.

From another angle, Lawrence-Slater (2002) indicated that participants tended to place more effort and time on class-based commitments than those of online chat in nature. In designing future synchronous chat course structure, it appeared that in practice it would be recommended that a longer lead up time of more than a week and having well defined structured guidelines to follow.

Upon commencing the online sessions, students had already been involved in asynchronous discussion amongst themselves, future research could investigate to ensure the how the synchronous and asynchronous computer mediated communication systems could complement one another and not placing unnecessary burden to students. It was relatively straightforward for participants involved in the asynchronous discussion to have simply regurgitated their notes and merely present information rather than actively debate the topic.

Both the flow of conversation in an open dialog and the quality of the questions inside the online chat were challenging to control inside a synchronous chat room. These semi-structured chat sessions meant that the facilitator set the direction or provoke the topic of discussion, but it would be difficult to know ahead of time where or how the conversation direction may lead to. In this case study, it was evident in both the questionnaire findings

and the focus group that some learners were not confident in asking probing questions as noted, for instance:

(#E) *“we don’t know what to ask”,*

Another spoke about not knowing how to participate:

(#10) *“because sometimes I don’t know what to talk about, what response I can give to the other chatters”*

Perhaps more specific guidelines assisting students on how to apply their knowledge and what constitute a good quality post could be demonstrated to the students prior to the live online sessions.

e) The Influence of Group Attributes

Successful online interaction depends on a majority of students who are prepared to participate (Andrews and Haworth, 2001). In many cases students are lurkers or passive participants (Klemm, 1998). Joo (1999) suggest that for young Malaysians, this is due to their pass educational experience and cultural background. However, this has not been a major issue in this research for both case studies, given the full attendance rate, high levels of student engagement with the online experience and the mean number of posts submitted during each session are in itself, strong evidence of active interaction. Indeed participants are motivated, open to new pedagogy that encourages them to actively participate and remain engaged in the online conversation.

The qualitative approach to this research found that in both case studies the quality of the questions and content of the messages were critical to facilitate the interaction as identified in Balazs (2002) and Klemm (1998). The authors noted that these communication skills were not automatic, and with this in mind, it became more evident during the interaction in role play of each subgroup. Participants involved found contributing to the discussion challenging given that at times students did not ask appropriate questions, posted irrelevant messages, sometimes messages were unclear or when no specific questions were posted. A participant supported these issues in their feedback:

(#a7) *“no useful question given could be raised from the discussion topic, the group is not suitable, lack of participation”[sic]*

Undoubtedly, with group interaction, where participants relied on one another to discuss on the topic, if participants were unable to clearly express themselves or could not understand the post it not only affected their own personal contribution but could hampered the ability of the others to further the conversation.

Based on written responses from the questionnaire the triangulation method involving the questionnaire, observation technique and the focus group interviews, were successful in bringing to the surface multiple reasons which participants perceived to hinder their ability to follow and remain engaged with the online discussion.

f) Perceived Ease of Participation

Under the section on ease of participating in open dialog, the interactions of interrelated variables which impact on the whole group as well as the individual's ease of participation has been discussed at length. To sum up the key points, this included the volume of activities that influenced the speed of message flow, issues with language proficiency and communication skills, in conjunction with the importance of domain knowledge. Accordingly, the group's and the individual's analytical and reasoning skills, together with the overall group dynamics and their skills, also played a part in contributing to the efficiency of online communication.

Participants acknowledged in their responses to the open ended questions that the ease of participation was affected by multiple variables. The dominant themes revealed that many (18) participants had some problems in following the discussion and some (9) found it not easy to have an input. Majority indicated that the speed of message flow was an issue (19) and to a lesser degree the typing skills (7). The themes were derived from consolidating across a number of like questions in the questionnaire to validate participant's opinions.

This research study filled in a gap in existing literature by explaining and detailing the likely consequences of a fast pace and slow pace or silence in synchronous online chat dialog. The current literature on synchronous chat made no distinction between the issue with slow

paced chat dialog and moments of no interaction, as these two aspects were generally grouped as a lack of interaction.

Unlike Andrews and Haworth's (2001) case which involved an online discussion group that experienced a slow paced dialog and minimal interaction, which resulted in participants feeling agitated on numerous occasions when there were no posted messages. This was not the case in this research, in fact on the contrary too many messages were concurrently posted leading to a fast pace chat environment. The fast pace of online chat did not necessarily mean the return post was immediate as there were multiple conversations occurring at the same time and other messages were likely to interfere. Thus some posted messages could be left unacknowledged, however, with much activity occurring inside the chat room, the majority of participants did not consider this as a huge issue.

In this case study, the online chat questionnaire and the interviewees supported the observation that online chat sessions were quite active keeping users' preoccupied reading and responding to posts. Indeed, not having enough time to read all the posts, follow the multiple conversation occurring at the same time, or responding to them were issues of concern for some participants. In line with this, several students felt that they were being ignored when their posts were not acknowledged. In Prammanee's (2003) study, participants noted a lack of acknowledgement from the posted messages was an issue in using synchronous chat. This made it difficult to have continuous conversation and hence compromised an in depth discussion. Peer assessment could assist to mediate these issues for future studies.

It was certainly not intended for this medium of learning to create uneasiness, and suppressed user comfort to voice their opinion online as it could potentially leave participants feeling isolated. The active participant selectively chosen for the focus group interview expressed that to overcome the challenges of online chat it was a case of selectively responding to questions and follow that particular string of conversation rather than attempting to understand all the posts.

During the course of these two case studies, focus groups interviews aligned with the recent literature (Pallof and Pratt, 2001; Mock, 2001; Wang and Newlin, 2001; Kearsley, 2000) that to a certain extent almost one in three students (31%, 9) were comfortable voicing their opinion online using text-based communication. These participants suggested the reasons were primarily due to less confrontation, interference, more confidence in participating via online communication. It was described as being more secure to give and share ideas.

While 38% (11) of the participants indicated that they were able to follow the discussion, another 52% (15) of the participants felt they were “sometimes” able to follow the discussion and another 38% (11) of participants could often if not always follow the conversation. Only three (10%) participants believed they could not follow the discussion. It was not surprising that a number of participants choose the “sometimes” category as it was sometimes easy and other times more difficult to contribute to online chat depending on the dynamics of the group, the fluctuating number of posts during each session.

Online chat generated unpredictable events or activities that could occur inside the group interaction, for instance, there was limited ability to control the speed of the chat can be as low as one message per minute or as high as 19 messages per minute within an hour session. In support of this, eight participants claimed that the speed of online conversation was the dominating obstacle to participation in their written response to their questionnaire.

Based on student responses, it was also apparent that participants found online chat to be sometimes confusing (69%, 20), this in turn affected the usefulness of the messages, participants affirmed in their written responses of the similar difficulties encountered, with 59% (17) thought the messages were useful, and 10 % (3) disagreed. Similarly, very few participants felt strongly negative in relation to the ease of participation.

In case study 2, over 55%(16) felt online chat provided them with the opportunity to participate most of the time, while 45% of participants (13) chose “sometimes”, no student selected the “never” or “rarely” categories as this trial was delivered in stable system with a much improved connection line. With no major “physical” barrier to participation,

contribution to online chat was dependent on the learner's and the group's effort and their characteristics. This was supported in the comment below:

(#25) *“ya, everyone can given their opinion and no one can stop you”*

On a broader level, knowledge and information gained from the interaction together formed one aspect that related to the learning outcomes of perceived usefulness.

Another aspect involved critical thinking and brainstorming. Pallof and Pratt (2001) acknowledged that online chat was good for brain storming, which was part of constructive learning, but such process were not easy for participants who had little experience (Balazs, 2002). Essentially it was part of the cognitive learning process in which academics were prepared to accept as they strived to train learners.

However, issues related to the ease of participation need to dealt with in order to provide optimal learning outcomes; this include ensuring participants had done sufficient preparation before the chat session, encourage timely and quality contribution and feedback from class mates to have a continuum of activities, at the same time the pace of the chat should not prevent their participation.

The study indicated synchronous chat sessions were intense and demanded effort to participate. The ease of participation could negatively impact on the usefulness of the messages, the overall effectiveness of the online interaction, and thus the overall satisfaction of online chat.

On a positive note, ease of use related to text-based communication has been known for creating an environment that focused on the content of the discussion rather than visual cues or speech difficulties, allowing a certain level of anonymity, which provided students more confidence to speak their thoughts.

Students' responses indicated that their peers were more tolerant and not likely to be emotional when being challenged during the course of a chat session allowing more open discussion. Several students felt that they were less shy and more daring to participate in the

online synchronous chat session as compared to face-to-face. A couple of participants suggested that they were prepared to accept challenges of a new medium for interaction. It was noted by one participant in particular, noted one of the benefit was the ability to proof read the message before it was posted.

When students were questioned about whether they felt comfortable interacting with the offshore lecturer, 45% felt comfortable, they were less intimidated (mean =3.24 , Median= 3, SD= 0.91), while six participants specifically indicated their preference for text-based medium to communicate with the offshore lecturer as compared to face-to-face interaction. From the participant's responses it was agreed that the skills of the facilitator was to clarify doubt, stimulate more focused responses to create an environment which fostered effective interaction.

(#a28) *“[Offshore Australian lecture] was good in answering our questions and she will let us think more with her guide or opinion” [sic]*

Case study 2 however, also noted supporting comments in relation to being uncomfortable communicating with the offshore lecturer, this was around a lack of direct responses (4 participants) mainly attributed to lecturer not providing “answer” to their question and the volume of the messages concurrently posted (2).

The literature suggested that too much lecturer involvement or too little involvement can result in an unsuccessful online discussion (Horton, 2000), Horton recommended the only way to find out the appropriate level of participation may possibly be conducted by trial and error. Unlike the traditional role of a lecturer in a South East Asian educational setting, being the sole provider of information, these case studies saw the offshore lecturer taking on a facilitator role. In this study, the offshore lecturer had responsibility to facilitate, guide and give direction to the discussion, as well as to stimulate thinking, communication and learning amongst the participants. Two participants were uncomfortable about the role of the lecturer in this study, both felt frustrated and also noted that:

(#a3) *“the lecturer only give opinion and question - sometimes the lecturer does not reply what we want the answer”*

These results bear out Ruitenbeck's findings that the academic play an important role as a motivator and have an impact on students' attitudes toward participation (Ruitenbeck, 2004).

Kearsley (2000) suggested the most effective approach was to make quality participation as part of the course requirements and assessment. However, the possible reward of marks alone was not sufficient motivation. The challenge, therefore, was to find ways to ensure quality interaction by designing a suitable environment to facilitate such objectives. Furthermore, with an assessment of two marks per session alone may be insufficient to encourage students to exert great effort the quality discussion.

Indeed, Ruitenbeck (2004) found that students can be often "de-motivated, passive, consuming and sometimes even bored, working only for their marks." Other factors that may promote interaction include peer evaluation activities, usefulness and relevance of the content, and the level of instructor involvement (Kearsley, 2000).

As expected, students recommended practical suggestions for improvement in future delivery, a longer chat period (5 students), more preparation (3 students), more controls should be in placed (4 participants) in particular the pace of the messages flow, smaller groups (3 participants) such as group of 4 to 5 persons, more guidance from the facilitator (2 participants) and one participant spoke about a good mix of active and non active participants.

12.3.2 Perceived Usefulness (Efficiency)

One of the challenges in this case study was not only to provide a mechanism for maintaining contact between the offshore lecturer and the students but also to encourage students to learn from each other and to promote crucial thinking and communication skills.

Klemm (1998) claims online conferences encourage students to become active participants and minimize the risk of having too many lurkers. However, it has been suggested that Asian students are not proactive in giving their views, instead must be specifically asked for their opinion (Ballard and Clanchy, 1997). Bernath and Rubbin (2001) also support that

participants who have lower level of language proficiency are less likely to participate in online discussion. Literature note that international students from Chinese background are ashamed to ask questions in class, (Ballard and Clanchy, 1997; Garrison, 1990), and those international students rely heavily on their lecturer (McLoughlin, 2001).

Yet participants in this research were actively contributing to the online chat interaction. It was important to maximize the chance of the success with this interactive tool for group discussion before considering the other benefits that could be gained which may be sufficient number of participants using the system to contribute to the online chat discussion. Balazs (2002) further indicated the importance of motivation, without additional stimulation or motivation students were reluctant to use the system.

The assessment results of the online chat showed that the majority of participants were awarded more than one mark out of a possible two marks per session for their work as their discussion was deemed relevant. It did not take the degree of quality participation into consideration. Further research could consider the correlation between the usefulness construct and student performance in relation to marks awarded.

The ease of using the online chat to mediate the group dialog in the initial case study was found to suppress users overall attitudes and perceived usefulness. Unlike Ballard and Clanchy (1997), participants perceive the potential usefulness together with the setting design encourage them to participate in the first and subsequent chat sessions. This indicated motivation could be considered an aspect of perceived usefulness that drive users to achieve their goal.

The chat session addressed much of the dominant difficulties associated with its usability, this include reducing the group size to almost a third (9 – 10 students), encourage peer interaction, increased stability of the network connection, allowing a smooth operation. It was therefore anticipated that the study would reveal greater clarity of students' perception on the usefulness on this medium.

The chat sessions had encouraged participation from all students included those who were considered normally passive in class discussion. In this respect, more than half the participants (66%= 19) rated highly that it was encouraging to actively participate in the online chat sessions, and 52% (15) spoke about online chat capturing their attention.

On a broad level, the major findings in this case study affirmed students' perception of online chat in an improved setting, was useful in two primary aspects, namely supporting students learning and to facilitate interaction.

Not surprisingly the analysis of the perceived benefits of synchronous chat was consistent with much of the literature (Prammanee, 2003; Pallof and Pratt, 2001).

The most significant themes that students perceived as outcomes of the online chat discussion were information gathering (59%, 17) and the communication values (72%, 21). Some participants indicated the value of interacting with the offshore (Australian) lecturer (9 participants), the immediacy of the interaction (6), a comfort environment for participation (6) and increase their participation (4).

In general, these themes were not too different from Case Study 1, and uphold the importance of design factors in motivating participation. Other information sources in the literature and the focus group sessions in this research also drew similar findings, these underlying values attributed to the usefulness of online chat. Consistency was also shown in student's complementary written responses to their choices of their questionnaire rating scales, and confirmed in their rating of several questions in the Likert scale questions that the chat sessions assisted students in their learning.

The findings had the majority of participants re-emphasized the three key values associated with the usefulness of synchronous online chat; firstly, information sharing (48%, 14) leading to positive outcomes such as increase understanding or performance. Secondly, online chat sessions encouraged user participation, and thirdly users' valued the ability to receive guidance and feedback from the offshore lecturer. The first two aspects can be clearly illustrated in the following student's remark that online chat was:

(#a21) *“faster way in solving doubts and gain more knowledge and ideas. Students then will be pay more attention and talk less cause they are busy typing the questions and answering the questions. ... Most of all, it's easy, convenient, effective and interesting way of discussion”*

Participants value the ability to interact with their offshore (Australian) lecturer, their assessor, and found it was useful to be able to receive her feedback, two representatives of the focus group described that:

(#I) *“..... she mentioned who’s right and who’s wrong, point out errors. You are more open up inside”*

(#A): *“Final and assignment is marked by her, it is better to have some kind of discussion get some feedbacks, [to] see what she is looking for”*

a) Communication Values: Encourage participation

An examination of the results of the focus group interviews revealed that this mode of learning was less confronting for participants, it captured and maintained their attention during the live online tutorial. Some interviewees valued synchronous chat as a medium to comfortably voice their views. Slightly more than half of these students (55%) were prepared to challenge others and request for clarification.

It would be logical to expect that without visual cues and tone of voice to add extra meaning to the conversation, text-based communication could limit participants’ understanding and ability to express themselves in the class. This could pose a challenge for participants from non-English speaking backgrounds and those with slower typing ability (Murphy and Collin, 1997). Despite this all participants in case study 2 were actively engaged and posting messages, the average was between 30-50 posts per person across six sessions (two sessions for each group).

This aligned with Jones et al. (2001) who also noted that some participants from non-English speaking backgrounds were more comfortable with synchronous text-based communication compared with verbal communication in a classroom environment. It differed from Bernath and Rubbin (2001) who acknowledged language proficiency could

inhibit some participants from contributing to discussion. This could be explained by the fact that participants were familiar with one another and were from a similar culture (with the exception of the offshore Australian lecturer) rather than a diversity of cross cultural learners.

The focus group interviews along with the questionnaire results indicate users' perceived willingness and confidence to pursue the discussion to gain greater knowledge. Together with sufficient enthusiasm, Wang and Newlin (2001) suggested that, students with language barriers would partake in the discussion.

This research indicated that these two groups of South East Asian students, as in the two case studies, were more opened and readily shared their views as they perceived online chat worthwhile, notwithstanding language barriers and cultural background, irrespective as to whether users' were active or passive learners. Participants' perceived that the use of the text-base synchronous chat sessions would allow more freedom to contribute without physical interruption, free from social bias, and other visual or vocal disability.

The results from literature (Mock, 2001; Balazs, 2002) and from the initial case study demonstrated the importance of motivation to facilitate user participation. It was indeed found in the case of this research that with sufficient motivation along with the less confrontational environment engaged users inside the synchronous chat.

Balazs (2002) noted that students who were unfamiliar with each other would not seek to interact online. While Mock (2001) spoke about students who already have their face-to-face meetings would not value the online interaction. For this case study, more than half the students valued the online chat discussion with their peers despite having face-to-face discussion. This research appear to align with Motteram's (2001) argument that students being more secure to voice themselves when they are familiar with one another.

b) Educational (Learning) Values

Overall, more than half the class felt online chat had achieved various useful outcomes which were consistent across the constructs. Primarily, it was the ability of online chat

sessions to support student learning (62%, $X=3.72$, $SD=0.84$), improve their understanding (59%, $X=3.72$, $SD=0.80$), and assist them in their performance (59%, $X=3.48$, $SD=0.78$) in their final submission of their assignment, the results were substantially positive with a median rating of 4 on a 1 to 5 rating scale. Similar results were also elicited from the usefulness of the messages (59%, $X=3.62$, $SD=0.86$).

Wang and Newlin (2001) noted a correlation between active participants and the overall performance in the class. It was interesting to determine whether this case study would be consistent with the findings of Wang and Newlin (2001). A comparison of the assessment marks and participants' final written submissions was undertaken, the two of which were conducted with online discussion compared with one session without online chat. Indeed, more than 60% of the class's marks had improved (case study 1 =69% [20 participants], case study 2 =92% [18]). This could also be partly explained in Borresen's (in Kimber 1996) study on small group work in statistics classes; it revealed that better results were obtained when students work together as compared with individuals studying in isolation.

In addition, Johnston et al. (in Kimber 1996) perceived peer feedback is important for motivation, development of knowledge and had more chances in retaining this knowledge when it was frequent and feedback was immediate. Participants of both case studies perceived that useful learning outcomes together with the setting and the design of the chat sessions played a part in motivating them.

A comparison between the ease of use and the usefulness construct was commissioned, the analysis found that common themes were revealed in regards to obstacles that hindered the use of online chat. Like themes also emerged from participants who did not positively rate the perceived usefulness of the messages posted as well as online chat being able to support student learning..

At times students found it difficult to follow the content of the messages and contribute to the discussion due to the almost real-time nature of online chat together with group discussion led to an uncontrollable rate of message flow and the intertwining of the messages posted. It

was likely that the underlying factors primarily related to individual students' skills and attributes, domain knowledge of the discussion topic as well as the group capability (as discussed under the ease of use) affecting the overall useful outcomes of the chat session. Often reported in the literature (Balazs, 2002; Lawrence-Slater, 2002) was the notion of misinterpretation and misunderstanding during the course of the text-based discussion for students from non native English speaking background.

Upon alleviating concerns regarding the instability of the technological system in preparation for this second case study, the issue regarding message content not being clear became apparent. The findings showed factors that negatively influenced the usefulness of the messages aligned with those found under difficulties experienced. Similarly themes were found from those who spoke negatively in relation to the usefulness of the online chat in supporting learning.

In both of these case studies, the results also indicated the impact of the ease of use construct on the usefulness of online chat. As noted under the ease of use section in this chapter, with group interaction where participants relied on one another to discuss on the topic, the capability of individual not only affected their own personal contribution but the group as a whole in the ability to further the conversation or to proceed the conversation in greater depth. As a result this affected the ease of participation and the usefulness of the interaction. This aligned with the principles of the original Technology Acceptance Model (in Venkatesh, 1999) the easier it was to use the system the more useful it can be with all other things remain equal.

The written responses to the questionnaire indicated that those who were satisfied commented on the usefulness of the online chat, those who felt dissatisfied spoke of lack of value or difficulties associate with the participation. The study affirmed the importance of evaluating all three constructs to determine the success of the chat session rather than satisfaction alone, and to assist in refining the future design of the online chat model.

Frokjaer, Hertzum and Hornbaek (2000) research on the association between the three usability constructs, effective, efficiency and satisfaction on an information retrieval tasks,

and found that the three aspects should be considered separately as there were no strong connections evident, unless there was a particular rationale within the domain of the study which suggested otherwise. Clearly, under this context the circumstances were different, the online group discussion using synchronous chat software appeared to suggest these constructs were related.

There was indication from students who did not find the online chat useful merely because they were frustrated with the inability to obtain direct answers to the issues. As it was intended, some discovered that online chat encouraged critical thinking while others may not have made the connection that that this was a part of the cognitive learning process. This concept was consistent with Seaton (1993) research which noted that not all students view critical thinking as part of knowledge, referring knowledge as information gathering, and preferred the lecturer to provide all the answers.

For instance, a particular student mentioned (#A) that they valued the interactivity with the offshore lecturer, however he did not find the overall online chat valuable and admitted that he was not well prepared for the chat session. This was primarily due to the inability to gather concrete responses to the question or the issues. He does recognize that online chat enable one to explore to how others thought about the issues or process their information as quoted:

(#A) *“I don’t find any valuable .. I can learn about everyone, how they think.. it makes you think”, he later elaborated further by stating, “ Make you guys think even though you may not get what you wanted”*

It can be concluded that the impact of the online discussion, regardless of the quality and usefulness of the content, or whether students were able to distinguish facts from opinions, had 72%, a substantial proportion perceived that it “often” stimulated them to critically analyze the topic. Similar findings were found in Bernath and Rubbin (2001), whose work was based on asynchronous discussion, open discussion forced people to think and rethink their ideas.

Such concerns regarding the quality and clarity of the message content and the ability of the participants to carry on the conversation for each group indeed cannot be ignored. On one aspect, participants requested smaller group size to slow down the pace of online chat; on another perspective, too small group could risk insufficient number of posts to maintain student engagement. This remains a challenge in the future delivery.

12.3.3 Satisfaction and Attitudes to Online Chat

All students were committed to participate inside the active and open online chat dialog inside the laboratory class, with more than half of the participants were prepared to challenge and sought clarification if need be inside the chat session. Often students preferred to seek the onsite tutor for assistance directly in relation to simple queries, such as terminologies as they it was felt it was easier and less disruptive than asking such questions online.

For Case Study 2, the class was divided into two groups for role play, the aim of one half of the class was to support the arguments in the topic and the other half had the role to suggest alternative perspectives to the discussion topic or debate against the arguments presented. This provided much interactivity inside the chat room based on all data sources collected from the written feedback from the questionnaires, the focus group interviews and the tutor's observation of the live session. Many students valued the ability to learn and exchange information with their peers, for instance in a questionnaire response one respondent noted that students were interacting with one another:

(#a3) *“most of the time are the students chat with each others” [sic]*

In analyzing the data, 45%(13) of students were satisfied with the level of interaction with the offshore lecturer. The observation of the log file and the tutor's observation of the class showed that several students continued to place much emphasis on the interaction with the lecturer, expecting regular feedback and guidance and was frustrated when their questions were not responded to.

From the written responses participants felt that they were unhappy in relation to difficulties in receiving acknowledgement from the lecturer (3) due to the high volume of messages

posted concurrently and they did not have time to ask all the questions. Others (2) spoke about their limited understanding of the topic made it challenging to interact with the offshore lecturer. These influences interfered with their perceived satisfaction of the online chat experience.

The offshore lecturer allowed students plenty of opportunity to participate and was rather consistent with her contributions taking care not to dominate the chat session. She merely played her role as setting the direction of the topics for discussion, and would provoke or guide the students when necessary. Her contributions were in between 5 to 20 posts more than the class mean.

However, the research in Mazzolini and Maddison (2003) study found that students favoured lecturers who are active contributors to the forum; those who provide minimal contribution were perceived negatively even though the session appeared to be thriving. Interestingly, Klemm, (1998) and Mock (2001) reported students in general preferred actively participating lecturers perhaps it save them from doing their work. In this regard, it can be largely explained that those that did not obtain any direct feedback or direct answer from the lecturer felt disappointed.

In analyzing the findings, it was apparent that some participants had misconceptions regarding the aim of the online chat sessions, their role and that of the facilitator, as a result made considerable attempts to seek for direct answers. It was not an expectation, in this study, to have all participants satisfy with the online chat session, as noted in the literature, some learner characteristics were not suited to online chat (Pallof and Pratt, 2001), as such these participants struggled to express themselves in a quick-witted and concise manner. In this study, this was not a main problem as long as it did not apply to the majority of the participants.

Student ratings of their overall satisfaction indicated 55% (16) of the participants were satisfied on most or all occasions, and only 14% (4) were dissatisfied with the online chat. Receiving timely and frequent feedback (Rossman, 1999) was considered an issue for the

participants involved in this case study. This was proven to be challenging in Case Study 2 mainly because the ease of use construct was affected by the fast pace of conversation and the high volume of messages displayed.

Much of the existing literature focused on the positive attitudes of online chat in fostering online interaction but there is a gap in literature in that few studies have been conducted in similar settings to these two case studies.

A study, which had some alignment with this research, was Lawrence-Slater, 2002 research. Consistent with Lawrence-Slater's (2002) pilot study of participants from South East Asia, chat was used to support online tutorial together with asynchronous discussion. A slightly different blended learning to this study was implemented; it involved the offshore lecturer meeting the participants at the commencement and during mid term. In this case study the students were fully facilitated by the local tutor once the offshore lecturer had completed the one-week of face-to-face lectures. Lawrence-Slater's study consisted mostly of mature aged students, which was not the case in this research. The key findings noted in his study that was consistent with Case Study 2, students had an overall positive attitude to the online course, and the challenges, in group discussion, and the user's perceived need for greater controls of the interaction inside the chat room.

One of the aspects within Nielsen and Levy (1994) meta-analysis study was that they used a large number (127) of systems for which users' subjective preferences were measured on a 1 - 5 rating scale, 5 being most positive and 1 being less positive attitude towards the system. The analysis from Nielsen and Levy's (1994) study indicated that the median was 3.6 and the mean rating was relatively positive at 3.55 \pm 0.12 (95% confidence interval). These results provided a practical benchmark for comparison and support on participants' preference of the system.

The question regarding students overall satisfaction with the system from this case study was applied to the Nielsen and Levy meta-analysis research for comparison. The results showed a median rating of 4, which was considerably greater than the neutral point of 3 on a 1-5 interval scale and higher than the average of 3.6 in the Nielsen and Levy research study.

A slightly lower mean of 3.48 \pm 0.41 (95% confidence interval) was obtained in Case Study 2; this was still considered a slightly lower rating (with a difference of only 0.07) compared with a rating of 3.55 in the Nielsen and Levy's study. Overall, it was still a fairly good rating as it was rather close and above the midpoint.

There were no obvious misconduct that interfered with the discussions or the issue of flaming as noted in other previous research, perhaps this could be due to the rules set prior to the chat sessions. In comparing the results in which students in this case study were asked to rate their overall level of enjoyment with the new system. The median rating was 4 which was a more positive result than the neutral point of 3 in a 1-5 scale and also higher than the average rating of 3.6 in the Nielsen and Levy study of 127 systems. The mean was 3.66 (\pm 0.5 at 95% confidence level) which was slightly higher than the Nielsen and Levy meta-analysis study. The results in this case study showed that students enjoyed using the new system more in comparison to the benchmark set in the many systems examined in Nielsen and Levy (1994) study.

On most or all occasions, 45% (mean=3.59, SD =1.15) of the participants perceived online chat sessions were interesting, 55% (mean=3.66, SD=1.01) of the participants enjoyed their experience, and 41% (mean= 3.55, SD =0.91) of the participants found it stimulating. On the contrary, very few participants (14%, 4) had a negative perception of the online chat sessions as they did not perceive the experience enjoyable, nor interesting while two participants (7%, 2) did not find it stimulating.

An overwhelming 90% (26) of participants felt the online chat experience worthwhile, slightly more than half of the respondents were satisfied with the online chat interaction with the offshore lecturer. Further analysis across all the questions within the questionnaire found that in fact there was only a small minority of participants who had negative perceptions with ease of use, and usefulness of the online session, similarly negative attitudes toward participation, ranging from 0 to 14%.

Of the 26 participants who thought it was worthwhile, most of the ten participants, articulated the usefulness of online chat for learning such as clarifying doubts and gaining better understanding of the topic, one of the weaker themes was the value of the interaction with the offshore lecturer, and online chat was an effective method of communication. Similar themes were drawn out from the comments section to the Likert scale question from users; they perceived the value in being able to freely contribute their opinion regarding their online chat experience. Participants merely reaffirmed the communication and learning value under the perceived usefulness construct of online chat:

(#a25) *“we interact more in chat than we do in normal class. I think chat should continue, it provides more information than normal class”*

(#a6) *“it's challenging & I enjoy the experience, I like the way Ms (lecturer) correct our mistake , it is encouraging, I like to talk to her inside the chat than face to face”*

One additional theme drawn out was that chat sessions were perceived as being interesting and fun (5). These themes were also verified in the focus group discussion, for instance:

(#H) *“Don't feel boring, put in some jokes... sometimes teaching on the board students feel bored”*

One participant conveyed negative thoughts of online chat and did not perceive any value of this medium in supporting interaction. The quote below showed that the participant clearly had a preference for face-to-face communication:

(#a24) *“actually is waste time (online chat), face to face communication more important/ helpful”.*

Students were asked to comment on whether they would recommend online chat to other subjects, a considerable 69% of respondents indicated that they would. Those that disagreed thought that it depended on the nature of the subject.

Analysis of the focus group interviews indicated that the majority of respondents were satisfied with the chat session and thought it was worthwhile. There were suggestions

regarding the frustration of not been able to gain concrete answers from the discussion. Overall, according to interviewees it was fun and less formal and a new way of learning.

A participant conveyed that they were “okay” with the chat but was uncomfortable with the pressure put on the class knowing marks were given for participation. Three additional respondents felt that their satisfaction were interfered with the difficulties experienced in participation for instance if they were not prepared for the online session in advance.

All focus group participants agreed online chat was worthwhile, including the three students who felt they did not gain any “concrete solution” from the sessions one of whom did note that it was interesting and valued the ability to receive feedback directly from the assessor as illustrated by the following quote:

(#A) *“Final and assignment is marked by her, it is better to have some kind of discussion get some feedbacks, [to] see what she is looking for”,*

Overall, these students felt chat sessions have been interesting, challenging, and a good way to interact with others, sharing ideas and information. The overall written responses and focus group interviews indicated there were likely chances that these three constructs of usability were interrelated, this could be explain by the context of online chat where these variables were very much interrelated unlike the findings from Frokjaer, Hertzum and Hornbaek (2000) study.

An analysis of these two trials concludes the interrelationship between the ease of use and the usefulness on student attitudes. More specifically, the findings derived from applying the TAM to this study appeared that there was a relationship between user attitudes and the usefulness of the online chat experience. In addition, there was also a link between the ease of use construct and the usefulness of the online chat experience. Interestingly, this finding was also consistent with the Mathieson, Peacock and Chin, (2001).

For this research it was supported in student’s written feedback that showed common themes were emerged from questioning participants regarding the usefulness of online chat and

whether students thought online chat was worthwhile. Despite the perceived barriers and the demand imposed on them to effectively contribute, all students were prepared to tolerate this and continue to participate with the online chat sessions. The researchers revealed that it might be the perceived usefulness of the system and the worthiness of it that encouraged users to continue to persist with the system. In planning for the future design of synchronous online chat in a blended learning environment, such findings need to be taken into consideration.

The validity of the research findings requires further study in like population and settings. It is beyond the scope of this research to generalize the findings to the general population, the findings of this research has noted the affects of multiple variables that influence student perceptions and attitudes towards synchronous online chat. This study has provided greater knowledge in regards to the perceived benefits and difficulties experienced with online interaction to improve future delivery of the subject. Clearly addressing one variable was not sufficient to make an overall positive impact; rather a range of strategies implemented concurrently such as role play, reducing the group size and improving the stability of the technology are likely to have a significant impact on student's positive experience interacting amongst their peers and in using the new online medium.

In this respect, this research is able to add to the body of knowledge in reference to student attitudes; values and challenges encounter that affected their behaviour. These attributes also have an impact on students' overall attitudes toward participation.

12.4 Conclusion

The findings of this case study drew out consistency with several literature studies that acknowledge the impact of the combination of technology and human factors on the ease of use (Andrews and Haworth, 2001; Preece, 2001; Brinck, 1998), as well as the usefulness and attitudes towards using the system. The study revealed rich details of participants' perspective of usability variables. Clearly, the ease of use in the current study was an improvement from the initial study.

It was more apparent in this case study that the primary difficulties laid within the human factors as a high proportion of students found it easy to operate the chat but some students did not find it easy to make a valuable contribution to the discussion. This second case study recognized the potential impact of this on the impact of both individual and collective behavior, subsequently, affecting the usefulness, ease of use and the eventual satisfaction, and therefore the overall success of the online technology for mediating group forum. The internal state or characteristics of users including students' communication skills, analytical skills, language skills, facilitation skills and their domain knowledge were of importance for effective group participation as in face-to-face group discussion.

This study affirmed that students demanded greater clarity and quality of messages posted in an online chat environment in which the pace of the discussion should not inhibit their participation. The results showed that less than half of the participants found it consistently easy to participate due to a high volume of and relatively spontaneous activities inside the online chat. The quality of messages could also be affected by the fast speed of online chat as participants strived make a timely contribution in a lively chat environment, their messages were perhaps brief and informal. Given that the core focus of this case study was in relation to the usability and satisfaction of synchronous online chat, thus issues relating to the quality of the discussion such as messages deviating from the discussion topic and irrelevant or lower standard of postings were a key variable taken into consideration but not intended to be examined in great depth in this research.

In this case study a reduction on group size to 9 or 10 participants (excluding the offshore lecturer) was still not sufficient to control the speed and volume of messages pouring through the live chat system. Thus a limitation of the standard chat software, being solely text-based, could demand greater effort for participants to contribute to the discussion. Some participants particularly those with language difficulties commented on the challenges of using text-based communication for group discussion, yet they found the online chat worthwhile.

In fact this case study indicated an overwhelming 90% thought the online chat sessions in Case Study 2 was worthwhile. Notwithstanding the obstacles, it found that more than half

of students believed online chat was useful for enhancing learning outcomes and it encouraged user participation. They valued the ability to share information, voiced their opinions, students and their offshore lecturer were engaged in interaction in a less confronting environment. Across all the three usability constructs, similar perceptions were revealed in relation to their overall satisfaction and enjoyment in using the system as a communication tool.

Clearly the current study showed improved efficiency with the use of technology hosted locally as compared with the initial case study of student's actual performance based on mark awarded in using the medium in a blended learning environment compared with no online chat discussion.

Case Study 2 found that the usability of online chat is capable in supporting open and effective group dialog, and was considered successful in achieving high participation amongst the students allowing the offshore subject coordinator to monitor their understanding and progress. The success of the chat sessions depended on the settings, the social aspects and management, technological design of the system to improve overall student satisfaction.

12.5 Implications and Recommendation For Future Research

The results of this study provide an indication of the likely problems encountered to encourage participants to contribute to the new medium when applying under a similar context. It can be used to guide the design, the development, operation and the evaluation of synchronous chat systems.

The open dialog and the unpredictable nature of online chat created issues for students to understand how to prepare for online chat. Although the offshore lecturer facilitated the discussion flow of the conversation and the content of the discussion were still rather unpredictable, as it was not possible to have direct control of the questions asked amongst the participants. An emphasis on students' commitment to the quality contribution inside the chat room could be a potential improvement for consideration given that this mode of

communication relied solely on content of the messages for effective discussion and useful outcomes. The idea of peer assessment was considered for this case study, it could be explored as a way of encouraging quality participation.

By examining the difficulties experienced perceived by participants, it was possible that further improvement can be implemented to enhance the online setting or environment to further support their participation. The high volume and speed of messages during the synchronous online chat had implications of student perceptions and their ability to fully participate in the conversation. Some of the participant's negative perceptions were in part due to the group size, the group dynamics, and a lack of existing controls built into the software. Clearly, this called for a balance between not enough activity and too much activity in an online synchronous session, which may have an adverse impact on student participation.

To reduce the group size from 9 to 10 participants per group down any further would be a burden on time and resources of the lecturer and the university. This was not a viable option owing to the size of the cohort and resources available. Currently each group was divided into two subgroups for role play and debating of the topic of discussion. This was considered an effective method to minimize the impact of the large group sizes.

Future research studies could examine the potential of role play for group interaction via synchronous chat. It was however also not easy or possible to tackle the current issue in determining the group dynamics and participants' characteristics before the actual use of the system.

Passive students could become rather vocal in text-based communication, and the fact that the participants of each group have the ability to creating a highly interactive environment by encouraging or discouraging discussion. It was also recognized that students association with this system was unlike that of commercial users, they were not long term users of this medium, most of them started new to the subject and move on once they complete the subject.

Therefore, to minimize the impact of speed and increase the quality of the participation, clear and concise guidance on the expectations could be developed and creating opportunities for more practice sessions that complement face-to-face discussion. It was possible to also instigate other forms of controls; the role of the laboratory tutor can be exercised to provide participants with direct assistance in administrating the speed of online chat and offer ongoing support while observing the live chat environment. Students could be empowered to partake in peer assessment strategies as a possible solution to encourage quality interaction amongst individuals within the group.

Academics could incorporate innovative ways to encourage more preparation before the chat session. Another incentive worth investigating could be the allocation of a greater number of marks for participation. A small percentage of marks for participation may only be sufficient for participants to feel obliged to attend the online chat session but may not be enough for instigating quality discussion and top effort.

To maximize the value of the discussion inside the busy chat session, and minimize the frustration and confusion, the facilitator could close off each discussion session by summarizing the key issues that had been discussed. With this method, it could ensure a degree of understanding on the critical points, and clarify significant themes and messages. The current study focused mainly from the point of view of participants, it did not investigate the quality of the messages inside the log files. Further analysis of the log files may assist in determining the quality of the participation and how it could be improved. It could help to determine whether participants were able to distinguish fact from opinions, it may provide academics clues on topic areas, which require further work in future, sessions as well as resolving some of the difficulties experienced. Furthermore, the relationship between the usefulness construct and student performance in their assessment could also be investigated.

Without visual cues, where the communications focus solely on the content of the interaction, there was a need to weigh the benefits against the difficulties in the context of use. In this case study, the majority of participants felt it was worthwhile to continue this mode of learning. Participants and the academics alike were positive in relation to the

potential online chat could offer in a blended learning environment with the offshore academic.

Statistical analysis of figures could provide another method to determine the strength and correlation between various constructs such as user satisfaction, ease of use and usefulness of the medium for student interactivity. The data collected for this research may be used for future inductive hypotheses and could be analyzed using quantitative analysis – such as factor analysis, correlation, multivariate analysis, and its validity could be determine through Cronbach Alpha and Alpha Coefficient. When compare with subsequent studies, it could identify any patterns, trends, and drivers that can create a solid model for measuring usability specific for online group interaction using synchronous chat medium.

Given this context, where there is high reliance on individual characters and group dynamics, usability surveys conducted should not be an isolated event, but rather the beginning of a continual improvement cycle.

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