Understanding Learner Adoption Behaviour in E-learning

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ABBREVIATIONS

Lists of the abbreviation used throughout the thesis are presented in the table below

Abbreviation	Explanation
CMC	Computer-Mediated Communication
IDT	Innovation Diffusion Theory. An adaptation of the model of diffusion of innovations to measure adaptation of information technology innovations.
SET	Social Exchange Theory
TAM	Technology Acceptance Model. The most influential research model in the studies of the determinants of information system acceptance.
TPB	Theory of Planned Behaviour.
TRA	Theory of Reasoned Action.

ABSTRACT

E-learning environments are commonly referred to as learning environment mediated by computers and digital technology. E-learning is being utilized in a number of educational programs worldwide. It overcomes drawbacks that are inherent to traditional classroom teaching, especially its lack of flexibility in the use of resources, including space and time scheduling. However, e-learning is not popularly adopted by learners as compared to traditional learning, and the market acceptance of e-learning has fallen far behind its projected levels. While some students have adopted e-learning, others have not, a relevant question is what prevents students from choosing e-learning over traditional learning in higher education. This is the fundamental problem that motivated this study. This study aims to examine the factors that influence students' selection of e-learning over traditional learning in higher education. Based on the theoretical foundations of the Innovation Diffusion Theory (IDT) and Technology Acceptance Model (TAM), as well as factors related to technology, social and individual choices, a conceptual model for students' adoption of e-learning was proposed and examined.

A multi-method research design was developed starting with a qualitative investigation of adoption factors followed by a more focused quantitative examination. For the qualitative stage of this study, a semi-structured interview technique was utilized to collect data contrasting and comparing the views of 18 students and 12 teachers about the factors affecting the selection of e-learning over traditional learning and the constituents of an attractive e-

learning course. For the quantitative stage of the study, data were collected through a survey method from 140 students which included both current e-learning users and non-users, and they had the choice of selecting e-learning courses in higher education.

Results from the qualitative study show that both students and teachers identified 'convenience and time saving' and 'lower tuition fee' are the major factors governing students' choice of e-learning. Moreover, a majority of students and teachers perceived 'reputation of the university' and 'suit my lifestyle needs' as the other major factors affecting the choice of e-learning respectively. The findings indicate that whilst students and teachers have a broadly similar view of what factors affect the choice of mode of studies, there are differences in some aspects to those factors which constitute an attractive e-learning course. Comparison revealed that from a student perspective the instructional design and online interaction (such as email and online chats) were key attributes of an interesting e-learning course. In contrast, teachers argued that in addition to instructional design, personal (face-to-face) interaction and student supports are also important factors to constitute an attractive e-learning course.

The results from the quantitative study indicate that perceived relative advantage and organizational reputation are the factors that influence students' actual adoption of e-learning, whereas perceived relative advantage, organizational reputation, external influence, attitude, and subjective norm are

the useful predictors of students' intention to choose e-learning. Although the factors that influence students' actual adoption and behavioural intention to choose e-learning are not exactly the same, perceived relative advantage and organizational reputation are the two common major factors that influence students' selection of e-learning. These findings are consistent with the results obtained from the qualitative research. Further, the results reveal that experience was a significant moderator in the relationship between relative advantage and behaviour intention. The moderation effect was stronger for non-users in the case of relative advantage, this implies that non-users depend more on the perceived relative advantage of e-learning.

The study's findings contribute to the understanding of students' choice of e-learning over traditional learning in higher education for education administrators to understand the reasons for resistance to e-learning adoption among most students, they can thus enhance or improve the e-learning courses in term of their structural components based on the student needs identified in the empirical results. Such knowledge can also assist both educational services providers and their marketing planners to plan and implement e-learning strategies, to increase the adoption of e-learning and thus promote e-learning courses to the market. This study is intended to direct further academic research as well as to provide guidance for educational institutions struggling with the development and implementation of e-learning mode studies.

DECLARATION

I declare that this thesis presents work carried out by myself and does not incorporate without acknowledgement any material previously submitted for a degree or diploma in any university and that to the best of my knowledge it does not contain any materials previously published or written by another person except where due reference is made in the text; and all substantive contributions by others to the work presented, including jointly authored publications, are clearly acknowledged.

Pamela Po Yan Lam

..……***Pamela***…….. …30 September 2010…….

(Signature) (Date)

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Chapter 1

Introduction

1.1 Introduction

The aim of this investigation is to examine the factors that influence students' selection of e-learning over traditional learning in higher education. In this chapter, the background to the research project and background of distance learning and e-learning environment are introduced. Then, the research questions and objectives, and the significance of this research project are discussed. The research methodology, the limitations and delimitation of the study together with the structure of this thesis and a summary of the chapter are also presented.

1.2 Background to the Research

E-learning environments are commonly referred to as learning environment mediated by computers and digital technology. E-learning is becoming an increasingly important part of higher education. The business and higher educational communities are adopting e-learning for a variety of reasons and needs. These parties refer to major factors such as cost, convenience, flexibility, and collaborative learning to support the idea that e-learning could serve as a viable quality learning alternative (Picciano, 2001; Kruse, 2002; Pallatto, 2002).

With advances in educational technology and Internet access in recent years, a new generation of students has grown up with both computers and the Internet. They are computer savvy and fully expect to continue using computers and the Web in the process of getting an education (Elsenbarth, 2003). Besides, Huynh, Umesh and Valacich (2003) noted that working adults and mature age students with full-time jobs are the largest audience for online education as they might want to keep up with the knowledge to facilitate their professional and personal life style, and that e-learning could provide them not only the convenience but also the flexibility to advance their education and career.

Inspired by the promising future of e-learning, a number of e-learning initiatives have been launched around the world. According to the report conducted by the International Data Corporation (McGovern & Sarraf, 2000), the number of colleges and universities in US offering e-learning increased more than 100%, from 1,500 in 1999 to more than 3,300 in 2004. In addition, the worldwide market for e-learning was projected to be more than $18 billion by the end of 2005 (Moore, 2001), with some organizations projecting that over half of their training and education would be delivered electronically over the next five years (Gold, 2003). Allen and Seaman (2004) cited results of the Sloan Survey of Online Learning showed that 81 percent of all institutions of higher education in the United States offer at least one fully online or blended course, and 67 percent recognized online education as a critical long-term strategy for their institution. In the United States, enrolment of online learners

grew to approximately 3.5 million, a 21 percent increase since 2002 (Allen & Seaman, 2007). Colleges and universities also continue to increase their Web-based course offerings to appeal to audiences such as working adults who otherwise have limited access to higher education and strive to meet the expectations of the digital generation of learners (Aggarwal & Makkonen, 2009; Duan, He, Feng, Li & Fu, 2010; Franklin & Van Harmelen, 2007; Shi, 2010).

As the demand for tertiary and continuing education and professional development rises, and with the increasing availability and sophistication of the means of delivery, e-learning is being seen as a way to rapidly increase student numbers. However, the market acceptance of e-learning has fallen far behind its projected levels. Several universities, including Columbia University and New York University, have terminated or downsized their e-learning programs (Hane, 2003; Stein, 2001; Wilner & Lee, 2002). The UK e-University Worldwide (UKeU) closed down in July 2004 (Education and Skills Committee, 2005). According to the study conducted by McLeod (2004), it indicated that there is less demand for online study than enthusiasts predicted, and UKeU is being dismantled because of insufficient demand. Besides, according to a Corporate University Xchange study of 4,148 online learners, e-learning drop out rates typically stand at about 70% compared with an average of 15% for classroom training (Institute of IT Training, 2003). Muilenburg and Berge (2001) also noted that students resist adopting e-

learning and preferring to choose traditional classroom learning mode because they see technology as an additional challenge they do not wish to cope with.

Indeed, the market indicated that students who choose e-learning still remain relatively low compared to traditional learning mode. While some students have adopted e-learning, others have not, a relevant question is what prevents students from choosing e-learning over traditional learning in higher education. This is the fundamental problem that motivated this study. In the marketing literature, this topic is usually referred to as adoption of new technology (Rogers, 1983). An understanding of students' perception and the factors that drive adoption intention will help in the effort to make this mode of learning more acceptable. This information can help education institutions to formulate appropriate marketing strategies that will encourage the adoption of e-learning.

1.3 Distance Learning and E-learning Environment

Online learning, cyber learning, Web-based learning, e-learning – all of these terms are becoming synonymous with the latest technological approach to providing high quality flexible educational offerings (Seufert, 2001). Use of these terms is ever changing, as the concept of e-learning evolves (Urdan & Weggen, 2000). Some authors use a term like Web-based learning synonymously with e-learning (Urdan & Weggen, 2000). While there have been many terms used to describe the integration of technology and learning,

most of these terms are antiquated or no longer appropriate for the digital world (Rosenberg, 2001). To be consistent in the reporting of literature, only definitions of the term "e-learning" will be discussed in this review.

E-learning is a component of the telecommunication model of distance learning. Distance learning can be defined as separation of instruction and learning in time and place, connection (participation, communications, community) through educational media, and a learning process driven at-will by the learner (Palloff & Pratt, 1999). Distance learning where students and faculty are connected by technology and educational media, instead of a traditional classroom environment, has become a viable alternative to common teaching and learning methods. One of the comparative studies on students' satisfaction with distance learning in comparison to face-to-face classrooms found that "students show little preference for a live classroom to distance education" (Allen, Bourhis, Burrell, & Mabry, 2002, p.93). The result indicates that students perceive distance education to be as satisfactory as other traditional formats of learning.

E-learning, a type of distance learning, is a widespread and dynamic learning environment that allows instructors, learners and course materials to be placed at different locations so all parties can interact at the same or various time frames, using well-designed, Web-based technology tools to facilitate the learning process. According to Dabbagh and Bannan-Ritland (2005), online learning is "an open and distributed learning environment that utilizes

pedagogical tools, enabled by Internet and Web-based technologies, to facilitate learning and knowledge building through meaningful action and interaction" (p.15). This dynamic and flexible mode of e-learning is in demand by individuals and the business community. More people are looking to be trained via the Web on the latest computer programs, either for work or for recreation.

E-learning is also changing the teaching and learning culture in institutions of higher education. Indeed, it has increased and intensified communication by connecting the globe in an unrelenting mode of informational availability. Khan (2001) describes the Web as "well-suited for open, flexible, and distributed learning" (p.76). Web-based technology is becoming a primary tool/environment to satisfy the educational and training needs of both the nation's workforce and many individuals whose personal and professional demands make it difficult for them to attend traditional colleges and universities.

E-learning environments are commonly referred to as learning environment mediated by computers and digital technology. According to Wilson (1996), e-learning environment is defined as "computer-based environments that are relatively open systems, allowing interactions and encounters with other participants and providing access to a wide range of resources" (p.8).

The features of e-learning environment can be classified into three types: student features, tutor features and designer features (Ryan, Scott, Freeman, & Patel, 2000). Student features, which are available for students as they log on to the e-learning environment, include course content in the form of Web pages, bulletin board, discussion forum, e-mail, online tutorial system, whiteboard as a common area for communication, self-assessment quizzes or tests, student presentation areas, grading information and calendar. Tutor features, which assist tutors giving courses online, include progress tracking, timed automatically graded quizzes and tools for student management to generate class list and grade list. Designer features, which are specific tools built into the e-learning environment to assist the designer of e-learning courses, include standard interfaces and course content templates, tools for customization and site management features such as backup and loading of course material (Ryan et al., 2000).

The e-learning environment adds the dimension of communication to the learning experience by means of electronic interaction and discussion (Piccoli, Ahmad, & Ives, 2001). In other words, the e-learning environment provides several instructional activities to enrich the learning process. For instance, the discussion areas enabled by the synchronous (real time) and asynchronous (delayed) Web features in an e-learning course or program allow students to work collaboratively, read critically, reflect and review and share different viewpoints and ideas, which gives ongoing feedback and support to all e-learning participants.

In the e-learning environment, learners need to assume an active role. The e-learning learners should be provided with various learning opportunities and necessary technology tools to discuss, investigate, reflect, and ask questions (Conrad, 2002). E-learning discussion areas provide an ideal platform to do so. Hearing and critically reading others' point of views, and witnessing different interpretations of the same information, help learners to digest, reflect and fully comprehend a piece of information emanating from different perspectives (Aragon, Johnson, & Shaik, 2002; Thurmond, Wambach, Connors, & Frey, 2002; Vrasidas & McIsaac, 1999).

1.4 Prior Research in E-learning

In the past decade, a substantial number of articles have been published addressing e-learning. In the early 1990s the research included the relationship between teaching and learning (e.g. Berge, 1995; Ramsden, 1992). In recent years, many studies have focused on the comparison of the learning effectiveness of e-learning versus traditional learning approaches (Baker, Hale & Gifford, 1997; Lockyer, Patterson & Harper, 2001; Tuckman, 2002). Some studies examined the design and structure of e-learning based courses (Kaynama & Keesling, 2000; Leon & Parr, 2000; Selim, 2003). Several studies compared students' learning experiences within an e-learning based course (Ernest & Federico, 2000; Oliver & Omari, 2001; Wegner, Hollway & Garton, 1999). Recent literature on marketing in the online education area shows that several scholars have investigated the adoption of e-learning (Lee,

Cheung & Chen, 2005; Ngai, Poon & Chan, 2007; Ong, Lai & Wang, 2004; Saade & Bahli, 2005). However, the utilization of different set of theoretical models combined with a broad variety of data collection and analysis tools makes a comparison difficult between distinct studies and consolidation of their respective results. Hence, the current research project is targeted to propose a model that reconciles the key constructs in the best known theoretical models of new technology adoption to find out the factors that influence the adoption of e-learning.

Several competing theoretical approaches have been used to investigate the determinants of acceptance and use of new information technology (Venkatesh, Morris, Davis & Davis, 2003). The theoretical models employed to study user acceptance, adoption, and usage behaviour include the Theory of Reasoned Action (TRA) (Ajzen & Fishbein, 1980; Fishbein & Ajzen, 1975), the Theory of Planned Behaviour (TPB) (Ajzen1985, 1991; Mathieson, 1991), the Theory Acceptance Model (TAM) (Davis, 1989; Davis, Bagozzi & Warshaw, 1989), and Innovation Diffusion Theory (IDT) (Agarwal & Prasad, 1997; Rogers, 1995). TRA and TPB, which are general theories developed in social psychology, attempt to explain and predict individual behaviour across a wide variety of domains. TAM, which is an adaptation of the TRA, specifically explain IT usage behaviour, while IDT explains the process of the innovation decision process. More details of these models will further be discussed in Chapter Two. All these research streams are mostly being applied for information technology adoption studies in the business world such as

mobile banking (Luarn & Lin, 2005), WAP services (Hung & Chang, 2003), e-shopping (Shih, 2004; Vijayasarathy, 2004), and portal Web sites (Lin & Lu, 2000). However, little empirical research has been done to determine factors that influence learner acceptance of information technology designed specially for educational use in an educational context based upon the above four research streams.

Therefore, the current research project has two key objectives – to propose a method that lends itself to studying adoption of new technologies and test it to find out the factors that influence students' selection of e-learning over traditional learning in higher education. The proposed method is based on three pillars: a model that reconciles the key constructs in the best known theoretical models of new technology adoption; a sampling process that includes both current and prospective e-learning users; and the use of multiple linear regression and logistic regression techniques as data analysis tools. This research project takes a social, technical, and individual's choice approach in its investigation by using a research model based on some aspects of the above-mentioned theories to identify the influencing factors that affect the selection of e-learning in higher education. In determining such factors, this research project examines differences of characteristics among learner groups that might support feasibility of market segmentation for enticing e-learning. The current research project is expected to shed new insights concerning the complexity of the student's perception about the e-learning and the decision making process regarding the e-learning provision.

1.5 Significance of the Research Project

The purpose of the current research project is to identify the underlying factors that influence students' selection of e-learning courses. By knowing these factors, education administrators can understand the reasons for resistance to e-learning adoption among most students, they can thus enhance or improve the e-learning courses in term of their structural components based on the student needs identified in the empirical results. Such knowledge can also assist education institutions to plan and implement e-learning strategies, to increase the adoption of e-learning and thus promote e-learning courses to the market.

Additionally, marketers of e-learning institutions can use the outcomes of this research project as a valuable input when designing strategies to enhance e-learning diffusion, and can develop better marketing strategies as well as better management of online students. The research project also investigates the impact of previous e-learning experience on the causal model so that appropriate actions could be taken to address innovation acceptance for different student groups. Therefore, this research project has policy and practical significance.

Numerous institutions worldwide are adopting and, at the same time, struggling to adopt online education (Aydin, & Tasci, 2005; Homan, & Macpherson, 2005). E-learning is being seen as a way to rapidly increase student numbers, however, the market acceptance of e-learning has fallen far

behind its projected levels. While some students have adopted e-learning, others have not, a relevant question is what prevents students from choosing e-learning over traditional learning in higher education. Many educational institutions have certainly stated that e-learning would be an important part of their future, there is however, little empirical research in this field. The result of the research project can provide guidance for those struggling with the development and implementation of e-learning mode studies. By addressing the gap that would be demonstrated in the literature, this research project has scholarly significance.

1.6 Research Questions and Objectives

The central research focus of this research project is: "what factors influence the selection of e-learning as against traditional course delivery in higher education?" The key questions guiding the research include:

a) What are the underlying factors that would influence students' intention to choose e-learning rather than traditional learning?
b) What are the underlying factors that would influence students' actual behaviour to choose e-learning rather than traditional learning?
c) How do adoption characteristics differ between the experienced e-learning user group and the non-user group?
d) What makes e-learning courses more attractive than traditional courses?

To answer these questions, several objectives were set:

1. To conduct a literature review to provide a theoretical foundation for the study, and a general overview of the evolutionary changes of e-learning and the problems encountered by the higher education institutions (Chapters Two and Three).

2. To conduct interviews to compare the perceptions of teachers and students about the factors influencing choice of e-learning over traditional learning in higher education, and the factors enriching the attractiveness of an e-learning course (Chapter Four).

3. To conduct a questionnaire study to investigate the interrelationship among the research variables from the social, technical, and individual choice perspectives, and the actual adoption as well as the behavioural intention to choose e-learning. Also, to examine the moderating effect of user experience on his/her intention to choose e-learning. (Chapters Five and Six).

4. To provide an assessment of the contribution and a discussion of the implications of the study, and to recommend future research directions in view of students' adoption of e-learning (Chapter Seven).

1.7 Research Methodology

In order to develop support for and empirically verify the conceptual model to be discussed in Chapter Three, data were collected in two stages. A qualitative study was initiated to explore the domain of interest and was followed by a more focused quantitative study. The first stage is used to provide insight into the student adoption of e-learning and thus to provide additional support for the conceptual model, as well as to understand the constituents of an attractive e-learning course. Stage two follows with a focused investigation of the key constructs proposed to impact students' behavioural intention to choose e-learning. This methodological triangulation provides several benefits such as greater accuracy and increased confidence in the findings (Brewer & Hunter, 1989; Jick, 1979; Sherry, 1991). A complete description of these two stages is provided in Chapter Four, Five and Six.

Stage 1: Qualitative Study

Qualitative studies have seldom been incorporated into the adoption of innovation literature. Qualitative explorations may illuminate important factors that have been ignored in the research domain (Henwood & Pidgeon, 1992). Hence, in order to better understand the decision factors, it is important to develop a detailed understanding of the phenomenon from the user's perspective on his/her e-learning adoption decision. The results from the qualitative investigation will be the stepping stone for selection and development of measure for the quantitative study.

Interviews are chosen as the method to explore the student adoptions of e-learning because this technique allows for probing, detailed exploration and a clear focus in order to explore and support the proposed model. In this study, the interview is semi-structured which would help to remove the element of bias and provide the best mechanism of capturing data (King, 1994). Chapter Four provides extensive detail regarding the qualitative phase of this study.

Stage 2: Quantitative Study

A survey method was used in the quantitative stage of this research because it allows for the collection of a large amount of data from a large sample of respondents in a cost effective and timely manner. In addition, a large number of constructs can be explored in a natural setting. Before conducting the survey, the developed questionnaire was pre-tested to improve the quality and refine the data collection plan. The data were collected from students of a higher education institution in Hong Kong. A total of 120 usable responses were received. Data from the survey were analyzed using the Statistical Package for the Social Sciences (SPSS). More details of this second stage methodology are described in Chapter Five.

1.8 Limitations and Delimitation of the Study *Limitations*

There are three limitations that potentially influence the generalization from this research project. First, the research project targeted a subset of

higher education students, a subset where the adoption of technological innovations appears to be important and useful. Only students enrolled in the postgraduate level classes offered by the computing department were selected to participate. Other findings may have resulted if students from other disciplines and faculties had been chosen. Given the differences in disciplines, this research project focused on the one discipline of computing in order to control for those differences. The computing profession has been on the vanguard of accepting and using technological innovations and is generally wedded to information technology.

Second, since the study was restricted to those students enrolled in the computing classes which were offered in both traditional and e-learning modes, only 140 possible participants were available for study. Therefore, the study was limited to a small sample size of the above-mentioned criteria.

Lastly, participants voluntarily participated in the survey of this research project. It is possible that a disproportionate number of users or non-users of e-learning students participated in the survey. This may bias the factor loading of aforementioned variables.

Delimitation

The understanding of factors that affect people's behavioural intention is challenging. This research project addressed the challenge by identifying key

social, technology, individual choices factors from literature. There is a large amount of literature on the acceptance of technology innovation and an exhaustive study is virtually impossible; thus, the literature review focused on people's key technology, social, and individual choices factors that may affect their acceptance of innovation. The review identified eight factors to investigate – relative advantage, compatibility, complexity, organizational reputation, interpersonal influence, external influence, attitude, and subjective norm. Accordingly, the research project focused on the factors that influence students' selection of e-learning over traditional learning in higher education.

1.9 Definition of Terms

The following definitions are provided to ensure a clear understanding of some specific terms used throughout this research project.

Adoption: A decision to make full-scale use of a new idea as the best course of action available (Rogers, 1995).

Asynchronous learning: Web-based learning that is interactive, but not occurring simultaneously between the instructor and learner. In this electronic learning environment, time and/or space separate the teacher and the students, and each learner can determine the pace of his or her own learning.

Attitude (ATT): is defined as "a learned predisposition to respond in a consistently favourable or unfavourable manner with respect to a given object" (Fishbein & Ajzen, 1975, p.6)

Attitude toward behaviour: "Attitude toward behaviour is defined as a person's favourable or unfavourable evaluation of the behaviour in question" (Venkatesh & Brown, 2001, p.73).

Behaviour intention to use (INT): has typically been defined as "a person's subjective probability that he or she will perform a specific behaviour" (Fishbein & Ajzen, 1975, p.288).

Compatibility (COMP): is the degree to which an innovation is perceived as being consistent with the existing values, past experiences, and needs of potential adopters (Rogers, 1995).

Complexity (CX): is the degree to which an innovation is perceived as difficult to understand and use (Rogers, 1995).

Computer-mediated communication (CMC): Transmission and reception of messages using computers as inputs, storage, output, and routing devices. CMC includes information retrieval, electronic mail, bulletin boards, and computer conferencing (Paulsen, 1995).

Computer self-efficacy: is a specific type of self-efficacy, which is a belief in an individual's capability to use the computer in diverse situation (Compeau & Higgins, 1995b).

Constructivism: "is a philosophy of learning based on the premise that knowledge is constructed by the individual through his or her interactions with the environment. It has its roots in the constructivist movement of cognitive psychology, which holds that individuals gradually build their own understanding of the world through experience, maturation, and interaction with the environment, to include other individuals" (Rovai, 2004, p.2). As suggested by Brandt (1997), constructivism is a basis for e-learning. E-learning education supported by the constructivist theory should enable learners to engage in interactive, creative, and collaborative activities during knowledge construction.

Delivery mode: A method to deliver instructional and learning activities. Examples of delivering such activities include traditional courses, face-to-face training sessions, television, telephone, independent study options, and the World Wide Web. In this research project, attention is given to the Web as a developing delivery mode.

Diffusion: "is the process by which an innovation is communicated through certain channels over time among the members of a social system" (Rogers, 1995, p.5).

E-learning: The delivery of a learning, training, or education program by electronic means. Internet technologies used to deliver a broad array of solutions that enhance knowledge and performance (Rosenberg, 2001). E-learning involves the use of an electronic device to facilitate and enhance learning by means of one-way and two-way interactive video, audio, personal computers, CDROMS, and the Internet (Stockley, 2006).

E-learning course: Internet-based learning or Web-based learning where learner and learning resources are separated by space and possibly also by time (Bostrom, 2003). E-learning courses can be classified as pure online courses or blended learning courses (Martínez-Caro, 2009).

E-learning systems: "A learning technology system that uses Web-browsers as the primary means of interaction with learners, and Internet or an intranet as the primary means of communication among its subsystems and with other systems. These systems work as platform to facilitate teaching and learning" (Ngai, Poon & Chan, 2007, p.252). A variety of Internet-based e-learning systems, such as Blackboard, eCollege, Embanet, HorizonLive, Lotus LearningSpace, and WebCT, are presently used in highly education.

Image: The degree to which use of an innovation is perceived to enhance one's image or status in one's social system (Moore & Benbasat, 1991).

Innovation: "is an idea, practice, or object that is perceived as new by an individual or other unit of adoption" (Rogers, 1995, p.11). E-learning system is an example of IT innovation (Hayashi, Chen, Ryan & Wu, 2004).

Innovation-decision process: Stages that characterize how individuals make decisions about using a new idea, practice, or object (Rogers, 1995).

Instructional design: The entire process of the analysis of learning needs and goals, and the development of a delivery system to meet identified needs that includes development of instructional materials and activities, and tryout revision of all instruction and learner assessment activities (Briggs, 1977).

Observability: The degree to which the results of an innovation are observable to others (Rogers, 1995).

Perceived ease of use: is defined as **"**the degree to which an individual believes that using a particular system would be free of effort" (Davis, 1989, p.320). The idea of effort-free use or effortless in a technology is less concerned with instrumental goals. If a technology requires less effort to use it might be widely used because it is pleasant to work with and results in less frustration. Innovation diffusion theory also suggests that the less complex a technology the faster it will diffuse through a social system (Rogers, 1983).

Perceived usefulness: is defined as "the prospective user's subjective probability that using a specific application will increase his or her job performance within an organizational context" (Davis, 1989, p.985). The idea of usefulness can be equated with work goals and advancement. If a technology is useful it can be seen to be able to fulfill needs in the workplace and to help the use achieve those goals and advance within the organization.

Relative advantage (RA): The degree to which an innovation is perceived as better than the idea it supersedes (Rogers, 1995).

Social system: as a set of interrelated units that are engaged in joint problem-solving to accomplish a common goal (Rogers, 1995).

Subjective norm (SN): refers to "the person's perception that most people who are important to him or her think that he or she either should or should not perform the behaviour in question" (Fishbein & Ajzen, 1975, p.302).

Synchronous learning: Educational or training instruction that is coordinated to occur live within a single scheduled or coordinated time frame and via the World Wide Web and packaged software, broadcast television, and audio and video conferencing technology, where an instructor and learner(s) engage in interactive learning activities and can communicate with one another to send, receive, and resend information.

Technology acceptance: refers to the effect of system characteristics on user acceptance of computer-used information systems (Davis, 1989, p.2).

Trialability: The degree to which an innovation may be experimented with on a limited basis (Rogers, 1995).

Voluntariness: The degree to which use of an innovation is perceived as being voluntary, or of free will (Moore & Benbasat, 1991).

1.10 Structure of the Thesis

This thesis comprises seven chapters: (a) introduction, (b) theoretical background, (c) literature review, (d) qualitative research, (e) quantitative research design and methodology, (f) results and discussion, and (g) summary and conclusion.

Chapter One describes the background of the research project, highlights the research objectives, questions, and methodology. Chapter Two describes the theoretical background of the study. The chapter presents reviews of the salient theories related to technology, individual choice, and social perspectives that affect innovation diffusion and adoption. This review gives an overview of previous research and provides the background and foundation upon which the present study is based.

Chapter Three provides a review of literature on the concept and evolution of e-learning in higher education, the e-learning models, the advantages and disadvantages of e-learning, constructivism and the e-learning environment, the face-to-face and computer mediated group literature, synchronous and asynchronous communications in e-learning, and the learning styles in e-learning. The findings provide an overview of the present situation and problems encountered by the higher education institution under study. Then, a conceptual model which builds upon and integrates several diverse literature streams is presented.

Chapter Four reports the objective, design and methodology justification, data analysis, findings and discussion of the qualitative study. By conducting interviews, the perceptions of teachers and students about the factors influencing choice of e-learning over traditional learning in higher education are compared. Moreover, the factors enriching the attractiveness of an e-learning course are also explored.

Chapter Five presents the quantitative portion of the study including the research framework, hypotheses development, and the method and procedure used to conduct this research.

Chapter Six details the results of the statistical analysis based on the hypothetical model. It begins by reporting the descriptive statistics of the sample groups. Then, it provides intermediate analyses such as factor analysis

and correlation. The chapter concludes by describing the interrelationship of the key research variables and confirming or disconfirming the hypotheses with the use of logistic and multiple regressions, and the discussion of the findings.

Finally, Chapter Seven closes the thesis by drawing conclusions and providing a summary of study, discussing the contributions and implications of this research project, and stating the limitations and suggesting directions for future research.

The following chapter will describe the theoretical background of the study by reviewing the salient theories related to technology, individual choice, and social perspectives that affecting innovation diffusion and adoption.

Chapter 2

Theoretical Background

2.1 Introduction to the chapter

This research project is designed to understand what factors and/or variables affect student adoption and selection of e-learning over traditional learning in higher education. In addition to the demographic variables such as age and gender, students' perceptions of e-learning in higher education may be influenced by many different variables, such as characteristics related to technology, social, and individual choice. Consider, for instance, a student who is not comfortable with using computers, yet wants to take advantage of a course offered entirely over the Web. This student may experience learning barriers due primarily to his/her knowledge or understanding of technology. Since student adoption of e-learning involves the understanding of technological, individual choice, and social factors, there is a need to discuss multi-disciplinary theoretical perspective to find out the factors that influence the adoption.

This chapter introduces the theories and models underpinning this research project. To develop a strong theoretical research framework, this chapter will present reviews of the salient theories related to technology, individual choice, and social perspectives affecting innovation diffusion and adoption. First, the technology related theories include Innovation Diffusion Theory (Rogers, 1962, 1983, 1995) and Technology Acceptance Model (Davis,

1989) with its revision will be reviewed. Second, the individual choice related theories include self-efficacy (Bandura, 1982) and Media Richness Theory (Daft & Lengel, 1986) will be introduced. Lastly, the social theories such as Social Exchange Theory (Ekeh, 1974) and Social Influence Theory (Fulk, Schmitz & Steinfeld, 1990) will be reviewed in this chapter. Each section of the chapter concludes with an explanation of how the concept or theoretical model described contributed in the research study work.

2.2 Technology Related Theories

To date, much of innovation and diffusion research has introduced general themes and frameworks related to adopting, diffusing, or infusing information technology. Many popular models represent attempts at applying general social-psychological models to the IT context, including the Technology Acceptance Model (TAM) by Davis (1989), Theory of Reasoned Action (TRA) by Fishbein and Ajzen (1975), Innovation Diffusion Theory (IDT) by Rogers (1962, 1983, 1995), and Theory of Planned Behaviour (TPB) by Ajzen (1985). These models are chosen to be the bases for this research because of their in depth theoretical foundation and the fact that they have been proven successful in numerous empirical studies (for instance, Moore & Benbasat, 1991; Tornatzky & Klein, 1982; Venkatesh et al., 2003).

Although many of these models differ in their theoretical structure, constructs, and relationships posited, all of them have been applied to a variety

of information technologies in different contexts such as mobile banking (Luarn & Lin, 2005), Wireless Application Protocol (WAP) services (Hung & Chang, 2005), e-shopping (Shih, 2004; Vijayasarathy, 2004), and portal Web Sites (Lin & Lu, 2000). To better explain e-learning, this research project uses IDT and TAM as its primary theoretical foundations. TRA and TPB also help in theoretical development by supporting and confirming TAM and IDT. The concept, use and development of these four theories are discussed in the following subsections.

2.2.1 Diffusion of Innovation

One theory that is often associated with research on technology innovation is Innovation Diffusion Theory (IDT). Rogers (1995) defined innovation as "an idea, practice, or object that is perceived as new by an individual or other unit of adoption" (p.11). Diffusion is also defined as "the process by which (1) an innovation (2) is communicated through certain channels (3) over time (4) among the members of a social system" (Rogers, 1995, p.10). An innovation generates uncertainty, and uncertainty motivates an individual or other unit of adoption to seek more information about alternatives. When an innovation is adopted by a large number of potential adopters in the community of adopters, it is said to have been diffused. According to Rogers (1995), IDT intends to explain the innovation decision process, and the factors that influence the rate of adoption. Moreover, factors contributing to the acceptance of IT are likely to vary within different

categories of adopters. IDT also helps predicting the likelihood of adoption and rate of adoption of an innovation.

IDT was widely researched and applied in disciplines such as anthropology, sociology, education, communication, marketing, etc. (Rogers 1962, 1983, 1995). Most of the innovations studied in recent IDT research are technology innovations (e.g. Hsu, Kraemer, & Dunkle, 2006; Mallat, Rossi, Tuunainen, & Öörni, 2009; Melville & Ramirez, 2008; Spanos, Prastacos & Poulymenakou, 2002). IDT theory helps identify numerous factors that facilitate or hinder technology adoption and implementation, and it has also provided insight into infusion, and diffusion of technological innovations and comprises a substantial body of literature (Prescott & Conger, 1995). IDT explores the communication aspects behind how an innovation is adopted.

Some empirical studies of IT adoption and diffusion using the IDT are shown in Table 2.1. The studies conform to two general styles of research: adopter studies and diffusion modeling studies. Adopter studies are primarily interested in understanding differences in adopter 'innovativeness', whereas diffusion modeling studies are primarily concerned with what determines the rate, pattern and extent of technology diffusion (Mahajan, Muller & Bass, 1990; Mahajan & Peterson, 1985; Parker, 1994).

A previous study on IT adoption and diffusion using the IDT include adoption of online service conducted by Parthasarathy and Bhattacherjee

(1998). The findings indicated that the decision not to use a particular information technology can be understood in terms of external influence (e.g. mass media and advertising), interpersonal influence (e.g. word-of-mouth influence from friends and relatives), perceived usefulness, and service utilization. Chau and Tam (1997) investigated the adoption factors of open systems technology in organizations. The findings showed that organizations tend to focus more on their ability to adopt than on the benefits from adoption, and perceived importance of compliance and perceived barriers were the factors affecting the adoption. Grover and Goslar (1993) also examined the adoption of telecommunication technologies in organizations. The results indicated that two factors, environmental uncertainty and decentralization of decision making, showed significant relationships with the usage of these technologies in organizations.

Further, Spanos, Prastacos and Poulymenakou (2002) examined the impact of information and communication technologies adoption on management praxis. The findings showed that changes in strategy, organizational structure, management systems, and human skills do affect the information and communication technologies adoption. Similarly, DeCanio, Dibbie, and Amir-Atefi (2000) tested the important of organizational structure for the adoption of innovations. These researchers concluded that organizational structure is a crucial element in the diffusion of technological innovations.

Moreover, Igbaria, Zinatelli, Cragg and Cavaye (1997) investigated the key factors affecting personal computing acceptance in small firms. The findings indicated that exogenous variables such as management support and external support influence both perceived ease of use and perceived usefulness, and consequently affect the usage acceptance of personal computing. Besides, Loh and Venkatraman (1992) attempted to examine the determinants of information technology outsourcing by integrating both business and IT competences. The results indicated that IT outsourcing is dependent on business governance, particularly financial leverage.

For the diffusion modeling studies, Rai, Ravichandran and Samaddar (1998) empirically investigated the diffusion of telecommunication systems using IDT. This perspective asserts that the adoption of an innovation results mainly from a learning or communications process. Consequently, a key step in examining the process of the information flow, as well as the characteristics of information flow, information reception and resistance to adoption were presented. According to their study (Rai et al., 1998), resistance to adoption included the general tendency of individuals to adopt particular innovations, or their innovativeness, and the similarity between the innovation in question and the social, economic and psychological characteristics of the potential adopters.

Brancheau and Wetherbe (1990) also investigated the diffusion process of spreadsheet software by individual accountants and managers within organizations. Findings showed that earlier adopters of spreadsheet software

were younger, more highly educated, more attuned to mass media, more involved in interpersonal communication, and more likely to be opinion leaders. The results also indicated that interpersonal channels of communication were dominant in all phases of adoption decision making, and IS departments played a minor role in the diffusion process. Likewise, Nilakanta and Scamell (1990) examined the process of diffusion of innovations in the database design tools and techniques. The findings suggested that organizational resources such as information resources, communication channels and a technical support function were found to influence only certain classes of these innovations.

Zmud (1982) examined the influence of centralization and formalization on diffusion of software development. The results indicated that the poor adoption of technical modern software practices was caused by the reluctance of computer specialists to learn the new techniques. Based on the innovation and technological diffusion literatures, Cooper and Zmud (1990) examined the interaction of managerial tasks with the information technology and the resulting effect on the adoption and infusion of material requirements planning. The results indicated that the interaction of managerial tasks with the information technology does affect the adoption of material requirements planning, but it does not affect the material requirements planning infusion.

Gurbaxani (1990) further examined the adoption pattern of computing networks from the perspectives of innovation diffusion theory and economics

by analyzing the growth of BITNET, a popular network of university computers. The findings showed that the pattern of diffusion in the case of BITNET was S-shaped and is consistent with the concept from innovation diffusion theory and economics.

Table 2.1 Previous Studies on IT Adoption & Diffusion Studies

Authors	**Topic**	**Findings**
Adopter Studies		
Chau & Tam (1997)	Identifying open systems acceptance factors	Data were collected from senior executives responsible for managing corporate IS functions from 89 organizations. Findings showed that perceived importance of compliance and perceived barriers are factors affecting adoption of open systems technology.
DeCanio, Dibbie & Amir-Atefi (2000)	Testing the behaviour of organizational acceptance	The results indicated that failure to recognize the importance of organizational structure on the performance of firms will lead to serious bias in estimation of the costs or benefits of a change in external circumstances.

Grover & Goslar (1993)	Examining the adoption of telecommunication technologies in organizational contexts	Results from examining a set of 15 distinct telecommunications technologies in 154 organizations indicated that environmental uncertainty and decentralization of decision making are the two significant factors that enable diffusion of technologies in U.S. organizations.
Igbaria, Zinatelli, Cragg & Cavaye (1997)	Personal computing acceptance factors in small firms	Results from a survey of 358 users in small firms in New Zealand indicated that perceived usefulness had a strong effect on system usage, and perceived ease of use was a dominant factor in explaining perceived usefulness and system usage. The results also showed that management support and external support are the two exogenous variables influence both perceived ease of use and perceived usefulness. Inconsistent with prior research in large firms, relatively little support was found for the influence of both internal support and internal training.

Loh & Venkatraman (1992)	Testing a model of determinants of information technology outsourcing by integrating both business and IT perspectives	Results indicated that IT outsourcing is dependent on business governance, particularly financial leverage.
Parthasarathy & Bhattacherjee (1998)	Examining the post-adoption behaviour (continued adoption versus discontinuance) within the context of online service use.	The results indicated that potential discontinuers can be discriminated from continued adopters based on their sources of influence (external and interpersonal), perceived service attributes (usefulness and compatibility), service utilization, and network externality (complementary product usage), during their time of initial adoption.
Spanos, Prastacos & Poulymenakou (2002)	Examining the impact of information and communication technologies adoption on management praxis	The results indicated that changes in strategy, organizational structure, management systems, and human skills will affect the ICT adoption.
Diffusion Modeling Studies		
Brancheau & Wetherbe (1990)	Testing the diffusion of spreadsheet software by individual accountants and managers	Results from a survey of over 500 professionals from 18 large businesses in manufacturing and services industry indicated that the innovation diffusion model's focuses on the

		individual adoption process is consistent with the degree of autonomy most knowledge workers have in carrying out their work.
Cooper & Zmud (1990)	Examining the interaction of managerial tasks with the information technology and the resulting effect on the adoption and infusion of material requirements planning (MRP)	Using a random sample of manufacturing firms across the United States, the results found that the interaction of managerial tasks with the information technology does affect the adoption of MRP, but not affect MRP infusion.
Gurbaxani (1990)	Examining the adoption pattern of computing networks, BITNET, from the perspectives of innovation diffusion theory and economics	Data was collected from the computing network BITNET across several countries from the period of 1981 to 1988. Results showed that the adoption of BITNET follows an S-curve pattern over time and is consistent with the concept from innovation diffusion theory and economics.
Nilakanta & Scamell (1990)	Examining the process of diffusion of innovations in the database design tools and techniques	The results suggested that organizational resources such as information sources, communication channels and a technical support function are

		found to influence only certain classes of these innovations.
Rai, Ravichandran & Samaddar (1998)	Investigating the diffusion of telecommunication systems using Innovative Diffusion Theory.	The results indicated that the adoption of an innovation results mainly from a learning or communications process. It was found that the resistance to adoption included the general tendency of individuals' innovativeness, and the similarity between the innovation in question and the social, economic and psychological characteristics of the potential adopters.
Zmud (1982)	Examining the influence of centralization & formalization on diffusion of software development	Results from a survey of 49 software development managers indicated that the poor adoption of technical modern software practices (MSP) were due to reluctance of computer specialists to learn the new techniques.

One of the major contributions of IDT is the innovation decision process, which starts with one's knowledge about the existence of the innovation and ends with the confirmation of the adoption/rejection decision. The five stages that are involved in innovation decision process shown in Figure 2.1 (Prescott & Conger, 1995). In the knowledge stage, users are first exposed to innovation and gain initial understanding of the innovation. In the persuasion stage, the decision making unit forms the attitude toward the innovation. In the decision stage, the decision to adopt/reject is reached. In the implementation stage, users actually use the innovation. Finally, the adoption/rejection decision is reconfirmed or reversed in the confirmation stage.

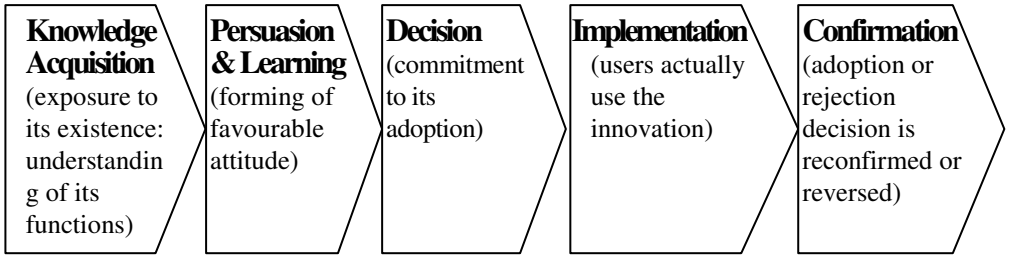


Figure 2.1 Innovation Decision Process (Source: Prescott & Conger, 1995)

Much of the literature on IDT has focused on the innovation decision process (Rogers, 1995; Karahanna, Straub & Chervany, 1999). Karahanna et al. (1999) have argued that key constructs in the innovation decision process include the perceived attributes of an innovation, individual attributes and beliefs, and communications regarding an innovation that individuals receive from the wider social environment. Karahanna et al. (1999) first combined

IDT and the theory of reasoned action (TRA) into a theoretical framework to investigate differences in information technology usage. The findings indicated that the intentions of potential adopters are determined solely by normative pressures, whereas user intentions are determined solely by attitude. Moreover, potential adopters base their attitudes on a more comprehensive set of innovation characteristics than users.

Another major contribution of IDT is the set of innovation attributes it provides. These innovation attributes, perceived by individuals, help to explain the different rate of adoption. According to Rogers (1995), these characteristics include relative advantage, complexity, compatibility, trialability, and observability. Refining the work of Rogers (1983), Moore and Benbasat (1991) expanded the relevant innovation characteristics set and developed an instrument to measure the perceived characteristics using an information technology as shown in Table 2.2.

The characteristics of an innovation, perceived or apparent to individuals, control the rate of adoption. The perceived newness of the innovation for an individual determines the reaction to the idea. It does not matter if an idea is 'objectively' new as measured by the time of discovery or introduction. According to Rogers (1995), an innovation has to be relatively advantageous, compatible with the existing values or needs of potential adopters, and simple to use. An innovation that can be experimented with on a limited basis and is visible to others will be more likely to be adopted.

Table 2.2 Innovation Characteristics based on Moore and Benbasat (1991) & Rogers (1995)

Characteristics	Description
Relative Advantage (Usefulness)	○ The extent to which a potential adopter views the innovation as offering an advantage over previous ways of performing the same task. ○ The degree of relative advantage may be measured in economics terms, but social prestige, convenience, and satisfaction are also important factors.
Complexity (Ease of Use)	○ The degree to which a potential adopter views usage of the target system to be relatively free of effort. ○ New ideas that are simpler to understand are adopted more rapidly than innovations that require the adopter to develop new skills and understanding.
Compatibility	○ The degree to which an innovation is perceived as being consistent with the existing values, needs, and past experiences of potential adopters. ○ An idea that is incompatible with the values and norms of a social system will not be adopted as rapidly as an innovation that is compatible.

Image		○ As a part of relative advantage, image captures the perception that using an innovation will contribute to enhancing the social status of a potential adopter.
Observability	Result Demonstrability	○ The tangibility of the results of using an innovation
	Visibility	○ The extent to which potential adopters see the innovation as being visible in the adoption context. ○ The easier it is for individuals to see the results of an innovation, the more likely they are to adopt it. Such visibility stimulates peer discussion of a new idea.
Trialability		○ The extent to which potential adopters perceive that they have an opportunity to experiment with the innovation prior to committing to its usage. ○ An innovation that is trialable represents less uncertainty to the individual who is considering it for adoption, who can learn by doing.

A stream of research on innovation diffusion was based on these attributes. The notable works related to the innovation characteristics is

summarised in Table 2.3. Some related notable works in the area of innovation characteristics (as cited in Fichman, 1999) include Cooper and Zmud's (1990) examination of the interaction of managerial tasks with the information technology, Meyer and Goes's (1988) examination of the assimilation of innovation into organizations, Leonard-Barton's (1988) explication of characteristics related specifically to technology implementation, and Ramiller's (1994) detailed review and assessment of the compatibility construct. The results of these studies illustrated that compatibility and divisibility are positively correlated with technology innovation but complexity is negative correlated to technology innovation.

Other notable studies include Downs and Mohr's (1976) examination of the conceptual and measurement issues related to innovation characteristics, Moore and Benbasat's (1991) explication of the development of an instrument to measure perceptions of adapting an IT Innovation, as well as Tornatzky and Klein's (1982) meta-analysis of innovation. The results of these studies indicated that relative advantage, compatibility, trialability, and observability, ease of use, image, visibility, usefulness, communicability, divisibility, and profitability are positively associated with innovation adoption, however, complexity and cost of an innovation are negatively associated with innovation adoption.

Table 2.3 Innovation Characteristics and its Related Work

Authors	**Topic**	**Research Variables**	**Reported Relationship**
Cooper & Zmud (1990)	Examining the interaction of managerial tasks with the information technology	Task-technology compatibility Technical complexity	The results indicated that the there is a positive relationship between the task-technology compatibility and MRP implementation success, and there is a negative relationship between the technical complexity and its implementation success.
Downs & Mohr (1976)	Examination of conceptual and measurement issues related to innovation characteristics	Relative advantage Compatibility Complexity Trialability Observability Cost	The results revealed that more the relative advantage, compatibility, trialability, and observability, the more likely the organization is to adopt the innovation. On the other hand, the more complexity and higher cost incurred, the less likely the organization is to adopt the new innovation.
Leonard-Barton (1988)	Explication of characteristics related to technology implementation	Complexity Divisibility	The results indicated that the organizational complexity negatively affects the implementation of technology, but the divisibility positively affects the technology implementation.

Meyer & Goes (1988)	The extent of assimilation of an innovation	Compatibility Complexity	The findings showed that the greater the compatibility and less complexity of an innovation, the more likely the hospital is to adopt and implement it.
Moore & Benbasat (1991)	Development of an instrument to Measure Perceptions of Adapting an Information Technology Innovation	Relative advantage Compatibility Complexity Trialability Observability Perceived Voluntariness Ease of Use Image Visibility Usefulness	The results found that the innovation characteristics such as the relative advantage, compatibility, trialability, observability, ease of use, image, visibility, and usefulness are positively correlated to the innovation adoption. Complexity is negatively correlated to innovation adoption. However, perceived voluntariness is found to be varied.
Ramiller (1994)	Review and assessment of compatibility construct	Compatibility	The findings indicated that the perceived compatibility construct positively affects the adoption of information technology innovations within organizations.

Rogers (1995)	Diffusion of Innovations	Relative advantage Compatibility Complexity Trialability Observability	The results revealed that relative advantage, compatibility, trialability, and observability are positively correlated to the diffusion of innovations. And complexity is negatively correlated to the diffusion.
Tornatzky & Klein (1982)	Meta-analysis of innovation characteristics research	Relative advantage Compatibility Complexity Cost Communicability Divisibility Profitability Social Approval	The findings indicated that the relative advantage, compatibility, communicability, divisibility, profitability, and social approval of an innovation to the potential adopter is positively relate to adoption and implementation of the innovation. However, the complexity and cost of an innovation to the potential adopter is negatively related to adoption.

IDT identified five adopter categories (Rogers, 1995). Innovators, which represent 2.5% of the average members of a system, are characterized by their venturesomeness. Early adopters are respected by their peers and 'checked with' before an adoption of an innovation. They usually make up 13.5 % of the members. Early majority (33%) have a longer deliberation time than innovators and early adopters. They are an important link in the diffusion process. Also making up one-third of the members of a system, late majority approach innovations with skepticism. They only adopt the innovation after the majority of the members have done so. The last category includes laggards (16%), who tend to resist innovations. The five categories depict the various types of adopters in a system, hence understanding their characteristics enable researchers and practitioners to introduce innovations more effectively to different audience. Research studies have found that different adopters differ in terms of their socioeconomic status, personality variables, and communication behaviour, therefore, the characteristics of the five categories of adopters can be used for audience segmentation (Coleman, Katz & Menzel, 1996; Rogers, 1962; Ryan & Neal, 1943).

IDT is a theory that has gone through a long history of research in a great variety of disciplines. It was claimed by Rogers (1995, p.12) that "no other field of behaviour science research represents more effort by more scholars in more disciplines in more nations". The theory helps us understand how and why an innovation is diffused into a social system. E-learning, as the hybrid of learning process and modern technology, is considered innovation as

it has completely revolutionized education by making learning accessible in ways that are beyond the scope of the traditional face to face model. Hence, it is considered that the classic theory, IDT, will shed light on our quest to comprehend its diffusion.

The main contribution of IDT to this research project is the set of innovation attributes. They help to explain the different rate of adoption by users. The attributes include: relative advantage, compatibility, complexity, trialability, and observability. They are employed to predict or explain the diffusion of innovations in numerous research projects (i.e. Agarwal & Prasad, 1997; Karahanna, et al. 1999; Moore & Benbasat, 1991). Although the original set of innovation attributes includes five attributes, they have been reported to have different relative importance on the adoption decision making in various research. In two meta-analyses of innovation characteristics and innovation adoption and implementation (Roger, 1983; Tornatzky & Klein, 1982), researchers found that relative advantage and compatibility were consistently and positively related to adoption of innovations, while complexity was negatively related to adoption. Inconsistent or non-interpretable results were reported for the other two attributes of innovations (observability and trialability). Moreover, from the study of Moore and Benbasat (1991), they found that only relative advantage, complexity, and compatibility were found to be especially relevant with respect to technology innovations. Since e-learning is considered as innovation, thus the three

attributes (relative advantage, complexity, and compatibility) are included in the proposed research model.

2.2.2 Technology Acceptance Model with its Revisions

Technology innovation research has mainly focused on investigating the factors of technology acceptance and utilization among users (e.g. Davis, 1989; Davis, et al., 1989; Mathieson, 1991; Moore & Benbasat, 1991, Taylor & Todd, 1995a). Most of this research draws its theoretical underpinning from the adoption and diffusion of innovation literature where individuals' perceptions about using an innovation are posited to influence adoption behaviour (Moore & Benbasat, 1991; Rogers, 1995). Other significant theoretical models attempt to explain the relationship between user attitude, perceptions, and beliefs. These theories include Theory of Reasoned Action (TRA) (Fishbein & Ajzen, 1975), Theory of Planned Behaviour (TPB) (Ajzen, 1985; Mathieson, 1991), and the Technology Acceptance Model (TAM) (Davis, 1989). Indeed, TAM, proposed by Davis (1989), is an adaptation of the TRA (Fishbein & Ajzen, 1975), whereas TPB, is an extension of TRA, explains behavioural conditions not entirely under volitional control (Ajzen, 1985, 1991, 2001).

Among the different models that have been proposed, TAM appears to be the most widely accepted among information systems researchers and practitioners. The main reason for its popularity is perhaps its parsimony, as

well as its wealth of recent empirical support (Agarwal & Prasad, 1999; Lin, 2007). Also, TAM is acclaimed for its predictive power which makes it easy to apply in different situations (Ndubisi & Jantan, 2003; Venkatesh & Morris, 2000).

Theory of Reasoned Action (TRA)

The Theory of Reasoned Action (TRA), developed by Fishbein and Ajzen (1975), is probably one of the most influential theories used to explain human behaviour (Venkatesh et al., 2003). Simply put, according to this theory, the behavioural intention can be explained by the attitude towards behaviour and subjective norm. The attitude towards behaviour is defined as "an individual's positive or negative feelings (evaluative effect) about performing the target behaviour" (Fishbein & Ajzen, 1975, p.216). Subjective norms refers to perception that most people who really matter to the individual think that he/she either should or should not perform the behaviour in question" (Fishbein & Ajzen, 1975, p.302). The conceptual framework of TRA is presented in Figure 2.2.

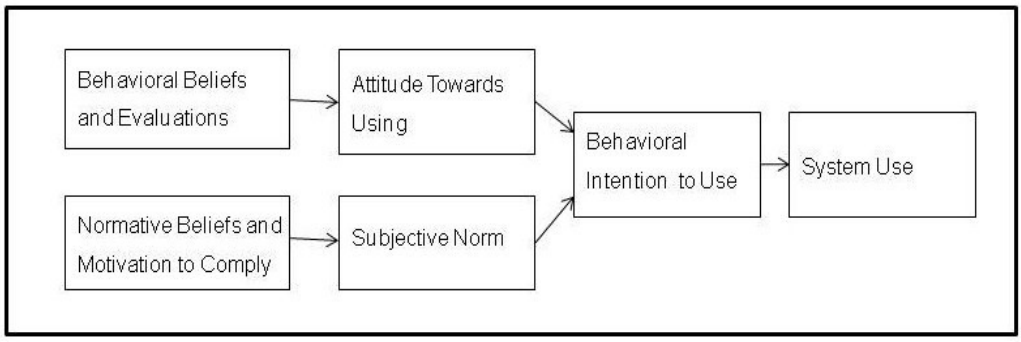


Figure 2.2 Theory of Reasoned Action (TRA)(Source: Fishbein & Ajzen, 1975)

TRA is based on the assumption that human beings make rational decisions based on the information available to them. The causal linkages within that model flow in a sequence of beliefs, attitudes, intentions, and behaviours. The theory hypothesizes that an individual's behavioural intention to perform (or not to perform) a behaviour is the immediate determinant of that individual's actual behaviour. Behavioural intention is the function of both personal and social influence. The personal influence is reflected in attitude towards using whereas the social influence is reflected in the subjective norm. When attitude towards using and subjective norms are conflicting with each other, the individual's intention to perform or not perform the behaviour depends on the relative importance of these two constructs. Both attitude towards using and subjective norms are functions of beliefs, yet the beliefs which influence these two constructs are of different types. If an individual believes that performing a certain behaviour will render positive results, he/she is likely to hold a positive attitude towards the behaviour. On the other hand, if an individual believes that other people with whom he/she is motivated to comply think he/she should perform the behaviour, he/she is likely to perform the behaviour due to the pressure from subjective norms.

TRA is a well-researched theory and has been successful in predicting a wide range of human behaviour, e.g. alcohol and drug use, safe sex behaviour, voting behaviour, family planning, strategy choices in lab games, grocery coupon use and dental hygiene (see extensive list of references in Ajzen &

Madden, 1986; Fishbein & Manfredo, 1992). The TRA model has also received broad support in empirical studies of consumer decision making and in the literature on social psychology (Sheppard, Hartwick, & Warshaw, 1988). Sheppard and colleagues (1988) conducted a meta-analysis of studies which have utilized TRA within the field of consumer behaviour. The findings suggested that the TRA has strong predictive utility across research boundaries. Specifically, for behaviours, an intention measure performed well in the prediction of behaviour, but less so in the prediction of goal or outcome. However, for predicting activities involving a choice among alternatives, it was noted that the TRA performed best in situations involving explicit choice among alternatives. The findings also indicated that the attitudes, subjective norms, and intentions relation was stronger when an intention measure rather than an estimation measure was used. On the other hand, the intentions and behaviours relation was marginally stronger when an estimation measure was used. These findings led to the conclusion that in people's minds, intention and estimation apparently are different concepts. This conclusion was based on a meta-analysis of 87 separate studies that had a total sample of 12,624 observations with a significance level of 0.001.

Korzaan (2003) applied flow theory and TRA in the context of online purchasing. Using a two phased structural equation analysis, Korzaan concluded that attitude is a direct and significant influencer of intention to engage in online purchasing transactions. Korzaan further added two constructs (exploratory behaviour and flow) into TRA. Exploratory behaviour

refers to surfing the Web, clicking on new links simply out of curiosity and a desire to experience variety such as online advertisements. Flow characterizes the subjective human-computer interaction experience as playful and exploratory. The results indicated that both constructs had significant influence on attitude towards online purchasing.

Similar studies that used the TRA as one of the foundation models were done in online purchasing and e-commerce. Pavlou (2003) combined the TRA with TAM in an e-commerce trust and perceived risk context. Three experimental survey studies were used to test the two models in the following settings: a) predetermined, b) self-selected, or c) general online retailer. First, 36 undergraduate students were to complete the questionnaire related to Amazon.com. Second, 41 students were asked to select a Web retailer of their choice that they were familiar with, and then complete a questionnaire with regard to that retailer. Third, 25 students were asked to rate their perceptions of Web retailers in general. Pavlou (2003) explained that the rationale behind these three different scenarios with either a predetermined or self-selected Web retailer or online retailers in general was to test the proposed research model in several contextual bases to assess its robustness and generalizability across different targets. The results indicated that the TRA and TAM are robust models in predicting behaviour and intention in the e-commerce context. Reimenschneider and McKinney (1999) combined the TRA and TPB to provide a theoretical foundation for their study. In the study, executives from 27 organizations over a wide range of industry types were surveyed to

examine factors that affect the adoption of e-commerce. The results indicated that the major factors that prevent decision makers from adopting e-commerce were cost, security, and the loss of personal contact.

Al-Gahtani and King (1999) also based their work on more than one model, keeping the attitude construct as a predictor of usage in addition to the end-user computer satisfaction. The model included constructs from the IDT like relative advantage, ease of use and enjoyment, and other constructs from the technology acceptance domain. Based on 329 surveys collected from university students regarding a spreadsheet system, the authors concluded that the TRA and TAM together provided better explanatory power, relative advantage had significant effect on both attitude and satisfaction, and compatibility of task had significant effect on usage.

Another related study done by Ha (1998) applied the TRA to brand loyalty. The proposed model was described in the context of purchase behaviour and the analysis was based on a classification system of unit brand loyalty. Ha concluded that unit brand loyalty is a valuable concept in depicting situation of customer loyalty, and the TRA was useful in conceptualizing the context of adoption.

Other comparisons between models in the social science have been conducted away from the information technology context. Leone, Perugini and Ercolani (1999) compared TRA with TPB and the theory of self regulation in

a structural equation analysis study which used 240 Italian college students' responses regarding their purchase decisions. The results indicated that past behaviour is a stronger predictor of future behaviour in the TRA, but not in the other two models which outperformed the TRA in performance. Finally, Hartel, McColl-Kenndey, and McDonald (1998) integrated the TRA with the attributional theory into a model to measure the consumer behaviour domain.

Table 2.4 lists the different studies that used or tested the TRA in different contexts. Overall, the results of the empirical testing of the relationship between intention to use the technology and subjective norms can be described as contradictory, but more consistent for attitudes. However, in general, individuals with positive attitudes will have greater intention to use the technology.

One of the drawbacks of TRA, however, is that the research model does not include external variables such as personality characteristics, demographic variables, or social role, which are often found to influence individual's behaviour (Ajzen & Fishbein, 1980). The current project will take into account the role of demographic variables in adoption of e-learning.

Table 2.4 Research related to Theory of Reasoned Action (TRA)

Authors	**Topic**	**Findings**
Abdul-Gader & Kozar (1995)	Use an expanded model based on TRA and Warshaw's model of purchase intention to examine the variables correlate with computer purchasing decision.	Results indicated that there are no differences between the two cultures of the United States and Saudi Arabia. Attitudes were influenced by education level, computer knowledge, and computer experience.
Al-Gahtani & King (1999)	Investigating factors that contribute to the acceptance of Information Technology.	By integrating the major constructs of TRA and TAM into a new model, the model testing result indicated that relative advantage contributed most to attitudes and satisfaction, and compatibility contributed most to usage.
Ha (1998)	Integrate attitude, subjective norm and purchase behaviour to predict and measure brand loyalty, and to investigate the relationships among several antecedents of behavioural brand loyalty by introducing the theory of reasoned action (TRA).	Results indicated that when attitude, subjective norm and purchase behaviour are all consistent and favourable, the maximum level of unit brand loyalty will be realized.

Hartel, McColl-Kenndey, & McDonald (1998)	Incorporating Attributional theory and the theory of reasoned action (TRA) to produce a contingency predictive model of consumer reactions to organizational mishaps.	A conceptual integration of the TRA and the Attributional theory models into one.
Korzaan (2003)	Predicting online purchase intentions by TRA.	By combining flow theory and TRA into a new model, results indicated that attitude has a direct and significant influence on intention. Also, flow and exploratory behaviour had significant influence on intention.
Leone, Perugini & Ercolani (1999)	Comparison of three models of Attitude–Behaviour Relationships (TRA, Theory of Self-regulation and TPB) in the Studying Behaviour Domain.	Results showed that past behaviour is a strong predictor of both intention and behaviour in the TRA model, while it is a weaker predictor of intention in TPB and in the Theory of Self-regulation models.
Pavlou (2003)	Predicting consumer acceptance of electronic commerce by integrating trust and risk in TRA with the Technology Acceptance Model (TAM).	Results indicated that TAM and TRA are robust models in predicting behaviour and intention. Trust and perceived risk is significant influencers of intention to use. Trust indirectly affects intention

		through perceived usefulness and perceived ease of use.
Reimenschneider & McKinney (1999)	Factors affecting the adoption of Web-based e-commerce for Businesses by TRA.	Results indicated that most firms which indicated they had already adopted Web-based e-commerce were those which employed between 250 and 500 people. Small firms have not been as quick to adopt the technology due to the cost, security and they prefer personal contact with customers.
Sheppard, Hartwick, & Warshaw (1988)	Two meta analyses were conducted to investigate the effectiveness of TRA model.	Results indicated that the TRA was a strong predictor of behaviour and intention.

Technology Acceptance Model (TAM)

As an adaptation of TRA, the Technology Acceptance Model (TAM), proposed by Davis (1989), is one of the most influential research models in studies of the determinants of information system acceptance. TAM is often used by both information systems researchers and practitioners to gain a better understanding of the adoption and use of information systems. Based on the TRA, Davis (1989) introduced TAM for predicting IT usage. While TRA is designed to explain any human behaviour (Fishbein & Ajzen, 1975), the goal of TAM was to provide an explanation of the determinants of computer acceptance that is general, capable of explaining user behaviour across a broad range of end-user computing technologies and user populations, while at the same time being both parsimonious and theoretically justified (Davis et al., 1989). The general model of TAM is presented in Figure 2.3.

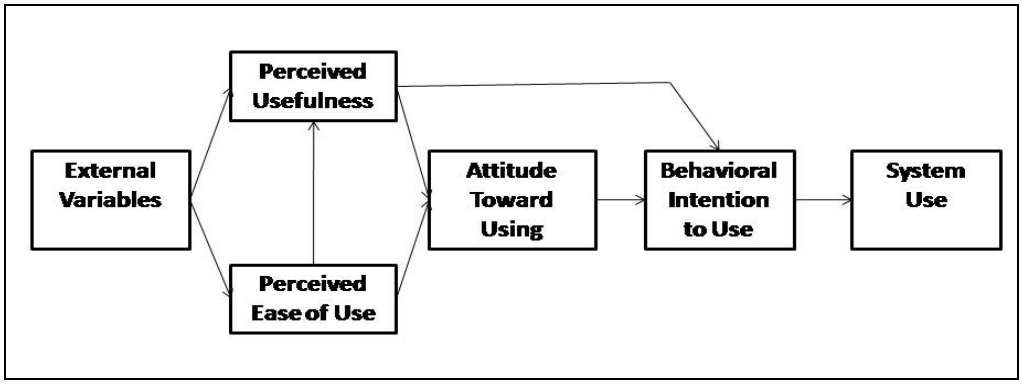


Figure 2.3 Technology Acceptance Model (TAM) (Source: Davis et al. 1989)

The model posits that a user's adoption of a new information system is determined by that user's intention to use the system, which in turn is

determined by the user's beliefs about the system. TAM further suggests that the two beliefs – perceived usefulness and perceived ease of use – are instrumental in explaining the variance in users' intentions. The key constructs in the theoretical model are defined as follows:

External variables

Davis (1989) and Davis et al. (1989) developed TAM by adapting the TRA (Ajzen & Fishbein, 1980; Fishbein & Ajzen, 1975) to understand the causal chain linking external variables to IT usage intention and actual use in a workplace. Davis's (1989) list of external variables includes: objective system design characteristics, training, computer self-efficacy, user involvement in design, and the nature of the implementation process. These are theorized to influence behavioural intention to use, and actual usage, indirectly through their influence on perceived usefulness and perceived ease of use.

Perceived usefulness

Perceived usefulness is defined as the degree to which a person believes that using a particular technology would enhance his or her job performance (Davis, 1989). The importance of perceived usefulness as an important factor derives from the TRA and TAM models, which propose that perceived usefulness affects computer usage due to the reinforcement value of outcomes. Adams, Nelson and Todd (1992), Davis et al. (1989), Straub, Limayem and

Karahanna (1995), and Szajna (1996) reported that user acceptance of computer systems is driven to a large extent by perceived usefulness. Other studies have also reported that perceived usefulness is positively associated with system usage (Igbaria & Iivari, 1995; Thompson, Higgins & Howell, 1991).

Perceived ease of use

Perceived ease of use is defined as the degree to which a person believes that using the system would be free of effort (Davis, 1989). Davis et al. (1989) identified ease of use as an important determinant of system usage through perceived usefulness. Davis (1989) suggested that perceived ease of use may actually be a causal antecedent to perceived usefulness. Goodwin (1987) argued that the effective functionality of a system, i.e. perceived usefulness, depends on its usability, i.e., perceived ease of use. Mathieson (1991) and Szajna (1996) each reported that ease of use explains a significant amount of the variance in perceived usefulness. Adams, Nelson, and Todd (1992) found that both perceived usefulness and perceived ease of use are important determinants of system usage. Similar findings have been reported by Mathieson (1991), Rogers (1995), Straub et al. (1995), and Thompson et al. (1991). They suggested that, in addition to perceived usefulness, usage is influenced by perceived ease of use.

Attitude toward using

Attitude is defined as an individual's positive or negative feeling (evaluating effect) about performing the target behaviour (Fishbein & Ajzen, 1975, p.216). An individual will have a favourable attitude towards using an information system if he/she believes that doing it will have largely positive consequences. According to TAM, an individual's attitude toward using a system is determined by two specific beliefs (i.e., perceived usefulness and perceived ease of use).

Behavioural intention to use

Behavioural intention is a measure of the strength of one's intention to perform a specific behaviour (Fishbein & Ajzen, 1975, p.288). In TAM, behavioural intention to use an information system is determined by attitude toward using the system.

TAM model hypothesizes that the actual system use is determined by users' behavioural intention to use, which is in turn influenced by users' attitudes toward using. Finally, attitude is directly affected by beliefs about the system, which consists of perceived usefulness and perceived ease of use. TAM theorizes this belief-attitude-intention-behaviour relationship to predict user acceptance of technology.

In these causal relationships, perceived usefulness has both direct and indirect relationships with behavioural intention. This implies that people form their intention to use on the basis of the belief that using a particular technology will enhance their job performance. Therefore, if two competing systems have the same level of usability, the system that can better achieve users' objectives will be used. Attitude is determined jointly by perceived usefulness and perceived ease of use. The two mechanisms by which perceived ease of use influences attitude are self-efficacy and instrumentality (Davis et al., 1989). Self-efficacy, which will be briefly explained in the next section, entails the judgments of how well one can execute courses of action required to deal with prospective situation, and instrumentality refers to the system characteristics. Finally, perceived usefulness is determined by both perceived ease of use and external variable (e.g. system features, training, documentation and user support).

The validity or reliability of the two fundamental determinants of user acceptance in TAM, perceived usefulness and perceived ease of use, were reexamined by Davis (1989). Based on cost-benefit paradigm, adoption of innovations, evaluation of information reports, channel disposition model and non-MIS studies, Davis (1989) designed 2 scales of 6 items each, which demonstrated high reliability and validity. The validated scales provided measures for predicting and explaining use. The validity of TAM was further tested again by Mathieson (1991), who compared TAM with another model based on the Theory of Planned Behaviour (TPB) which predicted an

individual's intention to use an Information System. The validity of the measurement scales of the two constructs (i.e. perceived usefulness and perceived ease of use) in Davis's model was reexamined in a number of other studies. Adam et al. (1992) replicated Davis's (1989) study with a focus on evaluating the psychometric properties of the two scales, while examining the relationship among ease of use, usefulness, and system usage. Two studies were conducted in the study of Adams et al. (1992). The results of the studies generally demonstrated reliable and valid scales for measurement of perceived usefulness and ease of use. However, a factor analysis in the second study indicated that two of the usefulness items, 'using Harvard Graphics makes it easier to do my work' and '…allows me to accomplish work more quickly', were loaded with both ease of use scale and usefulness scale. The researchers explained this finding was caused by the respondents' limited experience with Harvard Graphics, but it also revealed the complexity of the construct. Another test of the reliability of the perceived usefulness and perceived ease of use was reported by Doll, Hendrickson, and Deng (1998). Using two software packages, the researchers demonstrated that Davis's (1989) instrument exhibited a high degree of test-re-test reliability.

King and He (2006) further performed a statistical meta-analysis of TAM, using 88 studies published during 1998-2003. The studies were selected from the papers published in the social science citation index in the fall of 2004. After elimination of irrelevant papers, and papers which did not involve a direct statistical test of TAM, or were not empirical studies, or were not

available online through the University of Pittsburgh's Research Library, 88 TAM studies involving more than 12,000 observations were retained for the meta-analysis. The results of the meta-analysis indicated that TAM to be a valid and robust predictive model that has been widely used, but also has potentially wider applications. The main constructs of perceived usefulness and behavioural intention were found to be highly reliable and the influence of perceived ease of use via perceived usefulness was confirmed. King and He (2006) also found that perceived ease of use influenced behavioural intention to use an information system directly only in research contexts involving internet applications. While being generally strong, the statistical correlation of TAM varied among the studies of the meta-analysis. This variance was caused by moderating factors outside the model such as the experience level of users.

TAM has been widely used to predict user acceptance and use based on perceived ease of use and usefulness. The robustness of the model has been upheld in numerous studies (e.g. Ghorab, 1997; Igbaria et al, 1997; Straub et al., 1995). Straub et al. (1995) examined the conceptual as well as methodological issues related to measuring system usage. The results of the study suggested that the system usage should be factored into self-reported system usage and computer-recorded system usage. While self-reported measure of system usage is related to perceived usefulness and ease of use, computer-recorded measures show distinctly weaker links. Igbaria et al. (1997) also investigated the key factors affecting personal computer acceptance in

small firms. The results of the study indicated that perceived usefulness had a strong effect on system usage, and perceived ease of use was a dominant factor in explaining perceived usefulness and system usage. The results also indicated that exogenous variables influence both perceived usefulness and ease of use, particularly management support and external support. These findings, however, were inconsistent with prior research in large firms, relatively little support was found for the influence of both internal support and internal training. Further, Ghorab (1997) investigated the relationship between managers' perceptions toward the system, the system usage, and the adoption level of technological sophistication. The findings of the study showed that users' perception toward the system affected the system usage and adopted level of technological sophistication.

After validation efforts confirmed the saliency of the measurement instruments, TAM has been extended by a number of researchers in the attempt to improve its ability to predict use. The model was extended by external variables which include individual, organizational, and task characteristics. For instance, Agarwal and Prasad (1999) extended TAM with five individual difference variables (role with regard to technology, tenure in workforce, level of education, prior experience, and participation in training) as the external variables of perceived usefulness and perceived ease of use. The results showed that the relationship between participation in training and perceived usefulness, between prior experiences, role with regard to technology, tenure in workforce, level of education, and perceived ease of use,

were predicted successfully. Igbaria, Iivari, and Maragahh (1995) examined the effects of organizational factors and found that user training, computing support, and managerial support significantly affect both perceived usefulness, perceived ease of use and microcomputer usage. Karahanna and Limayem (2000) carried out a study with two technologies, e-mail and voice-mail, and found that the determinants of the system usage and those of perceived usefulness and perceived ease of use were different among the technologies. Perceived usefulness did not influence e-mail usage but social influence did, and the result was reversed in the case of voice-mail.

Moreover, a number of researchers have extended TAM to examine the moderating effects of external variables. For instance, Gefen and Straub (1997) examined the effect of gender differences on information systems acceptance, and determined that gender significantly moderates the effects of perceived usefulness, perceived ease of use, and social presence. The results indicated that men were more affected by perceived usefulness, while women were more affected by perceived ease of use and subjective norm. Gefen and Straub (2000) further examined the influence of task type which Web usage tasks were divided into information inquiry and product purchasing. The results showed that perceived ease of use responded differently according to the task type. Specifically, perceived ease of use significantly predicted Web usage for a purchasing task, but not for an inquiry task. Similarly, Moon and Kim (2001) examined TAM in the Internet context, differentiating tasks into entertainment and work-related task. The results showed that the significant factors affecting

Internet usage depend on the task type. Perceived playfulness was most critical for an entertainment task and perceived usefulness for a work-related task on the Internet.

For different user types, Karahanna Straub, and Chervany (1999) found a significant difference between potential users and current users over time. Social influence significantly affected the adoption intention of potential users, while attitudes significantly affected current users. Besides, Taylor and Todd (1995a) investigated the role of prior experience on IT usage, and found that subjective norm is a better predictor of intention with inexperienced subjects. Venkatesh and Davis (1996) further investigated the antecedents of perceived ease of use in TAM, and the findings showed that computer self-efficacy was the determinant of perceived ease of use before and after hands-on use of an information system.

TAM was also augmented to fit in different contexts. In their study, Phillips, Calantone and Lee (1994) augmented TAM to investigate international technology adoption in China. The results of the study indicated that cultural affinity has a significant and positive influence on international technology adoption through perceived ease of adoption. Rose and Straub (1998) further examined the general IT use in five Arab nations in the Middle East by using TAM. The results of the study showed that TAM applied successfully in the less developed country. Similarly, Straub, Keil, and Brenner (1997) examined the technology acceptance across three different

countries (Japan, Switzerland, and the United States). However, the researchers found that the model held for both the United States and Switzerland, but not for Japan, suggesting that TAM may not predict technology use across all cultures.

Besides, a number of researchers have compared TAM with other models. Davis et al. (1989) compared TAM with the Theory of Reasoned Action (TRA). TAM was empirically tested in a longitudinal study of 107 users' intentions to use a specific system. The results of the study supported TAM concepts; specifically, perceived usefulness was found to have a strong influence on people's intentions, while perceived ease of use had a smaller but still significant effect on that subsided over time. Mathieson (1991) compared TAM with the Theory of Planned Behaviour (TPB). The results indicated that both TAM and TPB predicted intention to use an information system quite well, but TAM slightly outperformed TPB. According to Mathieson (1991), TAM provides a fast and inexpensive way to gather general information about individuals' perceptions of a system, and it can be used to measure general levels of satisfaction across a range of users with diverse interests. On the other hand, TPB provides more specific information that can better guide development, and gives more insight into why an individual or group might be dissatisfied, but it is more costly to apply. Table 2.5 summarises some of the most important studies on TAM.

Table 2.5 Previous Studies on Technology Acceptance Model (TAM)

Authors	Topic	Findings
Validity of Perceived Usefulness and Perceived Ease of Use		
Adams, Nelson & Todd (1992)	Presented the findings of two studies that replicated Davis's (1989) study of TAM on the subject of perceived usefulness, ease of use, and usage of information technology. The studies focused on evaluating the psychometric properties of the ease of use and usefulness scales, while examining the relationship between ease of use, usefulness, and system usage.	The results indicated the reliable and valid scales for measurement of perceived ease of use and usefulness. Moreover, the results of the studies also supported the relationship between ease of use, usefulness, and system usage proposed by Davis (1989).
Davis (1989)	Validation of the scales for perceived usefulness and perceived ease of use	In two studies involving a total of 152 users and 4 application programs, the author developed 2 scales of 6 items each. The scales demonstrated high reliability and validity.

Doll, Hendrickson, and Deng (1998).	Testing the reliability of perceived usefulness and perceived ease of use.	The results of this confirmatory study provided strong support for the validity and reliability of Davis's perceived usefulness and ease-of-use instruments
King & He (2006)	Meta-analysis of TAM as applied to various fields by using 88 published studies.	The results indicated TAM to be a valid and robust model that has been widely used, but potentially has wider applicability. A moderator analysis involving user types and usage types was performed to investigate conditions under which TAM may have different effects. It also revealed the power of meta-analysis as a rigorous alternative to qualitative and narrative literature review methods.
Acceptance of System Use		
Ghorab (1997)	The relationship between managers' perceptions towards the system, the system usage and adopted level of technological sophistication	Results from a survey of 47 UAE bank managers indicated that users' perception towards the system affects the system usage and adopted level of technological sophistication.

Igbaria, Zinatelli, Cragg, & Cavaye (1997)	Personal computer acceptance factors in small firms	Results from a survey of 358 users in small firms in New Zealand indicated that perceived usefulness had a strong effect on system usage, and perceived ease of use was a dominant factor in explaining perceived usefulness and system usage.
Straub, Limayem, & Karahanna (1995)	Measuring system usage	The results suggested that the system usage should be factored into self-reported system usage and computer-recorded system usage. While self-reported measure of system usage is related to perceived usefulness and ease of use, computer-recorded measures show distinctly weaker links.
External Variables		
Agarwal & Prasad (1999)	Five kinds of individual difference variables were added to TAM as the external variables to predict IT acceptance.	The results identified several individual difference variables that have significant effects on TAM'S beliefs.

Gefen & Straub (1997)	Study the gender differences in the perception and use of E-mail	The results from a survey of 392 knowledge workers suggested that researchers should include gender and IT diffusion models along with other cultural effects. The study extended TAM to include gender construct.
Gefen & Straub (2000)	Examine the varying effects of perceived ease of use on IT adoption by differentiating between tasks (inquiry tasks and purchasing tasks).	The results showed that perceived ease of use directly affects IT adoption only when the primary task for which the IT is deployed is directly associated with intrinsic IT characteristics, such as when the task itself is an integral part of an IT interface.
Igbaria, Iivari, & Maragahh (1995)	Discuss the two motivators: extrinsic and intrinsic, for the computer usage in Finland.	The results indicated that extrinsic motivation plays a greater role in individuals' behaviour and that perceived ease of use affects both perceived enjoyment and usefulness, as well as usage. Moreover, they were found to mediate fully the relationship between perceived ease of use and computer usage.

Karahanna & Limayem (2000)	Examine whether the antecedents of e-mail use are different than the antecedents of v-mail use by expanding TAM to incorporate antecedents of perceived usefulness and perceived ease of use.	The results indicated that there were important differences between antecedents of e-mail and v-mail usage, in both the determinants of system use and in the determinants of perceived usefulness and perceived ease of use. The effect of social influence on use and its relation to beliefs differ across the two media, suggesting that strong social norms may have a moderating effect on the relation between beliefs and use.
Karahanna, Straub, & Chervany (1999)	Examine differences between pre-adoption and post-adoption beliefs and attitudes in information technology usage.	The results indicated that indicates users and potential adopters of information technology differed on their determinants of behavioural intention, attitude and subjective norm. Potential adopter intention to adopt was solely determined by normative pressures, whereas user intention was solely determined by attitude. In addition, potential adopters based their attitude on a richer set of innovation characteristics than users.

Moon & Kim (2001)	Examine the acceptance of the World Wide Web by adding perceived playfulness as a new intrinsic motivation factor.	The results indicated that perceived playfulness was most pivotal for an entertainment task and perceived usefulness for a work-related task on the Internet.
Taylor & Todd (1995a)	Study the role of prior experience on IT usage	Based on the results from a survey of 430 users with prior experience and 356 users with no prior experience, the authors concluded that while TAM provided an adequate model of IT usage for both experienced and inexperienced users, there were some significant differences in the relative influence of the determinants of usage depending on experience.
Venkatesh & Davis (1996)	Antecedents of perceived ease of use	From three experiments, the authors found that computer self-efficacy acts as a determinant of perceived ease of use before and after hands-on use. Objective usability was found to be a determinant of ease of use only after direct experience with a system.

Test TAM in Different Cultures		
Phillips, Calantone, & Lee (1994)	Investigating international technology adoption using TAM	The results from a survey of 303 Chinese government officials, managers and engineers indicated that cultural affinity has a significant and positive influence on TAM through perceived ease of adoption.
Straub, Keil, & Brenner (1997)	Testing TAM across cultures	After comparing TAM model across 3 different countries: Japan, Switzerland, and the US, the authors found that the model did not hold for all cultures. The results indicated that TAM held for both the U.S. and Switzerland, but not for Japan, suggesting that the model may not predict technology use across all cultures.
Rose & Straub (1998)	Predict general IT use in the Arabic world by applying TAM	This study tested TAM successfully in five Arab nations (less developed countries) in the Middle East.

Compare TAM with Other Technology Related Theories		
Davis, et al (1989)	A comparison of Theory of Reasoned Action (TRA) and TAM	In a longitudinal study of 107 users, the author found that a) People's computer use can be predicted reasonably well from their intentions. b) Perceived usefulness is a major determination of people's intention to use computers. c) Perceived ease of use is a significant secondary determinant of people's intention to use computers. A simpler but powerful model to predict user acceptance was suggested.
Mathieson (1991)	Comparison of TAM and Theory of Planned Behaviour (TPB)	Both TAM and TPB predicted intention to use an IS quite well, with TAM having a slight empirical advantage. TAM is easier to apply, but only supplies very general information on users' opinions about a system. TPB provides more specific information that can better guide development.

Although previous research studies have demonstrated the validity of TAM in predicting the individual's acceptance of various IT systems (e.g. Adams et al., 1992; Doll et al., 1998), TAM's fundamental constructs do not fully reflect the specific influences of technological and usage-context factors that may alter the users' acceptance (Moon & Kim, 2001). A number of researchers discussed the limitations of TAM recently (e.g. Agarwal & Prasad, 1998; Gefen & Straub, 1997; Lee, Kozar, & Larsen, 2003; Legris, Ingham, & Collerette, 2003).

According to Lee et al. (2003), self-reported usage is the most commonly reported limitation. Since TAM was developed based on self-reported system usage, the difference between self-reported system usage and actual system usage was not conceptualized in the model. Self-reported usage is widely used assuming that it is a reasonable predictor of actual system usage (e.g. Agarwal & Prasad, 1999; Jackson, Chow, & Leitch, 1997; Sheppard, Hartwick, & Warshaw, 1988). However, the risk of distorted research findings by using self-reported usage instead of actual objective usage was cautioned by several studies (Karahanna & Straub, 1999; Lederer, Maupin, Sena, & Zhuang, 2000; Straub et al., 1995; Szajna, 1996). For instance, using a modified form of TAM, Straub et al. (1995) found that research based on self-reported usage showed distinctly different results with those of actual usage. The computer-recorded system usage had significantly weaker links to perceived usefulness and perceived ease of use than self-reported system usage. Indeed, self-reported usage is known to be subject to the common

method bias, which distorts and exaggerates the causal relationship between independent and dependent variables (Agarwal & Karahanna, 2000; Podsakof & Organ, 1986).

The second most cited limitation of TAM is the tendency to examine only one information system with a homogenous group of subjects on a single task at a single point of time, thus raising the generalization problem of any single study (Lee et al., 2003). The use of student subjects also weakens the generalizability of the findings (e.g. Agarwal & Karahanna, 2000; Karahanna & Straub, 1999; Venkatesh, 2000).

Another limitation of TAM is the dominance of cross-sectional study (Lee et al., 2003). Since the user's perception and intention can change over time, it is important to measure these quantities at several points of time. However, only a few studies performed a longitudinal comparison (e.g. Karahanna, et al., 1999; Venkatesh & Morris, 2000). The cross-sectional study's major drawback is that it cannot infer the causality of the research results (Agarwal & Karahanna, 2000). According to Agarwal and Karahanna (2000), low explanations of variance were referred to as a major problem of TAM studies. Generally, 30-40% of the variance of the causal relationship was explained, however in some cases, only 25% was explained by the independent variables (e.g. Chin & Gopal, 1995; Gefen & Straub, 2000; Igbaria et al., 1997).

Other suggested limitations of TAM studies included single measurement scales (Agarwal & Prasad, 1998), relatively short exposure to the technology before testing (Gefen & Straub, 1997), self-selection biases of the subjects (Gefen & Straub, 1997), and lack of social variables (Mathieson, 1991; Taylor & Todd, 1995a). In view of these limitations, despite the wide acceptance of TAM, it still needs to be utilized and interpreted with great caution.

In order to resolve the limitations raised by previous studies, Venkatesh and Davis (2000) and Venkatesh (2000) extended TAM, and introduced TAM2 as a new version of original TAM. This extended TAM clearly defines the external variables of perceived usefulness and perceived ease of use, and provides a concrete means to advance the multi-level model. For instance, Venkatesh and Davis (2000) extended TAM and defined the external variables of perceived usefulness, such as social influence processes (subjective norm, voluntariness, and image) and cognitive instruments processes (job relevance, image, output quality, and result demonstrability, and perceived ease of use). On the other hand, Venkatesh (2000) provided the external variables of perceived ease of use, such as anchor (computer self-efficacy, perceptions of external control, computer anxiety, and computer playfulness) and adjustments (perceived enjoyment and objective usability).

Moreover, research studies were conducted to resolve several problems in TAM. For instance, Venkatesh (2000) conducted a TAM study by including

subjective norm from TRA as an additional predictor of behavioural intention and behaviour in the case of mandatory settings. This longitudinal study used employees in a working environment and measured actual usage instead of self-reported usage. Venkatesh and Davis (2000) also conducted a longitudinal study with data collected regarding four different systems at four organizations, two involving voluntary usage and two involving mandatory usage. Model constructs were measured at three points in time at each organization: pre-implementation, one month post-implementation, and three months post-implementation. The findings of this study indicated that the extended TAM model was strongly supported for all four organizations at all three points of measurement.

In brief, although TAM has assisted the understanding of information systems acceptance, it was concluded that a deeper understanding of factors contributing to ease of use and usefulness is needed. As Davis (1989) noted, future technology acceptance research must address how other variables affect usefulness, ease of use and user acceptance. In the context of e-learning, perceived ease of use and perceived usefulness may not fully explain behavioural intentions towards the use of e-learning, necessitating a search for additional factors that can better predict the acceptance of e-learning. Prior studies have extended TAM with constructs such as computer self-efficacy (Compeau & Higgins, 1995b) and perceived credibility (Ong, Lay, & Wang, 2004) as well as cognitive absorption (Saade & Bahli, 2005) in the context of

e-learning research. The results indicated that these new constructs were found to exert a significant influence on individuals' acceptance of e-learning system.

Theory of Planned Behaviour (TPB)

Theory of Planned Behaviour (TPB) was proposed by Ajzen (1985) as an extension of TRA (Fishbein & Ajzen, 1975) for situations where people do not have complete control over their behaviour. TPB is a well-established theory of social psychology that asserts that specific salient beliefs influence given behavioural perceptions and subsequent action behaviour. TPB (Ajzen, 1985, 1991) was designed to predict behaviours not entirely under volitional control by including measures of perceived behavioural control. There are three types of beliefs in TPB that impact three perceptual constructs: behavioural beliefs that influence attitudes, normative beliefs that affect subjective norm, and control beliefs that shape perceived behavioural control. In turn, these three perception constructs determine behavioural intentions and actual behaviour (Ajzen, 2001), as depicted in Figure 2.4.

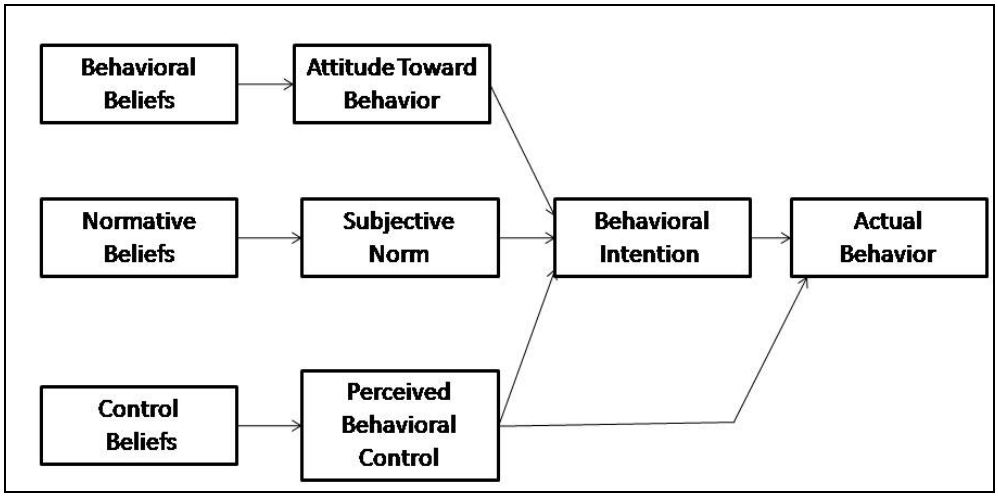


Figure 2.4 Theory of Planned Behaviour (Source: Ajzen, 1985)

Ajzen and Madden (1986) pointed out that TPB can provide a very useful theoretical framework for understanding and predicting acceptance of new information technology. TPB defines relationships between attitudes, subjective norms, and perceived behavioural control as determinants of intention and behaviour. These three major determinants are defined as follows:

Attitude towards behaviour

Attitude towards behaviour refers to the degree to which a person has a favourable or unfavourable evaluation or appraisal of the behaviour in question (Ajzen, 1991). According to Ajzen and Fishbein (1980), attitude is a function of a set of beliefs. For example, a person who believes that e-learning would bring positive consequences would hold a favourable attitude toward e-learning. A behavioural belief refers to an individual's subjective probability

that a behaviour will lead to a certain consequence (e.g., it is convenience and time-saving to study in e-learning mode) (Davis et al., 1989).

Subjective norm

Subjective norm refers to the person's perception that most people who are important to him/her think he/she should or should not perform the behaviour in question (Fishbein & Ajzen, 1975). Subjective norms have been found to be more important prior to, or in the early stages of innovation implementation when users have limited direct experience from which to develop attitudes (Hartwick & Barki, 1994; Taylor & Todd, 1995b). According to Ajzen and Fishbein (1980), subjective norm is a function of a set of beliefs termed normative beliefs. Normative beliefs are concerned with the likelihood that important referent individuals or groups would approve or disapprove of performing the behaviour (Ajzen & Madden, 1986). Chua (1980) suggested that the adopter's friends, family, and colleagues are groups that will potentially influence adoption.

Perceived behavioural control

Perceived behavioural control is defined as the individual's perception "as to how easy or difficult performance of the behaviour is likely to be" (Ajzen & Madden, 1986, p.457). According to Ajzen and Fishbein (1980), perceived behavioural control is a function of a set of beliefs termed control beliefs.

Control beliefs refer to the individual's perception of the extent to which he/she possesses internal and external factors that may increase or decrease the perceived difficulty of performing the behaviour. Internal factors include such variables as individual differences, information skills, abilities, power of will, emotions, and compulsions; whereas external factors involve time, opportunity, and dependence of others (Ajzen, 1985).

According to TPB, people act in accordance with their intentions and perceptions of control over the behaviour, while intentions in turn are influenced by attitudes toward the behaviour, subjective norms, and perceptions of behavioural control (Ajzen, 2001). TPB has been widely applied across a range of disciplines including marketing and consumer behaviour (Berger, 1993), leisure behaviour (Ajzen & Driver, 1992) and medicine (Randall & Gibson, 1991), among others.

Subsequent TPB studies have demonstrated that TPB can be successfully applied to a variety of situations to predict and understand intention and behaviour, as shown in studies predicting user acceptance of information systems (Chau & Hu, 2002; Mathieson, 1991, Taylor & Todd, 1995b), and online-shopping behaviour (Limayem, Khalifa, & Frini, 2000). Limayem et al.'s study showed that intention and perceived behavioural control equally contribute to the prediction of actual online shopping. The results implied that online shopping is low in volitional control and requires

adequate resources and opportunities to successfully perform. Some empirical studies related to TPB are summarised in Table 2.6.

Table 2.6 Research related to Theory of Planned Behaviour (TPB)

Authors	**Topic**	**Findings**
Armitage & Conner (2001)	Quantitative integration and meta-analytical review of the Theory of Planned Behaviour (TPB).	The results indicated that attitude, subjective norm and perceived behaviour control account for significantly more of the variance in individuals' desires than intentions or self-predictions, but intentions and self-predictions were better predictors of behaviour. Also, subjective norm construct is generally found to be a weak predictor of intentions.
Harrison, Mykytn, Riemenschneider (1997)	The Theory of Planned Behaviour (TPB) was used to explain and predict small business executives' decisions to adopt information technology (IT).	The results indicated that strong support for a decision process based on attitude, subjective norm, and perceived control regarding IT adoption. Additional variables such as firm and individual executive characteristics had no unique effect on adoption decisions. However, as business size increased, the perceived control overcome obstacles.

Hausenblas, Carron & Mack (1997)	Use meta-analysis to statistically examine the utility of the Theory of Reasoned Action (TRA) and the Theory of Planned Behaviour (TPB) for the explanation and prediction of exercise behaviour.	The results indicated that attitude and perceived behavioural control showed strong relationship with intention. Intention showed strong relationship with behaviour. Subjective norm was moderately related to intention to use.
Hu & Chau (1999)	Use the Theory of Planned Behaviour (TPB) to test physicians' acceptance of telemedicine technology.	The results indicated that attitude and perceived behavioural control were significant but not subjective norm in predicting the physician technology acceptance.
Limayem, Khalifa, & Frini, 2000)	Investigate factors that affect online shopping	The results indicated that behavioural control and intentions significantly influenced online shopping behaviour. Results also provided strong support for the positive effects of personal innovativeness on attitude and intentions to shop online.
Mathieson (1991)	Predicting user intentions by comparing the Technology Acceptance Model (TAM) with the Theory of Planned	The results indicated that both TAM and TPB models explained intention well. While TAM is easier, TPB provides specific information

	Behaviour (TPB)	with respect to system performance.
Morris & Venkatesh (2000)	Investigate age differences in individual adoption and sustained usage of technology in the workplace by using the Theory of Planned Behaviour (TPB).	The results indicated that younger people were influenced by attitudes. Older people were influenced by subjective norm when making the decision to adopt.
Notani (1998)	Conduct meta-analysis of the Theory of Planned Behaviour (TPB) to assess the robustness of the theory and delineate conditions that moderate support for the theory.	The results indicated that perceived behavioural control is a stronger predictor of behaviour intention with students (vs. non-students) samples and familiar (vs. unfamiliar) behaviours and is equally predictive under the operationalization and conceptualization moderators.
Riemenschneider, Hardgrave & Davis (2002)	Compare five models of individual acceptance of information technology tools: Technology Acceptance Model (TAM), TAM2, Perceived Characteristics of Innovating (PCI), Theory of Planned Behaviour (TPB), and the Model of Personal Computer Utilization (MPCU).	The results indicated that attitudes and subjective norms were significant, but not perceived behaviour control in predicting behavioural intention.

Sparks, Shepherd & Frewer (1995)	Assessing and structuring attitudes toward the use of Gene Technology in food production by the Theory of Planned Behaviour (TPB). Two constructs (perceived ethical and self-identity) were added.	The results indicated that attitudes and perceived behavioural control were significant predictors of expectations. Perceived behavioural control provided an independent contribution.
Taylor & Todd (1995b)	Comparison of TAM with the pure theory of planned behaviour (TPB) and decomposed TPB.	Using data collected from 786 potential users of a computer resource center, the authors concluded that all three models performed well in terms of fit and ability to explain behaviour. However, when behavioural intention is considered, the explanatory power for both pure and decomposed TPB were better than TAM.
Zint (2002)	Compare the Theory of Planned Behaviour (TPB), Theory of Reasoned Action (TRA) and Theory of Trying (TT) in predicting science teachers' intention to incorporate environmental risk education.	The results indicated that TPB is a better model for prediction of intention than the TRA. The perceived behavioural control adds more than 5% on the prediction of intention to use.

The study conducted by Armitage and Conner (2001) analyzed previous research using TPB in a meta-analysis study. The articles were selected based on the approaches such as ancestry and descendancy, abstracting services, online computer searches, the invisible college, and browsing. In total, references to 161 journal articles and book chapters testing TPB (up to the end of 1997) were found, and these 161 articles contained 185 independent empirical tests of TPB. The major conclusions were support for the efficacy of TPB, and the significant independent prediction of intention by perceived behavioural control. Also, the results suggested that more work is needed on normative variables to increase the predictability of the model. Similarly, Notani (1998) also assessed the robustness of TPB by conducting a meta-analysis of 36 studies. Studies to be included in the meta-analysis were identified by a search of ABI Inform, Psychological Abstracts, Psychlit databases, and references in published articles. After elimination of irrelevant articles, 36 usable articles provided 63 tests of TPB were included in the meta-analysis. The results of the meta-analysis indicated that TPB model performed well when perceived behavioural control serves as an antecedent to both behavioural intention and behaviour. The results also showed that perceived behaviour control is a stronger predictor of behaviour when it is operationalized as a global (vs. belief-based) measure, when reflecting control over internal factors (vs. external) to an individual, and when used with non-student (vs. student) samples and familiar (vs. unfamiliar) behaviours. In addition, perceived behavioural control is found to be a stronger predictor of behavioural intention with student (vs. non-student) samples and familiar (vs.

non-familiar) behaviours and is equally predictive under the operationalization (global or belief) and conceptualization (internal or external control) moderators.

Further, several studies have compared TPB to other models. Hausenblas, Carron and Mack (1997) compared TRA and TPB using a meta-analysis of 31 studies. The results indicated that attitude and perceived behavioural control showed strong relationship with intention, and intention showed strong relationship with behaviour. However, subjective norm had only a moderate effect on intention. The results also indicated that perceived behavioural control is an important construct for understanding behaviour and intention based on its significant effect on intention and behaviour.

Mathieson (1991) compared TPB with TAM in an empirical study that utilized 262 management students. The technology tested was a computer spreadsheet program. The differences between TPB and TAM were the degree of generality, the social factor included in TPB, and the different treatments of behavioural control. Mathieson concluded that both models explained intention well, but TAM explained more variance. Also, TPB provided more specific information related to the system's performance than the general deliverables of TAM, and TAM was easier to use than TPB. Furthermore, Zint (2002) compared TPB with TRA and the Theory of Trying and concluded that TPB is a stronger model for predicting intention than TRA. Similarly, Sparks, Shepherd and Frewer (1995) integrated TPB with TRA and added a new

construct (perceived ethical obligation) and concluded that attitude and perceived behavioural control are significant predictors of expectations.

Another study conducted by Taylor and Todd (1995b) compared TAM and two variations of TPB (i.e. traditional version and a decomposed version of TPB) were compared to assess which model best helps to understand usage of information technology. The findings of the study indicated that all three models performed well in terms of fit and ability to explain behaviour. When examining the path significance and explanatory power, it showed that TPB model, which adds subjective norm and perceived behavioural control as key determinants of both intention and IT usage, provided a fuller explanation of behavioural intention and IT usage behaviour. In addition, the decomposed TPB model which includes detailed attitudinal, social and control influences, provided the best overall explanation of IT usage behaviour. Finally, Taylor and Todd (1995b) concluded that "the decomposed TPB provides a fuller understanding of behavioural intention by focusing on the factors that are likely to influence systems use through the application of both design and implementation strategies" (p.144). The study also concluded that experience influenced specific factors but not all, and inexperience users put more emphasis on perceived usefulness than on control variables. Moreover, perceived behavioural control and subjective norms have a significant influence on intention for both experienced and inexperienced users.

Riemenschneider, Hardgrave and Davis (2002) further compared the applicability of five theoretical models in the domain of individual acceptance of system development methodologies. The five models are the Technology Acceptance Model (Davis, 1989), TAM2 (Venkatesh & Davis, 2000), the Perceived Characteristics of Innovating (PCI, Moore & Benbasat, 1991), TPB (Ajzen, 1991), and the Model of Personal Computer Utilization (Thompson, Higgins & Howell, 1991). The results of the study showed that a significant effect of attitude and subjective norms on intention. Perceived behavioural control was analyzed using two constructs (internal and external related-controls) and showed significant pair-wise correlations with many constructs. However, when applying multiple regression across all constructs, both internal and external behavioural controls were not significant in TPB context.

One of the studies that utilized TPB in the technology acceptance domain was done by Hu and Chau (1999) who empirically tested TPB by utilizing 421 physicians in the voluntary use of a telemedicine technology. The study's results indicated that attitude and perceived behavioural control were significant predictors of intention. However, a non-significant relationship was found between subjective norms and intention in the voluntary setting of the study. Moreover, Harrison, Myhytn and Riemenschneider (1997) utilized TPB to test for the adoption of information technology in small businesses and concluded that a stronger adoption decision is based on attitudes, subjective norms, and perceived controls. Finally, Morris and Venkatesh (2000) utilized TPB to test for age differences in the technology adoption domain and

concluded that younger individuals were influenced by attitudes, while older individuals were influenced more by subjective norms when making the decision to adopt.

To sum up, TRA and TPB, which are general theories developed in social psychology, attempt to explain and predict individual behaviour across a wide variety of domains, TAM has been proposed as an adaptation of TRA to specifically explain computer/IT usage behaviour (Davis, 1986). In order to investigate the factors influencing student acceptance of e-learning, TAM is used as one of the base theories for this research project because of its solid theoretical foundation. Since e-learning promises a new way of delivering education, using TAM as the basis for studying student acceptance of e-learning is a highly valid approach. In this research project, a further modification of TAM is necessary since TAM was created for a general explanation of the determinants of computer acceptance rather than for the specific topic of behavioural intentions of e-learning adoption as planned to further discussed in the present research project.

2.3. Individual Choice Related Theories

Effective implementation of an e-learning initiative requires that a number of factors be taken into account, including those related to technology, social and individuals (Fuller, Vician & Brown, 2006). While TAM perspective focuses almost exclusively on beliefs about the technology and the

outcomes of using it, some other beliefs from individual choice related theories that might influence behaviour, independent of perceived outcomes. In this research project, self-efficacy from social cognitive theory (Bandura, 1982) and perceptions of media richness from media richness theory (Daft & Lengel, 1986) will be chosen as these beliefs directly associated with the unique environment caused by the convergence of computing and communication tools embedded in e-learning environments.

2.3.1 Self-Efficacy

Self-efficacy, the belief that one has the capability to perform a particular behaviour, is an important concept in social cognitive theory (Bandura, 1982). Further, computer self-efficacy has been defined as an individual's beliefs about the ability to use a computer in the context of information technology usage (Compeau & Higgins, 1995b). According to Compeau and Higgins (1995b), computer self-efficacy is a specific self-efficacy that is defined as belief in individual's ability to "mobilize the motivation, cognitive resources, and courses of action needed to meet given situational demands" (p.408). This belief has an influence on choice of activities, degrees to effort expended, and persistence of effort. Hence, computer self-efficacy exerts a significant influence on individuals' emotional reaction to IT, their intention to use IT, and their actual use of IT (Hayashi, Chen, Ryan & Wu, 2004). Personal, subjective feelings and beliefs toward computers have a stronger impact on individuals' computer competence than

objective measures of computer experience and intensity of computer use (Melendez, Moreno, & Obra, 2008) According to Igbaria and Iivari (1995), computer self-efficacy implies that "individuals who consider computers too complex and believe that they will never be able to control these computers will prefer to avoid them and are less likely to use them" (p.590). In end-user computing research this internal perception affects the expectations of individuals using the computer to perform a job, and therefore their use of an information system. According to Compeau and Higgins (1995b), self-efficacy impacted an individual's affective and behavioural reactions to information technology as shown in Figure 2.5.

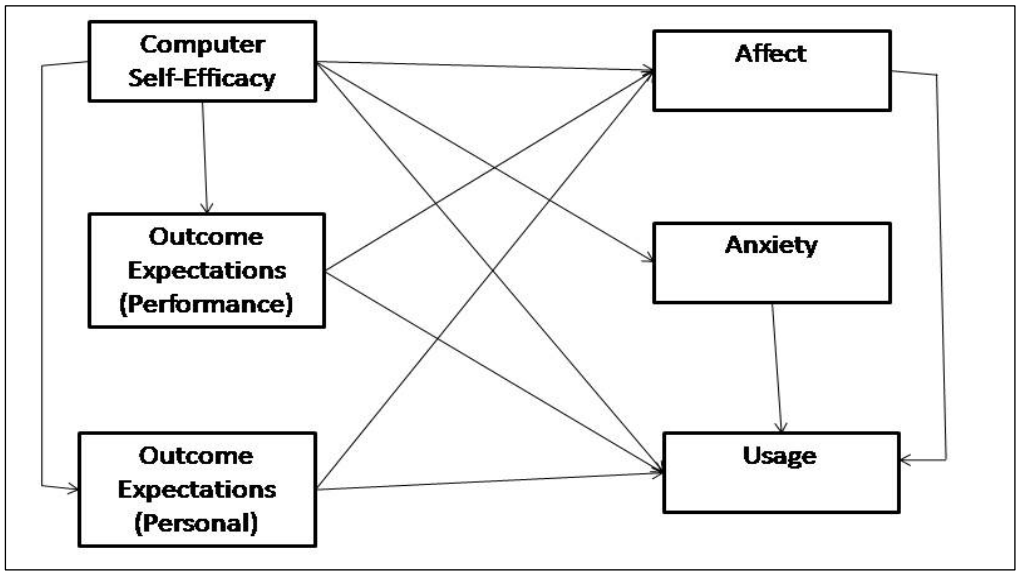


Figure 2.5 Self-Efficacy Mechanism (Source: Compeau & Higgins, 1995b)

As indicated, computer self-efficacy was found to exert a significant influence on individuals' expectations of the outcomes of using computers,

their emotional reaction to computers (affect and anxiety), as well as their actual computer use.

Computer self-efficacy is one of the individual factors consistently supported in information systems literature as an important construct to predict individuals' use of IT (Hasan, 2003; Lewis, Agarwal, & Sambamurthy, 2003). Some empirical studies related to the computer self-efficacy are summarised in Table 2.7.

Table 2.7 Examples of Research Related to Self-efficacy

Authors	**Topics**	**Findings**
Compeau & Higgins (1995b)	Examine the role of individuals' beliefs about their abilities to competently use computers in the determination of their computer use.	Results indicated that computer self-efficacy was found to exert a significant influence on individuals' expectation of the outcomes of computer use, emotional reactions to computers (affect and anxiety), and actual use of computer.
Fagan, Neil, & Wooldridge (2004)	Use Bandura's Social Cognitive Theory, Triandis's Theory of Interpersonal Behaviour, and the computer anxiety literature to develop a conceptual model to investigate key factors that	Results indicated that, as suggested by social cognitive theory, experience and support were positively related to computer self-efficacy, and computer self-efficacy was negatively related to anxiety and positively related to usage. As

	affect an individual's use of information technology.	suggested by Triandis's theory of interpersonal behaviour, experience was positively related to usage, and computer anxiety was negatively related to experience.
Hasan (2003)	Examine the influence of eight types of computer experiences on computer self-efficacy.	Results indicated that experience with computer programming and graphics applications have strong and significant effects on computer self-efficacy beliefs, whereas experience with spreadsheet and database applications demonstrated weak effects.
Hasan & Ali (2006)	Examine the effects of general and system-specific levels of computer self-efficacy on two key training outcomes: reactions and learning performance.	Results indicated that general computer self-efficacy had significant effects on perceived ease of use and far-transfer learning. Conversely, system-specific computer self-efficacy demonstrated significant effects on near-transfer and far-transfer learning.
Hayashi, Chen, Ryan, & Wu (2004)	Combine computer self-efficacy and Expectation-Confirmation Models to assess their applicability on the intention of online learners who continue	Results indicated that social presence was shown to have effect on e-learning but perceived usefulness, satisfaction level, and confirmation did not.

	using the e-learning system, and to theorize the causal relationship of the factors of perceived usefulness, confirmation, satisfaction, and IS continuance in the e-learning context.	
Kim & Kim (2005)	By incorporating self-efficacy into electronic commerce research, this study expands the understanding of what factor influences trust during online transaction.	Results indicated that self-efficacy affects trust in the Web vendor and, consequently, positively influencing the respondent's purchase intentions.
Lewis, Agarwal, & Sambamurthy (2003)	Examine the factors that influence key individual beliefs about technology use.	Results indicated that computer self-efficacy, personal innovativeness with IT, and management commitment affect the use of IT.
Melendez, Moreno, & Obra (2008)	Examine the influence of perceived computer self-efficacy on the intention to use Internet-based e-collaboration technologies in the learning–teaching process.	Results indicated that computer self-efficacy and attitude have positive influence on intention to use e-learning systems.
Shih (2008)	Use social cognitive theory and the theory of planned	Results indicated that students' outcomes expectation and

	behaviour (TPB) to assess learner adoption intentions for Web-based learning.	perceived behavioural control affect their intention to use e-learning systems.
Thatcher & Perrewe (2002)	Test relationships between IT-specific individual differences, situation specific traits, and broad traits.	Results provided further understanding of nomological network among individual differences that lead to computer self-efficacy.

From the study of Kim and Kim (2005), the relationship between self-efficacy and behaviour has been empirically validated in various domains such as education, health, and organizational tasks. Since self-efficacy is a dynamic construct that varies across domains, the concept of self-efficacy has been applied to various domains including IT (Hasan & Ali, 2006). Information systems researchers have discovered that the self-efficacy construct can be adapted to the IT context, and this construct is an important determinant of individuals' acceptance and intention to use IT in their organizations (Compeau & Higgins, 1995b). In the realm of IT, computer self-efficacy is regarded as determinant of individuals' use of IT; and information systems research considered computer self-efficacy to understand individuals' intention to use and actual use of new IT (Kim & Kim, 2005).

The continuing research efforts on computer self-efficacy in information systems literature have provided more evidences to support the belief that

computer self-efficacy plays a critical role in understanding individuals' use of IT (Chau, 2001; Hong, Thong, Wong, & Tam, 2001). Computer self-efficacy demonstrated positive effects on many computer-related behaviours (Hasan & Ali, 2006). Research suggests that individuals who possess high computer self-efficacy are more likely to use IT frequently (Thatcher & Perrewe, 2002). In the technology acceptance literature, a number of studies have found that high computer self-efficacy is related to the use of a variety of technologically advanced products (Compeau & Higgins, 1995b; Fagan, Neil, & Wooldridge, 2004). From the study conducted by Marakas, Johnson, and Clay (2007), computer self-efficacy has been shown to be an effective predictor of individuals' intention to use and actual use of IT. As a result, computer self-efficacy has become an important variable in the information systems research.

Besides, Compeau and Higgins (1995b) examined the role of individuals' beliefs about their abilities to competently use computers in the determination of their computer use. Based on the existing scales and definitions of computer self-efficacy, Compeau and Higgins (1995b) developed a 10-item instrument to assess impacts and antecedents of computer self-efficacy. To develop and validate the instrument, these scholars conducted a survey on managers and professionals. The study indicated that computer self-efficacy has significant impact on individuals' expectations of the outcomes of using computers, their emotional reactions to computers, and their actual use of computers. Compeau and Higgins (1995b) found that computer self-efficacy had a significant effect on learning of two applications

software. Individuals who demonstrated higher computer self-efficacy achieved higher learning performance than those who had lower computer self-efficacy. Computer self-efficacy becomes an important individual characteristic that appears to have effect on individuals' intention to use computers; hence, computer self-efficacy helps to understand individuals' actual use of computer. Therefore, Compeau and Higgins (1995b) emphasized, understanding computer self-efficacy is important to the successful implementation of IT in organizations.

Moreover, computer self-efficacy plays a critical role in terms of its effect on perceived ease of use (Venkatesh & Davis, 1996) and perceived usefulness (Hayashi, Chen, Ryan & Wu, 2004), because individuals' confidence in their computer-related knowledge and abilities can influence their judgment of the ease or difficulty of carrying out a specific task using a new IT, and how useful that new IT will be. Other researchers (Davis, 1989; Agarwal & Karahanna, 2000; Ong, Lai, & Wang, 2004) also found the empirical support for a significant positive relationship between computer self-efficacy and perceived ease of use of a specific IT. According to Hasan and Ali (2006), the relationship between computer self-efficacy and perceived ease of use has drawn considerable attention, especially in IT acceptance research. Hasan and Ali (2006) found that computer self-efficacy has a positive impact on perceived ease of use before and after individuals received hands-on experience with a system.

Davis (1989) also stressed that the importance of perceived ease of use is supported by Bandura's social cognitive theory. In the social cognitive theory, Bandura (1982) proposed two sets of expectations as the major cognitive forces that guide individuals' behaviour. The first set of expectations relates to outcomes of behaviour and the second set of expectations encompasses self-efficacy, or beliefs about individuals' ability to perform a particular behaviour (Compeau & Higgins, 1995a). According to Compeau and Higgins, Bandura (1982) argued that "in any given instance, behaviour would be best predicted by considering both self-efficacy and outcome beliefs" (p. 140). According to Davis, Bandura (1982) mentioned that self-efficacy and outcome belief have differing antecedents. To differentiate 'self-efficacy judgment' from 'outcome judgment', Bandura defined self-efficacy as one's conviction that one can successfully execute the behaviour required to produce a desired outcome. Thus, self-efficacy is more proximately related to task performance and is strongly related to actual behaviour and level of performance (Barbeite & Weiss, 2004).

Computer self-efficacy has been studied extensively in teaching-learning settings (e.g. Hasan, 2003; Compeau, Higgins, & Huff, 1999; Hasan & Ali, 2006), with the results demonstrating that higher levels of self-efficacy lead to better learning performance. The concept of self-efficacy (Bandura, 1982, 1997) has also been incorporated into studies on adoption and use of e-learning systems (Shih, 2008; Melendez et al., 2008). According to Shih (2008), Bandura's definition of self-efficacy suggested that the self-efficacy

judgment of accepting e-learning systems is rooted in instructors' cognitive process. In another study conducted by Shih (2008), Shih hypothesized that computer self-efficacy is a cognitive factor referring to individuals' self-assessments regarding their confidence or ability to use e-learning systems. Melendez et al. (2008) conducted an exploratory study on university students and found that computer self-efficacy as well as attitude has influence on students' intention to use e-learning systems. Therefore, computer self-efficacy should be included in theoretical model to gain a better explanation of the acceptance of e-learning systems (Melendez et al., 2008). In this research project, self-efficacy is defined as the confidence in one's ability to perform certain learning tasks using an e-learning system.

2.3.2 Media Richness Theory

Media richness theory, which originated from information processing theory, was developed by the organizational scientists Daft, Lengel, and Trevino (Daft & Lengel, 1984, 1986; Trevino, Lengel, & Daft, 1987). They argued that the communication efficiency between people is influenced by the fit of the media and the characteristics of the communication task. Media richness theory advances the notion that communication richness (or leanness) is an objective property of communication media, and defines media richness as the ability to facilitate shared understanding within a time interval. Communication transactions that can overcome different frames of reference or clarify ambiguous issues to change understanding in a timely manner are

considered rich. On the contrary, communications that require a long time to enable understanding or that cannot overcome different perspectives are considered low in media richness. In other words, media richness refers to its capacity to facilitate shared meaning and understanding (Daft & Lengel, 1984).

Daft and Lengel (1986) categorized tasks based on uncertainty and equivocality. Uncertainty is defined as the difference between the amount of information required to perform the task and the amount of information already possessed by an organization (Galbraith, 1977). This lack of information can be solved by "asking a large number of questions and acquiring more information to learn the answers" (Daft & Lengel, 1986, p.556). However, this solution only works when the organization knows what questions to ask to obtain specific information to reduce the level of uncertainty. On the other hand, equivocality is defined as the existence of multiple and conflicting interpretations of the available information (Daft & Lengel, 1986). It represents the confusion and lack of understanding of a situation. People in an organization, puzzled with equivocality, are confused about the complex and ill-defined problems, but they are not able to raise specific questions. Conflicting interpretations prevent people from making decisions and coordinating activities. To deal with equivocality, people in an organization must find structures that enable rapid information cycles among them so that meaning can emerge (Daft & Weick, 1984).

Reducing uncertainty and resolving equivocality are two important forces needed to influence organizational information processing (Daft & Lengel, 1986). One way to investigate how organizations process information is through communications. Daft and Lengel (1986) stated that effective communication is a significant contributor to individual and organizational performance. Many different communication channels or media, such as having face-to-face meetings, answering telephone calls, using fax machines, sending and receiving emails, and reading written letters and memos, are being used by people in their daily lives. These communication media vary in the capacity to process rich information (Daft & Lengel, 1984).

Daft and Lengel (1986) suggested that a medium's capacity to process rich information is dependent on four components, they are (1) the medium's capacity for immediate feedback, (2) the number of cues and channels utilized in the medium, (3) its personalization, and (4) its language variety. Firstly, media differ in the capacity to exchange messages. For instance, in face-to-face conversations, feedback can be transferred immediately between the information sender and receiver. In contrast, replies in email messages can take hours, or even days, depending on the accessibility of the recipient. Secondly, cues or channels of a medium indicate the array of physical presence, voice inflections, body gestures, words, numbers, and graphic symbols. Telephone conversations allow the transmission of voices and tones, but a written memo can convey information only through text. Thirdly, personalization or personal focus of a medium allows messages to carry

personal information, feelings and emotions. For example, most instant messaging software provides a variety of 'emoticons' (small faces or graphics) and winks (short animated flash emotions) to express vivid feelings and emotions. Lastly, language variety is the range of meaning that can be conveyed with language symbols (Daft, Lengel, & Trevino, 1987). Language with high variety provides a large pool of symbols communicating a wide range of ideas, emotions, and experience. For instance, art, such as a concert or a painting, has much higher language variety than a computer coding language.

According to the above four characteristics of communication media, Daft et al. (1987) classified communication media used in daily life as, in order of decreasing richness, face-to-face, telephone, personal documents (e.g. letters or memos), impersonal unaddressed documents (e.g. reports, bulletins, etc.), and numeric reports (e.g. spreadsheets). Face-to-face also provides multiple cues via body language and tone of voice, and message content is expressed in natural language. Telephone conversations rank below face-to-face because it allows verbal cues such as words, intonation, and silence, but cannot convey gestures and other visual cues. Personal documents are above impersonal unaddressed documents, while no-statement numerical reports rank as the leanest medium. Several researchers then followed a similar approach to classify others media such as video, voice, pictures, text, email (Rice, 1992; Schmitz & Fulk, 1991; Trevino et al., 1987; Zmud, Lind, & Young, 1990). These classifications can serve as a reference for medium

selection in different situations. According to the theory, face-to-face communication is considered to be the richest media while other media are thought to be leaner since they have fewer contextual cues and slower feedback compared to face-to-face (Daft & Lengel, 1986). With the advent of the Internet, computer-mediated communication (CMC) has been one of the most widely used communication modes, both synchronous and asynchronous. In education settings, asynchronous communication remains dominant.

According to Daft et al. (1987), rich media, having high capacity to carry rich information, facilitate insight and rapid exchange of information geared toward mutual understanding. Therefore, rich media are more capable of reducing uncertainty and resolve equivocality by allowing users to overcome different frames of reference and by providing the capacity to process complex and subjective messages (Daft and Lengel, 1986). In other words, richer media enabled users to communicate more quickly and to better understand ambiguous or equivocal messages and, therefore, would lead to better performance on equivocal tasks. In contrast, leaner media were better for low equivocality tasks because rich media provided communicators with too much information and superfluous messages.

McGrath and Hollingshead (1993) analyzed the fitness of media and communication task characteristics in organizations to form a media-task corresponding matrix from the perspective of media richness theory. Their research claimed that tasks with different levels of uncertainty and

equivocality need a proper media in communication. If using high richness media for simple tasks, it may cause distraction or a loss of focus. On the other hand, if tasks with high level of uncertainty and equivocality use lean media, it cannot convey the information efficiently and effectively and results in poor communication. In conclusion, efficient and effective communication requires the matching of media richness with the task at hand.

For the past two decades since the inception of media richness theory, researchers and scholars have conducted numerous studies testing, modifying and improving this most influential theory in communication and media research (Dennis & Kinney, 1998; Kahai & Copper, 2003; Sheer & Chen, 2004). Early studies of media richness theory examined the traditional media such as face-to-face meetings, telephone, voice mail, fax, addressed written memos and letters, unaddressed written memos, and formal reports. With the advances of new information technologies, scholars expressed great interest in studying new media such as email, video conferencing, synchronous computer-based communication, and online chatting. The common concerns of these studies on new media were: (1) where should new media rank in the richness hierarchy, compared to traditional media, and (2) how will the use of new media affect media preference and use behaviour in an organizational context?

Media richness theory has been widely applied in issues such as the fitness between media and task characteristics, the user performance on media

use, and the effects of media richness on task satisfaction, decision quality, and decision time (Dennis & Kinney, 1998; Kahai & Copper, 2003; Rice, 1992; Salmon & Joiner, 2005; Suh, 1999), users' perceptions and attitudes toward media (Carlson & Zmud, 1999; Trevino, Webster, & Stein, 2000), organization system design (Daft & Lengel, 1984, 1986), and marketing (Klein, 2003). Table 2.8 summarises some of the research done related to the media richness theory.

Table 2.8 Examples of Research in Media Richness

Authors	**Topics**	**Findings**
Carlson & Zmud (1999)	Based on the media richness theory to test the channel expansion theory that incorporates experiential factors to predict user perceptions of the new communication media.	The results indicated that richness perceptions were strongly related to user's channel communication experience.
Daft & Lengel (1984)	Theory building of the media richness theory	The results indicated that : • Information richness is composed of four factors. • Individual level of information processing matches media richness with equivocality of issues. • Organizational information processing is

		to reduce uncertainty and equivocality. • Hierarchical level of information processing.
Daft & Lengel (1986)	Further theory building of media richness theory	The results indicated that: • Information uncertainty and equivocality form the two forces of information processing in organizations. • Structural mechanisms fit with media richness. • Task variety and analyzability should match media richness. • Difference and interdependence between departments should match media richness.
Dennis & Kinney (1998)	Examine the effects of media richness on decision making in two-person teams using new media	The results indicated that the media richness theory is partially supported. Computer-mediated communication team consumed more time on decision making. Lean media had greater effect on less equivocal tasks. Matching media richness to task equivocality does not improve performance for the new media.

Kahai & Cooper (2003)	Examine the impact of two computer-mediated communication systems factors on decision quality.	The results indicated that: • Richer media results in greater socio-emotional communication. • Greater socio-emotional communication increases task-oriented communication. • Task-oriented communication increases decision quality. • Richer media results in greater message clarity.
Klein (2003)	Explore how computer-mediated environments can engender virtual product experiences. The construct of telepresence is used to examine the process by which media characteristics influence consumer responses.	The results showed that user control and media richness both contribute to creating a sense of telepresence. Moreover, through telepresence, these media characteristics influence consumers' cognitive responses.

Rice (1992)	Test whether using communication media that differ in media richness or social presence in condition of offering task analysability affects self-reported performance components such as quality of work, effectiveness, productivity, ability to obtain information, decision making ability, access to other etc.	The results indicated that the media richness theory was modest supported. Media richness matched with communication needs. Social presence and media richness are perceptions dependent upon intrinsic characteristics of the medium, as well as upon particular communication contexts and the individuals' experiences, attitudes, and preferences.
Salmon & Joiner (2005)	Based on the media richness theory, media features theory and situational determinants to explain manager's preferences for face-to-face, telephone, email and written communication.	The results indicated that higher levels of information equivocality required information of higher richness. In all communication, telephone was the last preferred.
Schmitz & Fulk (1991)	Investigate the effects of perceived media richness and social influences from organizational colleagues on the uses and assessments of electronic mail in a large research and development organization.	The results indicated that the perceived email richness varied across individuals and covaried with relational social influences and with media experience factors. Medium expertise had positive effects on email use and usefulness.

Shepherd and Martz (2006)	Study the effect of media richness theory in distance education environment.	The results indicated that the richer the distance education environment, the higher the reported satisfaction with the distance course and program, the more reported communication among students and faculty, and the higher the valuation of the course delivery platform by the users.
Suh (1999)	Examine media-richness theory using a laboratory experiment. The investigation focused on the effect of four different communication media (text, audio, video, and face-to-face) on task performance and satisfaction of both, intellective and negotiation tasks.	The results indicated that the media richness theory was not supported. Media richness rank: face-to-face, telephone, and email. No difference among media on decision making.
Trevino, Webster, & Stein (2000)	Test multiple influences in a study of media attitude and behaviours.	The results indicated that the three independent variables are influenced by different factors. Media choice was influenced by objective and social factors. Media attitude was influenced by job-related objective and social factors. Attitudes toward new media were influenced by person and technology factors.

To evaluate the users' performance on media use, Suh (1999) focused on the effect of four different communication media (text, audio, video, and face-to-face) on task performance and satisfaction of both, intellective and negotiation tasks. The results of the study showed that face-to-face communication was considered the richest media followed by video conferencing, telephone, and email. There were no task–medium interaction effects on either decision quality or decision time, and decision quality was the same for both the tasks. Salmon and Joiner (2005) further examined the users' performance on media use by using the media richness theory, media features theory and the situational determinants to explain manager's preferences for face-to-face, telephone, email and written communication. The results of the study showed that higher levels of information equivocality required information of higher richness. In all communication, telephone was the last preferred.

Rice (1992) suggested use of rich media for nonroutine, difficult tasks whilst lean media for routine, simple tasks. On the other hand, Dennis and Kinney (1998) compared the decision time of two-person teams using new media (i.e. computer-mediated and video communication). The results of the study showed that computer-mediated communication team consumed more time on decision making. However, they pointed out that media do not affect outcomes, including decision quality and satisfaction, at least for new media such as computers. They reported that richer media enable faster decision making regardless of task equivocality, and concluded that matching media

richness and task equivocality does not improve performance. Kahai and Cooper (2003), furthermore, investigated the impact of two computer-mediated communication systems factors on decision quality. It was found that richer media can have significantly positive impacts on decision quality when participants' task-relevant knowledge is high.

In addition to studies on media traits, other studies focused on attitudes about media and choice of media, as well as the use, effects and consequences of particular media. For example, Carlson and Zmud (1999) found that media richness perceptions were strongly related to a user's channel communication experience. Trevino, Webster, and Stein (2000) found that media attitudes were influenced by job-related objective and social factors, and attitudes toward new media were influenced by personal and technology factors. Klein (2003) further explored how computer-mediated environments can engender virtual product experiences. The results showed that user control and media richness both contribute to creating a sense of telepresence, and through telepresence, these media characteristics influence consumers' cognitive responses.

Schmitz & Fulk (1991) examined the effects of perceived media richness and social influences from organizational colleagues on the uses and assessments of electronic mail. They found that perception of media richness was not dependent on the features of the medium but rather on the experience of using the medium. So in the computer medium it could be keyboard skills,

experience of software, etc. The greater the experience of using computers, the higher perceived richness of media.

Moreover, Shepherd and Martz (2006) studied the effect of media richness theory in distance education environment, the results show that the more media used effectively in a distance program, the higher the reported satisfaction with the program, the more reported communication among students/faculty, and the higher the valuation of the course delivery platform by the users. The effective usage of the technology (i.e. tools such as discussion forums, document sharing areas, and Web casting), significantly enhances the communication and ultimately, the satisfaction with a program. Similarly, in this research project, face-to-face classes are considered as information-rich media, which can convey facial expressions or at least tones of human voice. An e-learning system is an information-lean medium, which uses formal language and cannot convey personal cues. Hence, the richness of media and communication frequency among students/faculty would affect students' channel choice.

2.4 Social Theories

Besides beliefs regarding technology acceptance and individual choices, social environment may also affect people's perceptions of a medium. In this research project, the idea of social exchange and relationship theory and social influence theory will be reviewed.

2.4.1 Social Exchange and Relationship Theory

Social Exchange Theory (SET) is one of the most widely used models to explain interpersonal conflict in social psychology (Worchel & Cooper, 1983). A social exchange is a relationship in which, on repeated occasions, the participants exhibit behaviour in each other's presence, created products for each other, or communicated with each other (Thibaut & Kelley, 1959). According to Social Exchange Theory (Ekeh, 1974), participants tend to maximize rewards and to minimize costs associated with the transaction. This theory comes from economics' rational choice theory, suggesting a relation between a person's satisfaction with a relation and a person's commitment to that relation (Thibaut & Kelley, 1959; Constant, Kiesler, & Sproull, 1994). Similarly, in the context of e-learning, SET suggests a relation between a student's satisfaction with the learning network and the student's willingness to actively participate in e-learning.

SET has been successfully applied to many areas including marketing (Anderson & Narus, 1984; Dwyer, Schurr & Oh, 1987; Morgan & Hunt, 1994), management (Konovsky & Pugh, 1994) and professional and social relationships such as employee-employer (e.g., Northcraft & Neale, 1994). The early social-psychology studies dealing with SET examined it in experimental settings in which actual behaviour was manipulated (Kelley & Thibaut, 1978) or examined (Blau, 1964). The latter research, including studies that applied SET to real-world business interactions in field settings, examined perception of the social exchange rather than actual behaviour

(Anderson & Narus, 1984). In essence, SET views interpersonal interactions in a manner somewhat similar to an economic exchange: people elect to partake in the exchange only if their expected rewards from it outweigh their costs – or at least satisfy their expectations and exceed alternative investments (Homans, 1961; Kelley & Thibaut, 1978; Thibaut & Kelley, 1959). SET therefore views interpersonal interaction as a rational process composed of a set of cost-benefit analyses.

In contrast to an economic exchange, SET deals with costs and rewards that are subjective (or perceived) and not explicitly bartered (Blau, 1964). A social exchange in which costs and rewards are made explicit loses its social nature and becomes a simple economic exchange with intangibles. In a typical social exchange, just like in an economic exchange, each party decides on a course of action based on expected benefits: the combination of costs and rewards. Unlike a simple economic exchange, however, the cost-reward combinations depend also on the behaviour of the social exchange partner.

Satisfaction

Satisfaction, as the major belief in SET, is the consumer's fulfillment response. It is a judgment that a product or service feature, or the product or service itself, provided a pleasurable level of consumption-related fulfillment, including levels of under- or over-fulfillment (Oliver, 1997). Satisfaction has been extensively studied in consumer psychology. In particular, services have

looked at a measure called SERVQUAL (Parasuraman, Zeithaml, & Berry, 1988) that has been adapted to measure education service quality (Betz, Klingensmith & Menne, 1970; Hampton, 1993; Tan & Kek, 2004), library services (Cook & Thompson, 2000; Martin, 2003), and IS service quality across industries including services, finances, and manufacturing (Jiang, Klein, & Carr, 2002; Jiang, Klein, & Crampton, 2000; Kettinger & Lee, 1994, 1997; Pitt, Watson & Kavan, 1995, 1997).

SERVQUAL was developed by Parasuraman et al. (1988), it aims to measure the gap between user expectations and perceptions of quality of service in terms of tangibles, reliability, responsiveness, assurance and empathy. SERVQUAL has been used in education as well. Students have expectations from educational providers, the fulfillment of which can create a positive learning environment leading to better performance (Bordia, Wales, Gallois, & Pittam, 2008). Several previous studies also indicated that the expectations that students have of a course and whether or not those expectations are met will have a substantive impact on affective variables such as attitude and motivation (Alsop, 1979; Antier, 1976; Bordia et al., 2006, 2008; Curtin, 1979; Gardner, Smythe, & Clement, 1978; Li, 1998). Although there is conflicting evidence (e.g., Rosen & Suprenant, 1998), the bulk of the literature tends to support satisfaction as an outcome of perceived good service quality (Brady & Robertson, 2001; Cronin & Taylor, 1994; Nitecki & Hernon, 2000; Parasuraman et al., 1988; Taylor & Baker, 1994; Teas, 1994). The main assumption therefore is that the evaluation of the quality of the service

provided determines, along with other factors, the customer's level of satisfaction with the organization or service provider (Hurley & Estelami, 1998).

In the context of IS use, it was proposed that higher customer evaluations for IT-based services would lead to higher overall service quality ratings and higher levels of customer satisfaction (Zhu, Wymer Jr, & Chen, 2002). Similarly, in this research project, it is considered that higher student evaluations for e-learning would lead to higher levels of student satisfaction.

Relationships

Besides satisfaction, relationships with other people and objects would also influence a user's channel choice. Social psychologists have found that relationships with other people and objects are at the very heart of human existence and are the foundations of social behaviours (Blau, 1964; Homans, 1961; Thibaut & Kelley, 1959). A relationship refers to how one person thinks, feels, perceives, expects, and reacts to the actions of another person (Heider, 1958). The concept of relationship has been used interchangeably with interdependence (Thibaut & Kelley, 1959), exchange (Blau, 1964), and interaction (Homans, 1961). Some researchers agree that a relationship is a series of interactions between two related persons, extending over a period of time from the past and into the future (Reis, 1995; Hinde, 1997). In the field of IS, current design methods and technologies have improved the animation,

interactivity, personalization, and humanization of IS. These new features of IS enhance a user's perception that IS is a relationship partner rather than a tool. An IS user may develop a relationship orientation toward an IS after a period of use of the IS.

Social psychologists have found that people have the need to belong with other people and objects and they have the motivation to form interpersonal attachments (Baumeister & Leary, 1995). Baumeister and Leary (1995) have generalized the concept of need to belong, which can be directed to any other human being. Further, researchers have found that people also show their emotional and psychological attachment to different types of objects, such as a brand (Oliver, 1999), a union (Gordon, Philpot, Burt, Thompson & Spiller, 1980), and an organization (Allen & Meyer, 1990). Taking the brand as an active and contributing member rather than a passive object, people usually believe that the brand is a relationship partner (Fournier, 1998).

According to the theory of personal relationships (Kelley, 1979), three essential elements must be presented in a relationship. The first element is interdependence. In the context of IS use, there is an interdependence between the IS user and the IS. The IS user relies on the IS for output and the IS replies on the user for input. The second element is interaction. In the process of input and output, the user follows programmed interactive dialogs and interfaces to interact with the IS. The third element is attribution to dispositions of the other

party. The IS user may attribute the correct and consistence output of an IS and overall performance of the IS to its reliability and credibility. People may show their commitment (i.e., psychological attachment and long-term orientation) to a computer during the interactions, if they obtain social and personal benefits from following social rules (Kiesler, Sproull & Waters, 1996). Likewise, in the context of e-learning, students may develop relationships orientation toward e-learning after a period of use of e-learning.

Reputation

Reputation is always built on informal and formal referrals of past users based on their satisfaction. In the service literature, Oliver (1980) explained that user satisfaction entails the full meeting of user expectation of the products and services. If the perceived performance matches or even exceeds users' expectations of services, they are satisfied. If it does not, they are dissatisfied (De Wulf, 2003). In the real world, dissatisfied customers tend to create negative word-of-mouth and convey their negative impression to other customers (Lewis, 1991; Newman, 2001; Caruana, 2002). This, in turn, will ruin the reputation and image of the organization. Indeed, firm image refers to perceptions of a firm reflected in the associations held in consumer memory (Keller, 1993), and firm image can impact perceptions of quality, value, and satisfaction and loyalty (Gronroos, 1990; Andreassen and Lindestand, 1998). In the field of IS use, when users find an online service convenient and time efficient, they will be satisfied with the general effectiveness and efficiency of

the electronic channel. Further, as the overall satisfaction with the online channel increases, it is likely that the users will build a positive impression of the online channel, and they will probably use the channel again and refer to other users (Bhattacherjee, 2001a). Likewise, in this research project, it is considered that an organization with good reputation in providing online learning would affect students' intention to select this online channel.

2.4.2 Social Influence Theory

Social influence or subjective norms are studied by several theories (e.g., the social influence model). The social environment may also affect people's perceptions of a medium. As group norms affect media choices of individuals, a social opinion may even prevent the most rationally efficient behaviour. Peers, superiors, and other people who are important to a person have been found to have a significant influence on people's perceptions of technology (Fulk, 1993; Taylor & Todd, 1995b; Venkatesh & Morris, 2000).

Social influence theory (Fulk et al., 1990) emphasizes media choice behaviour at the group level. The theory of social influence suggests that influence from peers, superiors, or group norms play a critical role in shaping peoples' media choice behaviour. Thus, appropriation of communication media is structured by the participants' internal system and social structure (DeSanctus & Poole, 1994). Due to the social nature of media use, it assumes that a social network or defined group will show similar patterns of the media

use. From this perspective, the richness of media is a subjective rather than a rational concept and varies across groups or individuals. Lee (1994) suggested that an alleged lean medium can become a richer one through distanciation, autonomization, social construction, appropriation, and enactment processes. Distanciation refers to the separation, in time and distance, that occurs between a text and its author, its originally intended audience, and/or its originating culture and society. Autonomization refers to the text's taking on a life of its own, despite the distanciation. Fulk and Boyd (1991) suggested four major influences on media perceptions and use: statement from peers, vicarious learning, group or organizational norm, and social definition of rationality. Organizational policies and managerial pressures are also pointed out as important social influences (Fulk & Boyd, 1991).

Moreover, Rogers (1983 & 1995) and Bhattacherjee (2000) also identified that external influence (e.g. mass media channels) and interpersonal influence (e.g. word-of-mouth) are the two main influential components of innovation adoption. The difference between the two is in how the information is transmitted.

External Influence

External influence ressembles information influence. According to Bhattacherjee (2000), external influence includes mass media reports, expert opinions and other non-personal information. Mass media is considered the

most rapid and efficient method to create awareness-knowledge, and it plays a large role in the initial awareness stage of diffusion. Through mass media, information knowledge is transmitted through such sources as radio, television, newspapers, the Internet, or other methods that people might use to reach a large audience.

Interpersonal Influence

Interpersonal influence ressembles normative influence. Bhattacherjee (2001a) defined that interpersonal influence includes word-of-mouth influence by friends, colleagues and superiors. Rogers (1995) also pointed out that interpersonal communications involve a face-to-face exchange between two or more individuals, and it often takes place during the decision-making process since individuals tend to judge the worth of an innovation through the subjective assessments of peers who have adopted the innovations. Interpersonal channels are more effective at forming and changing opinions and attitude toward a new idea (Rogers, 1995). Therefore, interpersonal channels have a greater impact on the decision to adopt or reject a new idea. This is important because individuals tend to judge the worth of an innovation through the subjective assessments of peers who have adopted the innovation.

In brief, social influence profoundly affects user behaviour (Lee, 2006). In TRA (Fishbein & Ajzen, 1975) and TPB (Ajzen, 1991), social influence was tested as subjective norms on behavioural intention. In the context of

technology usage, subjective norm has manifested itself as interpersonal influence and external influence (Mathieson, 1991; Taylor & Todd, 1995b). Giving that subjective norm in the technology adoption context is tied to interpersonal influence and external influence (Mathieson, 1991; Taylor & Todd, 1995b), it is expected that intention to adopt e-learning will be closely linked to the extent users can be influenced and respond to information input from mass media reports, advertising, course leaders, and adopting peers.

2.5 Summary

IDT, TRA, TAM and TPB are popular theoretical models in predicting and explaining innovation diffusion, human behaviour, system use and end-user behavioural intention respectively. They are chosen to be the bases for this research because of their in depth theoretical foundation and the fact that they have been proven successful in numerous empirical studies (for instance, Moore & Benbasat, 1991; Tornatzky & Klein, 1982; Venkatesh et al., 2003). TAM is especially designed to understand human behaviour in the domain of information systems, and most of IDT research projects in the recent years deal with technology innovation. They have been continuously refined and extended to explain the use and user evaluation of a wide range of information systems. As previously discussed, e-learning is considered as innovation because it has completely altered the traditional learning model. A number of recent studies adopted TAM to study the user acceptance of innovation

technologies such as adoption of internet banking services (Wungwanitchakorn, 2002; Hernandez & Mazzon, 2007), and consumer adoption of online store (Chen, Gillenson & Sherrell, 2002; Gefen, Karahanna, & Straub, 2003). Therefore, using TAM as the basis for studying students' acceptance of e-learning is a highly valid approach.

IDT is a theory that helps us understand why and how an innovation is diffused into a social system. Since e-learning is considered as innovation due to its newness relative to traditional learning mode. It represents a mix of learning process and modern technology, and the growing of e-learning is having an increasingly greater impact on people's daily lives. Thus, using IDT as the one of base theories for this research project will help us to understand the diffusion and adoption of e-learning by students. Although originated from different disciplines, TAM and IDT have some obvious similarities. Relative advantage in IDT is often viewed as the equivalence of perceived usefulness in TAM, and the complexity construct in IDT is extremely similar to the perceived ease of use concept in TAM (Moore & Benbasat, 1991). This observation suggests that TAM and IDT reconfirm each other's findings, which raises our confidence in the validity and reliability of these theories.

Based on the underlying themes of the theories reviewed, this research project uses innovation diffusion theory (IDT) and technology adoption model (TAM) as its primarily theoretical foundations, with the support of TRA/TPB and integrates the beliefs from individual choice related theories as well as

social related theories cited in the research literature to develop a new research model for adoption of e-learning in higher education. By applying these theories, the factors influencing student's selection of e-learning will be identified under a technological, social, and individual's choice approach. Technological factors such as relative advantage, complexity and compatibility have been found to be the innovation attributes affecting student's adoption decision on e-learning. Individual's choice factors such as self-efficacy and media richness have been identified to be possible determinants of students' behavioural intentions to choose e-learning. Social factors such as satisfaction, relationship, reputation, mass media channels and word-of-mouth are also possible influencing factors. This research project, as a result, is expected to shed new insights concerning the complexity of the student's perception about the e-learning and the decision making process regarding the e-learning provision.

In conclusion, the theories discussed in this chapter provide a strong theoretical support to this research project. The next chapter discusses the various aspects of e-learning environment, and the process of incorporating the base models with constructs unique in the context of e-learning. The resulting model serves as the research model for this research project.

Chapter 3

Review of Literature

3.1 Introduction to the chapter

After reviewing numerous well-established theories and the technology adoption literature in the last chapter, it is evident that there are a number of factors that influence the success of an innovation adoption (e.g. Moore & Benbasat, 1991; Tornatzky & Klein, 1982; Venkatesh et al., 2003). According to Rogers (1985) and other researchers these factors include technological, individual choice and social factors**.** By applying these theories, the determinants that affect student adoption and selection of e-learning over traditional learning in higher education could be identified. With the recognition of these technological, social, and individual motivation factors, marketers and policy makers of e-learning institutions can make use of this information as a valuable input when designing strategies to enhance the acceptance of e-learning among students.

This chapter will present the concept of e-learning, discuss the evolution of e-learning in higher education, the e-learning models, and review the literature on advantages and disadvantages of e-learning to explore why students might or might not adopt e-learning. Then, the connection between the tenets of constructivist learning theory and e-learning environment will be examined. As e-learning like all other teaching activities incorporates elements of group dynamics, we will review relevant aspects of face to face and

computer mediated group literature, the synchronous and asynchronous communication features, and the learning styles in e-learning. Then, a research framework which integrates key determinants from the well-established theories, the innovation diffusion theory (IDT) and technology acceptance model (TAM), as well as social and individual choice beliefs cited in the research literature, will be developed and discussed in detail. This study is intended to provide both theoretical and empirical analysis to explain the factors that influence student adoption of e-learning. The proposed model will be discussed again in the concluding chapter (chapter 7) after our qualitative and quantitative studies are discussed to incorporate the findings of the current project.

3.2 Concept of e-Learning

Technology has always been a part of education and training (Rosenberg, 2001). During the last decade, computer and Internet use have increased significantly overall more specifically on the subject of training courses. According to Urdan and Weggen (2000), technology has changed the way we live, work and think. The Internet has altered the way individuals communicate and is currently changing the way that people learn (Rosenberg, 2001). The rapid development and integration of Internet-based learning technologies has driven researchers, experts, and practitioners to question how best to define the new phenomenon known as e-learning.

E-learning is a very broad term for Internet-based learning in general. E-learning refers to the wide range of technology applications, strategies, and tools that offer students the means to increase their knowledge and improve their skills (Wagner, 2001). Rosenberg (2001) also indicated that "e-learning is based on three fundamental principles: (a) e-learning is networked, which makes it capable of instant updating, storage/retrieval, distribution and sharing of instruction or information, (b) it is delivered to the end-user via a computer using standard Internet technology, and (c) it focuses on the broadest view of learning solutions that go beyond the traditional paradigms of training" (p.14).

In general, e-learning is the use of technology to enhance educational experience. Many universities or organizations currently implement some forms of e-learning system to extend their education or training online. There may be differences in the level of application of e-learning by different institutions, and a variety of delivery formats may include self-instructional packages, Web-based subjects, two-way audio or video conferencing (Zalon, 2000). According to Engelbrecht (2003), e-learning may be used to supplement either traditional classroom education or print-based distance education or it may be a complete replacement of the traditional modes of teaching and learning. Richards (2002) argued that "a distinction must be made between what may be referred to as an add-on model of e-learning and a more integrated approach which goes beyond a mere transmission or delivery of content to promote more interactive and effective learning" (p.31).

However, it would be difficult to make this distinction, as e-learning should be based on using the technology to support a good learning experience. A good learning experience is one in which a student can "master new knowledge and skills, critically examine assumptions and beliefs, and engage in an invigorating, collaborative quest for wisdom and personal, holistic development" (Eastmond & Ziegahn, as cited in Jonassen, Davidson, Dollins, Campbell, & Bannan Haag, 1995, p.7). As these same authors continued to point out, "the most valuable activity in a classroom of any kind is the opportunity for learners to work and interact together and to build and become part of a community of scholars and practitioners" (Jonassen et al, 1995, p.7).

Nevertheless, it is commonly agreed that the use of technology in education does not merely refer to disseminating lecture information and content through the Internet, the underlying philosophy of adult education still applies (Chapman, 2000). According to Knowles' (1990) theory of adult education, adult-centred learning is the art and science of teaching adults. He assumed that adults take more responsibility for their own learning, are self-directing, have a readiness to learn and are intrinsically motivated to learn.

Generally, two modes of e-learning that are commonly used in higher education are (1) fully online learning mode and (2) blended learning mode - a combination of traditional face-to-face lecturers or tutorials and Web-based course content. According to Allen and Seaman (2005), an online course is defined as having at least 80% of the course content delivered online. Blended

education courses are defined as having between 30% and 80% of the course content delivered online. Lastly, Web enhanced courses are defined as having between 1% to 29% of course content delivered online. The typical classifications of e-learning course are shown in Table 3.1.

Table 3.1 Classifications of E-learning Course (Source: Allen & Seaman, 2005)

Type of course	**Proportion of online activities**	**Description**
Web enhanced	1 – 29%	Course with minor online activities. The instructor might use it to post the syllabus and timely announcements. Typically, traditional face-to-face meetings are held.
Blended	30 – 79%	Course that is a blend of online and face-to-face activities. Substantial proportion of content is delivered online, typically uses online discussion, and has some face-to-face meetings.
Fully online	80+%	The majority of the course is delivered online including the course content and online assignments. Special attention is given to interaction between the participants in the teaching-learning process. Typically have no face-to-face meetings.

The concept of blended learning has been defined in a variety of ways. Graham (2006) delineated that blended learning mainly falls into one of three categories: a) as a combination of different instructional media, b) as a combination of different instructional methods, and c) as a combination of online and face-to-face instruction. Graham (2006) also stated that blended learning systems can be defined as the combination of face-to-face instruction with computer-mediated instruction. This definition focuses on the role of computer-mediated instruction in blended learning environments. Similarly, Picciano (2006) defined blended learning as "a wide variety of technology or media integrated with conventional face-to-face classroom activities" (p.96). These definitions of blended learning also imply that instruction and learning is partly distributed. Indeed, the fast penetration of computing technology has created a large impact on the possibilities for distributed learning. Graham (2006) identified four dimensions of interaction in face-to-face and distributed learning environments. These dimensions of interaction include space (face-to-face versus virtual), time (synchronous versus asynchronous), fidelity (high versus low media richness) and humanness (high versus low presence of humans in the learning context).

Blended learning has been referred as the "third generation" (Phillips & Merisotis, 1999, p.26) of the distance education systems. The first generation was correspondence education which employed a one-way instructional delivery method such as mail, radio, and television. The second generation was distance education with single technology, for instance, computer-based

or Web-based learning. The third generation is blended learning, characterized as making the best use of face-to-face learning together with multiple technologies to deliver learning. Blended learning usually denotes any combination of learning delivery methods, including most often face-to-face instruction with asynchronous and/or synchronous computer-mediated technologies. Due to the lack of human interaction in the online learning environments, there has been an increasing movement toward blended learning approaches where students can have chances for both online and offline interaction with their instructors and peers (Allen & Seaman, 2003). The online component consequently becomes a natural extension of traditional classroom learning.

Many variations of blended mode exist. As described by Martyn (2003), a successful blended model used at a small liberal arts college consists of an initial face-to-face meeting, weekly online assessments and synchronous discussion, asynchronous threaded discussions, email and a final face-to-face meeting with a proctored final examination. The purpose of the initial face-to-face meeting is to provide students with opportunities to know other peers and to build group cohesiveness for subsequent collaborative work. When it is not feasible or efficient to have face-to-face meetings, instructors, as suggested by Curtis and Lawson (2002), can design online 'get to know you' activities where students post their brief introductions and also respond to others. In addition, providing one or two early synchronous computer-mediated communication sessions may enable students to have chances to introduce

themselves and receive immediate feedback. Moreover, activities such as ice-breakers and collaborative games can be posted online, they may help students to gain an initial experience with the process of group collaboration.

Another example revealed by Dziuban and Moskal (2001) stated that blended learning courses at the University of Central Florida replaced face-to-face class time with online learning, so that a 3-hour course occupied only 1-hour of actual face-to-face classroom time. Such courses enabled the weekly operation of multiple classes in a classroom previously occupied by only one course, hence making more efficient use of existing university infrastructure. Thus, it can be concluded that blended learning is a flexible approach to course design that supports the combination of different times and places for learning, providing some of the conveniences of fully online courses without the complete loss of face-to-face contact.

In blended learning environments, students' self-motivation and self-management are increasing important as there is less face-to-face interaction and more emphasis on self-regulated learning. However, a number of researchers observed that students had encountered difficulties adjusting to blended learning (Aycock, Garnham, & Kaleta, 2002; Bonk, Olson, Wisher, & Orvis, 2002). Aycock et al. (2002) indicated that students' poor time management skill instead of technologies was an important barrier. Moreover, when several components in a learning environment are not well integrated, the extraneous or ineffective cognitive load in learning processes can be

increased. These problems reflected that simply converting traditional classroom learning mode into blended learning mode do not certainly provide students with more interactive and flexible learning experiences. Therefore, educational institutions and instructional designers must decide whether the course will be fully online or a blended mode of online and traditional learning. If a blended model is chosen, the instructor and instructional designers must determine the amount and form of face-to-face learning.

3.3 Evolution of e-Learning in Education

The e-learning models of today rest on the shoulders of earlier distance learning approaches. The root of e-learning can be traced back to the correspondence model of learning. One of the first correspondence programs in the U.S. was developed at Pennsylvania State University in 1892, where the main mission was to provide higher education access to remote and rural areas (Banas & Emory, 1998). In later years, the correspondence model was further developed into a more robust distance learning program with the integration of technology. During its heyday in the 1920s and 1930s, schools such as Penn State experimented with the use of radio to broadcast their correspondence courses nationally (Huynh et al., 2003). Afterward, some other prestigious universities such as Columbia and Chicago launched several distance education programs in order to keep pace with the demand in the 1950s due to the massive technological development and education needs after the World War II.

Over 22 universities engaged in distance education worldwide between 1951 and 1992. Most of the university-level courses were conducted in a correspondence format via various media. One of the important educational technologies is film, the first modern learning technology (Rosenberg, 2001). The first major use of film as a learning technology was by the U.S. Military. Since the deployment of soldiers to other countries limited training in the traditional format, film was used extensively in an educational context by the military during World War II to ensure consistent training around the world. To this day, the military still uses film extensively in its training and has invested heavily in e-learning. In addition to military use, film was also a significant part of the public school curriculum in certain subjects during 1950s and 1960s. Similarly, Stanford University, a leader in 1970s, created special classrooms with video cameras focused on the instructor and on the students. Classes were telecast via microwave links to companies using an educational video band. Students could view their classes during work hours at video screens. The system worked quite well and attracted significant numbers of off-campus students (Rosenberg, 2001).

Another significant learning technology is television which was once thought of as a ground-breaking and innovative learning tool. In the UK, the use of television in training was pioneered with the founding of the Open University (Shoniregun & Gray, 2003). However, television as a learning technology never fully measured up to expectations. Students indicated that television based instruction was boring and did not hold their attention. The

lack of interaction between instructor and students suggests that television-based instruction was more a form of one-way communication rather than instruction (Rosenberg, 2001). Today, college-level television courses are still widely available. Although these courses are a bit more entertaining than past television based instruction, they still lack some of the fundamental interaction provided in a classroom environment.

The next wave of education technology involved computer based training. Chute, Thompson, and Hancock (1999) defined computer-based training as a training delivery method in which a computer is used to provide or manage a learning event. Initial computer-based training products were introduced in the early 1960s, and were improved significantly during the late 1970s and early 1980s with the introduction and diffusion of the personal computer (PC) (Chute et al., 1999). At this time, computer-based training became more commonplace at home and in the workforce, as they were thought to have many widespread applications.

Not every university processed the resources and technology to provide good distance learning experience during the 1960s and 1970s. Many of these programs failed due to poor quality and lack of student-teacher interaction (Huynh et al., 2003). Distance education in U.S. slowly re-emerged in the 1980s. Since the 1980s, text-based systems, audio-graphics and videoconferencing have been used in distance education (Mason, 1994). In the late 1980s hypermedia appeared which, by the early 1990s, had been

overtaken by the ability to integrate media elements (multimedia) into displays and presentations, giving rise to the ubiquitous CD-ROM applications (Sims, 2008). With the advent of the World Wide Web, the transformation of distance education approach into the modern e-learning industry accelerated in the 1990s. The World Wide Web integrates text, audio and video, and provides means for both real-time communication and asynchronous interaction (Mason, 1998).

By the end of 1990s, the convergence of information and communication technologies led to the widespread growth in the popularity of e-learning, and student enrolment in e-learning courses was growing at a high rate during the height of the dot.com era. For instance, enrolment at University of Phoenix Online nearly doubled from 16,000 to 29,000 in the year of 2000 (Carlson & Carnevale, 2000). It is estimated that more than 500,000 students are earning degrees via online programs in 2003, and in overall, the online school enrolment is growing at 33 percent a year (Symonds, 2003). As a result, e-learning – available at any time and any place – increasingly became a viable alternative to the traditional education model. Working adults with full time jobs are the largest audience for online education because it provides them not only the convenience but also the flexibility to advance their education and career.

According to the National Research Council (2002), digital technology is expected to create a convergence of higher education with publishing,

telecommunication, and entertainment, resulting in a global education industry. Nevertheless, like any other emerging industry, e-learning is going through a shakeout cycle. A round of layoffs at UNext in 2002 was a strong indicator of the severe turbulence in the market, and UNext wasn't the only one facing difficult times. This industry saw the downfall of New York University online (NYU online) in December 2001, the closure of University of Maryland University College online (UMUC online) in October 2001, the disappearance of Virtual Temple in July 2001 as well as the ongoing struggles of distance programs at the Masters Institute in California and the Western Governors University (Hafner, 2002; MacLeod, 2002). Further, the UK e-Universities Worldwide (UKeU) closed down in July 2004 (Education and Skills Committee, 2005). According to the study conducted by Mcleod (2004), it indicated that there is less demand for online study than enthusiasts predicted and UKeU is being dismantled because of insufficient demand and lack of funding.

The shakeout affects all educational institutions to take a long and careful look at the viability and demand of e-learning in higher education. Therefore, in order to boost up the e-learning trend, the purpose of this research project is to understand students' perception about e-learning and to identify factors that appear to influence their selection of e-learning over traditional learning approach in higher education. This information can help education institutions to formulate appropriate strategies that will encourage the adoption of e-learning.

3.4 E-learning Models

Previous research on the segmentation of the e-learning industry indicated that several classifications or types of e-learning exist (Ruttenbur, Spickler, & Lurie, 2000; Urdan & Weggen, 2000). According to Engelbrecht (2003), e-learning models have evolved in three phases from models that duplicate classroom experiences towards models that incorporate and integrate technology and pedagogical issues on their own terms. While the earliest e-learning models focused on the role of the technology in providing content (information), delivery (access) and electronic services (instructional design), more recent e-learning models have begun to move from being technology driven to being more pedagogically-informed such as online instructional design and the creation of online learning communities (Motschnig-Pitrik & Mallich, 2004).

3.4.1 Content, Service and Technology Model

In the earliest stages, e-learning went through a phase of huge excitement and enthusiasm that was characterized by unrealistic expectations. This phase was engendered by the unbounded enthusiasm of technology vendors. However, educators and learners have not adopted e-learning as expected and desired learning outcomes are not being achieved (Logan, 2001; Taylor, 2002). In the growth and experimentation phase of e-learning in the 1990s, universities, public and corporate institutions were enticed by vendors of learning management systems to base their e-learning initiatives on an e-

learning model comprising three elements: service to the learner, content and technology. The expectation was that a convenient means of learning would be created that would enable learners to learn anywhere and at any time. It was also assumed that the delivery of traditional learning content by means of Internet was all that was required to constitute e-learning. The learning design (content development) and the training of educators and learners for online teaching and learning received less attention.

The demand-driven learning model was developed in Canada as a joint effort between academics and other experts (MacDonald, Stodel, Farres, Breithaupt, & Gabriel, 2001). This model strongly reflects a vendor's appreciation of technology, content and service, however, the main focus in the model is on cost-effectiveness. Since the primary purpose of this model is to encourage academics to take the initiative in development and teaching online, it highlights the three consumer demands: high quality content (i.e. content that is comprehensive, authentic, well-researched and supported by adequate references), delivery (i.e. delivery that is Web-based together with a user-friendly interface and attractive and functional communication tools), and service (this refers to resources, administration and technical specifications).

The demand-driven learning model provides a valuable framework for understanding the importance of investing in information and communication technology infrastructure to support content, delivery and service. Nevertheless, this model also emphasizes the importance of realizing the

changing needs of learners and their employers and the pedagogical changes that must be made to content and services to meet these needs. The demand-driven learning model is shown in Figure 3.1.

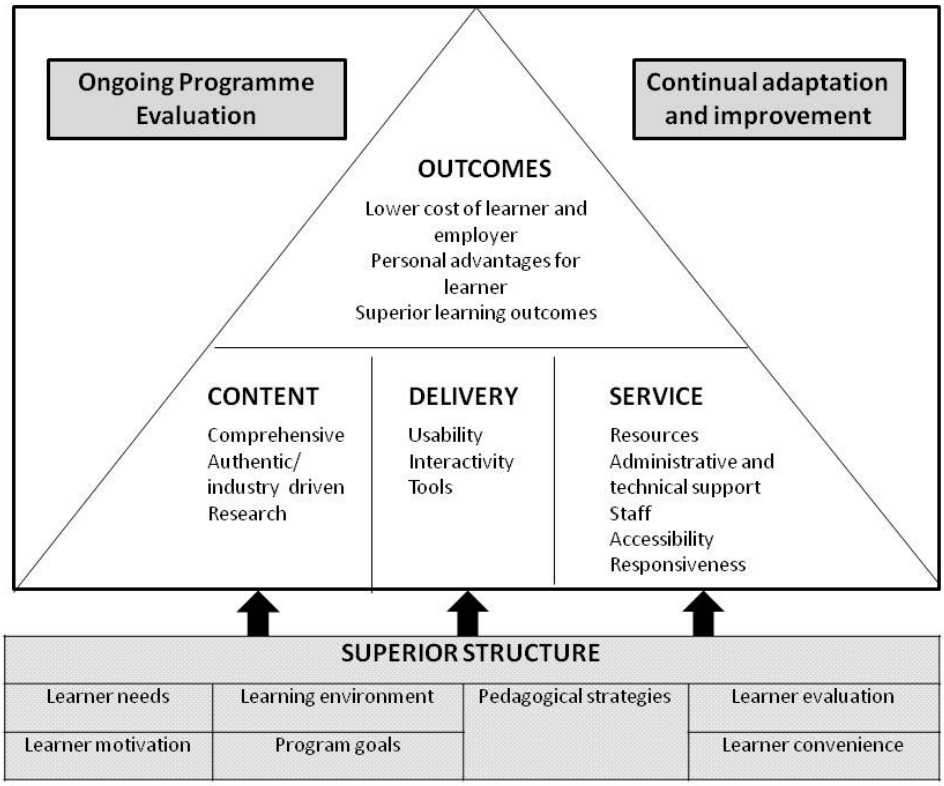


Figure 3.1 The Demand-driven learning model (MacDonald et al, 2001)

3.4.2 Instructional Design Model

Instructional design is the systematic and reflective process of translating principles of learning and instruction into plans for instructional materials, activities, information resources, and evaluation (Smith & Ragan, 1999). Since technology plays a key role in delivery e-learning, but it is changing rapidly, faculty and instructional designers therefore must remain

focused on instructional outcomes, not the technology to delivery. The key to quality e-learning is focusing on the learner's needs, the content's requirements, and the constraints faced by the instructor before selecting a delivery system. According to Sauve (1993), the goal is to establish a mix of instructional media to meet the learners' needs in a manner that is instructionally effective and economically prudent.

One of the most essential prerequisites for successful implementation of e-learning is to carefully consider the underlying pedagogy. Conrad (2000) defined effective e-learning as "the integration of instructional practices and Internet capabilities to direct a learner toward a specific level of proficiency in a specified competency" (p.11). According to Engelbrecht (2003, p.42), instructional value may be added by:

- customizing content for the needs of the learners;
- presenting outcomes-based learning objectives;
- logically sequencing material to reinforce those objectives;
- basing navigational options (hypertext links) on existing and desired skills and the knowledge of learners;
- designing objective-based, interactive learning activities that learners must complete to receive some form of evaluation.

Designing a Web site that satisfies the requirements of Web-based content and the diverse learning needs and expectations of e-learning students

is an essential factor in the e-learning process. Optimal Web-based content requires effective graphics, audio, video, and text. Fuccella and Pizzolato (1999) stated that a well-designed Web site should integrate good structure, effective graphics, exciting content, and intuitive navigation seamlessly.

Also, since e-learning is open to various places and cultures in the global community, carefully implementing the design process of a Web-based learning environment is a must. For example, the concept of signs as they relate to different cultures could have a tremendous impact on using technology as e-learning users gain access to expanded communities of learning because signs can be misread. The same sign could mean different things to different people. Hence, content experts and instructional designers are required to ensure that embedded signs will be interpreted similarly by all learners when they construct e-learning instruction and activities.

Instructional designers should also consider the usability and accessibility of a site when they designed the Web-based contents (Opitz, 2002). Web sites that are mainly text-based would provide several viable options for all learners, such as faster downloading and data transmission to other electronic devices. Adding unnecessary animation to the Web site may distract the user who is looking to access specific information, not entertainment (Krug, 2000).

Moreover, Driscoll (1998) pointed out that students who learn electronically need content that is applicable to real-life events and situations. Constructing authentic activities can facilitate knowledge acquisition and quality learning. In other words, the more relevant and realistic the material and class activities, the easier for e-learning students to understand the presented content and engage themselves in constructive learning. This flexible approach encourages faculty and instructional designers to present information in different ways, and encourages students to associate with what is learned electronically to work experiences.

Besides, designing a structure that meets and displays the e-learning class content effectively is crucial for students to assume an active role in the e-learning process. The e-learning course should be accessible and useable for all learners. In order for an instructor to deliver a quality e-learning class and facilitate meaningful and authentic learning tasks, the course structure should be designed to comprehensively meet these needs.

Indeed, several researchers have offered models of e-learning that fall into this second phase of instructional design. Conrad's (2000) development model for an e-learning experience was divided into seven stages that comprise 21 separate tasks. Collis and Moonen (2001) found institution, implementation, pedagogy and technology as the key components for developing online learning materials. Joliffe, Ritter and Stevens (2001) illustrated an 18-step process for achieving a similar goal. Mishra (2001)

indicated seven key factors that need to be considered in the design of an online course. Alexander (2001) identified that successful e-learning takes place within a complex system that includes the students' experience of learning, teachers' strategies, teachers' planning and thinking, and the teaching and learning context concerned. In general, they all emphasized the following issues (cited from Engelbrecht, 2003):

- needs analysis
- student profiles that will identify their needs and expectations
- institutional support for e-learning initiatives
- pedagogical choices that meet the requirements of the subject and the needs of the target learner group.

These instructional design models are useful in the sense that they provide practical frameworks for the guidance of those responsible for developing e-learning materials. These models could assist in making valuable contributions to strategic planning as they emphasize the issues of quantity and quality of learning materials and learning support.

As suggested by Harman and Jones (1999), Web technology can be applied in e-learning in multi-layered with five levels. These levels are informational, supplemental, essential, communal, and immersive. The first three levels (informational, supplemental, and essential) are simply Web-based resources which provide students with additional reading materials, course

details and syllabus, and organized learning resources including textbooks, library lists and reserves, list of Web sites, syllabi and course pack materials. The forth level (communal) of Web use represents a blended learning environment where students meet face-to-face and online, however, most of the learning activities are performed electronically. The fifth level (immersive) of Web use organizes and facilitates a live social context for synthesizing learning among the students as a group. As recommended by Dede (1996), e-learning must balance virtual and direct interaction in sustaining communication among people in order to succeed. Thus, encouraging synchronous and asynchronous interactive and collaborative learning discourse is a powerful educational tool.

E-learning, however, has another medium. It is the students and his or her expertise. Oliver (2001) stressed that "for electronic learning to become part of mainstream practice, it needs to sit comfortably with teachers and students and be easily achieved and maintained" (p.224). Eventually, the true test of effectively using technology in the classroom is not the material covered in the class, but rather in the quality level of student learning.

3.4.3 Learning Communities

Models from this phase focus the role of online learning communities. Lately, more researchers in the field of e-learning have shifted their focus to online communication and the issue of communities in the e-learning

environment. This includes attention to online interaction, communication tools and techniques for motivating learners to participate (Blignaut & Trollip, 2003).

Since most universities adopted e-learning at an early stage after the stabilization of their technological infrastructure, they have moved on to the stage in which they are now addressing pedagogical issues. This move is due to the fact that many learners are not participating in the learning experience as it was expected that they would, even though the educators concerned conscientiously designed their learning materials in accordance with the most appropriate and highly regarded best practice instructional design models.

Generally, interaction can be defined as a reciprocal communication process between human and human or between human and non-human (e.g. human-computer interaction). Palloff and Pratt (1999) pointed out that the key to the learning process are the interactions among students themselves, the interactions between faculty and students, and the collaboration in learning that results from these interactions. In the field of distance education, Moore (1989) suggested three kinds of interactions which include learner-content interaction, learner-instructor interaction, and learner-learner interaction. Hillman, Wills and Gunawardena (1994) have further added another type of interaction, learner-interface interaction, in the e-learning environment.

3.4.3.1 Learner-Content Interaction

Learner-content interaction is defined as "the process of intellectually interacting with content that results in changes in the learner's understanding, the learner's perspective, or the cognitive structures of the learner's mind" (Moore, 1989, p.2). The majority of student time in all forms of education is consumed by interactions with educational content. In traditional classroom learning mode, learner-content interaction has meant study using texts and library resources. In e-learning contexts, content can be expressed in the form of a paper-based text, radio or television programming, audio or videotape, but content is often supplemented with a rich variety of computer assisted instruction (such as a CD, computer program, or online communication), simulations, micro worlds, and presentation creation tools (Garrison & Anderson, 2003). Westbrook (1999) pointed out that online learners tend to engage extensively in learner-content interaction since online learning is largely text-based.

Moore and Kearsley (1996) indicated that learner-content interaction results from students examining or studying the course content and from participating in class activities. Part of the learning process includes how students interact with the content presented in the e-learning course. Studies on learner-content interaction were not always easy to distinguish and may have been tied to other variables such as learner-learner interactions or learner-interface interactions.

In the past, content was assumed to be static and waiting for consumption by students. However, in the field of e-learning, content can be animated and given agent-like properties of autonomy, volition, and rationality and can be programmed to take a more active part in learner-content interactions (Garrison & Anderson, 2003). Sometimes a student interacts only with the course content and never interacts with the instructor, other students, or the interface. The development of learning heuristics that allow for adaptation by content in response to student performance and request allows for an individualized form of student-content interaction.

Numerous studies have investigated the factors that affected students' perception of learning the course content, these factors included continuous contact with the content (Leasure, Davis, & Thievon, 2000); clarity of course design (Swan, 2001); time (Atack & Rankin, 2002); participation in online discussions (Jiang & Ting, 2000); and mode of delivering course content (Faux & Black-Hughes, 2000). The findings from these studies provided support that students interacting with course content in a Web-based format can and do learn the material. Other findings revealed that students have more continuous interaction with the content in an e-learning course, the more learning and overall greater satisfaction with the course can be achieved (Leasure et al., 2000). Swan (2001) also found that students were more satisfied with the course and perceived greater learning when more of their course grade was based on participating in discussions. In addition, Jiang and Ting (2000) indicated that the more students believed that their participation in

discussions enhanced their learning, the more they thought they learned.

However, Atack and Rankin (2002) found that the lack of time to participate in course work has been identified as a barrier to learner-content interaction. On the other hand, other studies reported that students preferred to learn the course content in the traditional classroom setting where they could list to the content rather than read it (Faux & Black-Hughes, 2000) or preferred live instructors rather than video-taped/Web facilitated interactions (Sole & Lindquist, 2001).

3.4.3.2 Learner-Instructor Interaction

The learner-instructor interaction is the most important factor in student motivation and involvement in e-learning classes. The interaction takes place when an instructor delivers content knowledge, provides appropriate scaffolding, clarifies misunderstanding, and increases student motivation. As defined by Moore (1989), learner–instructor interaction measures the level of involvement of the instructor with the learners and the extent to which they experience the proximity of the instructor through his/her online presence. The instructor serves as an expert who plans the instruction to stimulate student's interests and to motivate their participation in the learning process. This form of interaction is regarded as essential by many educators, and as highly desirable by many learners.

McKenzie, Mims, Bennett, and Waugh (2000) surveyed 70 e-learning instructors at the State University of West Georgia and found that around 55% of e-learning instructors wanted to teach online because e-learning gave them opportunities to respond to the needs of those students who are unable to attend face-to-face classes. Indeed, concerned and caring instructors help e-learning students get through rough times and keep on working. Conrad (2002) also found out that e-learning students looked for the information they needed to begin their learning effectively and in an organized manner. Thus, e-learning instructional designers and instructors should create an atmosphere that emphasizes the individual student's importance and overcomes distance by generating group rapport, productive discourse, and interaction.

Depending on the instructional approach, the instructor can take a prominent role (instructor centered) or a facilitator role. For example, an objectivist mode of instruction, which is based on the transfer of information from the lecturer to the learner, emphasizes learner–instructor interaction over the other types (Leidner & Jarvenpaa, 1995). According to Sutton (2001), learner-instructor interaction can vary from the instructor making a presentation of information to a group of students to the instructor interacting one-on-one with a student regarding an individual concern.

Effectively technology tools are instrumental in improving the communication process between e-learning students and instructors. Dede (1996) stated that "how a medium shapes its users and its message is a central

issue in understanding the transformation of distance learning into distributed learning" (p.24). As suggested by Duffy and Cunningham (1996), learning is truly mediated by tools and signs. For instance, Marra and Jonassen (2001) pointed out that instructional video is a potentially powerful tool for enhancing constructivist learning. The Web assists us to use rich tools and signs to deliver instruction and develop meaningful learning activities. These advanced technological tools' development has enhanced discourse and dialogue in e-learning courses and enabled learners to actively share, explore, and discuss ideas and insights with peers and instructors.

Web tools such as video, audio, radio, simulation, databases, multimedia, hypertext linking, asynchronous and synchronous discussions, e-mail, bulletin broads, file transferring, e-learning collaboration via chat rooms and file sharing applications, are the most frequently used tools in a Web-based learning environment. For some organizations, two-way interactivity (i.e. synchronous two-way interactivity) is considered as a mandatory component of e-learning (Barron, 1999). E-mail is also an effective and timely communication tool which works well for both students and instructors in the e-learning process.

Besides, signs are used as means to convey meaning and construct knowledge. Signs such as language, graphs, diagrams, visuals, art, music, numbers, pictures and flashcards are considered as the most commonly used signs in an Internet-based learning environment. By having constant access to

multimedia technology, students can post questions at the time a problem arises. In sum, Internet-based technology tools and signs can be used effectively for dynamic communication, quality learning opportunities, and impulsive interaction among students and instructors.

According to Duffy and Cunningham (1996), a dialogic structure is essential in an effective learning environment. In a quality e-learning environment, a dialogic component is based on the Web-based instruction and its goals and instructional settings. As delineated by Vrasidas and McIsaac (1999), the level and extent of interaction in a quality e-learning class depend upon the course structure, class size, feedback provided to the students, and learners' prior experience with computer-mediated communication. Some behavioural electronic tutorials, lectures, or presentations are expected to educate the audience and do not anticipate discussion. In contrast, constructivist e-learning classes recommend effective electronic discussion features. In these discussions, the instructor play a role as an expert to consult with students, and provides access to a variety of reliable and rich Web resources and constructive peer feedback.

Moreover, timely feedback is also concluded as an important factor in student learning and distance learning courses (Berge, 2002; Billings, Boyle & Wambach, 2001; Connors & Skiba, 2001; Thurmond et al., 2002). E-learning students require appropriate and immediate feedback on performance to benefit from quality e-learning courses and keep their motivation levels high.

In getting started, e-learning students need helps in assessing existing knowledge and competence. According to Collis, Deboer and Slotman (2001), feedback is critical to assessment and provides students information about their progress in the course.

Vrasidas and McIsaac (1999) conducted an interpretive research on the factors that affect interaction in a graduate course which was delivered in blended mode (i.e. include both face-to-face and online sessions). The findings indicated that the major influencing factor was receiving prompt feedback. When students perceived that instructors did not respond in a timely manner, they felt discouraging and limited their participation in the online discussions. Similar findings were reported by Hara and Kling (1999) who found that the lack of prompt feedback can result in learners' uncertainty about their performance in the e-learning course and can contribute to their frustration. Therefore, instructors need to provide students with immediate feedback to keep them engaged in the learning.

Synchronous discussion Web tools enhance the e-learning environment and culture by making it dynamic and open to the whole community of learners. A numerous of assessment and learning tasks and techniques such as collaborative e-learning activities, electronic research, timely reports and assignments posted to the designed Web site, consistency in instruction, and varying e-learning instructional techniques and methods are helpful in the learning process for quality e-learning environments.

In summary, the learner-instructor interaction plays an important role in student motivation in the e-learning environment. Reliable technology tools allow multiple opportunities for meaningful interaction within a social context in the e-learning class. Technology-based interaction can enrich learners' critical thinking, reflective, and negotiation skills, and generate new ideas anytime and anywhere during the e-learning process (Pene-Shaff, Martin, & Gay, 2001). This interactive process could be superb in giving or leading to equal and successful learning opportunities for e-learning students.

3.4.3.3 Learner-Learner Interaction

Moore (1989) asserted that learner-learner interactions occur "between one learner and another learner, alone or in group settings, with or without the real-time presence of instructor. Such interaction can be an extremely valuable resource for learning, and is sometimes even essential" (p.4). Through learner-learner interaction, learners can share ideas, collaborate on tasks, gain multiple perspectives, encourage and support each other. Some studies revealed that this type of interaction is a valuable experience and resource of learning (Bull, Kimball, & Stansberry, 1998; Vrasidas & McIssac, 1999). Much empirical evidence also indicated that students actually desire learner-learner interactions regardless of the delivery method (Grooms, 2003; King & Doerfert, 1996).

Vrasidas and McIssac (1999) found that collaborative instructional

pedagogies such as group activities are needed to facilitate learner-learner interaction in online education. Team work, or collaborative learning, involves students working together in groups to complete academic assignments (Alavi, 1994; Palloff & Pratt, 2001). This form of learner-learner interaction is intended to promote understanding the course content and stimulate critical thinking. Collaborative projects may lessen feelings of isolation and promote a sense of a learning community (Abrahamson, 1998; Palloff & Pratt, 2001) in the Web-based classroom.

However, students who were required to participate in teams or group projects in a Web-based course have reported less satisfaction with the course (Thurmond, Wambach, Connors, & Frey, 2002). Thurmond and colleagues (2002) indicated that the reason for the dissatisfaction may be due to the challenge of completing course assignments without the face-to-face interactions. Much empirical studies addressing learner-learner interactions in e-learning courses highlighted the need for students to connect with their classmates (Atack & Rankin, 2002; Billings, Connors, & Skiba, 2001; Fredericksen, Pickett, Shea, Pelz, & Swan, 2000; Jiang & Ting, 1999; Muirhead, 1999, 2001; Soo & Bonk, 1998; Swan, 2001)

Besides, numerous studies have concluded that increases levels of interaction result in increased motivation, more positive attitudes toward learning, higher satisfaction with the instruction, deeper and more meaningful learning, and higher achievement (e.g. Entwistle & Entwistle, 1991; Garrison,

1990; Wagner, 1994). Students' interaction with their peers in a distance learning environment can contribute to learning (Moore & Kearsley, 1996). For example, a study by Fredericksen and colleagues (2000) examining asynchronous learning found that the more interaction students believed they had with other students, the more they were satisfied with their courses, and the more they thought they have learned. Muirhead (1999) reported that students believed their learning was influenced negatively by other students who participated late in online class discussions.

Similarly, instructors have reported on the importance of learner-learner interaction (McGinn, 2000; Muirhead, 1999, 2000; Soo & Bonk, 1998). In a study with eight experienced distance education instructors, Soo and Bonk (1998) used the Delphi Technique and showed that the instructors in online learning rated the learner-learner interaction as the most important form of interaction, followed by learner-instructor interaction. This result supported the idea adopted by other researchers that the student is central to any learning (Ehrlich, 2002; Soo & Bonk, 1998) and that instructors are needed to guide the students.

Regardless the design of interactive components in Web-based courses, some students may still prefer to interact with their peers or instructor much as they would in the traditional classroom setting. Billings et al. (2001) conducted a research and found that students enrolled in e-learning courses were less likely to interact, with both students and instructor, than they were in

their traditional classroom.

Although the interactions that occur in the e-learning course are through an electronic medium, the electronic format seems to be an effective medium for dialogue (Larson & Keiper, 2002). Larson and Keiper (2002) examined discussions that occurred in a secondary Social Studies course and compared qualitative data gathered from face-to-face in class discussions, as well as electronic threaded discussions. The results indicated that some of the students who often did not participate in the face-to-face classroom discussions talked more in the online discussions. Moreover, students have reported enjoying the interaction and attention more from their instructors and peers in an online course (Aase, 2000).

In the field of e-learning, the learner-learner interaction is supported through a variety of communications technologies, in both synchronous and asynchronous formats. As indicated by Garrison & Anderson (2003), the design of appropriate amounts of interaction is critical and depends on a variety of factors, many of which are rooted in the expectations and capacity for interaction expressed by the students.

In sum, findings regarding learner-learner interaction indicated that students who interacted more in an e-learning course may perceive greater learning. Furthermore, collaborative group interaction can help in learning the course content and easing feelings of isolation. Nevertheless, some students

may still prefer the interaction that is found in the traditional classroom setting.

3.4.3.4 Learner-interface interaction

In addition to Moore's framework, Hillman, Wills, and Gunawardena (1994) argued that interaction between learner and interface should be considered as a critical component in technology-mediated nature of online education. This type of interaction occurs between the learner and the communication media used during the learning process, and it can be concluded as one of the most challenging types of interaction due to the fact that people are not used to it in traditional classroom education (Hillman et al., 1994). Hillman and colleagues further stressed that the learner must interact with the technological medium to interact with the content, instructor, or other learners, and that a medium can have great negative effects on the forms of interaction particularly when learners are unfamiliar with the communication technologies used to deliver instruction. A qualitative study of Wu (1999) indicated that users' attitudes toward a Web site are positively related to their perceived interactivity of the Web site, such as the responsiveness and navigability. Thus, in order to improve learner-interface interaction, learners need to possess the necessary technology skills (Harmon & Jones, 2000; Ross, 1996), and the design of media interface should also be friendly (Barnes & Lowery, 1998; Marshall, 1999).

Indeed, many researchers have investigated and studied the influence of computers on student learning (e.g. Debourgh, 1999; Hillman et al., 1994; Kenny, 2002; Leasure et al., 2000; Payne, 2002; Wilson & Weiser, 2001). Chickering and Ehrmann (1996) have conducted a study to explore the use of technology in education, the results of the study strongly advocated that technology use should support the seven principles of good practice in education. In particular, the relationship between student and technology should work in tandem to promote e-learning. Payne (2002) further commented that the technological tools themselves are neutral, hence the manner in which students interact with the technology is what impacts on their learning. Students learn the content through the interaction with computer technology, and that computer use fosters their willingness to continue with the online course is the desired outcome of learner-interface interactions. Thurmond and Wambach (2004) suggested that the major variables linked to learner-interface interactions included computer experience, students' perceptions regarding the technology, and access to technology.

Studies relating to learner-interface interactions, however, provided conflicting findings regarding the influence of students' perceptions of their interaction with the technology. Schrum and Hong (2002) indicated that unfamiliarity with the technology has been identified as a barrier to learning. Faux and Black-Hughes (2000) revealed that students reported getting lost on the Internet with the use of such technology, and the students stated that they preferred to listen to the course content in the traditional classroom setting

rather than reading it online. Furthermore, students' perceptions of the access to technology clearly influenced whether they believe the technology was helpful or an inconvenience (Schrum & Hong, 2002).

On the contrary, some studies have demonstrated that although students showed no previous experience with the technology, they have reported increased confidence in the use of computer (Billings et al., 2001; Kenny, 2002; Leasure et al., 2000), and have come to view the delays associated with the technology as a time for reflection (Daley, Watkins, Watkins, Williams, Countenary & Davis, 2001). After all, some studies indicated that computer experiences had no impacts on overall student satisfaction (Leong, Ho & Saromines-Ganne, 2002; Thurmond et al., 2002).

In sum, the above discussions demonstrated that lack of computer experience or difficulty with interacting with the technology does not certainly lead to negative learner-interface interactions. Much of the learner-interface interaction seems to hinge on how students perceive the technology, therefore students who are not familiar with the use of technology for learning may still report positive student outcomes in the e-learning course.

Following the demand-driven model and the instructional design models, Garrison and Anderson (2003) developed the community of inquiry e-learning model in an attempt to offer educators an in-depth analysis of the characteristics of e-learning. It aims to guide the use of instructional

technologies in creating and sustaining deep and meaningful learning through reflection and discourse in e-learning environments. A community of inquiry is an important prerequisite for higher-order learning because it creates an environment in which learners can take responsibility for their learning and control it on the basis of what they learn through interaction. The access and communication facilities of an e-learning environment offer distinctive features that support learners (Garrison & Anderson, 2003). The community inquiry model is shown in Figure 3.2.

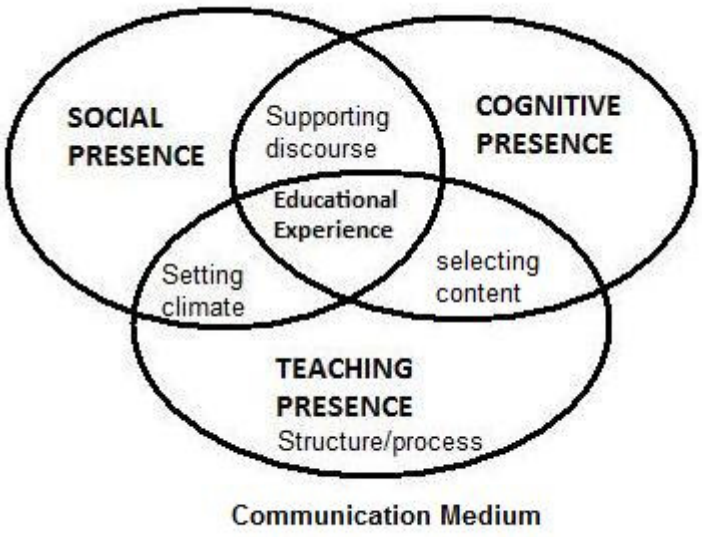


Figure 3.2 Community of Inquiry Model (Garrison & Anderson, 2003)

The community of inquiry model identifies the core elements of a collaborative constructivist learning environment required to create and sustain a purposeful learning community. The model also clearly demonstrates the current interest in how discourse and collaboration are able to confer pedagogical benefits. It presents how deep and meaningful learning becomes possible as a result of sufficient levels of three presences (Garrison & Anderson, 2003). The three main presences are cognitive presence, social presence and teaching presence.

The first presence is cognitive presence. Cognitive presence reflects the learning and inquiry process. It assumes that serious learning can only take place in an environment that supports the development and growth of critical thinking skills. Garrison and Anderson (2003) defined cognitive presence "as the extent to which learners are able to construct and confirm meaning through sustained reflection and discourse in a critical community of inquiry. In essence, cognitive presence is a condition of higher-order thinking and learning" (p.28). Cognitive presence is formally defined by the Practical Inquiry model that identifies four phases in the inquiry process (Garrison, Anderson, & Archer, 2001). The phases are definition of a problem or task; exploration for relevant information or knowledge; making sense of and integrating ideas; and, finally, testing plausible solutions. All of this occurs in an environment of reflection and discourse; analysis and synthesis.

The second presence is social presence. Social presence is defined as

"the ability of participants in a community of inquiry to project themselves socially and emotionally as 'real' people (i.e. their full personality), through the medium of communication being used" (Garrison & Anderson, 2003, p.28-29). Gunawardena and Mclsaac (2004) also indicated that social presence has appeared to be a social and communication factor that is particularly critical to distance learners' perception of psychological distance with their instructor and other learners. Indeed, social presence refers to the necessity of establishing a supportive environment that enable students to enjoy whatever degree of comfort and safety they might need in order to express their ideas in a collaborative context. The absence of a properly regulated and constructed social presence creates an environment in which students are unable to disagree, share opinions, explore differences and accept both support and confirmation from peers and instructors without losing face and experiencing discomfort and embarrassment.

The third presence is teaching presence. Teaching presence in the community of inquiry model is defined as "the design, facilitation and direction of cognitive and social processes for the purpose of realizing personally meaningful and educationally worthwhile learning outcomes" (Anderson, Rourke, Garrison, & Archer, 2001, p.5). Teaching presence includes three areas of responsibility – design, facilitation and direct instruction. Teaching presence provides the essential leadership and cohesiveness for a purposeful and successful learning experience. Research has shown that teaching presence plays an important role in creating and

sustaining a collaborative community of inquiry (Garrison & Cleveland-Innes, 2005; Shea, Swan, & Pickett, 2005) Evidence continues to grow demonstrating the importance of teaching presence for the successful use of instructional technologies to support e-learning communities (Meyer, 2003; Murphy, 2004; Swan & Shih, 2005; Vaughan & Garrison, 2006). On the other hand, instructional technologies expand teaching presence. For instance, in terms of design and organization category, Web 2.0 technologies lead to designing innovative, challenging, collaborative learning activities and environments. In terms of facilitation, these new technologies provide new means for communication and interaction between and among students and instructors, thus enhancing immediacy. Direct instruction could be implemented through sharing and injecting information from diverse sources in variety forms with the help of emerging technologies.

The community of inquiry e-learning model builds on the demand-driven model and the instructional design models, and draws attention to the complexities of communication in a virtual learning environment. Institutions of higher education have slowly began to appreciate that the content of educational experience alone will not define quality learning but the context - how teacher designs the interactions that drive the learning transaction – will ultimately distinguish each institution.

3.5 Advantages and Disadvantages of E-learning

As anticipated, e-learning differs from classroom-based learning in many ways. Hence, converting a traditional course to e-learning may denote a complex endeavour, and as such it requires accurate planning, monitoring and control, to make the conversion effective and economical. Before anything else, unless the advantages of e-learning are more numerous than the disadvantages for both the educational institution and the students, converting to e-learning may not represent an efficient solution.

3.5.1 Advantages of e-Learning

Recent technological developments have made e-learning a feasible alternative to improve access to educational and training opportunities for learners of all ages, at all levels, and in different environments. E-learning overcomes drawbacks that are inherent in traditional classroom teaching, especially its lack of flexibility in the use of resources, including space and time scheduling (Rosenlund & Damark-Benbenek, 1999). Since e-learning can be cost effective when compared to the traditional learning methods, more businesses and universities are using e-learning courses to teach their employees and students anything from company policies to new skills necessary for professional development. They are reducing expenses by not having to distribute the course materials by paper or CD-ROM to all of the employees and by not having to send their employees to training centres, which certainly reduces or eliminate food, lodging, and travel expenses

(Pallatto, 2002). When compared to traditional learning mode, e-learning offers several advantages to students interested in pursuing personal development. Some of those advantages include: consistency, accessibility, adaptability, affordability, controllability and flexibility over their learning experience.

Consistency in training is one of the advantages to e-learning. In traditional learning, different teachers may teach different material about the same subject, but in e-learning, consistent content can be provided to students. According to McShulskis (1997), having several trainers for a particular training topic could lead to different interpretations of the training material from one instructor to another which may or may not be the intended interpretation. Since the same training is given to all employees, the company can be assured that the quality and content of the training is consistent at all locations (Garvey, 1999).

Time and distance are the common barriers for traditional learning mode. With learning materials accessible by personal computer, learning can be conducted at anytime and anywhere. The great accessibility of e-learning is perceived as a key advantage to e-learning and a substantial cost savings to both training providers and learners (Nucleus Research, Inc. 2001). Students derive cost savings by using the technology in their own homes, eliminating travel expenses to the university. For the university, cost savings result when they can attract students from anywhere in the world.

Utilizing an e-learning course format is advantageous to students and teachers in terms of its adaptability. In case that changes need to be made, the information can be easily be uploaded from the teacher's computer to the server-computer which allows the student access to the most updated information when they log onto the course site. The content and format of an online course is easily updated to reflect changing times (Kruse, 2002). Moreover, e-learning is adaptable in its content and delivery such that it can be custom-made for any given situation. For instance, the e-learning system can determine what level of training that employee may require after analyzing an employee's training needs. Training does not have to be cut short or rushed due to the instructor ran out of time.

Affordability is also an advantage to e-learning. An online course is inexpensive in that the distribution and delivery costs are minimal. From a student perspective, the cost of an e-learning course is generally the same amount or less than a regular course taught in the traditional manner. However, for students who choose to take courses from universities located outside their home town, an online course can save relocation and accommodation costs. For the company, organizing an online course would probably be cheaper than a traditional conference or seminar for their employees (Kruse, 2002).

Another advantage to e-learning is controllability. E-learning allows students to have control over every aspect of the learning situation from the time spent on task, practice time, and study time (Brown, 2001). In other

words, it allows students to learn at their own pace. Unlike traditional classroom training where the training is paced to accommodate the slowest person in the class, computerized training allows learners to cover only the topics that they need to cover, not wasting time on subjects or concepts that they already understand (Hein, 1999). On the other hand, the training provider can easily check the participation rates of learners and monitor their learning progress.

Besides, quality e-learning methods offer the option to think before one speaks (Driscoll, 1998), and let the learner experience the thoughts of every peer in the class. E-learning discussion platforms, such as the delayed-time section of Blackboard, WebCT or eCollege software, allow learners take back what they write in the appropriate posting areas if they act quickly. Thus these tools provide the learner with the necessary time to think and review comments before posting them to the software system. Current advancements in educational technology, particularly in areas such as interaction and collaboration, may partly make up for the absence of face-to-face interaction in an e-learning course.

E-learning students may lose the non-verbal cues, however, students gain textual, graphical and visual and audio advantages. Drawings, tables, graphics, audio, video and animations are powerful tools to support the mental image in e-learning classes, which are sometimes unavailable in a face-to-face class (Picciano, 2001). Incorporating and designing the hypermedia Web

features in e-learning classes provides and allows the learner quite a lot of opportunities for live interaction, controlling the depth of class content, and learning experiences. In addition, hypermedia provides e-learning students with external learning resources to enrich their understanding and learning process (Dabbagh & Bannan-Ritland, 2005). Picciano (2001) also pointed out that use of information technology in education enables new opportunities to provide interactive learning experiences, and enrich students' understanding and learning process.

Moreover, it would be difficult to overstate the importance of flexibility to most e-learning students and learners. The pressures of modern life are such that most people demand educational and training programs which allow them to fit studying and training in and around many other commitments (Romer, 1997). According to a survey mailed to 3,000 chief academic officers and college presidents by Babson College and the Sloan Consortium, 57% of respondents stated that e-learning classes are at least equivalent in learning quality to those classes conducted in lecture halls (Allen & Seaman, 2003). Besides, faculty at eCollege.com analyzed the results and feedback from their students and reported that their students learned equally effectively online as they did on campus (TeleEducation, 2001). These studies showed that e-learning provides quality and convenient learning platforms for students and the institution.

Dede (1996) supported e-learning when he mentioned that "most people prefer face-to-face interaction, but find the convenience of just-in-time, any place access to others often outweighs the disadvantages of distributed sharing of ideas, experiences, and support" (p.12). Participation in interactive media, computer and Internet searching, and e-mailing also equips students with valuable interaction skills that are necessary to prepare them for today's working world (Moore, 1989). Polyson, Saltzberg and Godwin-Jones (1996) further identified that e-learning may also support students who have different learning needs, personal habits and other preferences. For instance, e-learning students can create individually tailored paths to master the desired goals, moving at their own speed and retrieving additional information as needed.

E-learning is a viable, effective and efficient educational and training delivery mode. This medium is assuming these dynamic electronic learning and training opportunities for a number of specific reasons:

(a) Future education and training activities will be progressively more knowledge- and technology-based (Hanna, 1998).

(b) The amount of information available on the Web to individuals will continue to grow exponentially (Lee & Thompson, 1999).

(c) Rapid change will be the rule, not the exception, and Internet-based education and training will be supportive of this lead (Hanna, 1998).

(d) Inter-organizational and institutional partnerships, resource sharing and networking will improve information access (Hanna, 1998; Lee & Owens, 2000).

(e) E-learning can provide access to many different types of resources, including professional and educational training opportunities, experts working at other locations, network-dispersed groups, personal in remote or dispersed locations with access to a primary site, and personnel instructional materials and other resources. (Dabbagh & Bannan-Ritland, 2005; Lee & Owens, 2000; Lee & Thompson, 1999; Hanna, 1998).

3.5.2 Disadvantages of e-Learning

Although the flexibility of an e-learning course may allow for enhanced conceptual thinking with broader student participation, the actual process of this interaction can be cumbersome. Some drawbacks of e-learning may include socialization and lack of human contact, acceptance, cost, and time constraint.

Possibly the most important disadvantage of e-learning is the loss of social interaction and lack of human support (Anstine & Skidmore, 2005). Since people learnt a lot from their classmates through differences of opinions and questions, e-learning misses these interactions, resulting in little or no 'in-

person' contact and learning on their own. Hence, many students and teachers may feel that traditional classroom learning is warm and personal while e-learning is cold and impersonal (Nisar, 2002). In fact, face-to-face interaction teaches people how to deal with others verbally and physically. There is a need to learn how to associate and deal with a multitude of people from different backgrounds in the classroom and in the workplace, and transferring what we learn in the classroom into the work setting is an important educational and training task. Compared to traditional classroom teaching, the electronic experience takes away much of the social and diversity aspects in the e-learning class (Galusha, 1997). These important skills are essential in the business community and in an individual's success in interacting face-to-face with others.

Perhaps the most difficult barrier to overcome regarding e-learning is end-user acceptance of it as a learning medium. By taking away an individual's ability to interact with other human beings during the learning process, the synergistic group learning dynamic is interrupted (Campbell, 2006). Many students and teachers feel that e-learning is impersonal and that the valuable aspect of students and teachers having open discussion of class content is lost (Brower, 2003; Murgolo-Poore & Pitt, 2001). Indeed, the lack of face-to-face interaction that causes students to feel isolated is the most commonly cited objection to e-learning. In addition, the roles of teachers and students are required to change in this new learning mode. Many students feel that they lose the valuable interaction common in a face-to-face setting, while

teachers feel that “to teach is to touch students”, and they fear that e-learning will significantly change the way they are able to come into contact with students (Brower, 2003).

In e-learning, how well students do at learning on their own will have such significant bearing on their performance in an e-learning course, thus motivation is a critical factor for a successful e-learning experience. Galusha (1997) pointed out that students’ lack of motivation and determination may hinder their e-learning experience. While e-learning increases the flexibility and accessibility of learning, Garvey (1999) indicated that some individuals do not possess the disciplines required to manage it. Even though e-learning offers the student more control over their learning experience, Brown (2001) found that students many times do not exercise their control wisely. In order to succeed in a quality e-learning environment, Darnell and Rosenthal (2000) emphasized that electronic students must be highly disciplined, have strong reading and writing skills, proficiency, technical ability and the equipment, hence computer proficiency is another important factor for effective e-learning. However, Nisar (2002) indicated that the fear of technology is still apparent in many people, certainly for those over 40 years of age.

From an instructor’s perspective, Berge and Muilenburg (2001) concluded from their survey-based research project that faculty compensation concerns, the lack of development and maintenance time are the greatest barriers to the success of e-learning. In fact, ample of responsibility lies on the

professor and the students to develop quality e-learning courses and make e-learning courses and programs work efficiently and comfortably for all participants. A large part of this responsibility appears at the beginning of developing and teaching an e-learning course (Harasim, 1999). Developing various multimedia elements such as animation, audio, video and Web documents to address as much as possible all the learning styles of e-learning students is a powerful approach in a student-centered e-learning environment. However, this adds more work to already busy and overworked instructors.

Furthermore, monitoring and assessing the academic work of e-learning students could present a difficult task to an e-learning instructor. A significant portion of the success of an e-learning course and program lie with the professor's availability to monitor and guide what is going on, and to immediately provide additional information that adds to the knowledge base or the discussion at hand (Picciano, 2001; Driscoll, 1998). E-learning students need to be introduced to a number of forms of e-learning technology, such as chat rooms, online discussion forum, graphic and document sharing that allow the instructor to monitor the attendance and participation of students. In fact, e-learning itself may not be disadvantageous but lack of preparation time and training for instructors and students as well as budgetary constraints make it so in some cases.

Students should be challenged to learn in different high-quality educational mediums; however, this does not mean that e-learning should

reduce the importance and relevance of the traditional classroom experience. E-learning may not be a learning opportunity appropriate for everyone, thus e-learning should not be considered as a learning mode to forever replace the traditional classroom learning experience, but it should be considered as an opportunity to complement traditional learning to assist those students who require flexibility in learning.

Evidently, the advantages and disadvantages described above are not necessarily inevitable. With good design and effective communication medium most of the disadvantages can be overcome. A table that summarised the advantages and disadvantages of e-learning is shown in Table 3.2.

Table 3.2 Summary Table of Advantages and Disadvantages of E-learning

Advantages of E-learning	Disadvantages of E-learning
• Cost effectiveness - companies can reduce expenses by not having to distribute course materials by paper to their employees and by not having to send their employees to training centres. • Consistency in training – since consistent content can be provided to learners in e-learning, thus the company can be assured that the quality and content of the training is consistent at all locations. • Accessibility – since learning materials is accessible by personal computer, learning can be conducted at anytime and anywhere. • Adaptability – updated information can be easily uploaded from the teacher's computer to the server-computer which allows students access to the most updated information when they log into the course site. Also, e-learning is adaptable	• Lack of face-to-face and social interaction and lack of human support that make students feel isolated in e-learning. • Lack of motivation which may hinder learners' e-learning experience. • Students need to be highly disciplined, and have high computer proficiency in order to succeed in a quality e-learning environment. • Instructors are required to allocate lots of development and maintenance time to develop quality e-learning courses, this would add more work to already busy and overworked instructors. • Monitoring and assessing the academic work of e-learning students could present a difficult task to an e-learning instructor. • Large budget are required when develop e-learning courses.

in its content and delivery such that it can be custom-made for any given situation. • Affordability – the distribution and delivery costs of e-learning are minimal for both students and company. • Controllability – students can learn at their own pace, and training provider can easily check the participation rates of learners and monitor their learning progress. • Quality e-learning methods allow learner to think before he/she speaks, and let the learner experience the thoughts of every peer in the class. • Incorporating hypermedia Web features (e.g. graphic, audio, video and animations) in e-learning classes allow the learners opportunities for live interaction, controlling the depth of class content, and learning experiences. • Flexibility – e-learning allows learners to fit studying and	

training in and around many other commitments.	

3.6 Constructivism and the E-learning Environment

Constructivists focus on learning's process rather than on learning's products. The constructivist view of learning has its foundations in Piaget (1975) who believed that learning is not transmitted passively, but attained through well-defined stages by active participation of a learner. The constructivist's instructional goals comprise reasoning, critical thinking, and using knowledge actively and reflectively. In order to support these learning outcomes, several tools and instructional models such as problem-based learning, communities of practices, situated learning, anchored instruction and cognitive apprenticeship, are used in the constructivist learning environment (Almala, 2006).

Constructivist learning environment is defined as "a place where learners may work together and support each other as they use a variety of tools and information resources in their guided pursuit of learning goals and problem-solving activities" (Wilson, 1996, p.5). Wilson (1996) also emphasized learning environments as opposed to instructional environments in order to promote "a more flexible idea of learning", one which emphasizes "meaningful, authentic activities that help the learner to construct understandings and develop skills relevant to problem solving" (p.3). Oliver

(2000) further emphasized the importance of the Internet and its technological tools to facilitate constructivist learning when he stated that "without online tools, activities that ask learners to communicate, locate and organize external resources, collaborate on shared projects, and /or develop and share new materials can be limited" (p.13).

Lavooy and Newlin (2003) stated that computer-mediated communication (CMC) can produce a very effective e-learning environment with high levels of interactivity. Tu and McIsaac (2002) also reported that students accessing CMC at home had the convenience of privacy, a more relaxed atmosphere, a stronger familiarity with their own computers, and the ability to put forth greater control and flexibility over their own schedules. These technological tools support active and reflective use of knowledge through active interaction and collaborative teamwork among learners, and between instructor and learners. For example, many university classes use WebCT to post topics on the discussion boards, post grades and manage student projects. Others use Blackboard or Elluminate. The use of these discussion boards allows students to discuss topics related to the material they are learning in class, allows them to interact with one another and the instructor asynchronously and also post, view and if required rate group projects, thus allowing for a certain level of peer involvement and assessment (Sundararajan, 2009).

E-learning students experience an authentic or meaningful activity when they facilitate a discussion and moderate a class. Oliver (2000) stressed that in a constructivist-based e-learning environment, many constructivist lessons involved the use of teams or groups to facilitate discussion of concepts. Scaffolding and coaching by the facilitator or the instructor guiding the online discussion's direction should be consistent. Vrasidas and McIsaac (1999) explored the level of interaction in an online graduate course and found that only three messages posted by the course instructor in the eight-week asynchronous discussion. Indeed, e-learning instructors should take up the responsibilities of the instructional expert by setting certain restrictions for contributing to live or delayed online discussion, forming focusing questions and contributing effectively and constructively in a class discussion.

Moreover, multiple perspectives and collaborative learning can also be experienced via online discussion. As defined by Bernard, Rubalcava, and St-Pierre (2000), collaborative learning has been considered as an effective instructional method in both traditional and distance learning settings. Collaborative learning is usually used in constructivist environments in which learners explain and justify their point of views. By doing this, learners broaden their understanding as they attempt to resolve their cognitive conflicts (Duffy & Jonassen, 1991). One of the functions of the group is to listen carefully to each individual's point of view so that each member's personal confidence and motivation is strengthened. When learners learn how to

collaborate effectively in an educational setting, they develop and strengthen valuable life skills that prepare them for the workplace.

Driscoll (2000) further affirmed that "online collaboration enables insights and solutions to arise synergistically" (p.385). He emphasized that the collaboration process can support and promote multiple perspectives through dialogue and discourse, and by allowing the learner to become an active member of a community of practice. Online discussions are one effective constructivist instructional strategy that cultivates social negotiation and tests the viability of one's hypotheses or view on others. Oliver (2000) also elaborated that "if e-learning discussion are centered around a question or problem, students can learn by expressing their ideas, opinions, or solutions to others, by critiquing one another's proposed models, and by defending or modifying their initial models" (p.9). For a quality e-learning environment, encouraging more collaboration helps students learn from each other as well as from the instructor. Possibilities for learning are thus multiplied exponentially with group interaction (Tu & McIsaac, 2002; Vrasidas & McIsaac, 1999).

As a constructivist e-learning instructor, he/she needs to take up significant responsibilities in the e-learning process. In addition to empower and analyze students, instructor also requires to provide consistent feedback and reliable Web-based resources, and ensure relevant and authentic class activities (Oliver, 2000). Vrasidas and McIsaac (1999) examined the nature

and level of interaction in an online graduate course and found that only 25% of students participated to the asynchronous discussions during the fifth week of semester due to the poor class structure of online discussions. As indicated by Conrad (2002), "the presence of the instructor is noticed and desired – not as a personality, but as a course resource" in a quality e-learning course (p.222). These two studies highlighted that the e-learning instructor must provide the coaching and scaffolding within the learner's zone of proximal development, and create relevant and engaging Web-based activities appropriate for the learner's construction of knowledge.

As explained by Oliver (2000), the purpose of creating such authentic activities was to motive e-learning students and to provide them the flexibility to conduct Internet-based research and present project electronically that are meaningful to the class. The e-learning instructor should be an effective discussion facilitator, he or she should be able to change direction to meet students' needs and ensure students discuss relevant aspects of the environment, without stripping learning activities of applicable, tangential activities just because they are not directly relevant.

Problem-based learning is a constructivist instructional model where students work in group to solve authentic problems. It is to solve real-world problems by assembling and focusing problems, and guide the learner in utilizing his or her understanding, problem solving skills, and judgments (Barrows, 1996; Levin, 2001). Oliver (2000) stated that "problem-based

learning has a constructivist framework because it encourages active construction of knowledge through personal inquiry, the use of problems to form disequilibrium and subsequent accommodating inquiry, as well as social negotiation and work with peers" (p.6). Driscoll (2000) further explained that problem-based learning provides a problem-solving process that students may use systematically to identify the nature of the problem, assign tasks to be completed, reason through the problem as data and resources are gathered and consulted, arrived at a solution, and then assess the solution's adequacy. Hence, students can reflect on their reasoning and strategies once the problem is solved. In an e-learning course, students could utilize synchronous and asynchronous technology tools, such as bulletin board and a computer conferencing system, at anytime and anywhere to form teamwork activities that concentrate on sharing ideas and experiences. By using these tools, students can form hypothesis to solve a real-life problem, collaborate actively to collect data, clarify findings, and draw conclusions to offer various alternatives, constructive and innovative solutions and suggestions.

Constructivism has contributed greatly to the quality of e-learning. Through CMC tool, successful e-learning mainly emphasizes and allows interactive learning, learner-controlled exploration of ideas and information, teamwork and active collaboration within social contexts to receive constructive feedback and diverse explanations, and articulation to construct and revise existing knowledge (Dalgarno, 2001; Ocker & Yaverbaum, 2001). This e-learning process is consistent with the tenets of constructivism and the

work of constructivist scholars Vygotsky (1980) and Piaget (1975), who emphasized that learning is a social activity where students interact and collaborate with peers and instructors to construct knowledge and arrive at plausible solutions to real-life problems (Bielman, Putney, & Strudler, 2003).

3.7 Face-to-face Vs Computer-Mediated Communication

A number of different communication media are used in education as well as our daily life, and they differ in richness. In terms of richness, face-to-face communication is considered as being the richest, while other media are thought to be learner since they have few contextual cues and slower feedback compared to face-to-face (Daft & Lengel, 1986). With the advent of the Internet, computer-mediated communication (CMC) has been one of the most widely used communication modes, both synchronous and asynchronous, in educational settings. CMC can be defined as a system for information flow that enables learning participants to communicate and interact with one another over time (Romiszowski & Mason, 1996). The CMC technologies commonly used in e-learning environment include e-mail, news-groups, online chats, bulletin boards, asynchronous discussions, computing conferencing, and stream video and audio (Sutton, 2001).

In comparison to the face-to-face mode of communication, communication in an e-learning environment is more difficult because much of the context and nonverbal cues are eliminated. Body language or gestures

can often convey important meanings. During class, an observant instructor can notice whether students understand or not from their facial expressions while CMC lacks such contextual cues.

The effects of computer mediation on small group communication have been studied by comparing CMC conditions and face-to-face communication conditions. Earlier research on CMC was guided by social presence theory (Short, Williams, & Christie, 1976), media richness theory (Daft & Lengel, 1984), and the social context cues approach (Sproull & Kiesler, 1991). These theories, collectively referred to as the "cues filtered out" perspective (Culnan & Markus, 1987), emphasized the limited "bandwidth" of CMC, with its inability to text cues (such as gender, age, status, or physical appearance).

According to social presence theory (Short, et al., 1976) and media richness theory (Daft & Lengel, 1984), the less information available within a medium, the less attention is paid by participants. Both theories argue that the lack of information conveyed by CMC such as facial expression, posture, dress and nonverbal cues, leads to lower communication effectiveness. Bordia (1997) analysed eighteen studies comparing face-to-face and CMC and found that CMC groups took longer than face-to-face groups to complete the allotted tasks. The difference may simply be due to typing, which takes much longer than speaking (Hiltz, Johnson, & Turoff, 1986). Walther (1996) also noted that the main difference between face-to-face communication and CMC is communication speed. Moreover, text-based asynchronous CMC can be

overwhelming to students who are expected to read and/or respond to large numbers of messages (Woolley, 1998).

In addition, CMC groups tend to be more task-orientated and exchange less social-emotional information, which can slow down the relationship development and communication effectiveness among team members (Bordia, 1997; Chidambaram, 1996). For example, research suggests computer-mediated messages are inappropriate and/or ineffective for exchanges in which interpersonal exchange is needed because the medium provides "scant social information" (Dubrivsky, Kiesler, & Sethna, 1991), these findings imply that learning may be less effective in virtual teams.

However, when virtual teams are given sufficient time to develop strong member relationships and to adapt to the communication medium, they may communicate as effectively as face-to-face groups (Chidambaram, 1996; Bordia, DiFonzo, & Chang, 1999; Irmer, Chang, & Bordia, 2000). For example, Hightower and Sayeed (1995) found that the computer-mediated discussion among e-learning student groups tends to be less efficient because initially it is more difficult to exchange information and develop social ties. These difficulties can be compounded by the relatively short longevity of the course and has been suggested as a possible cause for the relatively high attrition rates associated with e-learning courses (Ellram & Easton, 1999; Ridley & Sammour, 1994). However, these differences should reduce as e-

learning students exchange the equivalent amount of messages as face-to-face students.

Moreover, Kearsley (2000) argued that CMC appears to enhance interaction between instructor and students. Sutton (2001) further claimed that CMC in e-learning has caused the shift from correspondence learning to social learning, increasing interaction with other students as well as the instructor. Berge (1995) contended that the goal of online discussion is to maximize interactions between and among instructors, students, contents, and interface, as well as to facilitate constructive thinking. Additionally, CMC can provide a more comfortable environment and discussion opportunities for students who do not perform well in spontaneous face-to-face discussion because they are introverts or second language speakers of English (Berge & Collins, 1993; Leasure, Davis & Thievson, 2000).

Numerous studies showed that students who are exposed to e-learning, compared to those exposed to traditional classroom-based learning, has resulted in comparable learning outcome (Johnson, Aragon, Shaik & Palma-Rivas, 2000; Parker & Gemino, 2001), higher student performance (Zhang, 1998), and improved learning effectiveness (Tuckman, 2002; Baker et al., 1997; Lockyer et al., 2001). Moreover, Kekkonen-Moneta and Moneta (2002) found that the use of carefully designed interactive e-learning modules fosters positive learning experiences and higher-order learning outcomes. These studies provide evidence that, with the proper use of CMC in higher education,

e-learning course proved to be at least as effective as the lecture course in terms of students' learning outcomes.

3.8 Synchronous and Asynchronous Communications in E-learning

There are two forms of CMC – asynchronous and synchronous. Communication that does not occur in real time is considered as asynchronous. This means that individuals can post a message to a server and that other people can sign on to that servers at other times and retrieve and comment on the information posted by the original author of the message. The communication may take place over a long period of time such as days, weeks or even months. While it is possible that individuals posting to these servers may be online at the same time as those who are viewing the responses, it does not necessarily have to be so for effective communication to take place. In a quality-designed CMC asynchronous e-learning class, most of the communication occurs via bulletin boards, Web sites, or e-mails (Lavooy & Newlin, 2003).

Instructors in Web-based asynchronous classes play an important role in providing prompt feedback pertinent educational examples and applications, and in helping students refine their ideas and discussions (Hara, Bonk, & Angeli, 2000). Zhu (1998) emphasized that these instructors need to evaluate and monitor students' progress, assign and consult with discussion facilitators, approve discourse topics, and groups new students in advanced according to

their expertise and background. To facilitate quality e-learning using this form of communication, McDonald and Campbell-Gilson (1998) also indicated that students should feel comfortable and be welcomed, supported, included, and encouraged to participate effectively in group learning activities and active knowledge construction.

The second category of CMC is synchronous communication. Synchronous communications, such as happens in chat rooms, required participants be online at the same time as all other individuals in the group who are participating. According to Chou (2001), a well-designed synchronous CMC provides a solid ground for building small learning communities, archiving information, and enhancing opportunities for dialogue and social negotiation within small groups of learners in a quality e-learning environment. In these synchronous e-learning communities, students need clear guidance for live discussions, immediate and positive feedback, time to become familiar with technology tools, user-friendly, accessible and effective technology systems, and private and quiet electronic places for discussion (Chou, 2001). This e-learning process promotes learning outcomes and provides students authentic and unique learning experiences.

Some instructors have attempted to combine both of these communication techniques when using the Internet as a way to supplement the traditional class format or, indeed, to supersede it. This method of teaching needs the use of special software that is designed to facilitate a communication

process of this kind. To utilize CMC's features in synchronous and asynchronous e-learning courses effectively, instructional designers and instructors need to structure and facilitate learning activities that provide students flexible options to reflect critically on their learning, and interact collaboratively and productively with peers to construct knowledge and solve practical problems in an authentic environment (Wu, 2003). Wu (2003) also indicated that, in an effective interaction e-learning environment, e-learning students need to share learning resources and original ideas with fellow students, have assigned roles, be provided with continuous coaching and rewards for participating regularly and effectively in class, and be given clear instructions and guidelines on how to pose related questions and bring relevant issues and learning problems into the discussion.

Since synchronous and asynchronous communications have the potential to enhance the quality of e-learning, students and instructors should be aware of the limitations of these forms of interactivity. For instance, students participating in Web-based synchronous classes should have strong reading, typing, and writing skills, and be prepared to face frustrating time delays during live class discussions, whereas long threaded discussions in asynchronous courses may confuse and prevent students from participating fully and effectively in collaborative and group activities (Wu, 2003). Lavooy and Newlin (2003) concluded that the applications of quality-designed synchronous and asynchronous communications play important roles in achieving specific learning objectives in a quality e-learning environment. If

these communication systems are designed, constructed and used effectively in e-learning courses, students can obtain educational benefits and valuable technological skills.

3.9 Learning Styles in E-learning

Individual learning styles play an important role in adapting to new learning situations. Learning styles has been defined as the way a learner organizes, compares and structures information that he or she has sensed and attended to before encoding it in his or her neutral circuits (Goldstein & Blackman, 1978). The concept of learning styles illustrates learners' preferences towards different types of learning and instruction. As indicated by Jonassen and Grabowski (1993), learners differ in their general skills, attitudes and preferences for processing information, constructing meaning from it, and applying it to new situations. Hence, students with different learning styles can be anticipated to react in different ways to virtual learning environments, in respect to learning outcomes as well as in attitudes.

Drennan, Kennedy and Pisaki (2005) stressed that autonomous and innovative learning modes created positive perceptions of flexible online learning. Federico (2000) also emphasized that successful learning stems from the conformity between student needs and the learning environment. Further, Chen and Ford (2000) concluded that learning styles are considered as one of the most important factors that influence e-learning. Among the previous

literature on learning styles, field dependence and field independence, which is categorized as a cognitive control, Kolb's learning styles (Kolb, 1984) and the learning styles of Honey and Mumford (Honey & Mumford, 1985), are identified as the most commonly reviewed learning styles.

The cognitive control of field dependence/field independence describes the degree to which a learner's perception or comprehension of information is influenced by the surrounding perceptual or contextual field. Field dependent learners find it difficult to find the information they are looking for as other information is likely to disguise it. On the other hand, field independent learners find it easy to recognize and choose the important information from the surrounding field. They also experience reorganization, restructuring, and revision of information to be easier than field dependent learners (Jonassen & Grabowski, 1993). From the past research studies conducted by Heller (1982) as well as Ronning, McCurdy, and Ballinger (1984), their results indicated that field independent learners were more likely to solve problems than field dependent learners, and that field independency is important in analyzing and categorizing visual information (Wise, 1980). However, Lu, Chun-Sheng, and Chang (2002) examined the impact of field dependence and field independence on students in WebCT-based graduate course on management information systems. The findings showed that the field dependent and field independent students performed equally well in the course.

One of the leading typologies of learning styles is the one created by the

American psychologist, David A. Kolb. According to Kolb (1984), there are four basic learning modes: concrete experience (feeling), abstract conceptualization (thinking), reflective observation (watching), and active experimental (doing). Concrete individuals apprehend information by the tangible, felt qualities of immediate experience. They have to practice what they learn. Abstract individuals comprehend information conceptually and symbolically. They learn best when they deal with models, theories, concepts and systems. Reflective individuals show intention by internal reflection on the external world. They perform careful intellectual analysis before acting. Active individuals extend the environment by external manipulation. They thrive in competitions and situations being in the focus. In other words, the dimension of concrete experience and abstract conceptualization describes how a person grasps or perceives information, whilst the dimension of reflective observation and active experimentation describes how information is transformed or processed. These four learning modes are combined into four learning styles which are presented in Figure 3.3.

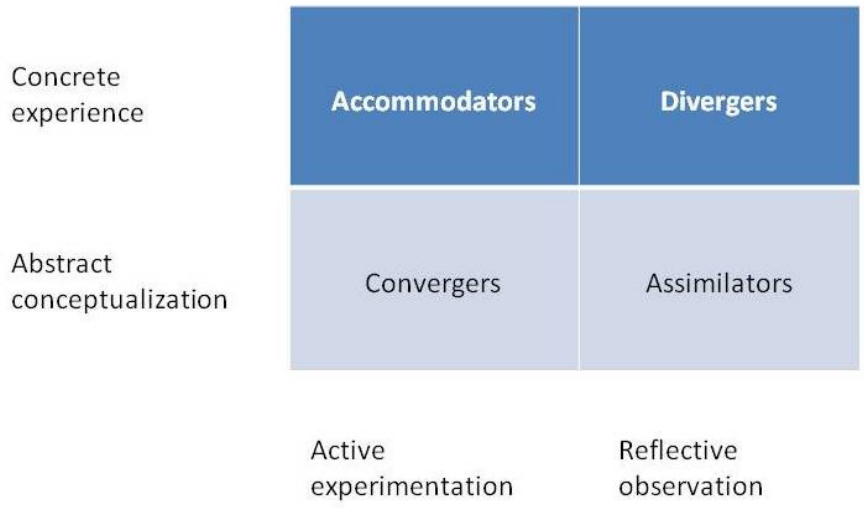


Figure 3.3 Learning modes combined into learning styles (Kolb, 1984)

As indicated, convergers combine abstract conceptualization and active experimentation. The divergent learning style emphasizes concrete experience and reflective observation. The dominant learning abilities of assimilators are abstract conceptualization and reflective observation, while accommodators focus on concrete experience and active experimentation. As defined by Margerision and Lewis (1979) and Kolb (1984), learning style is partly shaped by personality type, as assimiliars tend to be introverted while convergers may be extroverted.

There are also relationships between learning styles and educational specialization. In the early stage, educational experiences shape individual learning styles in the sense that people are taught how to learn. Kolb (1984) stated that there is an increasing process in specialization that extends in

undergraduate education which shows that an individual's learning style can be associated to his or her educational discipline. This correlation indicates that students in business majors normally are accommodators, while students in nursing and engineering are convergers. Those students in linguistics, political science, and psychology majors are most likely divergers, while mathematics, economics, sociology and chemistry majors are assimilators. Kolb (1984) also addressed that learning style is not only shaped by education, it is also shaped by professional career, current job, and adaptive competencies.

Honey and Mumford (1985) further proposed four learning styles based on Kolb's classification. Their suggested learning styles, which include activist, reflector, theorist and pragmatist, are somewhat equivalent to the learning modes of Kolb. Activists are open-minded and involve themselves fully in new experiences. They are weaker in implementation and consolidation, and highly sociable. Their days are packed with activity and they are easily bored. Reflectors are thoughtful and cautious, and collect as much information as possible before taking action. They prefer to take a back seat in meetings and discussions, and enjoy observing other people in action. Theorists move toward problems in a logical way, and integrate their observation into theories. They tend to be perfectionists, and like to analyze and synthesize. They prefer rationality and logic. The last type is pragmatists who thrive on new ideas and like to put them into practice. They look for new ideas and take every opportunity to experiment with applications. They are practical, down-to-earth people who like making decisions and solving

problems (Honey & Mumford, 1985; Downing & Chim, 2004).

Learning styles are considered in literature to be an essential individual student background factor influencing perceptions of virtual learning environments. Learners interact differently with specific instructional material and situations. Felder and Silverman (1988) argued that a student interacts with course material and tools in either a global or sequential dimension. Sequential learners, according to Felder and Silverman (1988), prefer a narrow viewpoint whilst global learners prefer a broader view. When apply to an online context, students with a liberal learning style might prefer asynchronous communication such as forums, while students with a more local or sequential view might gravitate to online tasks related to searching and integrating information (Koc, 2005).

In addition, student writing skills have been seen to improve when done in an online environment. Bruce and Peyton (1990) found that students become better writers when they feel they have a more immediate, authentic audience online. Wang and Haertel (1994) further indicated that online writers in collaborative groups wrote more per session than did paper and pencil writers. While this interaction benefits all involved as quoted by Smith (2005), extroverted students may do best in collaborative environments (Hughes, 2005). Besides, the social attributes of e-learning and collaborative interaction more closely support learning styles than traditional classroom interactions, especially for those students needing time to reflect and conceive of responses

to ideas and questions (Lyman, 1999; Palloff & Pratt, 2001). This delay conversation supports Gordon Pask's Conversation Theory (Pask, 1980) which suggested that learning can occur through dialogue on specific subject matter, serving to make knowledge explicit (Kearsley, 1988). Galarneau (2004) also found that the social aspect of online conversation is related to Lava's Situated Learning Theory, as the social aspect is a critical component of creating context for learners (Lave & Wenger, 1990). Galarneau (2004) further noted that in collaborative settings students must synthesize and build on perspectives and insights of others.

Keller and Hrastinski (2007) conducted a qualitative meta-analysis study of nine research studies and a single case study focusing on the learning styles of Kolb, and of Honey and Mumford. The articles were identified by the searches in the scientific databases of ABI/Inform, and Emerald, using the term 'learning style'. The meta-analysis showed that students of difference learning styles seem to perform equally well in online education, but that the drop-out rates of students of less common learning styles in a certain course, seem to be higher than for students of common learning styles. The results of the meta-analysis study were inconclusive when it came to perceptions of virtual learning environments. Some studies indicated that students preferring the learning style of active experimentation perceived online education more positively. Other studies concluded students with the learning style of reflective observation have positive perceptions of online education. It is because they usually behave more extrovertly in asynchronous online

discussions than in classing teaching in campus. Besides, the findings from the single case study showed that theorists perceived themselves as being more active in asynchronous online discussion than they actually were, and that pragmatists thrived on the immediate feedback of synchronous online discussions. The findings of the study implied that asynchronous communication in virtual learning environments generally might be preferred by students using reflective observation or theorizing as their main learning styles. On the other hand, asynchronous communication is preferred by students preferring the learning style of active experimentation. Nevertheless, the most important findings of the study was that students' learning outcomes and perception of online education mainly seem to depend on the design of the course, rather than the learning style of the student.

3.10 Studies on Educational Technology

Literature on educational technology has developed particularly as of the late 1980s and the early 1990s, with the emergence of new technologies that simplified remote access to higher education. Innovations such as audio-graphics, videoconferencing, television-based instruction, computer-based training, and e-learning have aroused the interest of both scholars and practitioners. A substantial number of literature studies have been published addressing e-learning in the past two decades. Revisiting the articles published on the topic over the past years, studies on e-learning probably could be divided into three categories. Firstly, a major concern is on learning

effectiveness and outcomes comparison between traditional settings and IT-enabled environment. The second group of studies is focused on determinants which have positive influence on the e-learning users' satisfaction or performance and impact the success of a specified educational technology system. The last scope of research investigates predictors of users' acceptance behaviour towards educational technology. Table 3.3 summarises some empirical studies related to technology-mediated learning.

Table 3.3 Summary of Empirical Research on Technology-Mediated Learning

Authors	Topics	Findings
Alavi (1994)	An evaluation of classroom experience and student learning via group decision support system (GDSS) in a collaborative learning process	The results indicated that GDSS supported collaborative learning leads to higher levels of perceived skill development, self-reported learning, learning interests and evaluation of classroom experience. GDSS supported students significantly out performed than their counterparts in the final grades.
Alavi & Leidner (2001)	Suggest a greater depth and breadth of research in the area of technology-mediated learning. A greater depth included the	The results supported the belief that collaboration and participation improve learning because of their mediation on socio-

	consideration of relationships among technology capabilities, instructional strategy, psychological processes, and contextual factors involved in learning, and a greater breadth of research included issues of how technology-mediated learning affects program design and what structures and processes universities can employ to facilitate innovation.	emotional variables and affection on cognitive processes.
Alavi, Marakas & Yoo (2002)	An assessment of learning outcomes of two distributed learning environments varying hierarchical characteristics	The results indicated that participants using the simple group support systems had higher learning outcome than did those of users under the more sophisticated group support systems. Participants at Beta System generated more messages on technology sense-making while their counterparts exchanges messages related to learning task. No significant discrepancies was observed in the students' satisfaction with the learning

		process under two learning environment.
Alavi, Wheeler & Valacich (1995)	Compares the outcomes of three types of collaborative learning with different levels of technology-mediated	The results indicated that students in the three learning environment have equal effectiveness of knowledge acquisition and satisfaction of learning process and outcomes. Distant desktop videoconferencing students were more committed and attracted to their group and had higher critical thinking skills.
Alavi, Yoo & Vogel (1997)	Impact of IT-enabled learning on students, faculty and cost via GSS and videoconferencing technology	The results indicated that distance learning environment does not make difference on students' performance but experience. Students positively evaluate their learning experience in a virtual e-learning environment.
Allen, Mabry, Mattrey, Bourhis, Titsworth & Burrell (2004)	Uses meta-analysis to summarise the quantitative literature comparing the performance of students in distance education versus traditional classes	The results demonstrated that there is no significant difference in educational effectiveness when comparing students in distance education and traditional classes.

Benbunan-Fich & Hiltz (1999)	A field experiment compared groups and individuals solving an ethical case scenario, with and without an asynchronous learning network (ALN), to determine the separate and joint effects of communication medium and teamwork.	The results indicated that that an ALN enhances the quantity and quality of the solutions to an ethical case scenario. The combination of teamwork with ALN-support increases the students' perception of learning. Although the perception of collaborative learning was similar between ALN-supported and unsupported groups, participants in computer-mediated groups reported lower perceptions of discussion quality than participants in manual groups.
Carswell & Venkatesh (2002)	Investigates student outcomes in a Web-based distance learning environment characterized by asynchronous electronic communications between student and teacher	The results indicated that attitude, social norm, relative advantage, visibility and compatibility are influential factors of e-learning environment outcomes in terms of acceptance and learning.

Chiu, Sun, Sun & Ju (2007)	Integrates the concept of subjective task value and fairness theory to construct a model for investigating the motivations behind learners' intention to continue using Web-based learning	The results showed that attainment value, utility value, intrinsic value, distributive fairness, and interactional fairness exhibited significant positive effects on satisfaction. Utility value and satisfaction play significant roles in shaping learners' intention to continue using Web-based learning. Satisfaction mediated effects of students' subjective task value towards e-learning on behavioural intention.
Choi, Kim & Kim (2007)	Explores how the two key mediation variables of flow experience and attitude affect learning outcomes in the context of ERP training with the Web-based e-learning system.	The results indicated that attitude and flow experience mediate the effect of external factor. Perceived ease of use of learner interface and content affect attitude and flow simultaneously. Interaction and instructor attitude towards students influence flow experience and instructor technical competence impacts attitude.
Goodman & Darr (1998)	Examines the computer-aided systems in organizational learning	The results indicated that regional computer-aided communities have better performance on

		organizational learning. The characteristics of virtual communities facilitate proceeding of regionally specific problems.
Haynes & Dillon (1992)	Examines the impact of telecommunication media upon learning outcomes designed on the level of learning and instructional strategy	The results indicated that there were no differences between the groups upon learning at any level. This suggested that the problem of interaction at a distance does not impede learning at either the lower or higher order levels.
Hiltz (1986)	Student characteristics that affect outcomes of IT-enabled learning system	The results showed that only informed and motivated learners can fully get the benefits of increased learner control. The system provides better access to professors and higher levels of participation and learning motivation.
Hiltz & Wellman (1997)	Investigates the outcomes of virtual learning environment	The findings indicated that the belonging of learning communities facilitated by the system motivates students to work harder and to keep up with the contributions of instructors and classmates.

Johnson, Aragon, Shaik & Palma-Rivas (2000)	Compares a graduate online course with an equivalent course taught in a traditional face-to-face format on a variety of outcome measures. Comparisons included student ratings of instructor and course quality; assessment of course interaction, structure, and support; and learning outcome measures such as course grades and student self-assessment of their ability to perform various Instructional Systems Design (ISD) tasks.	The results revealed that the students in the face-to-face course held slightly more positive perceptions about the instructor and overall course quality although there was no difference between the two course formats in several measures of learning outcomes. The findings have direct implications for the creation, development, and delivery of online instruction.
Lee, Cheung & Chen (2005)	Investigates students' acceptance of an Internet-based learning medium (ILM) by using technology acceptance model	The results showed that both perceived usefulness and perceived enjoyment significantly and directly impacted students' intention to use ILM. However, perceive ease of use did not posit a significant impact on student attitude or intention towards ILM usage.
Leidner & Fuller (1997)	A learning outcomes comparison between two different learning methods.	The results indicated that students involved IT-enabled collaborative learning have

	One with and the other without IT support.	higher levels of interest in learning than individual learners but lower levels of performance. After an individual learning session, students have higher levels of perceived learning when they had first interacted in a collaborative learning environment.
Leiden & Jarvenpaa (1993)	Examines the use and outcomes of computer-based instructional technology in the context of graduate business education	The results indicated that computer-based technology is a means of interactive guided learning and real time manipulation of data, a flexible learning lab and a display mechanism. Teacher styles and student preferences are two important moderators of teaching methods and their effect. Student preferences for one method over another vary and affect attitude and satisfaction with learning.
Lim, Ward & Benbasat (1997)	A comparison of the outcomes of two computer learning methods: co-discovery and self-discovery	The results indicated that co-discovery subjects formulated mental models that provided greater inference potential, which leads to a better performance

		on a novel task, than did those of counterparts. Co-discovery forces student to engage in deeper level thinking, and co-discovery students generated more utterances than did self-discovery subjects.
Machtmes & Asher (2000)	Uses meta-analytic procedures to examine experimental research literature about the use of telecourses in adult and higher education	The results indicated that two-way interaction was found to be the best method of interaction between learners and the instructor.
Ngai, Poon & Chan (2007)	Examines the acceptance behaviour on WebCT by using technology acceptance model	The results indicated that perceived ease of use and perceived usefulness are the dominant factors affecting the attitude of student and also significantly mediate the effect of technical support on the attitude and system usage.
Ong, Lai & Wang (2004)	Identifies factors affecting acceptance behaviour on asynchronous e-learning systems in high-tech companies by using technology acceptance model	The results indicated that an extended TAM incorporating perceived credibility and computer self-efficacy explained 44% variance of engineers' behavioural intention to accept the e-learning system.

Piccoli, Ahmad & Ives (2001)	The assessment of effectiveness of virtual learning system in basic IT skill training	The results indicated that there were no significant differences in performance between students who enrolled in virtual learning systems environment and students who enrolled in traditional environment. The virtual learning environment leads to higher reported computer self-efficacy, but participants report being less satisfied with the learning process. Some students found themselves unable to cope with high degree of learner control, that is, a great shift of responsibility from the instructor to themselves and with novelty of the learning environment.
Pituch & Lee (2006)	Investigate student acceptance behaviour to use an e-learning system when the system is used as a supplementary learning tool within a traditional class or a stand-alone distance education method	The results indicated that system characteristics are important determinants to influence use intention. Students who want to use the system as a supplemental learning tool also want to use it as an entire distance learning tool.

Saade & Bahli (2005)	Investigates acceptance of an Internet-based learning systems by using an extended version of the technology acceptance model (TAM)	The results indicated that cognitive absorption significantly relates to perceived usefulness but less important to perceived ease of use. Perceived usefulness has strong relationship with intention to use but not perceived ease of use. Cognitive absorption seemed to explain the intention directly and indirectly.
Selim (2003)	Examines students' acceptance behaviours on course Websites	The results indicated that perceived ease of use and perceived usefulness are the two key determinants of acceptance and usage of course Website as an effective and efficient learning tool.
Smith, Smith & Boone (2000)	Compares the effectiveness of three education instructional methods (i.e. lectures, guided instruction, collaborative discussion) provision under an online learning environment and traditional classroom environment	The results indicated that the instructional methods can be used effectively in the online learning environment.

Storck & Sproull (1995)	Compares the outcomes of learning in videoconferences and traditional face-to-face interaction	The results indicated that participants on remotes sites can achieve the same levels of performance as they do in face-to-face interaction. Face-to-face interaction helps people come to know better since the method of video changes patterns of attention to information, with resulting changes in impression formation.
Toral, Barrero & Martinez-Torres (2007)	Examines students' acceptance behaviours on Web-based learning environment	The results indicated that external factors including application specific self-efficacy, enjoyment, playfulness and curiosity, and TAM with significant influence in the use of the tool.
Van Raaij & Schepers (2008)	Examines the acceptance and use of a virtual learning environment	The results indicated that social norms and perceived ease of use do not influence system usage directly but through the significant relationship between perceived usefulness and system usage. Both personal innovativeness and computer anxiety have significant impact on perceived ease of use.

Volery & Lord (2002)	Identifies the critical success factors in online delivery	The results indicated that technology (ease of access and navigation, interface design and level of interaction); the instructor (attitudes towards students, instructor technical competence and classroom interaction); and the previous use of the technology from a student's perspective are the three influential factors on the success.
Wang (2003)	Measurement of e-learning satisfaction with asynchronous systems	A 17-item instrument for measuring learner satisfaction for e-learning systems was developed.
Webster & Hackley (1997)	Develop an initial conceptualization of key technology mediated distance learning outcomes relating to teaching effectiveness and of factors that may influence these outcomes, then to examine teaching effectiveness through students' reaction to technology-mediated distance learning.	The results indicated that the greater the number of locations, the greater the process loses. Students at remote sites did not act as involved in the course. The most important influence on involvement and participation was teaching style. Students' comfort with image on screen affected behaviour in synchronous distance learning environment.

Zhang, Zhou, Briggs & Nunamaker (2006)	Examines the effectiveness of interactive video in e-learning context	The results indicated that students under e-learning system with interactive video have better learning performance and use satisfaction than those of other groups.

Compared to face-to-face or traditional classroom learning mode, whether or not IT-enabled learning environment can enhance users' learning effectiveness and study performance has been a crucial question in educational technology research. The results had mixed conclusions: findings of Alavi (1994) showed that a significant difference in learning outcomes whereas Wetzel, Radtke, and Stern (1994) found that comparative studies of IT-enabled and traditional learning show no statistically significant difference. Alavi, Yoo and Vogel (1997) observed there was no difference in the learning outcomes of students in a traditional class and those that met via Internet video conferencing. Similarly, a study comparing learning outcome between online and traditional courses, Benbunan-Fich and Hiltz (1999) found that the implementation of online learning technique in the college classroom typically produced no significant differences in learning outcomes. Allen, Mabry, Mattrey, Bourhis, Titsworth, and Burrell (2004) conducted a meta-analysis of quantitative research in comparing the performance of students in distance education versus traditional classes, the results demonstrated that there is no statistically significant difference between the two classes on the basis of

performance. While more and more comparative studies have been conducted, the discrepancy has been diminishing; invariably, researchers summarised findings to a fact that learners achieve the same levels of performance in IT-enabled learning environment as they do in various other forms of instruction (e.g. Alavi, Wheeler, & Valacich, 1995; Alavi et al., 1997; Haynes & Dillon, 1992; Johnson, Aragon, Shaik, & Palma-Rivas, 2000; Machtmes & Asher, 2000; Piccoli, Ahmad, & Ives, 2001; Russell, 1999; Smith, Smith, & Boone, 2000; Storck & Sproull, 1995).

In addition to performance comparison, researchers also have examined the impact of IT on consequences of different instructional methods and learning outcomes in educational technology. A substantial amount of studies attention has addressed the questions of collaborative learning facilitated by group decision support systems (GDSS) (Alavi & Leidner, 2001). Alavi (1994) found that GDSS-supported collaborative learning makes students significantly out performed than their non-supported groups. Findings from another study (Lim, Ward & Benbasat, 1997) suggested that co-discovery (a form of collaborative learning) forced students to engage in deeper level thinking than facilitated and improved learning. Furthermore, the belonging of learning communities facilitated by the system motivated students to work hard and to keep up with the contributions of instructors and peers (Hiltz & Wellman, 1997). In fact, these findings support the belief that collaboration and participation improve learning because of their mediation on socio-

emotional variables and affection on cognitive processes (Alavi & Leidner, 2001).

Besides, research has considered the outcomes of derivations of collaborative learning and other instructional methods. Piccoli et al. (2001) studied the virtual learning environment and found that it can lead to higher computer self-efficacy while participants report being less satisfied with the learning process. Lim et al. (1997) found that co-discovery students formed mental models that provided higher inference potential, which leads to a better performance on a novel task. Zhang, Zhou, Briggs and Nunamaker (2006) observed that students in the e-learning environment that provided higher level of interactive control achieved better learning performance and a higher level of learner satisfaction than those of other groups. Leidner and Fuller (1997) also found that students involved in IT-enabled collaborative learning have higher levels of interest in learning and their levels of perceived learning increase after the first use. Students positively evaluate their learning experience in a virtual learning environment (Alavi et al., 1997). Some research studies also investigated the use of educational technology for organizational learning. Goodman and Darr (1998) observed that regional computer-aided communities have better performance on organizational learning and the characteristics of virtual communities facilitate proceeding of regionally specific problems. Further, Alavi, Marakas and Yoo (2002) examined the learning outcomes of two distributed learning environments varying hierarchical characteristics. They concluded that although the advance

technology figures do not generate higher learning performance, they can change the aims of their communication.

Moreover, researchers observed the importance of the characteristics of students and role of instructors on e-learning applications. In an earlier study, Leidner and Jarvenpaa (1993) examined several new computer-based technologies in use including interactive guided learning, real-time manipulation of data, a flexible learning lab and a display mechanism with students. The findings indicated that instructor styles and student characteristics are two key moderators of teaching methods and their effects. Webster and Hackley (1997) also conducted a research on synchronous learning technology, videoconferencing system, and suggested that the greater the number of locations, the greater the process losses. Students' comfort with image on screen and teaching style affect their participations and involvements. Moreover, Hiltz (1986) found that only informed and motivated students can fully benefit the increased learner control in a virtual classroom environment. This has its root in research suggesting that instructional designs should be created that provide various pedagogical options for students depending upon the student's learning style (Lengnick-Hall & Sanders, 1997).

In the second category of studies, several scholars and researchers have developed assessment measures of educational technology outcomes such as learners' satisfaction or performance, and explored factors that may influence these outcomes. Allen et al. (2004) stressed that measures of student

satisfaction is important because of the potential implications for issues like completion or drop out rates. Webster and Hackley (1997) developed an initial conceptualization of key technology-mediated distance learning outcomes relating to teaching effectiveness such as technology self-efficacy and attitude toward the technology. The results indicated that reliability and quality of the technology, instructors' attitude, interactive teaching style and instructor control of the technology would positively affect learning outcomes in a synchronous environment. Wang (2003) also developed a comprehensive model and instrument for measuring learner satisfaction with asynchronous e-learning systems in terms of learner interface, learning community, content and personalization.

Further, Carswell and Venkatesh (2002) conducted a research exclusively in an asynchronous distance learning environment using the technology planned behaviour (TPB) and diffusion of innovation theory. The findings showed that attitude, social norm, relative advantage, visibility, and compatibility are influential factors of e-learning outcomes in terms of acceptance, learning and future outcome. For a Web-based educational environment, Volery and Lord (2002) identified that characteristics of technology, the instructor, and the previous use of the technology from a student's perspective were the three critical success factors in online delivery. Choi, Kim and Kim (2007) found that there were significant interdependent relationships between the characteristics of e-learning, flow experience, learners' attitude towards e-learning, and the resulting learning outcomes. The

result was revealed that flow experience plays a critical role to impact learning outcomes directly and indirectly.

Besides, Piccoli et al. (2001) developed a broad framework identifying the theoretical determinants of learning effectiveness. They grouped determinants into two classes: human dimension and design dimension from previous research in technology-mediated education. The human dimension includes characteristics of students such as previous experience, technology comfort, and the profile of teachers (e.g. teaching style, technology attitudes). The design dimension includes learning model, technology, learner control, content and interaction. This framework organized the virtual learning environment research domain and addresses the relationship between the main constructs.

The third category of studies investigates predictors of users' acceptance behaviour towards educational technology. Consistent with previous information systems research, the interest of exploring determinants of users' acceptance behaviour toward e-learning system leads to many empirical studies. The technology acceptance model (TAM) (Davis, 1989) dominates the research across different forms of the systems (e.g. asynchronous e-learning system and Web-based system), subjects (students and employees) and culture (e.g. Americans, Chinese and Arabic)(Lee, Cheung & Chen, 2005; Ngai, Poon & Chan, 2007; Ong, Lai & Wang, 2004; Saade & Bahli, 2005; Selim, 2003; Toral, Barrero & Martinez-Torres, 2007; Van Raaij & Schepers,

2008). Each of the studies tended to draw attention to different factors from external environment. Besides TAM, other IT adoption and diffusion models or theories including the theory of reasoned action (TRA) (Fishbein & Ajzen, 1975), the theory of planned behaviour (TPB) (Ajzen, 1985), and the innovation diffusion theory (IDT) (Rogers, 1962, 1983, 1995) can be valuable tools. These models, which have been used to explain IT adoption and diffusion in a variety of contexts, are particularly attractive because of their parsimonies and consistently good predictive records.

Analysis of this group of studies seems to suggest, at first glance, that the literature on e-learning adoption is already mature and makes up a consistent theoretical body. However, a more thorough analysis will conclude that the use of a diversified set of supporting theoretical models and different tools of data collection and analysis add to the difficulty of integrating the results from these studies. Therefore, despite the vast number of existing studies, very little is known about the variables that truly determine the student adoption of e-learning.

3.11 Proposed Research Model

The current research project aims to propose a methodology that can be used as a reference for future studies on the adoption of new technologies such as e-learning. The characteristics that set this methodology apart from others

used in previous studies rest on two pillars, discussed in more detail in the section below.

3.11.1 Propositions of a Multi-disciplinary Theoretical Model

By and large, the earlier studies on the adoption of e-learning took variables from one or more of the best known models of technology adoption and added other variables expected to enhance their explanatory ability (for instance, Ong & Lai, 2006; Roca, Chiu, & Martinez, 2006; Selim, 2003). However, addition of new variables has contributed very little to increasing the explanatory ability of these models, probably due to the effect of multi-collinearity between the new variables and those already exist in the original models. This research project thus proposes a model that includes those variables from traditional models that are actually separate and theoretically sound constructs.

The research model of this research project is developed based upon the theoretical foundations of the innovation diffusion theory (IDT) and technology acceptance model (TAM), with the support of the Theory of Planned Behaviour (TPB) and Theory of Reasoned Action (TRA) as well as integrates factors related to technology, social, and individual choice. From IDT, the technological characteristics that are found to be especially relevant with respect to technology innovations: relatively advantage, complexity, and compatibility (Moore & Benbasat, 1991) are used. According to Moore and

Benbasat (1991), IDT's complexity construct is similar to TAM's perceived ease of use whereas IDT's relative advantages is in fact the same concept as TAM's perceived usefulness. Therefore, by including one, the project also includes the other. From TRA/TPB came the subjective norm construct. This model posits that the three social characteristics (external influence, interpersonal influence and organizational reputation) which derived from social related theories will directly affect the subjective norm. Further, self-efficacy and media richness are considered as the individual choice characteristics which may influence an individual's perception of a technology's ease of use and acceptance decision indirectly.

As an independent variable, previous studies included either the intention to use e-learning system (for example, Lee, 2006) or the level of e-learning system utilization (for example, Selim, 2007), whereas a handful of other studies included both the behavioural intention and the actual behaviour to choose e-learning (Liao & Lu, 2008; Ozdemir & Abrevaya, 2007). The model herein includes both the intention to choose e-learning and the actual behaviour to choose e-learning (i.e., adopt/didn't adopt). The advantages of this decision are discussed in the next section. Figure 3.4 shows the proposed research framework for this study.

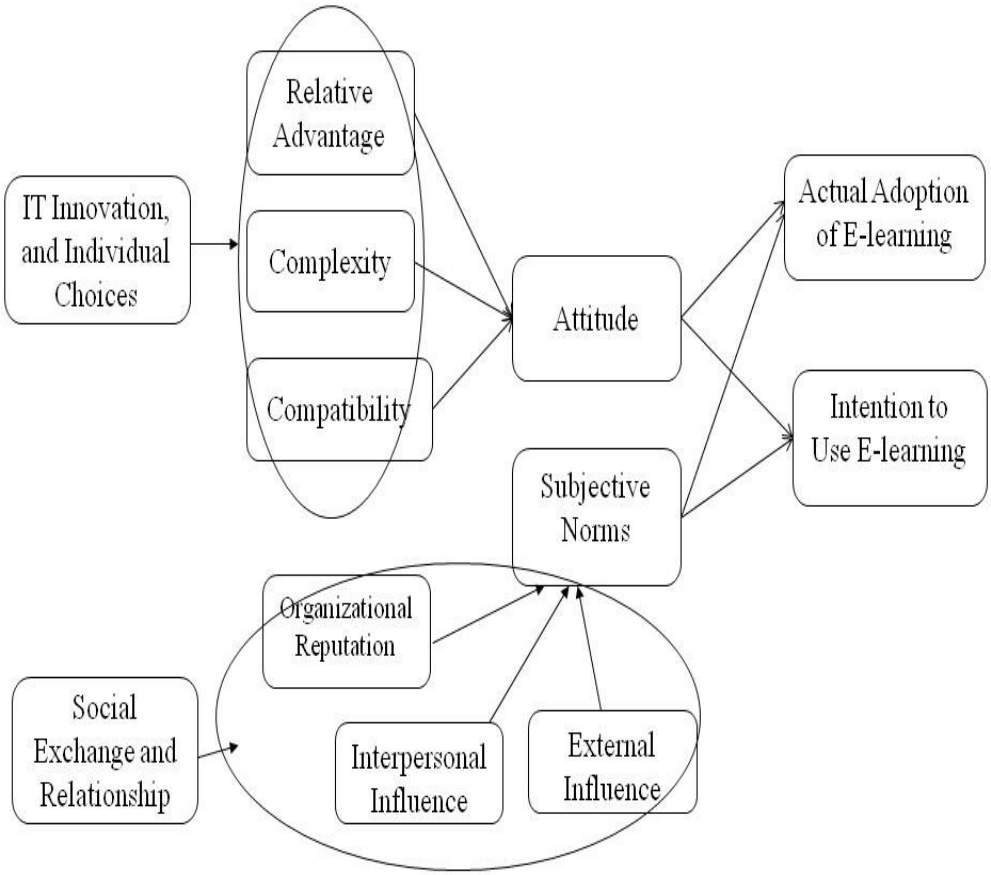


Figure 3.4 Research Framework

3.11.2 Joint Sampling Process: e-learning users and non-users

By including both the intention to choose e-learning and the actual adoption of e-learning in the new technology adoption model, this present method assumes that the sample will cover both current and prospective e-learning users. By investigating current users alone, it is possible to detect what drove them to select e-learning. However, the perceptions of this group reveal a decision made long ago in the past and they can be masked by the effects of time and the experience acquired through use of the innovation.

On the other hand, by investigating prospective users only, all we could find out was which variables influence their intention. Fishbein, Hennessy, Yzer, and Douglas (2003) argued, however, that a lack of skills and/or environmental constraints may prevent intention from turning into action, therefore, intention might not be a good enough predictor of behaviour under some circumstances. In order to improve the ability to predict behaviour born of intention, researchers have tested alternative scales (for example, Wansink and Ray, 2000) and developed models in which intention scores are based on analysis of the actual purchase behaviour of specific consumers whose purchase intention had been previously measured. However, Chandon, Morwitz, and Reinartz (2005) drew attention to the limitations of these models since the very measurement of intention might feed back into the association between intention and behaviour, improving the chance that individuals will actually act upon their intention after being interviewed.

By including in the sampling process both current and prospective adopters, it is possible to avoid some of the limitations related to the prediction of adoption based solely on the measurement of intentions. Hence, the differentiating factor in this method is the incorporation of a sampling process that includes both populations with distinct and defined characteristics: e-learning users and non-users.

3.12 Research Variables

The focus of this study is to investigate the factors which have a significant influence on learners' attitude and behaviour towards e-learning. Based on previous studies (for example, Rogers, 1995; Davis, 1989; Moore & Benbasat, 1991), the most common factors that have been identified as significant factors influencing innovation adoption are selected.

3.12.1 Relative Advantage

Relative advantage denotes the extent to which an innovation is perceived to be superior to alternatives already available (both economic and non-economic considerations) (Rogers, 1995). These alternatives encompass other product/service classes, forms and brands. Relative advantage is often operationalized in the innovation literature in terms of extra functionalities such as 'perceived usefulness', 'time saving' and 'convenience'. In the context of e-learning, this study defines relative advantages as the extent to which a

student views saving of time, less money and convenience to be relatively advantageous.

3.12.2 Complexity

Complexity is the degree to which an innovation is perceived as difficult to understand and use (Rogers, 1995). According to Rogers (1995), innovation is negatively correlated with adoption processes. If individuals find an innovation too difficult to understand or to use (low perceived ease of use), they are less likely to adopt a new innovation. Venkatesh and Davis (1996) indicated that self-efficacy was considered as an antecedent of perceived ease of use in the study of technology acceptance because individuals' confidence in their computer-related knowledge and abilities can affect their judgment of the ease or difficulty of carrying out a specific task using a new technology. Zaltman, Duncan, and Holbek (1973) concurred with Rogers and found that the complexity of a concept or of an implementation can be a deterrent to the adoption of innovations. In this context of e-learning, this study defines complexity as the extent to which a student views usage system of e-learning system to be relatively free of effort.

3.12.3 Compatibility

Compatibility is the extent to which an innovation is perceived as being consistent and compatible with the existing values, needs, beliefs, and past

experiences of potential adopters (Rogers, 1995). Compatibility is one of the perceived characteristics suggested in the innovation diffusion literature as being pertinent to innovation adoption decisions (Moore & Benbasat, 1991). Since e-learning could be considered as an innovation on account of its newness relative to other modes of learning, this study includes compatibility which is an indicator of how well an innovation fits a potential adopter's values and needs. In this study, compatibility is defined as the extent to which a student believes that e-learning fits his/her lifestyle needs and learning preference.

3.12.4 Organizational Reputation

According to the study of customer adoption research (De Ruyter & Wetzels, 2000), it showed that organizational reputation is one of the important factors that influence customers' attitude and behaviour towards a new innovation. Indeed, reputation is always built on informal and formal referrals of past users based on their satisfaction, whereas satisfaction is the outcome of service quality (Brady & Robertson, 2001; Taylor & Baker, 1994). Swan and Oliver (1989) identified three types of post-purchase communication by past users, namely positive/negative word-of-mouth, recommendations/warnings to other people, and complaints or compliments, and indicated that satisfaction was related to more positive post-communications. Positive post-communications will enhance the reputation of an organization, and users will probably use the channel again and refer to

other users. This study therefore suggests that organizational reputation could be an evaluation criterion for learners to adopt or reject e-learning.

3.12.5 Interpersonal Influence

In marketing, the diffusion of innovations occurs with every launch of a new type of product, and is widely thought to be influenced by both inter-personal and mass media communication. Potential adopters are regarded as having different propensities for relying on these two forms of communication when seeking information about an innovation. According to Bhattacherjee (2001a), word-of-mouth is driven by interactions between existing and potential adopters in the social system. The effect of interpersonal communication in particular is thought to be a key factor in accounting for the speed and shape of the diffusion of an innovation (Rogers, 1983; Gatignon & Robertson, 1985; Mahajan, Muller, & Bass, 1990). In this study, the learner's friends, family members, colleagues, and adopting peers are assumed to be the group that will potentially influence his/her selection of e-learning.

3.12.6 External Influence

Besides internal influence, Bhattacherjee (2000) also identified mass media communication as the external influence for innovation adoption. Mass media play a large role in the initial awareness stage of diffusion. In this study, external influence such as informational input from mass media reports,

advertising, expert opinions, and other non-personal information may affect learners' decision to adopt or reject e-learning.

3.12.7 Attitude

Attitude is defined as the degree to which an individual has a favourable or unfavourable evaluation or appraisal of the behaviour in questions (Ajzen, 1991). An individual will have a favourable attitude towards this behaviour if he/she believes that doing it will have largely positive consequences. On the other hand, if an individual perceived mostly negative outcomes from performing the behaviour, then he/she will view the behaviour unfavorably. In this study, students' attitudes towards e-learning will be affected by the relative advantage, complexity, and compatibility.

3.12.8 Subjective Norm

Subjective norms refer to "the person's perception that most people who are important to him think he should or should not perform the behaviour in question" (Fishbein & Ajzen, 1975, p.302). Some previous studies (Hartwick & Barki, 1994; Taylor & Todd, 1995a) demonstrated that subjective norms have been found to be more important prior to, or in the early stages of innovation implementation when users have limited direct experience from which to develop attitudes. Giving that subjective norm in the innovation adoption context is tied to both interpersonal and external influences

(Bhattacherjee, 2000), it is expected that intention to adopt e-learning will also be affected by social influence.

3.12.9 Intention to Use

According to Fishbein and Ajzen (1975), behaviour intention is a measure of the strength of one's intention to perform a specific behaviour. Therefore, in this study, the intention to use is defined as a measure of the strength of a learner's intention to adopt e-learning.

3.13 Summary

By reviewing the literature review and theoretical background, a research framework that explains student adoption and selection of e-learning over traditional learning in higher education has been developed in this section. Based on the underlying themes of the theories reviewed, this study has integrated the basic frameworks of innovation diffusion theory, the technology adoption model, as well as social related and individual choice beliefs to develop a new multi-disciplinary research model for adoption of e-learning. Next chapter provides detail regarding the qualitative exploration of teacher and student perceptions about the factors affecting choice of e-learning over traditional learning in higher education.

Chapter 4

Qualitative Research

4.1 Introduction to the chapter

This chapter discusses the qualitative interviews that were used to compare teacher and student perceptions about the factors influencing choice of e-learning over traditional learning in higher education, and the factors enriching the attractiveness of an e-learning course. After a brief introduction into the qualitative approach, justification for using qualitative interviews is provided. The general methodology is then described, including a discussion of the sampling procedure and data analysis plan. The last section of the chapter details the findings from the qualitative research. Here major themes are discussed and supported with illustrative quotes.

The qualitative research described in this chapter is based on interviews that are used to provide insight into the student adoption of e-learning. To compliment the literature and theory reviewed in the previous chapters, it is important to rely on firsthand accounts by students to develop and support a conceptual model. In addition, interviews can be an effective means of discovering important factors not previously studied in relation to the adoption of innovations. Stemming from the literature reviewed in previous chapters and given the paucity of research on antecedents of e-learning selections, this research is guided by two main research questions:

Research Question A: What factors contribute to the selection of e-learning courses?

Research Question B: What makes e-learning courses more attractive than traditional courses?

Students' selection of e-learning courses may be dependent on social, technical, organizational, and individual factors, while factors enriching the attractiveness of an e-learning course may include different attributes such as instructional design, interaction and motivation. In this chapter, students and teachers were interviewed to assess any potential gaps in understanding of these issues between them.

4.2 Qualitative Methodology Justification

4.2.1 The Nature of Qualitative Study

'Qualitative' implies an emphasis on the quality of the entities that are being scrutinized rather than on conclusions drawn from the kind of numerical and statistical data that is generated in experiments in the hard empirical sciences (Denzin & Lincoln, 2000). Qualitative research is an interdisciplinary, trans-disciplinary, and sometimes counter-disciplinary field (Nelson, Treichler, & Grossberg, 1992). It incorporates the humanities, the social sciences and the physical sciences simultaneously. It is the source of many different points of view, attitudes and assumptions. Qualitative research makes use of multiple paradigms and its practitioners will use as many methods as they need to

produce meaningful results. Qualitative researchers are committed to the naturalist point of view and to an interpretive understanding of human experience.

Qualitative research exists in a creative tension between two apparently opposed worldviews. On the one hand, "it is drawn to a broad, interpretive, post-experimental, post-modern, feminist, and critical sensibility. On the other hand, it is drawn to more narrowly defined positivist, post-positive, humanistic, and naturalistic conceptions of human experience and its analysis. Further, these tensions can be combined in the same project, bringing both post-modern and naturalistic or both critical and humanistic perspective to bear" (Nelson et al., 1992, p.4).

Qualitative research is often characterized as exploratory, aiming at discovery, description, and theory building. It allows for the unanticipated, and hence emphasizes more on specific cases and expectations than on abstractions and generalizations (Becker, 1993). Moreover, Van Maanen (1998) specified that qualitative research generates narratives that link events to events in stories and write a research report with an apparent causal structure. Importantly, qualitative field research is especially appropriate to the study of attitudes and actions better understood within their natural settings.

There are two reasons for utilizing a qualitative methodology as the starting point for this research. First of all, qualitative investigations have

rarely been incorporated into the adoption of innovation literature (Kitchell, 1995). Qualitative explorations may illuminate important factors that have been ignored in this research domain. Second, there are extensive benefits to using methodological triangulation (Brewer & Hunter, 1989; Jick, 1979; Sherry, 1991). It allows for a holistic understanding of the research area. The results from qualitative investigation will be the stepping stone for selection and development of measures for the quantitative study. The remainder of this section will briefly discuss each of these two justifications for including a qualitative study and explain why interviews were chosen as the method of exploration.

4.2.2 Qualitative Studies in Innovation Adoption Literature

Qualitative studies have seldom been incorporated into the adoption of innovation literature. This is counter-intuitive since the user perspective is an integral part of the ultimate adoption decision. Hence, in order to better understand the decision factors, it is important to develop a detailed understanding of the phenomenon from the user's perspective. In this case, students are the key participants and their thought and perception should be investigated qualitatively. The qualitative paradigm is specifically designed to generate a rich understanding of behaviour from the relevant actor's own perspective (Calder, 1977; Hudson & Ozanne, 1988).

Adoption research has mainly been carried out through the use of cross-sectional surveys (Cowles & Crosby, 1990; Dickerson & Gentry, 1983; Gilly & Zeithaml, 1985; Mahajan, Muller, & Srivastava, 1990; Midgley & Dowling, 1993; Zeithaml & Gilly, 1987), experimentation (Ellen, Bearden, & Sherma, 1991; Olshavsky & Spreng, 1996) or some combination of the two (Ostlund, 1974). Moreover, much of the adoption research has mostly been conducted at the aggregate level rather than individual level of analysis. The user adoption factors and research questions exploring reasons and motives, which are the focus of this research, are ideally suited for a qualitative investigation (McQuarrie & McIntyre, 1988).

4.2.3 Methodological Triangulation

Combining a qualitative design together with a quantitative study extensively strengthens the research. Integrating methodologies has been described as convergent methodology, multi-method/multi-trait (Campbell & Fiske, 1959), convergent validation or triangulation (Jick, 1979). Each of these approaches support that qualitative and quantitative methods can, and should, be used together rather than being deemed as contradictory approaches to research. Triangulation is defined as "the combination of methodologies in the study of the same phenomenon" (Jick, 1979, p.602).

Although most IS researchers prefer utilizing either a quantitative or qualitative methodology in isolation, there has been an increasing number of

studies that advocate the benefits of combining one or more research methods (Gable, 1994; Kaplan & Duchon, 1988; Lee, 1991; Mingers, 2001; Ragin, 1987). Indeed, the use of multiple methods has a strong history in social science research and provides several key benefits. Firstly, there is greater accuracy and increased confidence in the research findings (Brewer & Hunter, 1989; Jick, 1979; Sherry, 1991). Campbell and Fiske (1959) claimed that multiple methods should be used to ensure that the variance observed is in fact due to variance in the constructs of interest rather than merely variance in the method utilized. Methodological triangulation allows for a more accurate conceptualization and evaluation of theory by verifying findings from multiple methods (Jick, 1979). When multiple methods are applied and similar results found, we can be more confident that the findings accurately represent the true nature of the phenomenon and the theoretical frameworks are more likely to withstand challenges (Grover & Fisk, 1992). According to Jick (1979), the use of complementary methods is generally thought to lead to more valid results. Moreover, using multiple methods limits the effects of biases that may represent themselves in certain types of research (Brewer & Hunter, 1989).

Moreover, combining these methods may lead to a richer understanding of phenomenon under investigation. By incorporating multiple methods, additional insights may be revealed that would otherwise remain undiscovered via a single methodological approach. Good examples of combining multiple methods include Markus's (1994) study on electronic mail and Trauth and Jessup's (2000) paper on groups support systems. Markus (1994) utilized both

quantitative and qualitative research methods to assess the power of information richness theory (Daft & Lengel, 1986), relative to alternative social theories, to explain and predict managers' use of email. In the Trauth and Jessup's (2000) study, both positivist and interpretive approaches were used to analyze the computer-mediated discussions. Both studies demonstrated how one method can complement another and become mutually supportive.

While all methods have inherent weaknesses, a research project can be strengthened by utilizing complementary methods (Bonoma, 1985; Miles & Huberman, 1994). Morgan (1983) even commented that "the insights generated by any one approach are at best partial and incomplete" (p.369). Indeed, with triangulation, the strengths of one method compensate for the weaknesses in a different method (Brewer & Hunter, 1989; Brinberg & Hirschman, 1986). It is crucial to ensure the methods have complementary strengths and do not have overlapping weaknesses. According to Miles (1979), 'not generalizable' and 'inherent subjectively' are the limitations of qualitative research. Although these limitations have been well-documented (McQuarrie & McIntyre, 1988; Miles, 1979), the value of qualitative investigations is substantial. Qualitative methods provide a deep insight of the phenomenon of interest and generate a rich description. Moreover, qualitative methods preserve the chronological flow of events and their face validity seems irrefutable (Miles, 1979). While the value of qualitative research is clear, there do exist important weaknesses that can be overcome through coupling with a quantitative study. Quantitative research overcomes weaknesses such as small,

non-representative samples and subjectively in interpretation. Without quantitative support for the findings from the interviews, one can never be sure how enduring the results are since they are based on a relatively small sample. Based on the findings from the qualitative study, the quantitative investigation is well suited to focus on the constructs identified as central to the initial trial decision.

For the current research, a mix of qualitative and quantitative research methods were used in investigating the adoption of e-learning and to provide a practical solution to find out factors that influencing students' selection of e-learning over traditional learning in higher education. The qualitative research will explore the phenomenon of interest, highlighting and supporting the relevant constructs. After the model is sufficiently supported and adapted, the quantitative research will follow, focusing on the relevant constructs identified.

4.2.4 Interviews

To conduct qualitative research, numerous alternatives such as ethnography, critical incident technique, participant observation, and interviews can be chosen as the methods of exploration. It is important to select the most appropriate method for the research questions associated with the study. For this research study, interviewing was chosen as the method to explore the student adoption of e-learning as this technique allows for probing,

detailed exploration and a clear focus in order to explore and support the proposed model (Sommer & Sommer, 1997).

Kerlinger (1986) concluded that in depth interviews is the best instrument available for sounding people's behaviour, future intentions, feelings, attitudes and reasons for behaviour. This approach provides a rich conceptualization of user adoption of innovative technology. Babbie (2004) commented that "qualitative interviewing design is flexible, iterative, and continuous, rather than prepared in advanced and locked in stone" (p.300). When comparing with survey questions, the qualitative interview is based on a set of topics to be discussed in depth and creates dynamic interactions between the interviewers and respondents. Design in qualitative interviewing is iterative and responsive as the researchers have to repeat the process of gathering information, analyzing it, testing it, and questioning it.

In this study, semi-structured interviews were conducted with teachers and e-learning students. The focal concepts were identified based on the literature review, so as to design appropriate interview questions to elicit high quality answers. As defined by King (1994), semi-structured interviews would help to remove the element of bias and provide the best mechanism of capturing data. Moreover, face-to-face personal interviews were also preferred over other data collection methods as they enabled the interviewer to probe and clarify answers (King, 1994). According to Overcash (2004), such an interview can be helpful because it allows the participants to tell sometimes emotional and stressful account to someone who is an impartial listener. This

simple design in consistence with qualitative research. As mentioned by Robson (2002), one of the characteristics of qualitative designs is that much less pre-specification is required to allow the design itself to evolve, develop, and unfold as the research proceeds. However, when utilizing quantitative research designs, the researcher must be able to specify in advance the variables included in the study, the exact procedures to be followed, and the theory of the phenomenon he or she is researching (Robson, 2002).

4.3 Methodology

4.3.1 Sample Selection

According to Calder (1977), sample generalizability is not even particularly meaningful for the exploratory approach. For this research study, the desired sample was selected to provide variability in use and experience with e-learning. The ultimate purpose of the sample is to assess the applicability of the proposed model and generate a wide range of factors that may be influential in the adoption process.

Since the study compared the student's and teacher's perception of factors affecting the selection of e-learning over traditional learning in a higher education, students and teachers had to be exposure to or experienced with this learning mode. In view of this, students who were enrolled in the programmes which were delivered in both traditional learning and e-learning modes were targeted for interviews. That is, students could choose either e-

learning or traditional classroom learning when they applied for the programmes. As such, this study involved postgraduate students at a University who were enrolled in the master programmes that were delivered in both learning modes during the fall semester of 2006/07. In addition, students enrolled in the second year or above in these master programmes were selected in order to ensure that respondents had a fair knowledge of the University's programmes, infrastructures, and academics to help in their judgments.

Similarly, teachers were selected based on having at least two years teaching experience in e-learning courses. A total of 12 teachers was identified as the maximum realistic target for teacher interviews and it was decided to target a similar number of students to attain a representative proportion of the student population. The student interviewees were identified by random sampling. In total, 18 postgraduate students and 12 teachers were interviewed in this study. Although this may seem like a small number of subjects, McCracken (1988) concluded only eight respondents are necessary for generating themes in qualitative research. "Qualitative researchers usually work with small samples of people" (Miles & Huberman, 1994, p.27). This is evidenced by Barczak, Ellen and Pilling (1997, p.132) who stated "by the 13th interview, common themes were emerging and responses were becoming redundant." Other published studies have used approximately 20 respondents (Gremler, 1995; O'Guinn & Belk, 1989) while some have used less than 15 (Barczak et al., 1997; Schouten, 1991).

Student Interviews

Interviews were conducted with 18 students (9 male and 9 female; average age = 37.65 years), who were all studying part time, and were from Department of Computing of a Hong Kong based university. These students were enrolled in the master programmes which were delivered in both traditional learning and e-learning modes during the fall semester of 2006/07. The normal duration of the master programmes for part time study is 2.5 years, and the maximum duration for completion of the master award is 8 years. In this interview, ten students were enrolled in the second year and eight were enrolled in the third year of the master programmes. One-on-one interviews were conducted with participants. The interview questions for postgraduate students are listed in Table 4.1.

Table 4.1 Interview Questions to Postgraduate Students

Interview Questions to Postgraduate Students

1. Have you ever chosen to attend any subjects/courses using e-learning mode before?
   a) If yes, what were the reasons that led you to choose e-learning?
   b) If no, what were the reasons that led you to not choose e-learning?

2. Will the following reasons influence you from choosing e-learning rather than traditional classroom mode? (Check all that apply to you)
   - ϒ Convenience and time saving
   - ϒ Ease of use
   - ϒ Suit my lifestyle needs
   - ϒ Reputation of the University
   - ϒ Word of mouth
   - ϒ Mass media reports
   - ϒ Lower tuition fee
   - ϒ Other factors (please suggests): _____

3. What would make you more interested in e-learning courses?

4. Can you suggest any improvements for e-learning courses? e.g. structural components

Teacher Interviews

Twelve teachers were interviewed (3 female and 9 males) in this qualitative study. All had more than four years teaching experience in e-learning courses in various departments of the University. The interviews were completed within a two-week period. The interview questions for teachers are listed in Table 4.2.

Due to some participants' apprehensiveness about being audio-recorded, interviews were recorded by handwritten notes. Extensive notes were taken and were subsequently written up within 48 hours of the interviews while they were still fresh in mind so no vital information was lost. After each interview, the interviewer confirmed notes with the interviewee for agreement and accuracy. Permission was obtained from the interviewees to publish de-identified comments for research purposes.

Table 4.2 Interview Questions to Teachers

Interview Questions to Teachers

1. Based on your e-learning teaching experience, which of the following factors, do you think, will influence students from choosing e-learning over traditional approaches? (Check all that apply to you)
   - ϒ Convenience and time saving
   - ϒ Ease of use
   - ϒ Suit my lifestyle needs
   - ϒ Reputation of the University
   - ϒ Word of mouth
   - ϒ Mass media reports
   - ϒ Lower tuition fee
   - ϒ Other factors (please suggests): _____

2. What would you do to make an e-learning course more interesting?

3. Can you suggest any improvements for e-learning courses? e.g. structural components

4. Do you have any suggestions for this study?

4.3.2 Data Analysis

Analysis of qualitative data is an inherently difficult task. “The most serious and central difficulty in the use of qualitative data is that methods of analysis are not well formulated. For quantitative data, there are clear conventions the researcher can use. But the analyst faced with a bank of qualitative data has very few guidelines” (Miles; 1979, p.590). Miles (1979) even goes as far as to call the analysis of qualitative data “a mysterious, half-formulated art” (p.593). In general, the analysis process is intended to take raw data and develop common themes and generate conclusions or develop meaning based on these patterns. There are several approaches to the analysis of qualitative data. However, most approaches include several essential tasks. “Analysis amounts to systematically grouping and summarizing the descriptions, and providing a coherent organizing framework that encapsulates and explains aspects of the social world that respondents portray” (Holstein & Gubrium, 1995, p.79). Spiggle (1994) stated the inferential processes of categorization, abstraction, comparison and refutation that connect the end product to its data. It is though each of these operations that researchers organize data, extract meaning, arrive at conclusions and support or dispute conceptual frameworks (Spiggle, 1994).

Data collected from the interviews were analyzed using the qualitative content analysis method developed by Mayring (2000) to identify key themes associated with attractiveness e-learning. Mayring (2000) stated that “qualitative content analysis can be defined as an approach of empirical,

methodological controlled analysis of texts within their context of communication, following content analytical rules and step-by-step methods without rash quantification" (p.2). The set of procedures includes identifying and defining a target variable, collecting samples of representative text, and devising reliable and valid rules for categorizing segments of the text. The aspects of text interpretation were put into categories which were formed inductively and/or deductively and revised within the process analysis and feedback loops. Ultimately, this process culminates in descriptive or inferential conclusions about the target variable. To establish the stability of the analysis, the data set was independently analyzed by two researchers and then compared to arrive at a consensus on the categories discussed in the results (a vital operative process in consensual qualitative research, Hill, Thompson, & Williams, 1997).

It is important to note that although every effort was made to analyze the data in an objective manner, analysis of qualitative data is often a subjective process. Guidelines associated with qualitative data analysis were followed carefully to minimize subjectivity. As suggested by Spiggle (1994), the first step in the data analysis process is categorization. This has been defined as the process of classifying or labeling units of data and is commonly referred to as coding (Spiggle, 1994). Here the researcher decides that units of data belong to, or represent, a certain category of interest based on their similarity (Lincoln & Guba, 1985). This is analogous to cluster or factor analysis of grouping like items together. As defined by Lincoln and Guba

(1985) and Miles and Huberman (1994), the categorization process has also been called as unitizing. As cited from Miles and Huberman (1984), "when you are working with text or less well organized displays, you often note recurring patterns, themes, or gestalts, which pull together many separate pieces of data" (p.246). Having a preliminary model allows the categorization process to be conducted both deductively (locating passages that represent a priori constructs, themes or ideas) and inductively (identifying emergent categories from the data).

The second step in qualitative data analysis is abstraction, which builds on the previous categorization process (Spiggle, 1994). In this stage, empirically grounded categories are collapsed into higher-order conceptual constructs which goes beyond the mere identification of patterns. Previously identified categories are grouped into more general, conceptual classes. It may be a construct from the preliminary model or a new construct may emerge and be recognized as theoretically relevant. According to Lincoln and Guba (1985), abstraction was described as 'the method involves sorting units into provisional categories on the basis of look alike characteristics" (p.203).

The third step is a comparison across categories (Spiggle, 1994). The goal is to establish homogeneity within categories and heterogeneity between categories. Similarities are noted across units of data that appear to belong to the same category to ensure they do in fact belong together. As described by

Glaser and Strauss (1967), this step is an important aspect of the constant comparative method.

The last step in the qualitative analysis process is refutation (Spiggle, 1994). This involves deliberately challenging emerging inferences to ensure their relevance. The last step also involves incorporating a diverse sample or intentionally seeking out specific cases that might disconfirm the emerging analysis. It is critical to be able to find added evidence after a theme has been identified yet remain open to disconfirming evidence when it appears. This translates into maintaining skepticism throughout the data collection and analysis process, continually searching for an alternative explanation (Strauss & Corbin, 1990).

Each of these processes described above were included in this qualitative study in order to control the quality of data interpretation and thus to minimize subjectivity. During the data collection process, the preliminary categories were developed. Then the interview notes were read several times with key phrases highlighted after the interviews were conducted. After becoming familiar with the interviews as a whole, recurrent themes and ideas were identified. Although each respondent expressed ideas differently, the analysis involved identifying the similarities between respondents. Key phrases were selected to identify recurring thoughts and ideas related to the factors affecting choice of e-learning, and attractiveness of e-learning from both the students and teacher perspectives. These recurring themes and ideas

were then used to support for the hypothesized adoption model. In the following sections, the examples of participant responses were selected and shown based on their ability to support or illustrate an important issue from the interviews.

4.4 Results

This section summarises the findings from the analysis of the qualitative interviews. Each of the relevant themes and constructs found to be important in the e-learning adoption are discussed and supported with evidence from the interviews. The interviews were not audio taped, but paraphrases from interviewees' comments were written up. The summary of interview findings with extraction of key comments from students and teachers were summarised in Table 4.3. The essential purpose of this qualitative study was to identify the underlying factors that influence students' choice of e-learning courses, and the factors that enrich the attractiveness of an e-learning course as these were perceived by students and teachers. Results have been presented under the following themes: factors affecting choice of e-learning, and attractiveness of e-learning from both the student and teacher perspectives.

4.4.1 Factors affecting choice of e-learning

Responses show that almost 95% of students perceived 'convenience and time saving' as the key factor that affected their decisions to choose e-

learning over traditional learning (Figure 4.1). Amongst other factors affecting choice of e-learning, around 80% of students perceived 'reputation of university' and about 70% of students identified 'lower tuition fee' were the major factors governing their choice. The order of importance for other factors is 'suit my lifestyle needs', 'ease of use', 'word of mouth', and the 'mass media reports'.

On the other hand, all teachers perceived 'convenience and time saving' as the key factor that affected students' choice of e-learning. Then, about 70% of teachers perceived 'suit my lifestyle needs' and around 60% of teachers stated 'lower tuition fee' were the other major factors affecting students' choice. Likewise, the order of importance for other affecting factors is 'reputation of university', 'word of mouth', 'ease of use', and 'mass media reports'.

From the above results, it can be concluded that both students and teachers have a broadly similar view on what factors affect the selection of e-learning over traditional learning. Both groups identified 'convenience and time saving' and 'lower tuition fee' were the major factors governing students' choice of e-learning. Amongst other factors affecting choices of e-learning, a majority of students and teachers perceived the reputation of an institution as one of their evaluation criteria when making their decisions, and reputation is always built on informal and formal referrals of past users based on their satisfaction. Moreover, 'suit my lifestyle needs' was also perceived as another

key factor affecting choice of e-learning. Since e-learning could be considered as an innovation on account of its newness relative to other modes of learning, students have to find e-learning compatible with their needs and lifestyle if they opt for this mode.

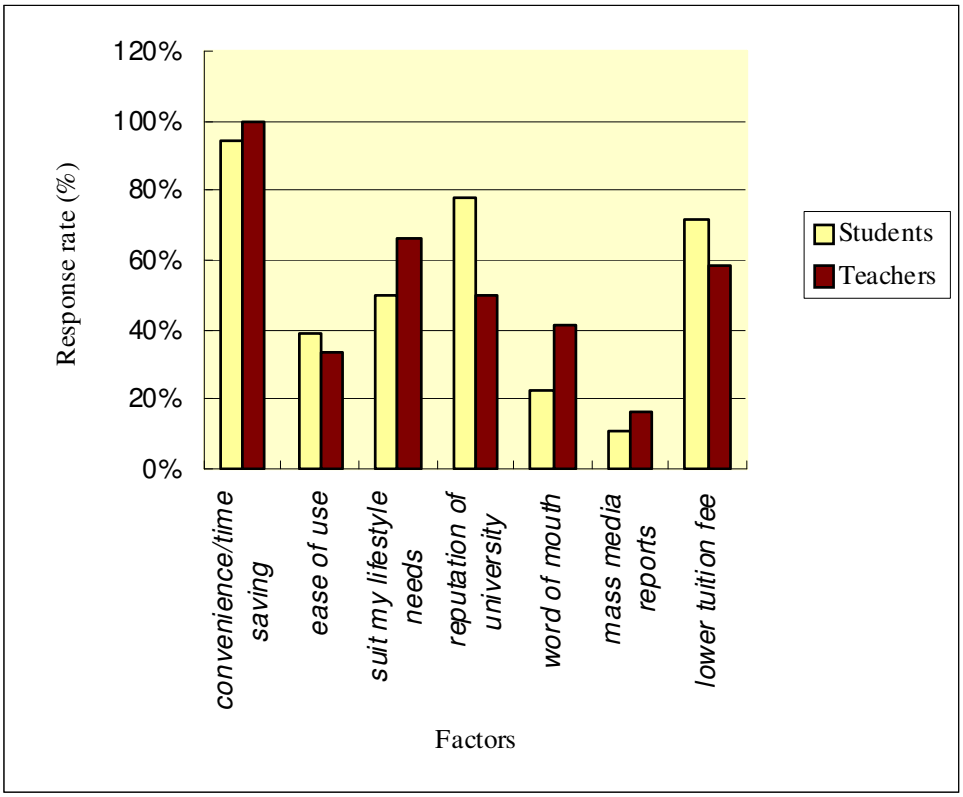


Figure 4.1 Comparison of percentage of students identifying the factors that affecting students' choice of e-learning with perception of teachers. (Lam & Bordia, 2008)

In summary, this study has shown that students and teachers approach e-learning with broadly similar expectations. In terms of choices, there was generally very close agreement between the factors that students identified as major factors and those that the teachers expected to be influencing students.

4.4.2 Attractive e-learning from the student perspective

In terms of factors that enrich the attractiveness of an e-learning course, students indicated that there were two key attributes which constituted an attractive e-learning course. These were instructional design and online interaction.

Instructional design

A total of 12 students (67 per cent) identified the design of course content as an essential element of an attractive e-learning course. Most students preferred the content design and presentation of e-learning courses to include different multimedia formats in order to increase the interactivity and attractiveness. Students also felt that incorporating and designing hypermedia Web features in e-learning courses offers and allows students several opportunities for live interaction, controlling the depth of class content, and learning experience:

> *It would make me more interested in e-learning courses if there are more presentation formats such as multimedia, video or video-taped lecture in the content design. Multimedia and hypermedia are learner-controlled interactive technologies, and hypermedia provides e-learning students with external learning resources to enrich our understanding and learning process.*

Moreover, a number of students suggested that more practical case studies should be included when designing an e-learning course:

> *It would make an e-learning course more attractive if it can link the study materials to real life application because students want to know how knowledge would help them in their working life.*

Students indicated that the more relevant and realistic the course material, the easier for e-learning students to increase the ability to understand key concepts and their practical applications to enterprise.

Online Interaction

Ten students (56 per cent) identified online interaction as being important. Student-teacher contact in e-learning classes is the most important factor in student motivation and involvement. Effective technology tools are instrumental in improving the communication process between e-learning students and teachers. Most students preferred to have more online interaction with teachers and peers in order to increase the communication:

> *It's important for lecturers or tutors to setup more regular team discussions and group sessions on the internet, arrange online chat room for group discussion, conduct tutorial via video conference, so that students can have more interaction with tutors and peers to overcome*

distance by generating group rapport, enhance discourse and dialogue in e-learning courses and make it possible for tutors and peers to actively share, explore, and discuss ideas and insights.

A number of students felt that appropriate and immediate feedback in discussion forums and e-mail helped to build confidence in their ability to understand key concepts and keep their motivation levels high:

Prompt responses from lecturers are very critical. It will disappoint students for a late response (especially those over a week's time).

Moreover, students felt that the lack of immediate feedback in the online portion was discouraging and contributed to their limited participation in the online discussions. In e-learning classes, students need frequent opportunities to perform and receive immediate suggestions for improvement and to overcome feelings of isolation and apprehension.

4.4.3 Attractive e-learning from a teacher perspective

From interviews conducted with teachers, three qualities of an attractive e-learning course were identified. These were instructional design, personal interaction and student supports.

Instructional design

Similar to the student perspective, instructional design was identified by 10 (83 per cent) teachers as the most essential element which constitutes an attractive e-learning course. This involves the presentation format, content design and course structure of an e-learning course:

> *It will be useful if certain part of the materials is developed in a self-learning mode for students to place their own study better; and to build in more mini-benchmarks/study blocks in the content design to ensure students keep up with the material and pace.*
>
> And
>
> *We need to provide clear instructions for student participation in content design, updated subject materials with case examples and interactive exercises for course follow up, research assignments for problem exploring with creative thinking.*

Some teachers even suggested that e-learning course materials can be prepared to the standard similar to UK's OpenU's teaching materials on TVs or in mobile browsing format in order to provide more flexibility for students. The majority of teachers argued that instructional design is a systematic process for developing effective instruction, and the key to developing an attractive e-learning course is focusing on the students' needs, the content requirements, and instructional outcomes, but not the technology of delivery.

Personal Interaction

A total of 6 (50 per cent) teachers indicated that personal (face-to-face) interaction between student and teacher, and student and student was a key component in an e-learning course. Some teachers surveyed indicated that face-to-face interactions helped to build up the sense of community among students, and hence to increase the attractiveness of e-learning courses:

> *Organize more activities such as group projects, organization visits, face-to-face tutorials or meetings will help to increase sense of belonging and get to know each other.*

A number of teachers suggested that e-learning must balance virtual and direct interaction in sustaining communion among students. In addition to online interaction, direct interaction between student and teacher, and student and student helped students to overcome feelings of isolation and often enhanced the learning experience.

Student Support

Besides content design and face-to-face interaction, the provision of student support services was also identified by 6 (50 per cent) teachers. This included the provision of technical and non-technical support services to e-learning students:

It would be helpful to extend the School's services hours on technical support for students having problem in accessing the site, submitting assignment or printing materials. Also, it will help to save students' time in printing the notes themselves by providing them printed materials.

A number of teachers implied that technical staff should assist in providing support and services in meeting all students' special needs, such as setting up equipment and fixing technical glitches. Moreover, some teachers suggested that the School could provide a helpdesk of tutors to support modules within one programme. In many cases, proactive support staffs provide basic leadership in maintaining a good rapport between students and teachers, and this could help to increase the attractiveness of e-learning courses.

4.5 Discussion

Results show that students and teachers have a broadly similar view on what factors affect the selection of e-learning over traditional learning. Both groups identified convenience and time saving was the major factor governing students' and teachers' choice. However, to the role of institutional reputation in relation to the choice of an e-learning course was more important to students than teachers.

Two main factors that enrich the attractiveness of e-learning courses were identified by students - the instructional design and online interaction.

These findings seem to relate to what students require from a quality e-learning environment. E-learning students often feel isolated and cannot easily evaluate how well they have engaged with the learning materials. The provision of feedback through discussion boards and email helps students overcome these barriers and encourage participation (Shepherd, 2000; Kemshal-Bell, 2001). Moreover, designing a structure that meets and displays the e-learning course content effectively is necessary for students to assume an active role in the e-learning process (Driscoll, 1998).

Teachers shared the same view as students that instructional design was identified as one of the essential elements which can enhance the attractiveness of e-learning courses. However, teachers argue that student support, including technical and non-technical support services, and personal interaction such as face-to-face meeting and discussion are also key elements in constituting attractive e-learning courses.

When some of these factors are compared with each other, it is evident that the key difference between the views of students and teachers is the perception of the experience and the process. The student group places more emphasis on the nature of the everyday e-learning experience. In contrast, the teacher group placed more emphasis on ensuring students receive general support and build a sense of belonging within an online community. Teachers tended to identify factors that facilitated and supported the learning process

(Packham, Jones, Miller & Thomas, 2004). Thus more significance is given to the online interaction and quality feedback by students.

This study suggests that whilst attributes differed between students and tutors, these disparities when contrasted with each other are caused by differences in perception. Students tended to evaluate the attractiveness of an e-learning course from an individual perspective whereas teachers were more concerned with ensuring students to receive good support and establish sense of belonging within a valuable, participative and equitable learning experience. As a result, it is argued that students evaluate the attractiveness of an e-learning course from the perspective of assisting their interaction with the learning environment. In contrast, teachers considered factors that facilitated and empowered the learning process.

These findings therefore should help inform e-learning providers when considering how students and teachers will interact with online course material. Consequently, online course design must take into consideration student and teacher perceptions of the learning environment and the way they will prefer to interact with it. Guidance and training should be provided by programme administrators into what behaviour and attributes constitute an attractive e-learning course. Notwithstanding this fact, it is evident that effective instructional design plays a critical role in the success of online pedagogy. The research study has thus tentatively established a link between student and teacher perceptions of an attractive e-learning course.

Table 4.3 Summary of Interview Findings

	Responses from Teachers	**Responses from Students**
Convenience and time saving	12	17
Ease of use	4	7
Suit my lifestyle needs	8	9
Reputation of the university	6	14
Word of mouth	5	4
Mass media reports	2	2
Lower tuition fee	7	13
Other factors	Easier to get the degree	Allow me to carry out my study anywhere anything even on business trip

Extraction of Key Comments from Students

1. ***Have you ever chosen to attend any courses using e-learning mode before?***

   a) ***If Yes, what were the reasons that led you to choose e-learning?***
   - Only cyberu mode available during the summer semester. But given up later as the lecturer was late to response to our questions. Feel very bad and helpless;
   - Flexible study schedule; can arrange my learning hour flexibly;
   - No need to attend regular classes;
   - Saving traveling costs to campus;
   - Can study and review course materials online at any time. My job requires intensive travel and long working hour. I cannot attend lectures every week or on time;
   - To keep my knowledge update;
   - To keep competitive in the market; keen competitiveness around;
   - To release working pressure at work;
   - Internet convenience: anytime, anywhere; no limit to location where I study;
   - Trend;
   - China grows;
   - Referred from a friend;
   - Recognition same as traditional learning mode;
   - Information technology based/oriented;

- Lower tuition fee;
- Communicate at self-convenience;
- Efficient;
- Easily accessible to course content.

b) If no, what were the reasons that led you to not choose e-learning?

- Lack of face-to-face discussion with lecture and classmates;
- Lack of market information about the availability of e-learning.

2. What would make you more interested in e-learning courses?

- Course outline; more curriculum;
- Different presentation format, such as multimedia or video;
- Information share on discussion board;
- Background and popularity of the university that offering the e-learning courses; increased reputation;
- Provide more courses and flexible study modes to students. E.g. Submit assignments and take exam over the internet, and courses conducted in summer terms;
- More participations and resources input by the university. E.g. Setup more tutorials and online group discussions over the internet;
- Need some form of face-to-face tutorial once or twice during each course;
- Video conference with tutor/lecturer; more interactive way to interact with the lecturer;
- Technical/non-technical support from university is very important (e.g. Handle query, schedule, admin work);
- Guess speaker to share experience;
- The course involves the necessary facilities and support in using the technique;
- Online interactive live learning; more interactive learning activities;
- Flexibility and easy adoption to my life;
- Timing and convenience;
- No formal attendance in classes;
- No assignments and exam required;
- Lower tuition fee;
- Video recording on lectures;
- More practical cases.

3. Can you suggest any improvements for e-learning courses? E.g. structural components.

- Prompt response from lecturer /tutor on online discussion;
- More information provided by tutor;
- Online chat room for group discussion;
- Video conference tools for face-to-face discussion;
- Arrange regular team discussions and group sessions (on the internet); regular function & meeting for students;
- Tutors conduct tutorial via video conference;
- Link study materials to real life application because students want to know how knowledge would help them in their working life; more case studies;
- Require more public promotion;
- Solve candidates' worries about the requirements of facilities;
- Job opportunities and market driven;
- Creative teaching methods;
- More knowledge library or reference in the Web;
- With voice and visual contacts;
- Variety of subjects;
- Recruit famous instructors;
- More promotion from employers.

Extraction of Key Comments from Teachers

1. What would you do to make an e-learning course more interesting?

- Allow more flexibility e.g. optional tutorials;
- Decent and interactive interface; highly interactive and user friendly;
- Video-taped lecture to simulate classroom learning;
- Supplements with face-to-face tutorial sessions to increase personal contact;
- Hold regular social functions to help students building network for study and work;
- Set up discussion topics & FAQ in e-learning forum;
- More online activities such as forum, emails, icq, animations/videos and questions; more project and group meeting over internet; interactive exercise for course follow up, research assignments for problem exploiting with creative thinking;
- Giving appropriate response to students input;
- Materials develop in self-learning mode for students to pace

their own study better;

- More practical stuff such as teaching industrial package; more case examples, exercises and solutions to the chapters of each subject;
- Video conference.

2. *Can you suggest any improvements for e-learning courses? E.g. structural components.*

- Video conference;
- Tegrity – video recording on lectures;
- Allow students to take examinations at offshore locations;
- Provided printed materials to save students' time in printing the notes themselves; printable graphic materials;
- Extending service hours on technical support for students having problem in accessing the site, submitting assignments and printing materials;
- More activities to develop sense of community; sense of belongs and get to know each other;
- To have standardized way to support re-use of learning/teaching materials;
- Use of technical set-up should be standardized for the ease of standard delivery;
- To have a helpdesk of tutors to support modules within one program;
- Build in mini-benchmarks/study blocks to ensure students keep up with the materials and pace;
- Provide timely and appropriate feedback to individual student; take necessary response to attend student problems during their study;
- Powerpoint style materials;
- Updated learning materials;
- More face-to-face meetings; organization visits, projects, tutorials, case study, discussion;
- Course materials to be prepared to the standard similar to UK's OpenU's teaching material on TVs;
- More videos;
- Mobile browsing.

3. Do you have any suggestions for this study?

- It would be interesting to see what particular difficulties students encounter in using e-learning => a related prospective on the same issue;
- May ask the students and compare their responses with those of instructors;
- Some ranking mechanism to differentiate the importance or preference of these factors will be useful.

4.6 Summary

This chapter presents the findings regarding the factors influencing students' selection of e-learning courses and the constituents of an attractive e-learning course. By knowing these factors, educational administrators can understand the reasons for resistance to e-learning adoption among most students, they can thus enhance or improve the e-learning courses based on student needs identified in the empirical results. Such knowledge can also assist educational institutions to plan and implement e-learning strategies, to increase the adoption of e-learning and thus promote e-learning courses to the market.

Since this study was exploratory, future research with a larger sample size conducting a quantitative approach would be helpful to further confirm the validity of the findings. Thus, the next chapter presents the research design and the quantitative methodological issues, followed by a discussion of the results in Chapter Six.

Chapter 5

Research Design and Methodology

5.1 Introduction to the chapter

This chapter presents the methodological issues relating to the quantitative stage of the research. This chapter presents research design and the quantitative methodology employed. It consists of three sections: (1) research framework, (2) research questions and hypotheses development, and (3) quantitative research method which include the rationale, survey instrument, the sample, data collection, and data analysis procedures in the research.

5.2 Research Framework

The purpose of this study was to investigate factors that influence students' selection of e-learning and compare the adoption characteristics among the different student groups based on their usage experience of e-learning. This study proposed a theoretical framework to accomplish the research objective.

Based on previous studies of technological innovation and adoption, this study proposed several distinctive factors that can help explain students' adoption of e-learning in higher education. It is also assumed that there are

meaningful differences among the user groups according to their usage experience on e-learning.

Another focus of this research was on how factors that are thought to be major influences in innovation adoption can be applied differently in the context of online learning. Thus, this study selected the most common factors that have been identified as significant factors influencing innovation adoption in previous studies.

5.3 Research Questions and Hypotheses Development

To accomplish the research objective, the major research question of this study is: what factors influence the selection of e-learning as against traditional course delivery in higher education?

In order for the research question to be answered, this research needs to have its objective investigation into:

a) What are the underlying factors that would influence students' intention to choose e-learning rather than traditional learning?
b) What are the underlying factors that influence students' actual behaviour to choose e-learning rather than traditional learning?
c) How do adoption characteristics differ between the experienced e-learning user group and the non-user group?

By reviewing the literature review and theoretical background, a research model that investigates student adoption and selection of e-learning over traditional learning in higher education is developed (Figure 3.1, Chapter 3) based upon the theoretical foundations of Innovation Diffusion Theory (IDT) and the Technology Acceptance Model (TAM), with the support of the Theory of Reasoned Action (TRA) and the Theory of Planned Behaviour (TPB) as well as integrates factors related to technology, social and individual choice. In the research model, eight variables (relative advantage, complexity, compatibility, organizational reputation, interpersonal influence, external influence, attitude, and subjective norm) are measured against with the actual behaviour and behavioural intention to choose e-learning. To study the relationships between the model variables, the following research hypotheses or propositions are proposed.

Hypothesis 1: Relative Advantage

Rogers (1983) defined relative advantage of an innovation as the degree to which the innovation is perceived as better than the idea it supersedes. According to Agarwal and Prasad (1998), relative advantage of an innovation is positively related to its rate of adoption. Moreover, Tornatzky and Klein (1982) found relative advantage to be an important factor influencing adoption in their meta-analysis of innovation studies. As proposed in technology acceptance model (Davis, 1989), relative advantage is similar to the perceived usefulness which is defined as the degree to which a potential adopter views

the innovation as offering an advantage over previous ways of performing the same task, and thus tends to have a more favourable attitude towards it.

In the context of e-learning, the possibility of studying at anytime and anywhere would be a source of real advantage to learners who have extremely tight schedules. It is therefore possible to suggest that the advantages that e-learning offer over and above traditional learning could positively influence learners' attitude towards e-learning. This provides support for the hypothesis:

H1. The greater the perceived relative advantage of e-learning compared to traditional learning, the more likely that the learner will have a positive attitude towards e-learning.

Hypothesis 2: Complexity

Complexity is the degree of difficulty associated with understanding and learning to use an innovation (Rogers, 1995). The complexity of the technology creates greater uncertainty for successful implementation and therefore increases the risk in the adoption decision. That is, if individuals find an innovation too difficult to understand or to use, they are less likely to adopt a new innovation. For this reason, Cooper and colleagues (Cooper & Zmud, 1990; Grover, 1993) concluded that complexity is negatively correlated with adoption.

According to the technology acceptance model (Davis, 1989), complexity can be considered as the exact opposite of ease of use which has been found to directly impact the adoption of a new innovation. Moreover, prior studies (Venkatesh & Davis, 1996; Agarwal & Prasad, 1999; Chau & Hu, 2001) also have indicated that computer self-efficacy was an antecedent of perceived ease of use since an individual's confidence in his/her computer related knowledge and abilities can influence his/her judgment of the ease or difficulty of carrying out a specific task using a new technology. In other words, the greater the requirement of technical skills the less likely an individual would be to adopt a new innovation. Consequently the learners' attitudes towards e-learning are likely to be less favourable when the level of complexity of e-learning process is high. This leads to the following hypothesis:

H2. Perceived complexity of usage of e-learning will be negatively related to the learner's attitude towards e-learning.

Hypothesis 3: Compatibility

An innovation's compatibility is defined as the degree to which it is perceived as being consistent with the existing values, past experiences and needs of the potential adopter (Rogers, 1995). Tornatzky and Klein (1982) in their meta-analysis found compatibility to be an important determinant of adoption. Compatibility is often thought to underlie technology acceptance (Davis et al., 1989; Moore & Benbasat, 1991) and has been found to predict

student intent to use an e-learning system for distance education purposes (Carswell & Venkatesh, 2002).

Thus, if the innovation can be seen as advantageous by the potential adopter or as compatible with an individual's needs and lifestyle, it is more likely to influence their attitude towards e-learning positively. This provides support for hypothesis:

H3. The greater the perceived compatibility e-learning has with the way a learner manages his or her studies, the more likely that the learner will have a positive attitude towards e-learning.

Hypothesis 4: Organizational Reputation

Primarily, the essence of reputation is a social one rather than an individual judgment. Reputation is a social construction collectively created through the process of social communication and is not confused by perception of an individual (Emler, 1990). With respect to organizational reputation, we propose that when an organization has a good reputation, customers will have a more positive impression towards the new innovation. According to De Ruyter and Wetzels (2000), organizational reputation is one of the key factors that influence a customer's decision to choose a new innovation.

Reputation is always built on the formal and informal referrals of past users based on their satisfaction, and satisfaction is a positive affect experienced by an individual in a relationship (Brady & Robertson, 2001; Rusbult, Martz, & Agnew, 1998). Overall consumer satisfaction is a general perception based on all the experiences in past transactions with the good or service provider. When the overall satisfaction increases, it is likely that the users will use the good or service again and refer or influence others to use (Bhattacherjee, 2001a). This social influence is reflected in the subjective norm. IS researchers have found that user satisfaction is a strong predictor of system use (Baroudi, Olson, & Ives, 1986) and a predictor of the intention to use IS continuously (Bhattacherjee, 2001b). Thus, this study postulates that the reputation of an organization could positively influence learners' subjective norms towards e-learning, and learners are likely to use reputation as a cue to evaluate the e-learning courses. Therefore, the following hypothesis is formulated:

H4. The reputation of the organization will be positively related to the learner's subjective norm towards e-learning.

Hypothesis 5: Interpersonal Influence

Interpersonal influence includes word-of-mouth influence by friends, colleagues and superiors. Rogers (1995) found that two individuals who are homophilous (or from similar background) are more likely to have greater

effects on the transmission of knowledge, on attitude formation, and on behaviour change related to a new innovation because they share similar values related to work and home environments. Rogers (1995) further explained that homophilous social system seems to favor the diffusion of innovation in products and technology. This is because the adoption of new innovations in products and technology are based on personal preferences, which can be persuaded to people by others who are similar to them in their prefeence. Hence, if we persuade one person in a homophilous social system to adopt a new technology, then his friends will surely be able to understand and relate to why the innovation appeals to him. With each progressive adoption of the new technology, it becomes easier and easier for the technology to diffuse. Venkatesh and Brown (2001) also suggested that a positive word-of-mouth from friends, family, and other adopters has a significant influence in future adopters, but may not be as influential on those who have already acted.

In this study, learners' friends, family, and adopting peers may be the group that will potentially influence their subjective norms towards e-learning, and learners are likely to choose e-learning with positive interpersonal influence. Therefore, the hypothesis is proposed as:

H5. Interpersonal influences will be positively related to the learner's subjective norm towards e-learning.

Hypothesis 6: External Influence

Other than interpersonal influence, Bhattacherjee (2000) proposed that external influences are another determinant of social influence. External influence resembles informational influence which is described as individuals accepting information as evidence of reality. External influence includes mass media reports, expert opinions and other non-personal information. Mass media communications such as radio, television, newspapers, and the Internet, play a large role in the initial awareness stage of diffusion, and it may be used as a tool to reach the general public.

In this study, informational input from mass media, advertising, and other non-personal information may potentially influence learners' subjective norms towards e-learning, and learners are likely to choose e-learning with positive external influence. Thus the hypothesis is formulated that:

H6. External influences will be positively related to the learner's subjective norm towards e-learning.

Hypothesis 7: Attitude towards E-learning

Attitude is defined as an individual's positive or negative feeling about performing the target behaviour (Fishbein & Ajzen, 1975). It is related to behavioural intention because people form intentions to perform behaviours toward which they have positive feeling. As proposed in Theory of Reasoned

Action (Fishbein & Ajzen, 1975), attitude was expected to influence behavioural intention in accepting a new innovation. Most intention-based theories model attitude as a mediator between beliefs and intentions. Individuals' salient beliefs about the outcomes are expected to influence their attitude towards the behaviour, which in turn is expected to impact their intention to perform that behaviour.

In a technology adoption context, the key behaviour of interest is use of the system; therefore, attitude towards behaviour is a potential user's affective evaluation of the costs and benefits of using the new technology. If users perceive the benefits of using the new technology are greater than the costs, their attitude will be positive and a greater likelihood of adoption will be resulted. With regards to e-learning, attitude towards this learning model will be positively influenced by its perceived relative advantage and perceived compatibility, and negatively influenced by perceived complexity. The impact of attitude on intention to adopt e-learning is captured in the next hypothesis:

H7. Attitude towards e-learning will be positively related to the learner's intention to adopt e-learning.

Hypothesis 8: Subjective Norm

Subjective norm refers to the perceived social pressure to, or not to, adopt a new innovation (Fishbein & Ajzen, 1975). It is composed of the user's

perception of how others think he/she should behave, and his/her motivation to comply with the expectations of these referents (Fishbein & Ajzen, 1975). Individuals may be motivated to comply with the referents even if they do not favor the behaviour. In an innovator-imitator framework, individuals might attempt to "fit-in" with perceived opinions of important other people who may be early adopters of an innovation Vijayasarathy (2004).

The extended model of technology acceptance model (Venkatesh & Davis, 2000) integrates additional theoretical constructs across social influence and cognitive instrumental processes. Social influence is the extent to which a member of a social network influences another's behaviour (Rice, Grant, Schmitz, & Torobin, 1990). From a media richness perspective, social influence is exerted through messages and signals that assist to form perceptions of the value of a product or an activity (Fulk & Boyd, 1991; Fulk, Steinfield, Schmitz, & Power, 1987; Salancik & Pfeffer, 1978).

In the context of technology usage, subjective norm has manifested itself as peer influence and superior's influence (Mathieson, 1991; Taylor & Todd, 1995a; Taylor & Todd, 1995b). It is expected that intention to adopt e-learning will be closely linked to the extent users can be influenced and respond to informational input from their course leaders, school authority, and adopting peers. For example, a student may believe that the teacher thinks that he or she should use the e-learning system. If that student is strongly motivated to comply with the expectations of the teacher, a positive impact on subjective

norm may occur. This subjective norm-intention association has been regarded as compliance, where an individual accepts influence to gain a favourable reaction from another person or group (Warshaw, 1980). Thus, the following hypothesis is verified:

H8. Subjective norms towards e-learning will positively related to the learner's intention to adopt e-learning.

Based on the above eight proposed research hypotheses, their null and alternative hypotheses are formulated and presented in Table 5.1.

Table 5.1 Null and Alternative Hypotheses

Hypothesis 1: Relative Advantage
H1. The greater the perceived relative advantage of e-learning compared to traditional learning, the more likely that the learner will have a positive attitude towards e-learning. The hypothesis is established for statistically formulating the following null hypothesis and alternative hypothesis, respectively. $H_0$1: The learner's perceived relative advantage of e-learning compared to traditional learning will have either no impact or a negative impact on his or her attitude towards e-learning. Ha1: The learner's perceived relative advantage of e-learning compared to traditional learning will have a positive correlation with his or her attitude towards e-learning. According to the established alternative hypothesis (Ha1), it is indicated that the learner's perceived relative advantage is the independent variable, and learner's attitude towards e-learning is the dependent variable.
Hypothesis 2: Complexity
H2. Perceived complexity of usage of e-learning will be negatively related to the learner's attitude towards e-learning. The hypothesis is established for statistically formulating the following null hypothesis and alternative hypothesis, respectively. $H_0$2: The learner's perceived complexity of usage of e-learning will have either no impact or a positive impact on his or her attitude towards e-learning.

Ha2: The learner's perceived complexity of usage of e-learning will have a negative correlation with his or her attitude towards e-learning.

According to the established alternative hypothesis (Ha2), it is indicated that the learner's perceived complexity is the independent variable, and learner's attitude towards e-learning is the dependent variable.

Hypothesis 3: Compatibility

H3. The greater the perceived compatibility e-learning has with the way a learner manages his or her studies, the more likely that the learner will have a positive attitude towards e-learning.

The hypothesis is established for statistically formulating the following null hypothesis and alternative hypothesis, respectively.

$H_0$3: The learner's perceived compatibility of e-learning with the way he/she manages the studies will have either no impact or a negative impact on his or her attitude towards e-learning.

Ha3: The learner's perceived compatibility of e-learning with the way he/she manages the studies will have a positive correlation with his or her attitude towards e-learning.

According to the established alternative hypothesis (Ha3), it is indicated that the learner's perceived compatibility is the independent variable, and learner's attitude towards e-learning is the dependent variable.

Hypothesis 4: Organizational Reputation

H4. The reputation of the organization will be positively related to the learner's subjective norm towards e-learning.

The hypothesis is established for statistically formulating the following null hypothesis and alternative hypothesis, respectively.

$H_0$4: The reputation of the organization will have either no impact or a negative impact on the learner's subjective norm towards e-learning.

Ha4: The reputation of the organization will have a positive correlation with the learner's subjective norm towards e-learning.

According to the established alternative hypothesis (Ha4), it is indicated that the reputation of organization is the independent variable, and learner's subjective norm towards e-learning is the dependent variable.

Hypothesis 5: Interpersonal Influence

H5. Interpersonal influences will be positively related to the learner's subjective norm towards e-learning.

The hypothesis is established for statistically formulating the following null hypothesis and alternative hypothesis, respectively.

$H_0$5: The interpersonal influences will have either no impact or a negative impact on the learner's subjective norm towards e-learning.

Ha5: The interpersonal influences will have a positive correlation with the learner's subjective norm towards e-learning.

According to the established alternative hypothesis (Ha5), it is indicated that the interpersonal influence is the independent variable, and learner's subjective norm towards e-learning is the dependent variable.

Hypothesis 6: External Influence

H6. External influences will be positively related to the learner's subjective norm towards e-learning.

The hypothesis is established for statistically formulating the following null hypothesis and alternative hypothesis, respectively.

$H_0$6: The external influences will have either no impact or a negative impact on the learner's subjective norm towards e-learning.

Ha6: The external influences will have a positive correlation with the learner's subjective norm towards e-learning.

According to the established alternative hypothesis (Ha6), it is indicated that the external influence is the independent variable, and learner's subjective norm towards e-learning is the dependent variable.

Hypothesis 7: Attitude towards E-learning

H7. Attitude towards e-learning will be positively related to the learner's intention to adopt e-learning.

The hypothesis is established for statistically formulating the following null hypothesis and alternative hypothesis, respectively.

$H_0$7: The learner's attitude towards e-learning will have either no impact or a negative impact on his or her intention to adopt e-learning.

Ha7: The learner's attitude towards e-learning will have a positive correlation with his or her intention to adopt e-learning.

According to the established alternative hypothesis (Ha7), it is indicated that the learner's attitude is the independent variable, and learner's behavioural intention is the dependent variable.

Hypothesis 8: Subjective Norm

H8. Subjective norms towards e-learning will positively related to the learner's intention to adopt e-learning.

The hypothesis is established for statistically formulating the following null hypothesis and alternative hypothesis, respectively.

$H_0$8: The learner's subjective norm towards e-learning will have either no impact or a negative impact on his or her intention to adopt e-learning.

Ha8: The learner's subjective norm towards e-learning will have a positive correlation with his or her intention to adopt e-learning.

According to the established alternative hypothesis (Ha8), it is indicated that the learner's subjective norm is the independent variable, and learner's behavioural intention is the dependent variable

5.4. Quantitative Research Method

For the quantitative stage of this research, a survey method was used. In order to test the hypotheses described above, data were collected through questionnaires from students of a higher education institution. In this section, the rationale for survey research, survey instrument, the sample, the data collection, and statistical techniques are explained.

5.4.1 Rationale for Survey Research

There are numerous design options available, all of which have unique advantages and disadvantages. For this study, survey research was selected as the best method to collect data in order to test the hypotheses.

Survey research is one of the most prevalent research methods in management information system (MIS) research (Vogel & Wetherbe, 1984; Pinsonneault & Kreamer, 1993). Survey research is the systematic gathering of information from respondents for the purpose of understanding and/or predicting some aspect of the behaviour of the population of interest (Hawkins & Tull, 2002). Survey research can be described as a mode of inquiry that involves the collection and organization of systematic data and the statistical analysis of the results (De Vaus, 1995; Marsh, 1982; Glock, 1967).

Indeed, survey research provides several advantages over other methodological alternatives. First of all, surveys are an effective way to collect

information from a wide range of respondents (Babbie, 2007). Large samples that are feasible with survey research help to increase the generalizability of the findings (Kerlinger & Lee, 2000). Second, survey methodology is an effective way to directly measure and investigate a large number of variables (Churchill, 1995; Kerlinger & Lee, 2000). Third, there are economical advantages of using surveys. Although surveys can be costly, they are generally very economical in terms of the amount and quality of information provided (Kerlinger & Lee, 2000).

Although there are advantages to survey research, there are also important limitations in the methodology. Causal relationships cannot be established definitively, rather the conclusions are based on correlational relationships. Survey research allows the possibility of uncontrolled extraneous constructs to influence a relationship. While the impact of these extraneous variables limits the ability to infer causality, the findings are helpful in predicting relationships among variables.

Second, survey research utilizes standardized questionnaires that may cause the researcher to miss what is most important to a respondent (Babbie, 2007). To reduce this concern, pretesting and in-depth interviews were conducted in order to ensure the survey focused on key factors associated with the adoption decision relating to e-learning. Third, the survey approach typically utilizes self-report data through the completion of a paper and pencil survey instruments. Self-report data is subject to potential problems such as

social desirability bias or acquiescence. In order to limit these biases, existing scales with established reliability and validity were used for most constructs. Moreover, both negatively and positively phrased questions were used to detect respondent acquiescence. Confidentiality was also maintained in order to limit the effects of social desirability bias.

With consideration of all of the aforementioned advantages and disadvantages, survey research was determined to be the most effective way to conduct the research. Survey research allows for the collection of a large amount of data from a large sample of respondents in a cost effective and timely manner. In addition, a large number of constructs can be explored in a natural setting.

5.4.2 Instrument Design

A multi-step process was utilized to develop the survey instrument in this study. Firstly, a review of relevant literature was conducted in order to develop a conceptual framework to provide direction and guide the data collection process. Secondly, interviews that were described in Chapter Four were further utilized in order to refine what factors would be included in the survey instrument. By aggregating the results from interviews and previous literature review, a questionnaire was prepared to measure student's perception about the factors influencing student's selection of e-learning over traditional learning in higher education.

Special emphasis was given to the operationalization of the constructs in the research framework. All constructs in the research model were measured based on well-established scales from information systems research, marketing, and social psychology (e.g. Ajzen & Madden, 1986; Berger, 1993; Moore & Benbasat, 1991; Parthasarathy & Bhattacherjee, 1998; Tornatzky & Klein, 1982.) The items were primarily derived from previously tested survey instruments to take advantage of well-tested psychometric measures (Straub, 1989). Most of the constructs were operationalized by modifying these previously validated scales, as direct use of previous instruments was not always possible. Thus, minor modifications were made on the validated measures from previous studies to fit the specific content of e-learning in present study. For example, items in the form of statements assessing relative advantage, complexity, and compatibility with values were modified to reflect perceptions towards the use of e-learning. Besides compatibility with values, compatibility with Internet experience as well as with learning needs are also measured. To measure subjective norms, respondents were asked to indicate their agreement or disagreement with the extent to which they believed that their decision to choose e-learning would be influenced by their friends, family, peers, and mass media reports. A new variable, reputation, was constructed based on the statements in the literature, which is a common approach followed by researchers when previous instruments are not available (Grover, 1993). Moreover, each construct was measured by using multiple indicators to capture the underlying theoretical dimensions effectively (Premkumar & Ramamurthy, 1995).

The constructs used in this study are as follows: (1) relative advantages, (2) complexity, (3) compatibility, (4) organizational reputation, (5) interpersonal influence, (6) external influence, (7) attitude, and (8) subjective norms. The measurement items for each construct asked the students to rate the extent to which they felt or agreed with the features described by the statement on a seven-point Likert-type scale ranging from “strongly agree” to “strongly disagree”. The mid-point (4) represents the state of neutrality. Student’s demographic data, such as age, gender, educational programme, present mode of study, and previous experience in e-learning, were also collected through the instrument. The questionnaire, presented in Appendix J, consisted of 30 questions that addressed factors influencing student’s selection of e-learning. Table 5.2 explains each construct and its measurement items structured according to previous studies.

Table 5.2 Constructs and Their Measurement Items

Construct	Items Code	Measurement Items	References
Relative Advantage	RA1	E-learning enables me to learn more efficiently than traditional learning.	Moore & Benbasat (1991)
	RA2	E-learning improves the quality of my learning when compared to traditional learning.	
	RA3	E-learning enhances the effectiveness of my learning when compared to traditional learning.	
	RA4	E-learning offers more flexibility in learning as to time and place when compared to traditional learning.	
	RA5	E-learning gives me greater control over my learning than traditional learning.	
Complexity	CX1	Learning to operate an e-learning system is easy for me.	Moore & Benbasat (1991)
	CX2	I believe that it is not easy to get the e-learning system to do what I want it to do.	
	CX3	My interaction with the e-learning system is clear and understandable.	
	CX4	I find the e-learning system to be flexible to interact with.	

Compatibility	COM1	E-learning is compatible with my lifestyle.	Moore & Benbasat (1991)
	COM2	E-learning fits well with the way I like to learn.	
	COM3	E-learning can meet my need for ability to manage my study without attending regular classes in school.	
Organizational Reputation	OR1	I will choose an e-learning course offer by an organization that have a good reputation more favorably than an e-learning course offer by an organization with a bad reputation.	De Ruyter & Wetzels (2000)
	OR2	I believe that an organization with a good reputation will play more efforts in maintaining the quality of their e-learning courses.	
Interpersonal Influence	ITP1	My peers/colleagues/friends thought that I should use e-learning for my study.	Bhattacherjee (2000, 2001a)
	ITP2	People I knew thought that using e-learning was a good idea.	
	ITP3	People I knew influenced me to try out e-learning for my study.	
	ITP4	Many people around me use e-learning for their studies.	

External Influence	EXT1	I read/saw news reports that using e-learning was a good way of studying.	Bhattacherjee (2000)
	EXT2	The popular press depicted a positive sentiment for using e-learning.	
	EXT3	Mass media reports influenced me to try out e-learning.	
Attitude	ATT1	Using e-learning would be a pleasant experience.	Ajzen (1991), Fishbein & Ajzen (1975), Taylor & Todd (1995a,b)
	ATT2	Using e-learning is a good idea.	
	ATT3	An e-learning system provides an attractive learning environment.	
	ATT4	Overall, I like using e-learning for my study.	
Subjective Norm	SN1	People (Peers and experts) important to me supported my use of e-learning.	Fishbein & Ajzen (1975), Mathieson (1991), Taylor & Todd (1995a,b)
	SN2	People who influenced my behaviour wanted me to use e-learning instead of traditional classroom learning.	
	SN3	People whose opinions I valued preferred that I use e-learning.	
Intention to Use	INT1	I intend to increase my use of e-learning system in the future.	Fishbein & Ajzen (1975), Taylor & Todd (1995a,b)
	INT2	To the extent possible, I would use e-learning system to do different things, from downloading lecture notes and participating in chat rooms to learning on the Web.	

5.4.3 Sample Selection

The sampling process entails the selection of whom to study in the research (Davis & Cosenza, 1993). Purposive sampling (Lincoln & Guba, 1985) was used in this research project. Purposive sampling is a technique where the sample is not specified a priori, rather those included in the sample are selected on the basis of the participant' experience (Belk, Sherry & Wallendorf, 1988; Jorgenson, 1989). The emergent design allows for flexibility in who is included in the sample and is designed to "focus more particularly on those units that seem more relevant" (Lincoln & Guba, 1985, p.202).

Since the purpose of this study was to investigate factors that influence students' selection of e-learning and compare the adoption characteristics among the different student groups based on their usage experience of e-learning, the desired sample groups should be exposed to or experienced with e-learning in this study. In view of this, students who were enrolled in the programmes which were delivered in both traditional learning and e-learning were targeted for the survey. That is, students could choose either e-learning or traditional classroom learning when they applied for the programmes.

The population for this study was students from a Hong Kong based university that provides a number of programmes (in postgraduate levels) in both traditional classroom and e-learning modes, and allows students to choose either learning mode when they applied for the programmes. The

purposive sampling method was used in sample selection to ensure that only students enrolled in the second year or above in the postgraduate programmes was selected to ascertain that respondents had a fair knowledge of the University's programmes, infrastructures, and academics to help in their judgments. The necessary sample size was estimated based on the number of independent variables, and the sample size should be 15-20 observations per variable for generalizability purposes according to the recommendations of Hair, Anderson, Tatham, and Black (1998). The total number of independent variables in this study was eight, thus the minimum sample size targeted in this study was 120 usable observations. Based on the sample size required, students from the Department of Computing of the University were invited to participate for this study. Visiting students and offshore students were excluded.

5.4.4 Data Collection

A total of 140 questionnaires were distributed to students who were enrolled in the postgraduate programmes offered by the Department of Computing of the University, and that the programmes are delivered in both traditional learning and e-learning modes. Complete and usable questionnaires were received from 120 respondents. The response rate is 85.7 percent.

Before conducting survey, an application was submitted to the Human Research Ethics Committee of the University of South Australia to seek their

approval to conduct this study. A letter was also sent to the Head of Department of Computing of a Hong Kong based university to obtain permission and to arrange time for their classes to participate in the study.

After the survey was developed, the questionnaire was pre-tested by experienced practitioners in the e-learning research area in order to ensure appropriate design and utility of the research instrument, and to ensure the reliability of the questionnaire. The experienced practitioners (n = 5) were chosen based on their knowledge about the topic and/or research methods, availability and willingness to help. Those experts were requested to carefully review the questions, scales, instructions and the appropriateness of the questions and language for the target population. Based on the feedback from the practitioners, the questionnaire was revised. The changes that were made included revising some of the wordings (e.g. add the word compared to traditional learning in the statements under the relative advantage), and changing the format of the questionnaire (e.g. align all of the responses). Questionnaires were then distributed to students during classes. A research assistant then collected the questionnaires and returned all completed surveys directly to the researcher. The data collection was conducted during the spring semester of 2007.

5.4.5 Data Analysis Procedure

Prior to addressing the research questions and hypotheses posed for this study, a preliminary analysis was conducted to assess the proposed research model to include validity and reliability. Descriptive analysis will be used on gender, age and previous experience constructs to determine demographic tendencies of the participants. Validity will be tested through the use of factor analysis and a Cronbach alpha will be used to ascertain reliability of the measure (Cronbach, 1971).

In this study, Pearson-Product Moment correlation analysis was used to test the established hypotheses, logistic regression technique was used to test the determinants of actual adoption of e-learning, and multiple regression was used to predict the factors that influence students' intention to select e-learning over traditional learning.

Logistic regression is used to predict a dependent variable on the basis of continuous and/or categorical independents and to determine the percent of variance in the dependent variable explained by the independents, to rank the relative importance of independents, to assess interaction effects and to understand the impact of covariates as control variables (Hosmer & Lemeshow, 2000). Hierarchical method of logistic regression was followed in which control variables were entered in the analysis before the predictors whose effects were of a primary concern.

The method of multiple regression is used to test the model against the intention to choose e-learning dependent variable. Multiple regression is suitable for this analysis because we have dependent variable predicted by more than one independent variable (Hair et al., 1998). Hierarchical multiple regression technique was conducted to assess the model and the influence of each variable in determining the intention to use e-learning. Hierarchical regression analysis permits the researcher to control other variables in the model when examining the specific contribution of each variable in the model (Morris & Dillon, 1997). Further, the researcher, not a computer, determines the order of entry of the variables in this technique. Morris and Dillion (1997) added that the hierarchical multiple regression technique is also used to define the order of entry of variables when the study is based on a theory; and a preferred technique in studying models such as TAM that may involve a series of intermediate variables, which are dependent variables with respect to some other independent variables, but are themselves independent variables with respect to the ultimate dependent variable namely intention to use e-learning.

The assumptions of multiple regressions are linear relationship between the independent and dependent variables, variables are measured without error, and the independent variables are fixed. Other assumptions concern residuals and include: the mean of the residuals is zero, errors are not correlated with the independent variable, variance of residuals is constant (homoscedasticity of the variance of the residuals), errors are independent, and the errors are

normally distributed. Testing of the assumptions is completed prior to conducting the multiple regression analysis.

Finally, the moderating effect of experience with e-learning in this study was explored through the test for the interaction between the independent variables and the moderator variable. If the interaction is significant, the moderator variable is affecting the relationship between the endogenous and exogenous variables. The process of testing the moderation effect will be conducted through the individual multiplication of the moderator variable by the independent variable and testing for the significance of this part of the equation by utilizing multiple regression analysis.

5.5 Summary

This chapter provides the conceptual overview of the study along with detail and support for the proposed hypotheses. The key constructs were developed from a review of the literature discussed in Chapter Two and Three, and the qualitative depth interviews discussed in Chapter Four. The study design, rationale for its selection, survey instrument, the sample, data collection, and data analysis procedures were all described in detail. Background information on the development of the survey instrument was also provided. The analysis and results of the study will be discussed in the next chapter.

Chapter 6

Results and Discussion

6.1 Introduction to the chapter

In this chapter the results of the questionnaire data analysis are presented. The analysis measured the relationship between the students' adoption of e-learning and relevant factors that have been identified through the literature review and interviews with students in higher education. Several analytical techniques were utilized to assess the level of support for the hypotheses described in Chapter Five. The analysis used and presented here includes basic descriptive statistics, correlation analysis, factor analysis, hierarchical logistic and multiple regression. The chapter is organized into five sections: (1) descriptive analysis; (2) assessment of validity and reliability of measurement; (3) hypotheses testing, (4) test of research model; and (5) a summary of the findings and discussion.

6.2 Descriptive Analysis

As discussed in Chapter Five, students who were enrolled in the master's programmes that are delivered in both traditional learning and e-learning modes were invited to participate in the research project. Of the 140 questionnaires that were distributed, 120 were returned and used for statistical analysis. The response rate is 85.7 percent. Of the 120 respondents, 55.8 percent of respondents were studying a programme delivered in traditional

classroom mode, while 44.2 percent were studying the same programme but delivered in e-learning mode. Although the intent of generating equal numbers of e-learning users and non-users was not achieved, the group sizes are roughly similar which will allow meaningful comparisons to be made between the groups.

Table 6.1 summarises the basic demographic information from the 120 students who responded to the survey. As indicated in the table, more men responded to the survey than women. Age ranges from 21 to 55 with an average age of 33 years. Nearly 86 percent of the sample is between the ages of 21 and 40. In terms of previous usage experience, about half (55 percent) of the respondents had experience in studying e-learning courses, and 45 percent respondents had no experience. According to the general student profile provided by the University, students studying in their IT programmes comprise 70 percent males and 30 percent females. The students' average age was 34. Overall, the respondents are likely to be highly representative of the sampling frame, and this sample adequately reflects the typical profile of the broader student population.

Table 6.1 Demographic Information of the Sample

Category	Item	Respondents (n = 120)	Percentage (%)
Age (average age = 34)	21-30	44	36.7
	31-40	59	49.2
	41-50	16	13.3
	> 51	1	0.8
Gender	Male	80	67.7
	Female	40	33.3
Study mode of the current programme	Traditional classroom mode	67	55.8
	e-learning mode	53	44.2
Usage experience on e-learning	Pure online learning mode	31	25.8
	Blended learning mode	35	29.2
	No usage	54	45.0

Table 6.2 shows results of chi-square tests for demographic differences between current e-learning users and non-users. With significance set at the $p \leq 0.05$, the results show statistical differences between current users and non-users with respect to gender and their previous experience in e-learning. However, there is no statistically significant difference in age between the two groups.

Comparing the two groups indicated that the proportion of males and females is significantly different between e-learning users and non-users. Male is the dominant gender group in the non-users group. In terms of past

experience, 76% of e-learning users have previous e-learning experience, while 34% of non-users have previous experience in e-learning.

Table 6.2 Demographic Differences Between Current Users and Non-users of E-learning

Item		Current E-learning users		Non-users		Chi-square (χ^2)
		N	%	*N*	%	
Gender	Male	25	47.2	55	82.1	df = 1
	Female	28	52.8	12	17.9	χ^2 = 16.24
						p = 0.000
Age	21-30	15	28.3	29	43.3	
	31-40	28	52.8	31	46.3	df = 3
	41-50	10	18.9	6	8.9	χ^2 = 5.04
	>51	0	-	1	1.5	*p* = 0.061
Previous Experience	Yes	40	75.5	26	34.2	df = 1
	No	13	24.5	41	65.8	χ^2 = 16.08
						p = 0.000

6.3 Assessment of Validity and Reliability

Since this study is based on survey research, two types of errors (random error and systemic error) related to the measurement should be examined. Random errors tend to cause the measurement to vary around the exact value, while systematic errors tend to skew the measurement away from the actual value, resulting in a biased mean value (Rosnow & Rosenthal, 1999). Validity and reliability analyses are essential for random and systematic error assessment.

6.3.1 Result of Validity Analysis

Measurement validity refers to whether or not measurements are really measuring the intended variables (Gravetter & Wallnau, 1996). Validity can be classified into three categories: (1) content validity, (2) criterion validity, and (3) construct validity.

Content validity refers to whether the scale items represent the domain of the concept (Davis & Cosenza, 1993). It was established during the preparation of the questionnaire by using scales already validated in the literature, carefully analyzing the items during translation, and judiciously developing new items (Devellis, 2003). Straub (1989) recommends that experts who are familiar with the phenomena should review the instruments to ensure content validity. Criterion validity is the degree of correspondence between a measure and a criterion variable (Bollen, 1989). To evaluate it, a variable is needed that is a standard against which to compare the measure in question. Construct validity is the extent to which an operationalization measures the construct it is supposed to measure (Peter, 1981; Nunnally & Bernstein, 1994). Among these categories, construct validity is an essential characteristic of validity (Rosnow & Rosenthal, 1999).

To ensure the content validity, a thorough review of the literature on the subject of the study is conducted. This allows the author to have an in-depth understanding of the constructs and ensures that all the items needed to measure the constructs are included. The preliminary questionnaire was

distributed to five experienced practitioners who work in the e-learning research area of the University to critique on both the content and writing skill, and necessary changes were made to improve the questionnaire accordingly.

Construct validity ensures that the instrument used is in fact measuring the construct or concept being studied (Churchill, 1979). It can be assessed in two dimensions: convergent validity and discriminant validity (Bagozzi, 1980). Convergent validity refers to the degree of association of two maximally different scales that measure essentially the same concept. If the association is high, the convergent validity is suggested. Discriminant validity refers to whether the scale is differentiated from other scales that measure a maximally different concept. If the differentiation is high, then discriminant validity is suggested (Davis & Cosenza, 1993). To test the validity of measure, factor analysis is applied in this study.

Factor analysis is a multivariate statistical technique that is used to analyze the structure of the correlations among a large number of variables based on a set of common underlying dimensions (Hair et al,, 1998). Factor analysis assists the researcher to find out whether a certain set of items do or do not constitute a construct (Straub, 1989). Moreover, factor analysis establishes dimensions within the data and serves as a data reduction technique through summarization (Stewart, 1981). To implement the factor analysis, SPSS statistical package was used.

6.3.1.1 Adherence to Assumptions in Factor Analysis

According to Hair et al. (1998), it is recommended that the researcher should ensure that the data matrix has sufficient correlations to justify the application of factor analysis. The Kaiser-Mayer-Olkin (KMO) measure of sampling adequacy and Bartlett's Test of Sphericity were used to assess the suitability of survey data for factor analysis. The KMO measure of sampling adequacy is an index for comparing the magnitudes of the observed correlation coefficients to the magnitudes of the partial correlation coefficients (Norussis, 1985). Kaiser and Rice (1974) give the following calibration of the measure: 0.90 or above is marvelous, 0.80 is meritorious, 0.70 is middling, 0.60 is mediocre, 0.50 is miserable and below 0.50 is unacceptable. In this research, KMO measure is 0.87, which is close to marvelous. This implies that the factor analysis of the variables should be performed because the correlations between pairs of variables can be explained by the other variables.

Bartlett Test of Sphericity is a statistical test used to detect the presence of correlation among the variables. The significance level gives the result of the test. Small values (less than 0.05) indicate that the data do not produce an identity matrix and, hence, are suitable for factor analysis. In this research, the probability level for Bartlett's Test of Sphericity is 0.000, which implies that the data are appropriate for factor analysis.

In conclusion, the results of Kaiser-Mayer-Olkin (KMO) measure of sampling adequacy and Bartlett Tests show that the data meet the fundamental requirements for factor analysis.

6.3.1.2 Factor Analysis Results

To confirm the construct validity, factor analysis was performed using principal components extraction with oblique rotation. As stated by Hair et al. (1998), the selection of an orthogonal or oblique rotation should be made based on the particular needs of a given research problem. Orthogonal rotation method is appropriate if the purpose is to reduce the number of original variables regardless of how meaningful the resulting factors may be. However, if the purpose of the factor analysis is to obtain several theoretically meaningful factors or constructs, an oblique solution is the appropriate approach. Oblique rotation produces solutions indicating a greater invariance of factors across the sampling of variables (Gorsuch, 1983) and it always meets the simple structure criterion better than orthogonal rotations (Reise, Waller, & Comrey, 2000). In this study, oblique rotation technique was chosen over orthogonal rotation method since the independent variables are not assumed to be completely unrelated. This conclusion is reached because, "realistically, very few factors are uncorrelated, as in orthogonal rotation" (Hair et al. 1998, p.111). Among the oblique rotation, promax was used because it attempts to maximize simple structures while allowing the factors to become correlated and is said to be an efficient procedure giving a good

solution (Hurley, Scandura, Schriesheim, Brannick, Vandenberg & Williams, 1997).

In discussing the use of factor analysis to validate measurement instruments, Burnett and Dart (1997) suggested that items with factor loading less than 0.4, and items which have loadings greater than 0.4 on two or more factors, should be removed, and the remaining items were subjected to another factor analysis until no further item has to be removed. For this study, two rounds of factor analysis were performed. The final results are shown in Table 6.3.

Table 6.3 Factor Analysis Results (with factor loading less than 0.4 suppressed)

Factors	Measures	Factor 1	2	3	4	5	6	7	8	9
1. Attitude	ATT4	0.77								
	ATT1	0.74								
	ATT3	0.63								
	ATT2	0.50								
2. Compatibility	COMP2		0.81							
	COMP3		0.76							
	COMP1		0.56							
3. Complexity	CX2			0.99						
	CX1			0.96						
	CX3			0.76						
	CX4			0.66						
4. Organizational Reputation	OR2				0.97					
	OR1				0.92					
5. Relative Advantage	RA1					0.99				
	RA3					0.80				
	RA2					0.68				
	RA4					0.56				
6. Interpersonal Influence	ITP3						0.93			
	ITP2						0.82			
	ITP1						0.68			
	ITP4						0.65			
7. External Influence	EXT1							0.94		
	EXT2							0.89		
	EXT3							0.57		
8. Subjective Norm	SN2								0.86	
	SN3								0.84	
	SN1								0.60	
9. Intention to Use	INT1									0.90
	INT2									0.70
Eigenvalue		12.43	5.43	3.06	2.20	1.92	1.63	1.21	1.09	1.01
Cumulative % of variance		42.83	53.38	60.01	65.65	69.81	73.27	76.51	79.34	81.89

As seen from Table 6.3, a nine-factor structure was suggested using the criteria of an eigenvalue greater than 1.0. The resulting factor loadings with all factor loadings less than 0.40 suppressed. As a result, one item for relative advantage RA5 (e-learning gives me greater control over my study) did not load well onto its own factor. This item was thus removed for subsequent analysis. A total of twenty-nine items out of the original thirty items, loaded on nine factors, were obtained and the extracted factors accounted for 81.89 percent of total variance. All items load well on their own dimension and the loadings are higher than 0.5. According to Hair et al. (1998), if factor loadings are equal or greater than 0.50, they are considered practically significant which implies the validity was established.

6.3.2 Result of Reliability Analysis

An important step in instrument validation is to test the instrument for reliability to ensure measurement accuracy, that is, to minimize the measurement error (Straub, 1989). Reliability refers to whether the measurement is consistent and stable. It reflects the extent to which the respondent can answer the same or approximately the same questions the same way each time (Cronbach, 1971). The hypothetical concepts being considered in this research were measured by the respondents' subjective perceptions. Hence, reliability analysis was conducted to determine to what extent those concepts were reliably measured by the instruments. In general, there are three methods to measure reliability: (1) test-retest, (2) internal consistency, and (3)

alternate form (Davis & Cosenza, 1993). Among these, internal consistency tends to be a frequently used type of reliability in the IS domain, and Cronbach's alpha is the most widely used measure to assess the internal consistency of the scale (Hair et al., 1998). Thus, in this research, Cronbach's alphas, which are calculated based on the average inter-item correlations, were used to evaluate the internal consistency.

There is no standard cut-off point for the alpha coefficient, but the desirable lower limit for Cronbach's alpha is 0.70 (Nunnally, 1978). Table 6.4 shows the reliability analysis results. As observed, Cronbach's alpha coefficients ranged from 0.79 to 0.90, which was significantly higher than the acceptance level of 0.70. The results show that participants responded to the measurement items used in this study consistently. Overall, the instrument demonstrates satisfactory reliability.

Table 6.4 Descriptive and Reliability Analysis Results

Variables	**No. of Items**	**Cronbach-Alpha**
Relative Advantages	4	0.90
Complexity	4	0.88
Compatibility	3	0.89
Organizational Reputation	2	0.86
Interpersonal Influence	4	0.84
External Influence	3	0.83
Attitude	4	0.88
Subjective Norm	3	0.80
Intention to use	2	0.79

6.4 Hypothesis Testing

The hypotheses were formulated to study the relationships between the model variables. The eight hypotheses were as follows:

H1. The greater the perceived relative advantage of e-learning compared to traditional learning, the more likely that the learner will have a positive attitude towards e-learning.

H2. Perceived complexity of usage of e-learning will be negatively related to the learner's attitude towards e-learning.

H3. The greater the perceived compatibility e-learning has with the way a learner manages his or her studies, the more likely that the learner will have a positive attitude towards e-learning.

H4. The reputation of the organization will be positively related to the learner's subjective norm towards e-learning.

H5. Interpersonal influences will be positively related to the learner's subjective norm towards e-learning.

H6. External influences will be positively related to the learner's subjective norm towards e-learning.

H7. Attitude towards e-learning will be positively related to the learner's intention to adopt e-learning.

H8. Subjective norms towards e-learning will positively related to the learner's intention to adopt e-learning.

A Pearson-Product Moment correlation analysis was performed to identify the significance and direction of these relationships. The null hypotheses are presented in Table 5.1 in Chapter Five. The correlation coefficients between variables, the means and standard deviations of the hypothetical variables are presented in Table 6.5.

Table 6.5 Correlations Coefficients Between Variables, the Means and Standard Deviations of the Hypothetical variables

Variables	Means	S.D.	1	2	3	4	5	6	7	8	9
1. Relative Advantages	4.18	1.17	1.00								
2. Complexity	4.44	1.17	0.67**	1.00							
3. Compatibility	4.46	1.22	0.52**	0.47**	1.00						
4. Organizational Reputation	4.86	1.22	0.60**	0.40**	0.32**	1.00					
5. Interpersonal Influence	3.73	1.07	0.34**	0.31**	0.04	0.36**	1.00				
6. External Influence	4.01	0.88	0.22**	0.24**	0.04	0.26**	0.50**	1.00			
7. Attitude	4.21	1.10	0.28**	0.34**	0.07	0.39**	0.38**	0.33**	1.00		
8. Subjective Norm	3.96	0.94	0.33**	0.33**	0.12	0.06**	0.30**	0.19*	-0.09	1.00	
9. Intention to use	4.28	1.23	0.80**	0.56**	0.41**	0.53**	0.34**	0.29**	0.37**	0.17*	1.00

** Correlation is significant at the 0.01 level (1-tailed)

* Correlation is significant at the 0.05 level (1-tailed)

Hypothesis 1

As shown in Table 6.5, there was a significant positive relationship between perceived relative advantage and attitude towards e-learning ($r = 0.28$, $p = .001$). This result suggests that when the learners perceive e-learning to be more advantageous than traditional methods of learning for their learning and career goals, they are more likely to have a positive attitude towards e-learning.

Hypothesis 2

There was a significant negative relationship between perceived complexity and attitude towards e-learning (r = 0.34, p = .000). This result suggests that the learners' attitudes towards e-learning are likely to be less favourable when they perceive the level of complexity of e-learning process is high.

Hypothesis 3

There was no relationship between perceived compatibility and attitude towards e-learning (r = 0.07, p =.230). This result suggests that the learners' perceived compatibility of e-learning with the way they manages the studies do not influence their attitudes towards e-learning.

Hypothesis 4

There was a significant positive relationship between organizational reputation and subjective norm towards e-learning (r = 0.06, p = .242). This result suggests that when a learning organization has a good reputation, learners are more likely to have a positive subjective norm towards their new innovation (e-learning mode).

Hypothesis 5

There was a significant positive relationship between interpersonal influence and subjective norm towards e-learning (r = 0.30, p = .000). This result suggests that the more positive interpersonal influences from learners'

friends, family, and adopting peers, the more likely the learners to have a positive subjective norm towards e-learning.

Hypothesis 6

There was a significant positive relationship between external influence and subjective norm towards e-learning ($r = 0.19$, $p = .020$). This result suggests that the more positive informational input from mass media, advertising, and other non-personal information, the more likely the learners to have a positive subjective norm towards e-learning.

Hypothesis 7

There was a significant positive relationship between attitude towards e-learning and intention to adopt ($r = 0.37$, $p = .000$). This result suggests that when the learners have a favourable attitude towards e-learning, they are more likely to have a greater likelihood to adopt e-learning.

Hypothesis 8

There was a significant positive relationship between subjective norm towards e-learning and intention to adopt ($r = 0.17$, $p = .031$). This result suggests that when the learners have a favourable subjective norm towards e-learning, they are more likely to have a greater intention to adopt e-learning.

The results support the theory driven hypotheses that perceived relative advantage correlates positively with attitude towards e-learning ($r = 0.28$), and

perceived complexity correlates negatively with attitude (r = 0.34), but they do not support the relationship between perceived compatibility and attitude. The findings also support hypotheses that indicate the positive relationships between organizational reputation, interpersonal influence, external influence and subjective norm (r = 0.06, r = 0.30 and 0.19 respectively). As expected, the study's findings show that attitude and subjective norm were positively correlated with intention behavioural (r = 0.37 and r = 0.17 respectively).

Moreover, a correlation matrix also provides some insights into the relationship among independent variables (i.e. multicollinearity or intercorrelation) as well as the correlation between a dependent variable and the independent variables. A high correlation between an independent variable and a dependent variable stands for strong association between them, and therefore the independent variable can be designated as a good predictor of the dependent variable. However, a high multicollinearity leads to imprecise estimation of regression coefficients, hence adverse effects on tests of their statistical significance and their confidence intervals (Pedazur, 1982).

As shown in Table 6.5, some correlations among independent variables were statistically significant. However, the correlations for any pair of independent variables did not exceed the multicollinearity criterion (0.9 and above) suggested by Hair, Anderson, Tatham and Black (1995). The correlations among independent variables ranged from -0.09 to 0.80. Based on

the above result, it can be concluded that there exists no multicollinearity among the independent variables.

Another measure for assessing multicollinearity is the tolerance value and the variance inflation factor (VIF). These measures indicate the degree to which each independent variable is explained by the other independent variables. Highly multicollinear variables can distort the results or make them unstable and thus not generalizable. Thus, in order to maximize the prediction power from a given set of independent variables, it is important to test for multicollinearity. As suggested by Neter, Wasserman, and Kutner (1989), as a rule of thumb, if the VIF of a variable exceeds 10, that variable is said to be highly collinear and will pose a problem to regression analysis. This condition is adopted to check for multicollinearity among the independent variables. On the other hand, tolerance is the proportion of each variable's variance not shared with the other independent variables. Field (2005) recommends that if the tolerance value is less than 0.20, the regression variate has multicollinearity problem. Table 6.6 reports the results of the multicollinearity test. In this study, all tolerance values were above 0.31, and the VIF's for all variables are well below 10, ranging from 1.38 to 3.25, indicating that the model does not suffer from multicollinearity effects.

Table 6.6 Collinearity Statistics

Variables	**Tolerance**	**VIF Value**
Relative Advantage	0.50	1.99
Complexity	0.48	2.08
Compatibility	0.46	2.16
Organizational Reputation	0.73	1.38
Interpersonal Influence	0.49	2.05
External influence	0.69	1.46
Attitude	0.31	3.25
Subject Norm	0.55	1.83

6.5 Test of Research Model

In this section, the statistical tests that are performed to test the research framework are discussed and the results obtained from these tests are presented. Firstly, the factors influencing students' actual adoption of e-learning were identified. Then, the model was tested by including experience as a moderator to predict students' behavioural intentions to choose e-learning in the future.

Logistic and multiple regression analysis were used to test the research model of this study, and the SPSS computer program was employed. There are several data entering methods for processing regression analysis. In this study, 'enter' method was used to input the variables into the regression equation.

This is a forced-entry method in which SPSS permits the researcher to enter the variables regardless of their significance levels (George & Mallery, 2000). It is important to use this technique to define the order of entry of variables when the study is based on a theory. Schwab (2000) suggests for regression analysis, the minimum ratio of cases to independent variables is 5 to 1, and the preferred ratio is 15 to 1. Since an index or average score is used for the eight constructs, the preferred ratio of 15 to 1 was also met as there are 120 valid cases in this study.

6.5.1 Predicting Actual Behaviour to Choose E-learning

Logistic regression technique was used to test the determinants of actual adoption of e-learning in this analysis. Logistic regression analysis is the linear regression analysis to conduct when the dependent variable is dichotomous, such as e-learning users (coded 1) or non-users (coded 0). Like all linear regressions, the logistic regression is a predictive analysis. Logistic regression is used to describe data and to explain the relationship between one dependent binary variable and one or more metric independent variables.

6.5.1.1 Assumption of Logistic Regression

In addition to fitting the dichotomous nature of the dependent variable, logistic regression analysis has other analytic advantages: it is relatively assumption-free, and a combination of continuous, ordinal, and categorical

variables can be used as predictors (Cox & Snell, 1989). Unlike linear regression, logistic regression assumes that the outcome must be discrete, otherwise explained as, the dependent variable should be dichotomous in nature. Also, logistic regression uses logs instead of least-square method to determine the relationships.

There are two widely used methods of interpreting the results of logistic regression: the estimated coefficients of logistic regression and odds ratios. Logistic regression coefficients estimate the effects of the independent variables on the predicted log odds of an outcome. A logistic coefficient estimates the additive change in the predicted log odds for a one-unit increase in the independent variable, controlling for all other independent variables in the model. In interpreting the logistic coefficient in terms of the effect on the log odds, the threshold between negative and positive effects is 0.

Logistic regression coefficients can be used to estimate the odds ratios for each of the independent variables in the model (SPSS, 2001). The exponential coefficient (Exp β) is called the odds ratio. The coefficients, B, are the natural logs of the odds ratios when the odds ratio is e^B. Odds ratios can be interpreted as the percentage change in the dependent variable with a one-unit change in an independent variable. An odds ratio less than 1 reflects a negative relationship while an odds ratio greater than 1 reflects a positive relationship.

6.5.1.2 Logistic Regression Results

In order to identify the determinants of students' actual adoption of e-learning, the logistic regression analysis was used. The dependent variable included in the analysis was a dummy variable for current e-learning users and non-users. The independent variables included were all from the latent constructs of the proposed model (relative advantage, complexity, compatibility, organizational reputation, interpersonal influence, external influence, attitude, and subjective norm). Demographic characteristics were coded as dummy variables.

According to the Theory of Reasoned Action (TRA), a behaviour is determined by behavioural intention, and the behavioural intention is determined by attitude toward the behaviour and subjective norm. Based on the theoretical and contextual description, the independent variables were entered into the logistic regression hierarchically in this analysis. The independent variables were divided into three blocks with demographic control variables making up a fourth block used as controls. First of all, the demographic control variable block which include age and gender was entered into the regression model (Model 1). Secondly, the three determinants of attitude (relative advantage, complexity, and compatibility) were added to the model (Model 2). Then, the three determinants of subjective norm (organizational reputation, interpersonal influence, and external influence) were added to the model (Model 3). Finally, in the fourth step of the hierarchical logistic regression, two more variables (attitude and subjective

norm) were added (Model 4) to observe whether they influenced the association between the determinants of attitude or subjective norm and actual adoption of e-learning. The value of Goodness-of-Fit χ^2 was used to compare the relative contribution of each added block. The mediating effects of attitude, and subjective norm on the relationship between the independent variables and adoption of e-learning were assessed following the recommendation of Baron and Kenny (1986). The results from the logistic regression analysis can be seen in Table 6.7.

In the demographic control model (model 1), the results reported in Table 6.7 show the fitted probabilities as a function of actual behaviour to choose e-learning. The Pearson Goodness-of-Fit χ^2 was 20.41, (df = 2, $p<$ .001), Therefore, the model was statistically significant and actual behaviour to choose e-learning could be predicted correctly with this model 41% of the time over a random assignment (Nagelkerke R^2 = 0.41).

Table 6.7 Hierarchical Logistic Regression Analyses for Variables Predicting Students' Actual Behaviour to Choose E-learning (current e-learning users was taken as a reference group)

Variables	***Model 1***	**Model 2**	**Model 3**	**Model 4**
Constant	-0.69	-0.09	0.01	0.06
Age	0.57	0.41	0.40	0.39
Gender	-1.72***	-2.28***	-2.23***	-2.27***
Relative Advantages		0.72*	0.36*	0.51*
Complexity		0.04	0.08	0.13
Compatibility		0.41	0.37	0.38
Organizational			0.72*	0.78*
Reputation			0.15	0.24
Interpersonal Influence			-0.44	-0.44
External Influence				-0.03
Attitude				-0.39
Subjective Norm				
χ^2 Increase for added variables		19.81***	7.48***	2.12***
Pearson χ^2	20.41***	40.22***	47.70***	49.82***
Nagelkerke R^2	0.41	0.38	0.44	0.46

****p<.001, **p<.01, *p<.05*

Model 1: Predictor: (Constant), Gender, and Age

Model 2: Predictor: (Constant), Gender, Age, Relative Advantage, Complexity, and Compatibility.

Model 3: Predictor: (Constant), Gender, Age, Relative Advantage, Complexity, Compatibility, Organizational Reputation, Interpersonal Influence, and External Influence.

Model 4: Predictor: (Constant), Gender, Age, Relative Advantage, Complexity, Compatibility, Organizational Reputation, Interpersonal Influence, External Influence, Attitude, and Subjective Norm.

When adding the attitude determinants (relative advantage, complexity, and compatibility) to the model and controlling for demographic variables (model 2), the impact of these variables was significant (the value of block model χ^2 is 19.81), the Pearson Goodness-of-Fit χ^2 was 40.22 (df = 5, p< .001), Thus, the attitude model was statistically significant and actual behaviour to choose e-learning could be predicted correctly with 38% of the time over a random assignment with the combined demographic control, attitude and subjective norm determinants model (Nagelkerke R^2 = 0.38).

When subjective norm determinants (organizational reputation, interpersonal influence, and external influence) were added to the model (model 3), the impact of subjective norm variables was significant (the value of block model χ^2 is 7.48), the Pearson Goodness-of-Fit χ^2 was 47.70 (df = 8, p< .001). The actual behaviour to choose e-learning could be predicted correctly with 44% of the time over a random assignment with the combined demographic control, attitude and subjective norm determinants model (Nagelkerke R^2 = 0.44).

Finally, when the attitude and subjective norm variables were added to the model (model 4), the estimated model was significant (χ^2 increase of 2.12), the Pearson Goodness-of-Fit χ^2 was 49.82 (df = 10, p< .001). The actual behaviour to choose e-learning could be predicted correctly with 46% of the time over a random assignment with the combined demographic control,

attitude and subjective norm determinants, attitude and subjective norm model (Nagelkerke R^2 = 0.46).

In Table 6.7, the model with all four blocks (demographic control, attitude determinants, subjective norm determinants, attitude and subjective norm) produced a log likelihood ratio of 114.898 and the value of χ^2 was 49.82. The likelihood ratio statistics was highly significant when compared to the χ^2 distribution, indicating a good fit of the model. Adding each block into the model, the impact of attitude determinants (the value of block χ^2 was 19.81) was the most significant among the other blocks. Thus, it can be concluded that attitude determinants had a greater impact on prediction of actual behaviour to choose e-learning than the other groups.

Table 6.8 Variables in the Final Logistic Regression Model

Variables	**B**	**S.E.**	**Wald**	**df**	**Sig.**	**Odds Ratio (Exp β)**
Age	0.39	0.35	1.27	1	0.26	1.48
Male (reference: Female)	-2.27	0.56	16.48	1	**0.00**	**0.10**
Relative Advantages	0.51	0.46	1.20	1	**0.05**	**1.66**
Complexity	0.13	0.41	0.10	1	0.75	1.14
Compatibility	0.38	0.31	1.43	1	0.23	1.46
Organizational Reputation	0.78	0.38	3.64	1	**0.05**	**2.05**
Interpersonal Influence	0.24	0.33	0.53	1	0.47	1.28
External Influence	-0.44	0.32	1.92	1	0.17	0.65
Attitude	-0.03	0.35	0.01	1	0.92	0.97
Subjective Norm	-0.39	0.31	1.66	1	0.19	0.68
Constant	0.06	1.00	0.00	1	0.96	1.06

Note: The bold items represent the coefficient of variables are significant at the 5% level

Table 6.8 presents the effects of the individual variables in the final logistic regression model predicting the variables of students having chosen e-learning. The test of significance for the relationship between an individual independent variable and the dependent variable is determined by the significance test of Wald statistic (Hosmer & Lemeshow, 1989). The individual coefficients represent change in the probability of being a member of the modeled category. The exponent of the logistic coefficient (Exp β) represents the change in the odds of the modeled event associated with a one unit change in the independent variable. Odds ratios of less than 1 reflects a

negative relationship and odds ratios of greater than 1 reflects a positive relationship.

Among the demographic variables entered into the hierarchical logistic regression, the male gender associated significantly ($p = 0.00$) with the actual behaviour to choose e-learning. The odds ratio was 0.10 which implies that the male gender in the non-users group are less likely to choose e-learning than e-learning users group. Attitude determinants entered into the model, it shows the coefficient of relative advantage were borderline significant at the 5% level ($p = 0.05$). With positive coefficient for relative advantage, the odds ratio of 1.66 means that respondents in this group are nearly two times higher perception of relative advantage than e-learning users. With regard to subjective norm determinants, the model found the coefficient of organizational reputation were also borderline significant at the 5% level ($p = 0.05$). With positive coefficient for organizational reputation, the odds ratio of 2.05 means that respondents in this group are two times higher perception of the organizational reputation than e-learning users. It was then concluded that age, complexity, compatibility, interpersonal influence, external influence, attitude, and subjective norm did not significantly affect students' actual behaviour to choose e-learning. With respect to evidence of mediation, no attenuation in the effects of the determinants of attitude or subjective norm was observed when attitude and subjective norm were added to the model.

6.5.2 Predicting Intention to Choose E-learning

In order to predict the factors that influence the students' intention to select e-learning over traditional learning, multiple regression analysis was performed. Multiple regression analysis is a technique that is used to analyze the relationship between a single dependent variable and several predictors or independent variables (Hair et al., 1995). Before this technique was used for the appropriate analyses, its assumptions were examined.

6.5.2.1 Assumption of Multiple Regression

Hair et al. (1995) listed four assumptions underlying multiple regression analysis (linearity, constant variance, independence of the residuals, and normality), which apply both to the individual variables (dependent and independent) and to the relationship as a whole.

A. Linearity of the Phenomenon

The linearity of the relationship between dependent and independent variables refers to the degree to which the change in the dependent variable associated with the predictor variable (the regression coefficient) is constant across the range of values for the independent variables. In this study, linearity was examined by residual plots against the predicted values and independent variables. The residuals were appropriately distributed randomly both above and below the zero horizontal. Thus, this assumption was not violated.

B. Constant Variance of the Error Term

The constant variance of the residuals (i.e. homoscedasticity) was examined by the residual plots described above. The assumption is satisfied unless the spread of the residuals increases or decreases systematically with the predicted values. In this study, the residuals did not exhibit such spread fluctuations. Therefore, this assumption was not violated.

C. Independence of the Error Terms

The independent assumption implies that the subjects are responding independently of one another (Stevens, 1986). More specifically, errors associated with one observation are not correlated with errors associated with any other observation. Consequently, this assumption of the technique was unlikely to be violated due to the aforementioned definition (independent responses of subjects).

D. Normality of the Error Term Distribution

In multiple regression analysis, the most frequently encountered assumption violation is nonnormality of the independent or dependent variables, or both (Seber, 1984). The normality assumption was checked through use of histograms of the residuals. Inspection of the histograms showed no violation of this assumption.

6.5.2.2 Multiple Regression Results

The method of multiple linear regression was used to test the model against the intention to choose e-learning dependent variable. The independent variables included in the analysis were all from the latent constructs of the proposed model. Along the lines of the logistic regression analysis, demographic characteristics were coded as dummy variables. Experience in e-learning was used as moderator.

Intention to choose e-learning as the dependent variable was regressed on the measured independent variables such as relative advantage, complexity, compatibility, organizational reputation, interpersonal influence, external influence, attitude, and subjective norm. In similar fashion to the predictive actual behaviour to choose e-learning, the independent variables were entered into the multiple regression hierarchically in this analysis. The independent variables were divided into three blocks with demographic control variables making up the fourth block used as controls. Same as previous, demographic control variable block which include age and gender was entered into the regression model first (model 1). Then, three determinants of attitude which include relative advantage, complexity, and compatibility were added to the model (model 2). Thirdly, three determinants of subjective norm which include organizational reputation, interpersonal influence, and external influence were added (model 3). Lastly, attitude and subjective norm variables were entered (model 4). The hierarchical multiple regression was employed to determine whether additional of these variables improved prediction of

intention to choose e-learning beyond that afforded by difference in demographic variables.

There are certain terminologies in multiple regression that help in interpreting the results of regression: the beta value in multiple regression and R-value. Beta value (β) is used in measuring how effectively the independent variable influences the dependent variable. The test of significance for the betas is conducted using the *t* value of that variable in the coefficient table. R-value indicates correlation between the independent variable(s) and dependent variable, while the R-square (R^2) value indentifies the portion of the variance in the dependent variable accounted by the independent variable(s) (George & Mallery, 2000). The results from the multiple regression analysis can be seen in Table 6.9.

Table 6.9 Hierarchical Multiple Regression Analyses for Variables Predicting Students' Intention to Choose E-learning

Model	*R*	*R^2*	*Adjusted R^2*	*S.E. of the Estimate*	*R^2 Change*	*F Change*	*F Test*
Model 1	0.191	0.036	0.020	0.99	0.036	2.20	2.20
Model 2	0.807	0.651	0.636	0.60	0.615	67.01***	42.579***
Model 3	0.813	0.662	0.637	0.60	0.010	1.13	27.129***
Model 4	0.825	0.680	0.651	0.59	0.018	3.14**	23.169***

****p<.001, **p<.01*

Multiple regression analysis yields the results as the followings:

Model 1: Predictor: (Constant), Gender, and Age

Model 2: Predictor: (Constant), Gender, Age, Relative Advantage, Complexity, and Compatibility.

Model 3: Predictor: (Constant), Gender, Age, Relative Advantage, Complexity, Compatibility, Organizational Reputation, Interpersonal Influence, and External Influence.

Model 4: Predictor: (Constant), Gender, Age, Relative Advantage, Complexity, Compatibility, Organizational Reputation, Interpersonal Influence, External Influence, Attitude, and Subjective Norm.

From Table 6.9, the results of model 1 reveal that the demographic variables are in the equation (R = 0.191, F(2,117) = 2.20). The data shows that the demographic variables accounted for 19.1% of the variance explained in the intention to choose e-learning, but this is not significant at the 0.05 level.

Model 2, with demographic variables, relative advantage, complexity, and compatibility to comply added to prediction of intention to choose e-learning (R^2 = 0.651, Adjusted R^2 =0.636, F(3, 114) = 67.01, p <.001). In other words, addition of relative advantage, complexity, and compatibility accounted for 63.6% of the variance, which is significant at level 0.001.

Model 3, with organizational reputation, interpersonal influence, and external influence added to prediction of intention to choose e-learning (R^2 = 0.662, Adjusted R^2 =0.637, F(3, 111) = 1.13). In other words, addition of organizational reputation, interpersonal influence, and external influence accounted for 63.7% of the variance but this is not significant at the 0.05 level.

Model 4, with the interaction effects of attitude and subjective norm added to prediction of intention to choose e-learning (R^2 = 0.680, Adjusted R^2 =0.651, F(2, 109) = 3.14, p <.01). In other words, addition of attitude and subjective norm to comply reliably improve R^2.

According to these results, it can be concluded that model 4 yields results that main effects can be used to predict the intention to choose e-leaning. The overall model did account for 65.1% of the variance, which is significant at level 0.01. It indicated more than half of the variance is explained by the model. As a whole, the regression did a good job of modeling scales. Based upon a t-statistic value and 2-tailed test in Table 6.10,

the regression coefficients of relative advantage, compatibility, organizational reputation, external influence, attitude, and subjective norm are significance at 0.05.

Table 6.10 Multiple Regression of Intention Results of Model 4

Variables	***Unstandardized Coefficients B***	***Std. Error***	***Stand. Coeff. Beta***	***t***	***Sig.***
(Constant)	0.04	0.38		0.09	0.92
Age	0.01	0.13	0.01	0.05	0.96
Gender	-0.04	0.25	-0.01	-0.14	0.89
Relative Advantages	0.38	0.18	0.37	2.16	**0.03**
Complexity	-0.11	0.11	-0.12	-1.04	0.30
Compatibility	0.22	0.11	0.25	1.95	**0.05**
Organizational	0.21	0.12	0.21	1.72	**0.05**
Reputation	-0.01	0.10	-0.01	-0.09	0.92
Interpersonal Influence	0.12	0.13	0.13	0.98	**0.03**
External Influence	0.15	0.11	0.16	1.32	**0.01**
Attitude	0.27	0.11	0.26	2.34	**0.02**
Subjective Norm					

Note: The bold items represent the coefficient of variables are significant at the 5% level

The stepwise method was used for selecting the statistically significant six independent variables to enter into the regression equation, at the 0.05 level of significance. The model was tested for significance using the F-test and used to predict intention to choose e-learning from the six predictor

variables (F(5,114) = 48.24, p = .000). These predictors are relative advantage, organizational reputation, external influence, attitude, and subjective norm.

The model yields an adjusted R^2 value = 0.66. This shows that 66 percent of variation of intention to choose e-learning among students can be explained by the predictors: relative advantage, organizational reputation, external influence, attitude, and subjective norm. These five predictive variables also have a positive relationship with intention to choose e-learning. Since there are interrelations between independent variables as presented in Table 6.5, Tabachnick and Fidell (1989) suggested that using squared semi-partial correlation of each independent variable with dependent variable is a better index of the contribution of each independent variable. Based on the semi-partial correlation values of the significant variables relative advantage is the most important predictor of intention, followed by organizational reputation, attitude, external influences, and subjective norm.

6.5.2.3 Moderating Effect of Experience

According to Ajzen (1991), previous experience is a strong predictor of future behaviour, and has a moderating influence on the relationship between belief constructs and performance (Thompson, Higgins, & Howell, 1994). Based on these perspectives, this analysis assumed that there is at least one significantly different parameter estimate in the proposed model between experienced users and non-experienced users. To test for this, moderating

effect of experience on the independent variables was measured in this analysis. Interaction effects (or moderation effects) were estimated using an additional term in the regression model that is computed through the multiplication of the independent variable and the moderator. Researchers recommend using dummy coding for categorical variables in the regression model. Dummy coding is a simple technique that represents the categorical variable with a set of K-1 factors, where K is the number of categories measuring that variable. The regression model includes the independent variables, the categorical moderator (or dummy variable), and the multiplication of the dummy variable by the independent variables.

Experience differentiates between users and non-users. This test utilized the entire sample collected and compared users vs. non-users. Experience was coded with one dummy variable with users as the reference category (control category). The model summary and the coefficient table of the moderating effect of experience can be seen in Table 6.11 and Table 6.12.

Table 6.11 Model Summary of the Moderating Effect of Experience

Model	*R*	R^2	*Adjusted* R^2	*S.E. of the Estimate*	R^2 *Change*	*F Change*	*F Test*
Model 1	0.787	0.620	0.582	0.67	0.620	16.31***	16.313***
Model 2	0.789	0.622	0.577	0.68	0.002	5.86***	13.856***

****p<.001*

Model 1: Predictor: (Constant), Nonusers, Relative Advantage, Organizational Reputation, External Influence, Attitude, Subjective Norm.

Model 2: Predictor: (Constant), Nonusers, Relative Advantage, Organizational Reputation, External Influence, Attitude, Subjective Norm, Relative Advantage Nonusers, Organizational Reputation Nonusers, External Influence Nonusers, Attitude Nonusers, Subjective Norm Nonusers.

The regression model (first block) was significant with an F(6, 60) = 16.31, p <.001. The model utilized the independent variables that were significant in predicting behavioural intention, they include relative advantages, compatibility, organizational reputation, external influence, attitude, subjective norm, and non-users dummy variable. The results indicated that experience is a significant predictor of behavioural intention (beta = -0.047, p <.001). E-learning current users have higher intentions to choose it than non-users (Users' behavioural intention mean = 4.65; Non-users' behavioural intention mean = 3.97).

The second block which included the moderation terms and the predictors, was also significant with an F (11, 55) = 5.86, p <.001. Experience

was a significant moderator in the relationship between relative advantage and behavioural intention. The moderation effect was stronger for non-users in the case of relative advantage. Experience failed to moderate the relationship between organizational reputation, external influence, attitude, and subjective norm.

Table 6.12 Coefficient Table of the Moderating Effect of Experience

Variables	***Unstand. Coeff. Beta***	***Std. Error***	***Stand. Coeff. Beta***	***T***	***Sig.***
(Constant)	0.020	0.09		0.22	0.82
Relative Advantages	0.836	0.11	0.744	7.46	0.00
Organizational Reputation	0.055	0.10	0.055	0.57	0.57
External Influence	0.135	0.08	0.150	1.79	0.08
Attitude	0.158	0.09	0.167	1.86	0.07
Subjective Norm	0.107	0.08	0.117	1.34	0.19
Nonusers	-0.101	0.19	-0.047	-0.53	0.00
Relative Advantages Nonusers	0.837	0.11	0.745	7.42	0.00
Org. Reputation Nonusers	0.050	0.10	0.050	0.51	0.61
External Influence Nonusers	0.141	0.08	0.156	1.84	0.07
Attitude Nonusers	0.150	0.09	0.159	1.73	0.09
Subjective Norm Nonusers	0.112	0.08	0.123	1.38	0.17

6.6 Findings of the Study

Descriptive statistics show that most of the respondents are male. An age between 21 to 40 years is most frequent, and more than half of the respondents have previous usage experience in e-learning. Overall, the respondents are likely to be highly representative of the sampling frame, and the sample adequately reflects the typical profile of the broader student population. When comparing the demographic difference between current e-learning users and non-users, it shows that gender and their previous e-learning experience are significantly difference between two groups, but no differences in age among the groups. Male is the dominant gender group in the non-users group, and 76% of e-learning users have previous experience while 34% of non-users have previous experience in e-learning.

Hypothesis testing was conducted by calculating the Pearson-Product Moment correlation coefficients based upon a one-tailed test at the 0.05 level of statistical significance. The hypothesis is practically called the proposition. When the statistical hypotheses were rejected, that means the null hypotheses were rejected and the research hypotheses or research propositions (H1 to H8) were accepted. The results show that relative advantage correlates positively with attitude towards e-learning, and complexity correlates negatively with attitude; however, the compatibility-attitude relationship is not supported (H1 and H2 are supported and H3 is not supported). The findings also reveal that organizational reputation, interpersonal influence, and external influence correlated positively with subjective norm (H4, H5 and H6 are supported).

The relationship between attitude, subjective norm, and intention behavioural are positive as expected (H7 and H8 are supported). As a result, seven items of all eight hypotheses were significantly supported. A summary of hypotheses testing results is presented in Table 6.13.

Table 6.13 Summary of Hypothesis Testing Results

Hypothesis	**Results**
H1. The greater the perceived relative advantage of e-learning compared to traditional learning, the more likely that the learner will have a positive attitude towards e-learning.	Supported
H2. Perceived complexity of usage of e-learning will be negatively related to the learner's attitude towards e-learning.	Supported
H3. The greater the perceived compatibility e-learning has with the way a learner manages his or her studies, the more likely that the learner will have a positive attitude towards e-learning.	Not Supported
H4. The reputation of the organization will be positively related to the learner's subjective norm towards e-learning.	Supported
H5. Interpersonal influences will be positively related to the learner's subjective norm towards e-learning.	Supported
H6. External influences will be positively related to the learner's subjective norm towards e-learning.	Supported
H7. Attitude towards e-learning will be positively related to the learner's intention to adopt e-learning.	Supported
H8. Subjective norms towards e-learning will positively related to the learner's intention to adopt e-learning.	Supported

Logistic regression analysis using hierarchical method was performed to predict the determinants of students' actual behaviour to choose e-learning. The dependent variable included in the analysis was a dummy variable for current e-learning users and non-users. The independent variables included relative advantage, complexity, compatibility, organizational reputation, interpersonal influence, external influence, attitude, and subjective norm. Demographic characteristics were coded as dummy variables. The independent variables were divided into three blocks and entered the regression model hierarchically. The logistic regression analysis yields the results that the two factors, relative advantage and organizational reputation, positively affect students' actual adoption of e-learning.

Multiple regression analysis using hierarchical method was used to predict the factors that influence students' intention to choose e-learning over traditional learning. The dependent variable included in the analysis was intention to choose e-learning. The independent variables included relative advantage, complexity, compatibility, organizational reputation, interpersonal influence, external influence, attitude, and subjective norm. Demographic characteristics were coded as dummy variables. Past experience in e-learning was used as moderator. The independent variables were divided into three blocks and entered the regression model hierarchically. The multiple regression analysis yields the results that additional of attitude and subjective norm improve R^2. The coefficient of determinant (R^2) from the model is 0.66. There are 66 percent variation of intention can be explained by relative

advantage, organizational reputation, external influence, attitude, and subjective norm. And based upon the semi-partial correlation values of the significance variables, relative advantage is the most important predictors, followed by organizational reputation, attitude, external influence, and subjective norm. Additionally, when testing the moderating effect of experience, it was found that experience was a significant moderator in the relationship between relative advantage and behavioural intention. The moderator effect was stronger for non-users in the case of relative advantage.

6.7 Discussion

The results from the correlation analysis reveal that there is support for the Technology Acceptance Model (TAM) and Theory of Reasoned Action (TRA) model. In the context of TAM, attitude is determined by perceived usefulness (or relative advantage) and perceived ease of use (or perceived complexity) (Davis, 1989). While in the context of TRA, behavioural intention is determined by attitude and subjective norm (Fishbein & Ajzen, 1975). Moreover, the results from the hierarchical multiple regression analysis show that attitude and subjective norm are included in the final predictive model, the relationships among these variables are consistent with the TRA model.

From the regression analyses, the logistic regression analysis yields the results that perceived relative advantage and organizational reputation positively influence students' actual adoption of e-learning. Further, the

multiple regression analysis yields the results that perceived relative advantage, organizational reputation, external influence, attitude, subjective norm are useful predictors of students' intention to choose e-learning. The findings show that the variables that influence actual adoption are not exactly the same as those that influence the behavioural intention to choose e-learning. However, it is clear to note that perceived relative advantage and organizational reputation are the two common determinants that influence students' actual adoption and their intention to choose e-learning. In addition, experience was found to be a significant moderator in the relationship between relative advantage and behavioural intention.

Perceived relative advantage was found to be a predictor of actual adoption and behavioural intention to choose e-learning. The results further indicate that relative advantage is the best predictor of intention to choose e-learning. This result is expected since past literature has consistently shown that perceived relative advantage is one of the important factors which has a significant and positive influence on the adoption of new innovations (Tornatzky & Klein, 1982; Tan & Teo, 2000; Venkatesh & Morris, 2000; Pijpers & Montfont, 2005). A student's perception of how useful a system is influenced his or her intention to choose e-learning. In this study, the possibility of studying at anytime and anywhere would be a source of real advantage to students who have extremely tight schedules. Thus, if the advantages that e-learning offer are over and above traditional learning, students would tend to have more intention to choose e-learning.

Attitude towards using was found to be a predictor of behavioural intention to choose e-learning. Attitude is a user's positive or negative feelings about performing a behaviour and is related to a behavioural beliefs and outcome evaluations. The result is confirmed by the TRA model (Fishbein & Ajzen, 1975), and also is consistent with many previous technology adoption studies (Ajzen & Madden, 1986; Downs & Mohr, 1976; Jackson et al., 1997; Moore & Benbasat, 1991), which suggested attitude was expected to influence behavioural intention in accepting a new innovation. In this study, the result indicates that students who have positive attitudes towards e-learning would influence their intention to choose e-learning.

Organizational reputation was also found to be a predictor of actual adoption and behavioural intention to choose e-learning. The result is in agreement with De Ruyter and Wetzels's (2000) findings. De Ruyter and Wetzels's (2000) found corporate brand and reputation is one of the key factors that influence customer's decision in accepting new innovation services in telecommunication sector. In this study, given the uncertainty associated with product acceptance (e-learning mode), individuals may rely on the reputation of the learning organization for deciding among behavioural choices. Good organizational reputation may generate a positive image and provide confidence to potential adopters who might think that a learning organization or university with a good reputation will play more efforts in maintaining the quality of their e-learning courses.

Similarly, external influence was found to be a predictor of behavioural intention to choose e-learning. Marketing studies indicated that in the absence of first-hand experience with a product or service, individuals may rely on second-hand or vicarious experiences for deciding among behavioural choices (Agarwal & Prasad, 1997). Second-hand experience may be an effective, inexpensive, and convenient way of forming intentions about using new, unproven services or products. Moreover, information obtained via second-hand experiences or the public press may be used to supplement attitudinal judgments for justifying behaviours with uncertain outcomes (Agarwal & Prasad, 1997). External influence such as press releases and advertisements may be particularly critical in generating awareness and trial in the initial stages of new technologies. Thus, more informational input from mass media reports, advertising, and other non-personal information may influence students' decision to choose e-learning.

Subjective norm was also found to be a predictor of behavioural intention to choose e-learning. Subjective norm refers to the perceived social pressure to, or not to, adopt a new innovation (Fishbein & Ajzen, 1975). This result is confirmed by theories such as Theory of Reasoned Action (TRA) and Theory of Planned Behaviour (TPB) (Fishbein & Ajzen, 1975; Ajzen, 1985). Also, the result is consistent with the previous findings reported by Hartwick and Barki (1994) and by Taylor and Todd (1995a), who found subjective norms to be important in affecting adoption in the early stage of introducing an innovation, when users have only limited direct experience from which to

develop attitudes. Thus, information input from course leaders, school authority, and adopting peers may influence students' intention to choose e-learning.

Unexpectedly, interpersonal influence was not found to be a predictor of behavioural intention to choose e-learning although interpersonal influence showed a significant correlation with the dependent variable. This result is in contrast with previous findings (Venkatesh & Brown, 2001; Hung & Chang, 2005; Hsu & Chiu, 2004), which indicated that the stronger interpersonal influences in the social network, the greater the influence on their intention to adopt the new innovation. In the study, the results show that the opinions of friends, family or peers are found to have no significant influence on intentions to choose e-learning. A possible explanation is that the easy access to information about e-learning has made potential adopters less reliant on the information provided by their referent groups. For example, a preliminary check of the e-learning information Websites of the local university indicates that all the sites have "Frequently Asked Questions" (FAQ) pages as well as e-mail addresses through which the potential e-learning adopter can gather the relevant information he or she needs in deciding whether to adopt e-learning or not. Another possible explanation is related to the nature of the sample groups, they are working adults who are mature and independence enough to make decisions by themselves and have less influence by others.

Perceived complexity was found to have no significant influence on intention to choose e-learning. This finding is in contrast with previous findings (Cooper & Zmud, 1990; Dickerson & Gentry, 1983; Igbaria et al., 1997), which indicated that the more complex an innovation is to use, the greater the skill and effect needed to adopt it, the less likely that it will be adopted. A surprising result of the non-significant effect of complexity indicates that even though learners may require complex and higher technical skills to use e-learning, learners might perceive that it is not an important factor in affecting their attitude towards e-learning. It might be because the sample groups are studying in IT programmes, they are confident of their computer-related knowledge and abilities to engage in any IS use.

Perceived compatibility was found to have no significant influence on intention to choose e-learning. This finding is in contrast with previous findings (Au & Enderwick, 2000; Carswell & Venkatesh, 2002; Cooper & Zmud, 1990), which have shown that the perceived compatibility of an innovation has a positive influence on the adoption of the innovation. One possible explanation could be that other factors such as relative advantage may be an artifact of difficulties in measuring perceived compatibility (Rogers, 1983). In evidence of that, perceived compatibility related strongly to perceived relative advantage ($r = 0.52$) as was the finding of Moore and Benbasat (1991).

Finally, the results reveal that experience showed significant moderating effect between relative advantage and behavioural intention. Experienced users (current e-learning users) had higher intention to continuing using e-learning. The moderating effect was stronger for non-users in the case of relative advantage. This result is in agreement with the previous findings reported by Castaneda, Munoz-Leiva, and Luque (2007) and by Thompson, Higgins, and Howell (1994) with respect to the moderating effect and direction. The result of this study can be explained as the effect tends to be stronger for students without previous experience as they depend more on the relative advantage of e-learning.

6.8 Summary

This chapter provides a summary of findings from this dissertation. Descriptive information regarding the sample was provided followed by a reporting of the assessment measurement. The main intent was to present the findings from the tests of the hypotheses and research models described in Chapter Five and discussion about the results. In the next chapter, implications for both marketers and academics are provided along with a reporting of limitations and directions for future research.

Chapter 7

Summary, Contribution and Future Research

7.1 Introduction to the chapter

This research project examined factors influencing student's intention in selecting e-learning. The exploration of this important topic was initiated with a qualitative investigation (discussed in Chapter Four) and is followed by a quantitative study assessing the hypotheses developed in Chapter Five and results in Chapter Six.

Within this concluding chapter, summary, limitations and contribution of the findings of this project are presented. First, the summary of the research are reviewed. Second, the contributions and implications of the research are described. Finally, the limitations of the research and suggestions for future research are explored.

7.2 Summary of the Research

The purpose of this research project effort was to investigate the factors that influence students' adoption and selection of e-learning over traditional learning in higher education. Based on the theoretical foundations of the innovation diffusion theory (IDT) and technology acceptance model (TAM), with the support of the Theory of Planned Behaviour (TPB) and Theory of Reasoned Action (TRA) as well as integrates factors related to technology,

social and individual choices, a research model for students' selection and adoption of e-learning was developed, and two separate but related studies were conducted. The findings of these studies generally support the proposed research model.

In order to provide a practical solution to determine factors that influence students' selection of e-learning over traditional learning, a mix of qualitative and quantitative research methods was used in investigating the e-learning courses in higher education.

First of all, the qualitative interviews were employed to compare teacher and students perceptions about the factors influencing choice of e-learning, and the factors enriching the attractiveness of an e-learning course. The results indicate that students and teachers have a broadly similar view on what factors affect the selection of e-learning over traditional learning. Both groups identified 'convenience and time saving' and 'lower tuition fee' were the major factors governing students' choice of e-learning. Amongst other factors affecting choices of e-learning, a majority of students and teachers perceived 'reputation of the university' and 'suit my lifestyle needs' as the other key factors affecting the choices of e-learning respectively. Besides, in order to enrich the attractiveness of e-learning courses, students identified that instructional design and online interaction were the two main factors, whereas teachers pointed out that, in addition to instructional design, student support

and personal interaction were also the key elements in constituting attractive e-learning courses.

By aggregating the results from the interviews and previous literature review, a research model with eight variables: (1) relative advantage, (2) complexity, (3) compatibility, (4) organizational reputation, (5) interpersonal influence, (6) external influence, (7) attitude, and (8) subjective norms, was developed to measure against with the actual behaviour and behavioural intention to choose e-learning. To study the relationships between the model variables, eight hypotheses (H1- H8) were developed.

For the quantitative stage of this research, a survey method was employed to collect data from the current e-learning users and non-users in a Hong Kong based university. Before testing the hypotheses, a preliminary analysis was conducted to assess the proposed research model to include validity and reliability. Validity was tested through the use of factor analysis and a Cronbach alpha was used to test the reliability of the measure. The results showed that both validity and reliability were established. Eight hypotheses were then tested by calculating the Pearson-Product Moment correlation coefficients. The results showed that seven of these hypotheses were statistically supported. More specifically, relative advantage (H1) was found to have a positive relationship with attitude, and complexity (H2) was found to have a negative relationship with attitude. Organizational reputation (H4), interpersonal influence (H5), and external influence (H6) were found to

have positive relationships with subjective norm. Furthermore, attitude (H7) and subjective norm (H8) were found to have positive relationships with intention to choose e-learning.

To identify the factors influencing students' actual adoption and intention to choose e-learning over traditional learning, logistic regression and multiple regression analysis using hierarchical method were conducted. The result of the hierarchical logistic regression showed that perceived relative advantage and organizational reputation are the factors influence students' actual adoption of e-learning. The result of the hierarchical multiple regression showed that perceived relative advantage, organizational reputation, external influence, attitude, and subjective norm are useful predictors of students' intention to choose e-learning. The result further indicated that relative advantage is the best predictor of intention to choice e-learning.

Although the findings showed that the factors that influence action adoption and behavioural intention to choose e-learning are not exactly the same, it is clear to note that perceived relative advantage and organizational reputation are the two common determinants that influence students' selection of e-learning. These findings are consistent with the results obtained from the qualitative research which indicated that both students and teachers identified 'convenience and time saving' and 'lower tuition fee' (both belong to perceived relative advantage) were the major factors governing students' choice. In addition, most students viewed the organizational reputation as

another key evaluation criterion when making their decisions in choice of e-learning.

In order to compare group differences in terms of existence of previous usage experience in e-learning (experienced users and non-experienced users), moderation effect of experience on the independent variables was measured in this analysis. The results revealed that experience showed significant moderation effect between relative advantage and behavioural intention. Experienced users had higher intention to continuing using e-learning. The moderation effect was stronger for non-users in the case of relative advantage, this implies that non-experienced users depend more on the perceived relative advantage of e-learning with respect to their intention to choose e-learning.

In summary, this research project identified major factors which influence students' decision to choice e-learning over traditional learning in higher education and showed distinctive group differences according to the existence of previous usage experiences.

7.3 Contributions of the Research

The purpose of this research project was to investigate factors that affect students to choice e-learning over traditional learning and furthermore to suggest the adoption model for e-learning enabled by IT. According to the purpose, this research tested: (1) what factors influence the selection of e-

learning as against traditional course delivery in higher education, and (2) what factors makes e-learning course more attractive than traditional courses. Thus, the contribution of this research can be summarised as follows:

First, the research contributes to the theoretical body of research by focusing on the individual adoption decision. Most adoption studies explore the overall diffusion of an innovation throughout a market without specifically addressing the decision made by individual consumers (Gatignon & Robertson, 1991; Olshavsky & Spreng, 1996). This research develops and supports hypotheses related to the specific factors influencing a single potential adopter. With an understanding of what factors are important in the decision process, efforts can be focused in order to influence future adoption behaviour related to specific innovations.

Second, this research avoids the common bias associated with the study of innovation adoption. The pro-innovation bias is the perception that all innovation is positive and should be utilized by all potential adopters (Rogers, 1995). Since all innovation is supposed to be beneficial, a failure to adopt is perceived as an irrational response. This bias has prevented important factors related to failure to adopt from being adequately explored in the literature. This research shows that many learners make well-informed, rational choices to reject an innovation will be readily accepted by learners. Whereas some learners may enjoy the technology based options such as e-learning, others may prefer to retain the interpersonal aspects of the service encounter such as

traditional face-to-face learning mode. To prevent this biased perspective, the data collection included both e-learning users and non-users. By including non-users, the findings better reflect important factors leading to the rejection of e-learning adoption. This perspective is uncommon in previous adoption studies.

Third, this research includes a key methodological contribution. The combination of a qualitative investigation leading to a quantitative exploration has a strong history in social science research but is unique in adoption research. According to Jick (1979), methodology triangulation allows for a more accurate conceptualization and evaluation of theory by verifying findings from multiple methods. Moreover, using multiple methods limits the effects of biases, provides greater accuracy and increased confidence in the research findings (Brewer & Hunter, 1989; Jick, 1979; Sherry, 1991). The detailed understanding of the phenomenon of interest provided by the qualitative research strengthens the results found in the quantitative study method (Brewer & Hunter, 1989; Brinberg & Hirschman, 1986). This methodological triangulation has seldom been utilized in adoption studies. In this respect, this research can serve as an exemplar piece concerning how quantitative and qualitative studies can be used together.

7.4 Implications of the Findings

The importance of the research findings are not limited to contributions to the literature outlined above. In fact, the practical implications are a critical aspect of this research. Educational services providers have been implementing online delivery options for learners over the past several years with mixed success. To date, academic researchers have provided little insight regarding how to best design, develop and implement these educational technologies. Knowledge regarding how to encourage usage and acceptance of e-learning is needed to assist in these online learning development efforts by marketing managers.

The outcomes of this research could be used as a valuable input for marketing planners and adopting institutions in designing strategies to enhance e-learning diffusion. By understanding the key factors that determine adoption, they can respectively develop better marketing strategies as well as better management of e-learning students. Effort must be made to develop a favourable attitude in users towards e-learning, and to eliminate or reduce substantially, constraints to technology adoption, which could result from lack of confidence and negative attitude towards e-learning.

Educational institutions that are interested in teaching online should begin by shaping the attitude of potential e-learning users in favor of this mode. Attitude, which has been defined as a favourable or unfavourable potential user's affective evaluation of the costs and benefits of using the

technology is favourable, will be positive if benefit is greater than cost, which will result in greater likelihood of adoption. Hence, both the adopting institutions and e-learning systems designers and marketing planners should act in concert to educate potential users on the gains and wisdom in using the e-learning mode. Some of the benefits to the user include saving in transportation cost, saving in time as commuting distance and frequency is reduced, ability to pursue learning at one's pace which is often lacking in the traditional classroom setting, learning under the comfort of the home or office, increased ease of accessing information, lower tuition fees, and so forth. By highlighting the usefulness and benefits of the online mode to potential users, interest in this method of learning will grow and in turn adoption.

However, unless those benefits are clearly conveyed to potential users, usage will be low. Thus, marketing strategy should focus on societal impulse, such as mass media communication and publishing media reports such as conduct market survey in students' likelihood on adoption e-learning, and cite the opinions of industry experts and leaders in order to generate a higher awareness of e-learning to potential users, and to illustrate how they will be benefited for choosing e-learning as their learning mode. In addition, marketing strategies focus on promoting the brand of the educational institutions should be formulated and implemented in order to generate a positive image, and thus, to increase the reputation of the adopting institution.

This research project also provided possible solutions to marketing planners of the educational institutions by showing group differences in terms of the existence of previous usage experiences in e-learning. The results show that the moderation effect was stronger for non-users in the case of relative advantage, this implies that non- users depend more on the perceived relative advantage of e-learning. Thus, marketing strategy should focus on highlighting the usefulness and benefits of e-learning to potential users.

In addition to identifying factors that influencing students' selection of e-learning over traditional learning, this research project also indicates the factors that enriching the attractiveness of an e-learning course. From students' perspective, instructional design and online interaction are the two key attributes which constituted an attractive e-learning course. Instructional design such as different multimedia formats and practical case studies should be applied in the content design of e-learning courses in order to increase the interactivity and attractiveness. Moreover, more online interaction with teachers and peers, and prompt feedback in online discussion forums and e-mails are highly preferred by students so as to overcome their feelings of isolation and apprehension. Similar to the student perspective, teachers also indicate instructional design is the most essential element which constitutes an attractive e-learning course. Besides this, student support including technical and non-technical support services, and personal interaction such as face-to-face meeting and discussion between teacher and student, as well as student and student, are also key elements in constituting attractive e-learning courses.

Although much of this discussion has focused on encouraging learners to select e-learning, it is important to keep in mind that some learners may not want to be encouraged to choose e-learning. This research shows a need for interaction is one of the important aspects when deciding which delivery alternative to use, indicating that some learners are not likely to adopt the e-learning mode option. For this reason, it is imperative to provide delivery method choices for learners. Some will favor the traditional learning mode option while others prefer the e-learning mode alternative. Forcing learners by providing only one option may disenfranchise a segment of learners. Allowing learners to select the option they are most comfortable with should result in increased satisfaction with the service encounter.

7.5 Limitations and Future Research Directions

Despite the contributions and implications of this research, it has several limitations. This section provides a critical discussion on these limitations together with recommendations on future research directions.

The first limitation of the research is the generalizability to other contexts since this research focuses on students in one university in Hong Kong. Single context studies are beneficial because they avoid the complexities of inherent differences between settings. However, cautions should be used when extending these findings to other settings. In support of the generalizability, the research was conducted in a naturally occurring

setting. Nevertheless, the participants in this research study may have had cultural reasons for responding the way that they did, thus the findings may be representative of one culture and may not be generalizable to other cultures. Therefore, future research should address other locations outside Hong Kong to examine whether culture is one of the factors affecting the behavioural intentions towards e-learning.

Furthermore, since the selected programmes in this research project are offered by the Computing Department in the University, students enrolled in these programmes should be well equipped with basic computing skills and knowledge. Thus, their ratings to one of the constructs like complexity should be relatively low. To generalize the findings, a variety of e-learning courses and students from other faculties could be included in further research, so that more participation and input could be obtained from students and teachers.

Third, interviews were conducted with only students and teachers. To obtain a diverse and broad perception of the issues relating to the adoption of e-learning courses, it is essential to extend the interviewing process to the other key stakeholders such as technical support staff and administrators in future research.

Finally, the result of this research could vary according to different cultural, educational, and economic environments. For example, different sets of factors might be identified according to geographical locations of data

collection. Different educational levels, such as bachelor's level and associate degree level, might also influence the intention of students to adopt e-learning.

A few important extensions can also be made to this dissertation. First, it would be more meaningful to conduct a cross-cultural study. It would alleviate some of the limitations in data collection of the current research and might provide interesting results depending on location and culture. Second, further research could be conducted to explore how e-learning impact student loyalty to the program and the educational institution. As with any other information system, the success of e-learning depends largely on students' loyalty, i.e., continued use. The student's decision to remain in the relationship is of practical importance to the e-learning provider because customer turnover can be costly, given that it costs more to acquire new customers than to retain existing ones (Hart, Heskett, & Sasser, 1990; Reichheld, & Schefter, 2000). Moreover, customer and brand loyalty could lead to certain advantages, such as reduced marketing costs, more new customers, and repurchase intention (Aaker, 1991; Chaudhuri, & Holbrook, 2001; Oliver, 1999). The very nature of e-learning implies a distance between students and teachers as well as the educational institution. Whereas most interpersonal encounters allow for the development of personal relationships and strong ties, e-learning circumvents the development of these relationships. It is important to better understand the long-term implications of shifting students away from interpersonal interactions to the technologically based learning mode and the resulting impact on student loyalty. Finally, the scope of this research did not extend to

examining the effectiveness of e-learning systems in promoting learning and whether such systems can provide as good as or better experience than provided by traditional classes. Well-designed experimental studies can shed light on this issue.

7.6 Chapter Summary

This chapter concludes the research project by restating the research objective and framework, providing a general conclusions and summary of the findings, discussing the contributions and implications of the research, stating its limitations and suggesting future research directions on e-learning. This research developed a theoretical model of students' selection of e-learning over traditional learning in higher education. Although students choose e-learning still remain relatively low compared to traditional learning mode, over time as technology becomes more prevalent in our society and learners who grow up with technology begin to use more online services, it is expected that use of e-learning will be gradually accepted. With the recognition of technology, social and individual choice variables and resulting factors, both marketing planners and educational institutions could be made aware of the critical components necessary to construct and support a successful innovation adoption decision. Overall, the findings strengthen our understanding of students' selection of e-learning over traditional learning in higher education.

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APPENDIX A

Request to Conduct Research in HKPU

Request to Conduct Research in HKPU

Dr James Liu (Programme Leader)
Associate Professor
Department of Computing
The Hong Kong Polytechnic University
Hong Kong

Dear Dr. Liu,

I am a doctoral student in the Doctor of Philosophy in Business and Management at University of South Australia. Currently, I am in the process of conducting doctoral research on e-learning. The title of this doctoral project is "Marketing of e-Learning Courses in Higher Education."

I would like to study closely the e-learning courses, offered by the Department of Computing of the Hong Kong Polytechnic University, to investigate the factors that affect student's selection of e-learning courses over traditional learning courses.

Therefore, I kindly request your permission to conduct anonymous surveys with the population of postgraduate students who have enrolled in the master's programmes which are delivered in both traditional learning mode and e-learning mode. In addition, some academic staff and postgraduate students who are experienced or exposed to e-learning will be interviewed to identify and review potential factors influencing student adoption on e-learning. The names of those individuals will not be used or mentioned in any way or means during the research period and in the final document. The research will be conducted according to and adhere fully to the policies of the Human Research Ethics Committee at University of South Australia.

If you have any questions or concerns, please do not hesitate to contact me at 852-9178 1982. I would appreciate a response from you at your earliest convenience. Thank you so much for your time and understanding.

Sincerely,
Pamela
Pamela Lam

APPENDIX B

Written Consent from HKPU to Conduct Research

Written Consent from HKPU to Conduct Research

----- Original Message -----
From: James Liu [Comp]
To: pamelalam@hkcyberu.com
Sent: Wednesday, October 04, 2006 9:49 AM
Subject: Re: Request to conduct research

Dear Pam

We have no objection to your plan to collect data from our MSc students. Please inform the related class instructor(s) in advance and the necessary arrangement to ensure minimum disruption of the lecture.

-James.

APPENDIX C

Ethics Approval from UniSA to Conduct Qualitative Study

Ethics Approval from UniSA's Human Research Ethics Committee to Conduct Qualitative Research

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From: Vicki Allen
Sent: Monday, 4 December 2006 12:48 PM
To: 'p1126@netvigator.com'
Cc: Lam, Po Yan Pamela - lampy006; Sarbari Bordia; Lan Lac
Subject: Ethics protocol P247/06 "Marketing of e-Learning courses in higher education
Importance: High

Dear Pamela

Re: **Ethics protocol P247/06 "Marketing of e-Learning courses in higher education** (PhD Candidate, Hong Kong).

Thank you for providing the amendments and/or additional information requested by the Chairperson of the University's Human Research Ethics Committee (email dated 23 November 2006).

I am pleased to advise that your protocol has been approved.

Please regard this email as formal notification of approval.

Ethics approval is always made on the basis of a number of conditions detailed in the attachment; it is important that you are familiar with, and abide by, these conditions. It is also essential that you conduct all research according to UniSA guidelines, which can be found at http://www.unisa.edu.au/res/ethics/default.asp

Best wishes for your research.

Regards, Vicki

Vicki Allen
Ethics and Safety Officer
University of South Australia
Research and Innovation Services
Mawson Lakes Campus
Mawson Lakes Boulevard
Mawson Lakes? SA? 5095
Tel: +61 8 8302 3118
Fax: +61 8 8302 3921
Email: Vicki.Allen@unisa.edu.au
CRIS Provider No. 00121B

<<Conditions.March 2004.doc>>

APPENDIX D

Interview Questions to Students

INFORMATION SHEET FOR THE INTERVIEW

University of South Australia
Division of Business/International Graduate School of Business
Project Title: Marketing of E-learning Courses in Higher Education
Researcher's Name: Pamela Lam, MA(Concordia)
Telephone Number: (852) 9178 1982
Supervisor's Name: Dr Sarbari Bordia

Research Procedures
You are invited to participate in a research study on e-learning. This research is being conducted to investigate the factors that affect student's selection of e-learning courses over traditional learning courses in the Hong Kong Polytechnic University (PolyU). In addition to students, academic staff experienced in e-learning will be interviewed face-to-face to identify and review potential factors influencing student adoption on e-learning at PolyU. The estimated average time to complete the interview should not exceed 15 minutes.

Benefits
The outcome of the entire project should be of high value to the institution's constituents in terms of offering continuous high quality e-learning courses based on the student needs identified in the empirical results, and other parties and individuals who are interested to promote e-learning.

Risks
There are no foreseeable risks for participants in the interviews.

Confidentiality
To participate, you need to answer the interview questions. Interviews will be conducted face-to-face. The data in this study will be confidential. To keep your name and responses anonymous. Your name will not be used nor included in either the initial process of information or the final document. Your responses will be valuable to answer the research questions and provide general answers to the problem statement posed in the project. The recorded data will be kept on CDRom for 7 years. A copy will be made available for the IGSB for storage. The data will be stored in the principal researcher's office.

Participation
Your participation is entirely voluntary, and you may withdraw from the study at any time and for any reason. If you decide not to participate or if you withdraw from the study, there is no penalty or loss of benefits to which you are otherwise entitled. There are no costs to you or any other party.

Contact
If you have any questions or concerns, please do not hesitate to call me at (852) 9178 1982. The supervisor of my research report, Dr. Sarbari Bordia, can be reached at +61 8 8302 7002.

The University of South Australia's Human Research Ethics Committee has reviewed this study. Should you wish to discuss the project with someone not directly involved, in particular in relation to matters concerning policies, information about the conduct of the study, or your rights as a participant, please contact

Ms Vicki Allen, Executive Officer
Human Research Ethics Committee
University of South Australia
GPO BOX 2471
Adelaide SA 5000
Email: Vicki.Allen@unisa.edu.au
Tel: +61 8 8302 3118
A copy of summary of the findings will be provided to research participants upon completion of analysis. Participants will be asked to provide me their contact details if they want to receive a copy of the final report.

CONSENT FORM

Project Title: Marketing of E-learning Courses in Higher Education

Researcher's Name: _____Pamela Lam_____

Supervisor's Name: _____Dr Sarbari Bordia_____

- I have read the Participant Information Sheet and the nature and purpose of the research project has been explained to me. I understand and agree to take part.

- I understand the purpose of the research project and my involvement in it.

- I understand that I may withdraw from the research project at any stage and that this will not affect my status now or in the future.

- I understand that while information gained during the study may be published, I will not be identified and my personal results will remain confidential.

Name of participant _____

Signed _____ Date _____

I have provided information about the research to the research participant and believe that he/she understands what is involved.

Researcher's signature and date

_____

Interview Questions to Postgraduate Students

5. Have you ever chosen to attend any subjects/courses using e-learning mode before?

   a) If yes, what were the reasons that led you to choose e-learning?

   b) If no, what were the reasons that led you to not choose e-learning?

6. Will the following reasons influence you from choosing e-learning rather than traditional classroom mode? (Check all that apply to you)

   Convenience and time saving
   Ease of use
   Suit my lifestyle needs
   Reputation of the University
   Word of mouth
   Mass media reports
   Lower tuition fee
   Other factors (please suggests): _____

7. What would make you more interested in e-learning courses?

8. Can you suggest any improvements for e-learning courses? e.g. structural components

APPENDIX E

Interview Questions to Teachers

INFORMATION SHEET FOR THE INTERVIEW

University of South Australia
Division of Business/International Graduate School of Business
Project Title: Marketing of E-learning Courses in Higher Education
Researcher's Name: Pamela Lam, MA(Concordia)
Telephone Number: (852) 9178 1982
Supervisor's Name: Dr Sarbari Bordia

Research Procedures
You are invited to participate in a research study on e-learning. This research is being conducted to investigate the factors that affect student's selection of e-learning courses over traditional learning courses in the Hong Kong Polytechnic University (PolyU). In addition to students, academic staff experienced in e-learning will be interviewed face-to-face to identify and review potential factors influencing student adoption on e-learning at PolyU. The estimated average time to complete the interview should not exceed 15 minutes.

Benefits
The outcome of the entire project should be of high value to the institution's constituents in terms of offering continuous high quality e-learning courses based on the student needs identified in the empirical results, and other parties and individuals who are interested to promote e-learning.

Risks
There are no foreseeable risks for participants in the interviews.

Confidentiality
To participate, you need to answer the interview questions. Interviews will be conducted face-to-face. The data in this study will be confidential. To keep your name and responses anonymous. Your name will not be used nor included in either the initial process of information or the final document. Your responses will be valuable to answer the research questions and provide general answers to the problem statement posed in the project. The recorded data will be kept on CDRom for 7 years. A copy will be made available for the IGSB for storage. The data will be stored in the principal researcher's office.

Participation
Your participation is entirely voluntary, and you may withdraw from the study at any time and for any reason. If you decide not to participate or if you withdraw from the study, there is no penalty or loss of benefits to which you are otherwise entitled. There are no costs to you or any other party.

Contact
If you have any questions or concerns, please do not hesitate to call me at (852) 9178 1982. The supervisor of my research report, Dr. Sarbari Bordia, can be reached at +61 8 8302 7002.

The University of South Australia's Human Research Ethics Committee has reviewed this study. Should you wish to discuss the project with someone not directly involved, in particular in relation to matters concerning policies, information about the conduct of the study, or your rights as a participant, please contact

Ms Vicki Allen, Executive Officer
Human Research Ethics Committee
University of South Australia
GPO BOX 2471
Adelaide SA 5000
Email: Vicki.Allen@unisa.edu.au
Tel: +61 8 8302 3118

A copy of summary of the findings will be provided to research participants upon completion of analysis. Participants will be asked to provide me their contact details if they want to receive a copy of the final report.

CONSENT FORM

Project Title: Marketing of E-learning Courses in Higher Education

Researcher's Name: _____Pamela Lam_____

Supervisor's Name: _____Dr Sarbari Bordia_____

- I have read the Participant Information Sheet and the nature and purpose of the research project has been explained to me. I understand and agree to take part.

- I understand the purpose of the research project and my involvement in it.

- I understand that I may withdraw from the research project at any stage and that this will not affect my status now or in the future.

- I understand that while information gained during the study may be published, I will not be identified and my personal results will remain confidential.

Name of participant _____

Signed _____ Date _____

I have provided information about the research to the research participant and believe that he/she understands what is involved.

Researcher's signature and date

_____

Interview Questions to Teachers

5. Based on your e-learning teaching experience, which of the following factors, do you think, will influence students from choosing e-learning over traditional approaches? (Check all that apply to you)

    Convenience and time saving
    Ease of use
    Suit my lifestyle needs
    Reputation of the University
    Word of mouth
    Mass media reports
    Lower tuition fee
    Other factors (please suggests):
    _____

6. What would you do to make an e-learning course more interesting?

7. Can you suggest any improvements for e-learning courses? e.g. structural components

8. Do you have any suggestions for this study?

APPENDIX F

Ethics Approval from UniSA to Conduct Quantitative Study

Ethics Approval from UniSA's Human Research Ethics Committee to Conduct Quantitative Research

From:	"Vicki Allen" <Vicki.Allen@unisa.edu.au>
Date:	2007/04/18 Wed PM 02:09:03 HKT
To:	"Sarbari Bordia" <Sarbari.Bordia@unisa.edu.au>, "Ian Richards" <Ian.Richards@unisa.edu.au>
CC:	"Pamela" <pl126@netvigator.com>
Subject:	RE: Ethics application P247/06 IGSB "Marketing of e-Learning courses in higher education

Dear Pamela

The Chair of the University's Human Research Ethics Committee has considered your request for approval of the questionnaire. I am pleased to advise that the Chair has granted ethics approval for the questionnaire and Information Sheet. However, please note that given that the questionnaire is anonymous you do not require participants to complete a consent form.

Please regard this email as formal notification of ethics approval of the questionnaire and information sheet.

Please note that the current expiry date of ethics approval is 3 December 2007. Should you require further time to complete the project, please apply for an extension of ethics approval using the form accessible from the following Website http://www.unisa.edu.au/res/ethics/human.asp#forms.

Best wishes for this stage of your research project.

Regards, Vicki

Vicki Allen
Ethics and Safety Officer
University of South Australia
Research and Innovation Services
Mawson Lakes Campus
Mawson Lakes Boulevard
Mawson Lakes SA 5095
Tel: +61 8 8302 3118
Fax: +61 8 8302 3921
Email: Vicki.Allen@unisa.edu.au
CRIS Provider No. #00121B

APPENDIX G

Questionnaire to Students

INFORMATION SHEET FOR THE INTERVIEW

University of South Australia

Division of Business/International Graduate School of Business
Project Title: Marketing of E-learning Courses in Higher Education
Researcher's Name: Pamela Lam, MA(Concordia)
Telephone Number: (852) 9178 1982
Supervisor's Name: Dr Sarbari Bordia

Research Procedures

You are invited to participate in a research study on e-learning. This research is being conducted to investigate the factors that affect student's selection of e-learning courses over traditional learning courses in the Hong Kong Polytechnic University (PolyU). The attached survey questionnaire is being distributed to students who have enrolled in either traditional learning or e-learning modes classes. Your participation in this study is entirely voluntary. It will take approximately 15-20 minutes of your time to complete the survey.

Benefits

The outcome of the entire project should be of high value to the institution's constituents in terms of offering continuous high quality e-learning courses based on the student needs identified in the empirical results, and other parties and individuals who are interested to promote e-learning.

Risks

There are no foreseeable risks for participants in the interviews.

Confidentiality

To participate, you need to complete the questionnaire. The data in this study will be confidential. To keep your name and responses anonymous. Your name will not be used nor included in either the initial process of information or the final document. Your responses will be valuable to answer the research questions and provide general answers to the problem statement posed in the project. The recorded data will be kept on CDRom for 7 years. A copy will be made available for the IGSB for storage. The data will be stored in the principal researcher's office.

Participation

Your participation is entirely voluntary, and you may withdraw from the study at any time and for any reason. If you decide not to participate or if you withdraw from the study, there is no penalty or loss of benefits to which you are otherwise entitled. There are no costs to you or any other party.

Contact

If you have any questions or concerns, please do not hesitate to call me at (852) 9178 1982. The supervisor of my research report, Dr. Sarbari Bordia, can be reached at +61 8 8302 7002.

The University of South Australia's Human Research Ethics Committee has reviewed this study. Should you wish to discuss the project with someone not directly involved, in particular in relation to matters concerning policies, information about the conduct of the study, or your rights as a participant, please contact

Ms Vicki Allen, Executive Officer
Human Research Ethics Committee
University of South Australia
GPO BOX 2471
Adelaide SA 5000
Email: Vicki.Allen@unisa.edu.au
Tel: +61 8 8302 3118

A copy of summary of the findings will be provided to research participants upon completion of analysis. Participants will be asked to provide me their contact details if they want to receive a copy of the final report.

Questionnaire

Thank you for agreeing to participate in the research project. All responses to this questionnaire are kept confidential. Your participation in this study is entirely voluntary. **Your responses will remain anonymous and will not affect your assessment grades.** Please give your fair and thoughtful feedback. The survey will take about 15 minutes to complete.

SECTION I – BACKGROUND INFORMATION

Please **check** the blank that applied to you or fill in the information requested.

1. Age:

   (a) ___ 20 or less (c) ___31 – 40 (e)___ 51 or above

   (b) ___ 21 - 30 (d) ___41 - 50

2. Gender: (a) ___Male (b)___ Female

3. Programme currently studying:

   (a) ___ MSc in Information Systems
   (b) ___ MSc in E-Commerce
   (c) ___ Others, please specify: _____

4. What mode of study have you chosen for this subject?

   (a) ___ Traditional classroom mode (b)___ e-learning mode

5. Have you ever attended subjects/courses using e-learning methods before (e.g. pure online learning, blended learning i.e. combination of face-to-face tutorials and Web-based learning)?

   (a) ___ Yes (please go to Q6) (b) ___ No (please go to Q7)

6. If yes, what type of e-learning method have you used before?

   (a) ___ Pure online learning mode

   (b) ___ Blended learning mode

7. If no, what are the reasons not to choose e-learning? (can choose multiple answers)

   (a) ___ Lack of interaction with peers

   (b) ___ Lacks of interaction with lecturers

   (c) ___ Lack of motivation to study if through online mode

   (d) ___ Lack of computer proficiency

   (e) ___ Lack of market information about the availabilities of e-learning

   (f) ___ Others, please specify: _____

SECTION II – YOUR PERCEPTIONS

Please **circle** the appropriate number to indicate your level of agreement or disagreement with each statement. Please respond to these items in terms of your present concerns and thoughts about your involvement or potential involvement with e-learning.

		Strongly Disagree	Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Agree	Strongly Agree
	Relative Advantages							
1.	E-learning enables me to learn more efficiently than traditional learning.	1	2	3	4	5	6	7
2.	E-learning improves the quality of my learning when compared to traditional learning.	1	2	3	4	5	6	7
3.	E-learning enhances the effectiveness of my learning when compared to traditional learning.	1	2	3	4	5	6	7
4.	E-learning offers flexibility in learning as to time and place when compared to traditional learning.	1	2	3	4	5	6	7
5.	E-learning gives me greater control over my learning than traditional learning.	1	2	3	4	5	6	7
	Complexity							
6.	Learning to operate an e-learning system is easy for me.	1	2	3	4	5	6	7
7.	I believe that it is easy to get the e-learning system to do what I want it to do.	1	2	3	4	5	6	7
8.	My interaction with the e-learning system is clear and understandable.	1	2	3	4	5	6	7
9.	I find the e-learning system to be flexible to interact with.	1	2	3	4	5	6	7
	Compatibility							
10.	E-learning is compatible with my lifestyle.	1	2	3	4	5	6	7
11.	E-learning fits well with the way I like to learn.	1	2	3	4	5	6	7
12.	E-learning can meet my need for ability to manage my study without attending regular classes in school.	1	2	3	4	5	6	7

		Strongly Disagree	Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Agree	Strongly Agree
	Organizational Reputation							
13.	I will choose an e-learning course offer by an organization that have a good reputation more favorably than an e-learning course offer by an organization with a bad reputation.	1	2	3	4	5	6	7
14.	I believe that an organization with a good reputation will invest more money and play more efforts in maintaining the quality of their e-learning courses.	1	2	3	4	5	6	7
	Interpersonal Influence							
15.	My peers/colleagues/ friends thought that I should use e-learning for my study.	1	2	3	4	5	6	7
16.	People I knew thought that using e-learning was a good idea.	1	2	3	4	5	6	7
17.	People I knew influenced me to try out e-learning for my study.	1	2	3	4	5	6	7
18.	Many people around me use e-learning for their studies.	1	2	3	4	5	6	7
	External Influence							
19.	I read/saw news reports that using e-learning was a good way of studying.	1	2	3	4	5	6	7
20.	The popular press depicted a positive sentiment for using e-learning.	1	2	3	4	5	6	7
21.	Mass media reports influenced me to try out e-learning.	1	2	3	4	5	6	7

		Strongly Disagree	Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Agree	Strongly Agree
	Attitude							
22.	Using e-learning would be a pleasant experience.	1	2	3	4	5	6	7
23.	Using e-learning is a good idea.	1	2	3	4	5	6	7
24.	An e-learning system provides an attractive learning environment.	1	2	3	4	5	6	7
25.	Overall, I like using e-learning for my study.	1	2	3	4	5	6	7
	Subjective Norm							
26.	People (peers and experts) important to me supported my use of e-learning.	1	2	3	4	5	6	7
27.	People who influenced my behaviour wanted me to use e-learning instead of traditional classroom learning.	1	2	3	4	5	6	7
28.	People whose opinions I valued preferred that I use e-learning.	1	2	3	4	5	6	7
	Intention to Use							
29.	I intend to increase my use of the e-learning system in the future.	1	2	3	4	5	6	7
30.	To the extent possible, I would use e-learning system to do different things, from downloading lecture notes and participating in chat rooms to learning on the Web.	1	2	3	4	5	6	7

-END