Emerging Technologies Acceptance in Online Tutorials: Tutors' and Students' Behavior

by

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Abstract

The goal of this study was to investigate the factors that may affect tutors' and students' intentions to use emerging technologies (ETs) in online tutorials. Based on a literature review, this study proposed a theoretical model predicting tutors' and students' intentions to use ETs based on their ETs reaction (ETsR), ETs understanding (ETsU) and technology competencies (TCs). Consequently, it examined the relationships of three independent variables to the dependent variable, intention to use ETs.

A Web-based survey was designed to empirically assess the effect of the aforementioned constructs on tutors' and students' intentions to use ETs in online tutorials. The web-based survey was developed as a multi-item measure using a Likert-type scale. Existing validated items were used to develop the web-based survey. The target population of this study was tutors and students of the Open University of Indonesia (*Universitas Terbuka*-UT). This constituted 436 potential survey tutor participants and 3,385 student participants. The data collected consisted of 159 responses from tutors (126 fully completed), representing a response rate of 36.5% and 1,734 responses from students (1,201 fully completed), 51.2% response rate.

Four statistical methods were used to formulate and test predictive models: Exploratory Factor Analysis (EFA), Multiple Linear Regression (MLR), Ordinal Logistic Regression (OLR) and Binary Logistic Regression (BLR). Based on tutor data, results were mixed since each variable was significant in the different analysis. However, from the qualitative data, TC was the most important contributor to BI. The theoretical model was able to predict instructors' and students' intention to use ETs in online tutorials. However, not all three independent variables showed significant relationships with the dependent variable. Based on student data, results of MLR and OLR analyses were consistent on emerging technologies reaction (ETsR) and technology competencies (TC) as having the greatest weight on predicting students' intentions to use ETs, while ETsU was found to have the least weight. Therefore, Universitas Terbuka should concentrate its efforts to improve tutors' and students' technology competencies as it was found to be the most significant factor.

Keywords: emerging technologies, technology acceptance model, online tutorial, communication, information retrieval, creation.

Dedication

To my UT's colleagues and my students – may you continue to support and embrace life-long distance learning.

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Table of Contents

List of Tables

List of Figures

Executive Summary

This study addressed the problem of continuing low technology acceptance among higher distance education tutors and students in using emerging technologies (ETs) in their online tutorials. Researchers have suggested that instructor and student usage of emerging technologies in distance learning environments remains a problem and have suggested additional research investigating the factors that influence instructors' and students' behavioral intention (BI) to use ETs.

The first factor identified in the literature as a possible contributor to intention to use technology was emerging technologies reaction (ETsR). Emerging technologies reactions is a person's *initial* response to emerging technologies during the learning process. The second factor was emerging technologies understanding (ETsU). Emerging technologies understanding is the way users of ETs understand and enhance their knowledge of ETs in educational contexts. The third factor was technology competencies (TC). Technology competencies is the user's experience with, ability to select and apply, and capacity to explore information and communication technology (ICT), especially with computers, to solve problems

The specific research questions addressed were:

1. To what extent does ETsR, ETsU and TC contribute to tutors' and students' intention to use emerging technologies in online tutorial?
2. Which construct out of the three independent variables (ETsR, ETsU, or TC) provides the most significant contribution to tutors' and students' intention to use emerging technologies in online tutorial?
3. What are tutors' and students' perceptions of technology skills, perceived technology barriers, behavioral intentions to use, and actual use of emerging technologies in Open University of Indonesia (UT)?

In order to address the specific research questions noted above, a survey instrument was adapted from the Brush, Glazewski, and Hew (2008) instrument to measure pre-service teachers' technology skills, technology beliefs, and technology barriers. The instrument was modified to accommodate the evaluation model of Alliger, Tannenbaum, Bennet, Traver, and Shotland (1997) and D. L. Kirkpatrick (1998), translated into the Indonesian language to provide clear understanding to respondents, and then provided in an online form. In addition, the instrument was evaluated in terms of reliability and validity. The open-ended questions were embedded in the online form to investigate ETs' barriers and challenges in online tutorial. Behavior Intention (BI) was measured using the instrument developed by C.-D. Chen, Fan, and Farn (2007) and Ball and Levy (2009).

A theoretical model was proposed, and three statistical methods were used to formulate models and test predictive power: Multiple Linear Regression (MLR), Ordinal Logistic Regression (OLR), and Binary Logistic Regression (BLR). It was predicted that ETsR, ETsU, and TC would have a significant impact on instructors' and students' intention to use ETs in the online tutorials. 126 tutors and 1,201 students were surveyed to determine their level of ETsR, ETsU, TC, and their intention to use ETs in online courses. MLR and OLR were developed to answer the four research questions presented in this study.

Results confirmed that for the tutor data, all regression models were found to be significant, but presented different results. Results were mixed since each variable was significant in the different analysis. However, from the qualitative data TC was most important contributor to BI. For students, the MLR and OLR regression models were found to be significant and presented identical results. ETsR and TC were found in particular to be significant predictors of BI in both models. This finding can be interpreted that higher levels of ETsR and TC were associated with higher levels of BI. Higher levels of ETsU were also associated with higher levels of BI; however, ETsU was not found to be a significant predictor in either model of student data.

The findings from the binary logistic regression analysis from tutor and student data show that ETsR and ETsU are strong predictors of people using ETs. Overall, a model consisting of ETsR, ETsU and TC can predict whether people indicate that they have intention to use emerging technologies.

The qualitative results from open-ended questions reveal that, based on the tutor's perspective, the most urgent factor that should be managed is tutors' and students' skills. From the students' perspective, tutors' skill with technology and emerging technology availability were the most crucial factors that should be improved.

The depth interviews confirmed that “inter-activity” and “simplicity” were still the main factors affecting respondent’s intention to use emerging technologies.

There were a number of limitations associated with this study. First, the data collected was self-reported by tutors and students. Second, as the survey was distributed through e-mail, UT’s webpage and Facebook’s page, it was limited to the tutors’ and students’ willingness to take the initiative to read the e-mail and taking time to complete the survey. Third, this study was designed to focus on tutors and students and was conducted at a single, distance learning university in Indonesia. Fourth, the design of Web-based survey in Zoomerang may have effect on respondents’ responses.

A study sample that includes a wider range of ages, ethnic diversity, domicile diversity, as well as some additional personal-trait and socio-economic variables is recommended in order to more broadly examine other possible correlational relationships and subsequent emergent factors. In addition, a longitudinal design would enable researchers to assess what variables and conclusions are temporal versus those that are more enduring. Furthermore, feedback from both tutors and students must be addressed and examined to understand the changes and trainings that are crucial for an effective online tutorial program.

There are two implications of this study for social change practice at the organizational level. First, the results provide key factors that affect instructors’ and students’ intentions to use ETs. They suggest that UT administrators should consider providing services for instructors and students who want to use ETs. Second, the findings will help the Department of Information and Technology at UT, especially learning management systems developers, to design and develop those systems that will be more likely accepted by instructors and students. Application of the concept of technology acceptance (TA) evaluation instruments should be a standard component of strategies prior to the introduction of new technologies to tutors and students.

1. Introduction

1.1. Background of the Study

The incorporation of emerging technologies in education is an acknowledgement of the profound influence technology has on all aspects of human life, and there is a critical need for all individuals to develop at least minimal levels of understanding of technology and what it means for their lives (Custer, 1995). Based on the annual Horizon Report, emerging technologies (ETs) are likely to have a large impact on teaching, learning, or creative inquiry in higher education institutions within the next five years (L. F. Johnson, Levine, Smith, & Haywood, 2010). ETs and their potential to foster unique types of learning have become a special issue in the last two years. ETs refer to tools, concepts, innovations, and advancements that are utilized in diverse educational settings to serve varied educational purposes, and that can be described as evolving organisms existing in a state of "coming into being" (Veletsianos, 2010). Additionally, educational technology is the study and ethical practice of facilitating learning and improving performance by creating, using, and managing appropriate technological processes and resources (Januszewski & Molenda, 2008, p. 1).

There are systematic differences in the way teachers view their teaching roles and responsibilities, and these are intertwined with their academic backgrounds (J. B. Collins, Selinger, & Pratt, 2001). Most teachers strive to be effective teachers so that students can learn better, and many explore methods to improve their teaching practice.

Today, the paradigm shift from instruction to learning is also happening in Indonesia. If advocates continue to promote these reform efforts and they see the need to change their methods of instruction and learning, it is more probable that new approaches to teaching and learning will be implemented.

The education process has been in a state of rapid change. This change has been paralleled by developments in technology, especially in higher education (Jones & O'Shea, 2004). The development of technology is advantageous in that it aids in making education at a distance more accessible to those who would otherwise not be able to take regular classes because of work demands, family pressures, and physical distance. The development of sophisticated computers and technology in general has changed the essence of distance learning delivery. The programs mentioned in the developing countries, particularly in Indonesia, are intended to ease the shortage of teachers. These programs have been around for more than 25 years in the Open University of Indonesia (*Universitas Terbuka*/UT).

Universitas Terbuka (UT) is a 45th state university in Indonesia which provides distance learning, particularly for in-service teachers, workers, and fresh high school graduates (Zuhairi, Wahyono, & Suratinah, 2006). UT was established in September 4, 1984 as a one of the Indonesian Government's national strategies to improve participation in higher education. In 2012, UT enrolls more than 650.000 students, residing in different parts of the country; most of them are working adults.

UT has the challenge to provide educational quality excellence at a distance for students who have different levels of economic capacity, access to information and communication technology (ICT) facilities and limited ICT literacy (Zuhairi, Adnan, & Thaib, 2007). Therefore, UT provides online services to support students' learning. The services include online counselling, online tutorials and, more recently, an online examination system. According to Zuhairi et al. (2007) the provision of learning support systems is crucial in making students successful in distance learning. Consequently, UT must implement effective learning support systems for students that suit their needs, characteristics, accessibility, the availability of technology, institutional capacity, and learning cultures and styles. Hopefully, the effects of effective learning support systems for distance learners can enhance learning and motivation to learn, improve peer interaction, provide opportunities for varied learning strategies, encourage independent learning, and enhance learning output and outcomes (Zuhairi et al., 2007; Zuhairi et al., 2006).

Faculty members also serve as online tutors at UT who have the responsibility to provide and maintain online tutorials for students (Noviyanti & Wahyuni, 2007). Becoming online tutors is hard work because tutors must represent themselves as:

- **Manager**. The tutor is the institutional representative. In view of the fact that the face-to-face contact between tutor and student is limited, the tutor should provide quality contact. To ensure this quality, the tutor must know all procedures related to the course and distance learning, understand the responsibilities of tutor and student, prepare well for each contact session, plan the learning activities to enhance students' learning experiences, show professional commitment by modeling the standard for the students, keep records of tutorial activities, and write reports to the institution if any problems appear and suggest possible solutions.
- **Facilitator**. The tutor facilitates the learning by providing online support. Tutors can ask student to collaborate with their peers. The tutor is not the main resource of knowledge, but rather facilitates students in learning by themselves and collaborating with others.
- **Mentor.** The tutor motivates and encourages students to participate actively in online tutorials. Maintaining students' enthusiasm in online tutorials is one of the challenges for UT, and because of the need to maintain enthusiasm, tutors must monitor students' progress and provide counselling and advice to help students overcome their problems. To attract students to online tutorials, tutors should offer students information about the advantages of the online tutorial process. Students will then see the relationship between the learning process and their goals and finally they will be motivated to be more involved in the online tutorials.
- **Evaluator**. The tutor provides detailed feedback or grades. Tutors should explain the relevance of assignments, correct specific errors, explain the mark or grade, suggest strategies to make improvements and demonstrate appreciation of students' efforts.
- **Peer reviewer**. The tutor reviews another tutor's learning materials to contribute toward providing valid and reliable learning materials.

Distance education has been defined and practiced differently in different parts of the world. Distance education is a common phenomenon that has multiple theoretical concepts and models. Given that distance education relies on technical modes of communication, its structure changes with the use of varying modes. Based on the mode of communication used, distance education has been categorized into five generations

(J. C. Taylor, 2001). These are the correspondence model, multimedia model, tele-learning model, flexible learning model and intelligent flexible learning model. According to the modes used, the first two generations are classified as the foundations of distance education while the later three are classified as the new models of distance education.

Research findings indicate that particular factors become barriers in integrating ICT in online tutorials. Snoeyink and Ertmer (2001) classify these barriers as external (first order) and internal (second order). The other studies mention other barriers, such as lack of time (Bauer & Kenton, 2005), lack of training, lack of confidence (Duhaney, 2001), no personal ICT experience (Jacobsen, Clifford, & Friesen, 2002), fear of change and access to resources; all these affect teachers' perceptions and use of ICT(Chin & Hortin, 1994; Goktas, Yildirim, & Yildirim, 2009; Keengwe, Onchwari, & Wachira, 2008; Wachira & Keengwe, 2011).

Technology integration decisions in the classroom depend on the teachers themselves and the beliefs they hold about technology (Ertmer, 2005). Teachers need time to learn to integrate technology into their curriculum, time to plan, and time to work collaboratively with their colleagues. While the use of technology has been found to be an effective means to produce growth in students' learning, research findings indicate that teachers resist using technology to enhance student learning (C.-H. Chen, 2008; Cuban, 2001; Sharla, 2002; Wachira & Keengwe, 2011).

This research explored tutors' and students' behavioral intentions as factors affecting their use of emerging technologies in their distance learning and how these behavioral intentions reflect changes in their educational beliefs and actual learning practice. It is believed that teachers are the important persons in changing the educational world, particularly in the learning and teaching processes. On the other hand, students might perceive the value of emerging technologies for improved learning differently and fail to understand the role of technology in transforming their courses (Bessier, Kurt, & Reinhart, 1997). Student comfort levels and experiences could affect students' perceptions of technology use in improving their learning (Keengwe, 2007). According to Atan et al. (2011) perceived confidence and satisfaction are significant and positively correlated with type of uses of the Internet, such as information retrieval. Perceived confidence and satisfaction are also significantly and positively correlated with the various dimensions of attitude: in effect, perceived control, perceived usefulness, affection and behavior.

Chickering and Gamson (1999) developed seven principles for affecting teaching practice that seem appropriate to the distance learning environment. These principles served as the guide for tutors and students in choosing appropriate emerging technologies in distance learning. The seven principles were as follows: (1) encourage communication and collaboration between students and faculty; (2) develop group work and interpersonal cooperation among students; (3) encourage active learning; (4) ensure prompt feedback from tutor to student; (5) expand quality and quantity of time on task; (6) convey high expectations for students learning outcomes; and (7) value diverse talents and different strategies for learning.

Although many studies have empirically replicated or extended the technology acceptance model (TAM), a key feature of the TAM is the opportunity for incremental contribution and extension by tracing the impact of external factors in explaining internal beliefs, attitudes, and intentions (F. D. Davis, Bagozzi, & Warshaw, 1989).External factors often include individual differences, situational factors, and variables suggested by other theories (King & He, 2006).

Jiun-Sheng Chris and Hsing-Chi (2011) reported that previous TAM research has indicated that individual differences are important external factors that play a crucial role in the implementation of any technological innovation across a wide range of disciplines (e.g. Y.-S. Wang, Wang, Lin, & Tang, 2003; M. Y. Yi & Hwang, 2003). In addition, studies have also investigated the influence of individual traits on the TAM, such as demographic factors, psychographic profiles, and personality traits (Agarwal & Prasad, 1999). Jiun-Sheng Chris and Hsing-Chi (2011) mentioned that researchers have paid limited attention to the effects of personal characteristics on new technology adoption. Y. Yi, Wu, and Tung (2006) suggested that focusing on these traits' impact on the tendency to use technology is crucial

Recent studies recommend that researchers undertake research in the areas of: (1) Best practices of technology integration to help teachers move from technology operators to technology facilitators, then to being technology integrators and transformers (Fluck, 2010). Qualitative interviews with teachers identified as 'teachers using best practices of technology integration' could be conducted to determine in-depth insights on best practices to integrate technology into teaching and learning (Gorder, 2008); (2) Creating and modeling a theory of change toward technology to support a student-centered paradigm (Palak & Walls, 2009); and (3) Assessing how technology applications create interactive environments for teaching and learning at a distance (Abrami, Bernard, Bures, Borokhovski, & Tamim, 2011).

1.2. Statement of the problem

Emerging technologies in computing and information system change the way teachers and students meet, communicate, retrieve information and work together outside the traditional classroom. Emerging technology is also dramatically affecting the way people teach and learn (Jones & O'Shea, 2004; Veletsianos, 2010). Distance learning (DL), as one of the emerging technologies, has primary roles for advancing student-oriented, active learning, open, and life-long teaching-learning processes. Simonson (2005) divided technologies used for distance education into two categories: telecommunication technologies and classroom technologies. The first category connects tutors to distant learners and the second category presents instructional information. In other words, technologies are being used to support both categories. Based on the Dictionary of Information and Communication Technology (ICT), information technology is "the technology involved in acquiring, storing, processing, and distributing information by electronic means, including radio, television, telephone and computers" (Collin, 2004, p. 125).

The International Council for Correspondence Education officially chose the term 'distance education' (DE) in 1982. The council is currently known as the International Council for Open and Distance Education (ICDE) (Lionarakis, 2008). Lionarakis noted that as a flexible educational media, distance education is linked to absolute freedom of choice when it comes to the technology employed in communication and information retrieval. Emerging technology offers a wide range of new opportunities for development of education, and the advantages of the use of it are numerous. The advantages cover administrative, financial, societal as well as pedagogical areas (Dalsgaard, 2005).

The Indonesia Open University (UT) aims at providing flexible inexpensive education, reaching people unable to attend traditional, classroom-based education, increasing access to higher education, providing training in areas demanded by economic and cultural development, and upgrading the qualification of primary and secondary school teachers (Perraton, 2010; Unesco, 2002). Although UT has established an effective and efficient system to teach its students through print-based DE, its experiences in online instruction are limited (Luschei, Dimyati, & Padmo, 2008). Yet increasing demand for DE is likely shifting to greater use of ETs approaches, especially Web-based ones. ETs-based approaches at UT have only reached an experimental stage. The major hindrances impeding the greater use of ETs in DE are a lack of ETs infrastructure and low levels of comfort and familiarity of many tutors and students with the ETs, particularly the Internet (Luschei et al., 2008; Zuhairi et al., 2007; Zuhairi et al., 2006). Tian Belawati, the rector of UT, has supported the use of ETs for socializing and educating students, tutors, and society (Belawati, 2005).

In order to provide learning support for working students who are scattered throughout the country, UT offers a fast, reliable and affordable interactive communication channel using ETs, specifically the Internet, in the structure of online tutorials. Although educational institutions have made large investments in emerging technology, many technologies have been underutilized or even abandoned completely due to low user acceptance (M. Y. Yi & Hwang, 2003). Woods, Baker, and Hopper (2004) found that, although tutors used technology for basic course management, in most cases tutors were still unsure about the pedagogical and psychosocial benefits of using emerging technologies in the classroom. Moreover, there has been little systematic effort to train tutors about how to use emerging technologies (Alavi & Leidner, 2001). Instead, usage among tutors often spreads through early adopters who then share their experiences with others. Alavi and Leidner recommended additional research investigating ways of encouraging tutors to use emerging technologies to improve their course design and delivery. Furthermore, Dabbagh (2003) concluded that tutors do not appear to be taking advantage of the potential emerging technologies hold for scaffolding learning in online classes. She recommended future research to explore the factors that lead to tutor decisions to support their online classes with emerging technology.

Ball (2008) summarized several technology acceptance models that have been developed by scholars in the past three decades to investigate factors that influence individuals' technology acceptance (e.g. Agarwal & Prasad, 1998; Dillon & Morris, 1996; R. Thompson, Compeau, & Higgins, 2006). F. D. Davis (1989) proposed the Technology Acceptance Model (TAM) to explain computer-usage behavior and constructs associated with acceptance of technology. R. Thompson et al. (2006) mentioned the dominant themes in research focus mainly on instrumental influences, which investigate acceptance decisions involving beliefs as to how using technology will result in objective improvements in performance. In addition, Thompson et al. argued that this approach may have had a limiting effect on technology research and broadened their research to include concepts related to non-instrumental influences on technology acceptance.

According to Hiltz and Turroff (2005) leading factors to motivate faculty with regards to teaching in online environment include the flexibility allowed by being able to teach "anytime/anywhere"; better/more personal interaction and community building supported by the medium; the technical and creativity challenges offered by e-learning; being able to reach more diverse student; and better course management. Major sources of inhibitors are more work, medium limitations, lack of adequate support and policies for teaching online, and the fact that the medium is not good fit for some learners. The results of Hiltz and Turroff's study are supported by Wozney, Venkatesh, and Abrami (2006) and Debevec, Shih, and Kashyap (2006). As more and more teachers in tertiary education still experiment with technology and look for new ways of enhancing their traditional ways of teaching, the need of flexible tools able to support well planned e-learning scenarios emerges (Georgouli, Skalkidis, & Guerreiro, 2008). However, Fraser and Walker (2005) noted a considerable number of higher education teachers are still not integrating emerging technologies in the online classroom. Moreover, a considerable number of teachers do not see the advantages of technology to support their pedagogy (Koehler, Mishra, Hershey, & Peruski, 2004). Instead, some teachers feel that learning technology is not important for them (Ball, 2008). Acceptance technology between teachers and students were relatively different (Qing, 2007). In general teachers reluctant to use emerging technologies in the classroom. In contrast, students were generally comfortable with technology, enthusiastic about embracing technology in the classroom, and preferred using technology to accomplish educational tasks.

The study found that infusing IT into classroom teaching is more effective than using traditional teaching methods and can promote students' learning attitudes and achievements (Mehra & Mital, 2007). Some scholars have illustrated that integrating technology into the teaching-learning transaction has been found to transform the teacher's role from being the traditional "sage on the stage" to also being a "guide on the side", and student roles also change from being passive receivers of content to being more active participants and partners in the learning process (Kundi & Nawaz, 2011; Mehra & Mital, 2007; Wozney et al., 2006). Students have been expected to respond positively to the process of infusing technology into teaching (Mehra & Mital, 2007).The continuing limited use of emerging technologies in distance learning among higher education teachers appears to be a viable problem, while additional research is needed on the additional factors that may contribute to such limited use (Nawaz, Awan, & Ahmad, 2011). Venkatesh and Bala (2008) suggested that administrators need assistance with determining the elements of perceived usefulness and ease of use that addressed individual differences, system characteristics, social influences and facilitating conditions.

1.3. Research Goal

The main research question that this study addressed is: What are the contributions of emerging technologies reactions (ETsR), emerging technologies understanding (ETsU), and technology competencies (TC) to tutors' and students' intention to use emerging technologies in online tutorials? The current study is an exploratory and predictive study as it attempts to explore and predict intentions of university tutors and students to use emerging technologies in distance learning. Georgouli et al. (2008) confirmed that technology alone is not sufficient because teachers have to understand beforehand the potentials it offers in order to be able to use it effectively in redesigning their educational scenarios. This research was the development of previous study done by Ball (2008). Ball mentioned that although emerging educational technology integration in the classroom has increased in recent years, technology acceptance and usage continue to be problematic for educational institutions. In her study, Ball aimed to predict university instructors' intention to use emerging educational technology in traditional classrooms based on the contribution of computer self-efficacy (CSE), computer anxiety (CA), and experience with the use of technology (EUT), as measured by their contribution to the prediction of behavioral intention (BI). Fifty-six instructors from a small, private university were surveyed to determine their level of CSE, CA, and EUT, and their intention to use emerging educational technology in traditional classrooms. Results showed overall significant models of the three aforementioned factors in predicting instructors' use of emerging educational technology in traditional classrooms. In addition, results demonstrated that CSE was a significant predictor of the use of emerging educational technology in the classroom, while CA and EUT were not found to be significant predictors. Another study from Al-Busaidi and Al-Shihi (2012) indicated that computer anxiety, personal innovativeness, system quality, information quality, management support, incentives policy and training are key factors to instructors' satisfaction of LMS in blended learning. Furthermore, instructors' continuous intention to use LMS was significantly influenced by instructors' satisfaction.

Although many variables have been identified as constructs in prior technology acceptance research, it appears that very little attention has been given in literature to the development of a predictive model of technology acceptance that incorporates Kirkpatrick's learning evaluation model in educational settings particularly in distance learning. The current study measured the contribution of ETsR, ETsU and TC on tutors' behavioral intention (TBI) and students' behavioral intentions (SBI) to use emerging technologies in the online tutorial. Fishbein and Ajzen (1975) defined behavioral intentions (BI) as "a measure of the strength of one's intention to perform a specified behavior" (p. 288). According to Ball (2008) and Legris, Ingham, and Collerette (2003), most acceptance studies do not measure actual system use, but the variance in self-reported use. It appears from literature that the consensus among researchers is that individuals are conscious about their decision to accept a technology; thus, BI is a good indicator of actual use (P. J.-H. Hu, Clark, & Ma, 2003). Moreover, Venkatesh, Morris, Davis, and Davis (2003) found that BI has a significant positive influence on technology usage. They noted that their findings were consistent with all of the intention models reviewed in their research. According to Venkatesh et al. (2003), "the role of intention as a predictor of behavior (e.g. usage) is critical and has been well-established in information systems" (p. 427). Thus, for the purpose of this study, BI was determined and investigated as the dependent variable.

1.4. Research Questions

This dissertation built on previous research (Agarwal & Karahanna, 2000; Ball & Levy, 2009; Saadè & Kira, 2006; M. Y. Yi & Hwang, 2003) by investigating the specific contribution of emerging technologies reaction (ETsR), emerging technologies understanding (ETsU), and the technology competency (TC) on tutors' and students' intention to use emerging technologies in the online tutorial. Figure 1 presents the conceptual map for this study.

The five specific research questions that this study addressed are:

1. To what extent does ETsR contribute to tutors' and students' intention to use emerging technologies in the online tutorial, as measured by the weight of ETsR's contribution to the prediction of BI?
2. To what extent does ETsU contribute to tutors' and students' intention to use emerging technologies in the online tutorial, as measured by the weight of ETsU's contribution to the prediction of BI?
3. To what extent does TC contribute to tutors' and students' intention to use emerging technologies in the online tutorial, as measured by the weight of TC's contribution to the prediction of BI?
4. Which construct out of the three independent variables (ETsR, ETsU, or TC) provides the most significant contribution to tutors' and students' intention to use emerging technologies in the online tutorial?
5. What are tutors' and students' perceptions of technology skills, perceived technology barriers, behavioral intentions to use, and actual use of emerging technologies in UT?

1.5. Theoretical Framework

The objective of this study is to uncover the important factors affecting the tutors' and students' behavioral intention to use emerging technologies. In order to provide a solid theoretical basis for examining the important antecedents for ETs usage, this study integrates the classification of technology competence levels from Tomei (2005), learning and training evaluation theory (D. L. Kirkpatrick, 1998) and two important streams of literature under the structure of the theory of reasoned action (TRA) (Fishbein & Ajzen, 1975): the technology acceptance model (TAM) (F. D. Davis, 1989; F. D. Davis et al., 1989) and the theory of planned behavior (TPB) (Ajzen, 1991). It also uses the diffusion of innovations theory (E. M. Rogers, 1983).

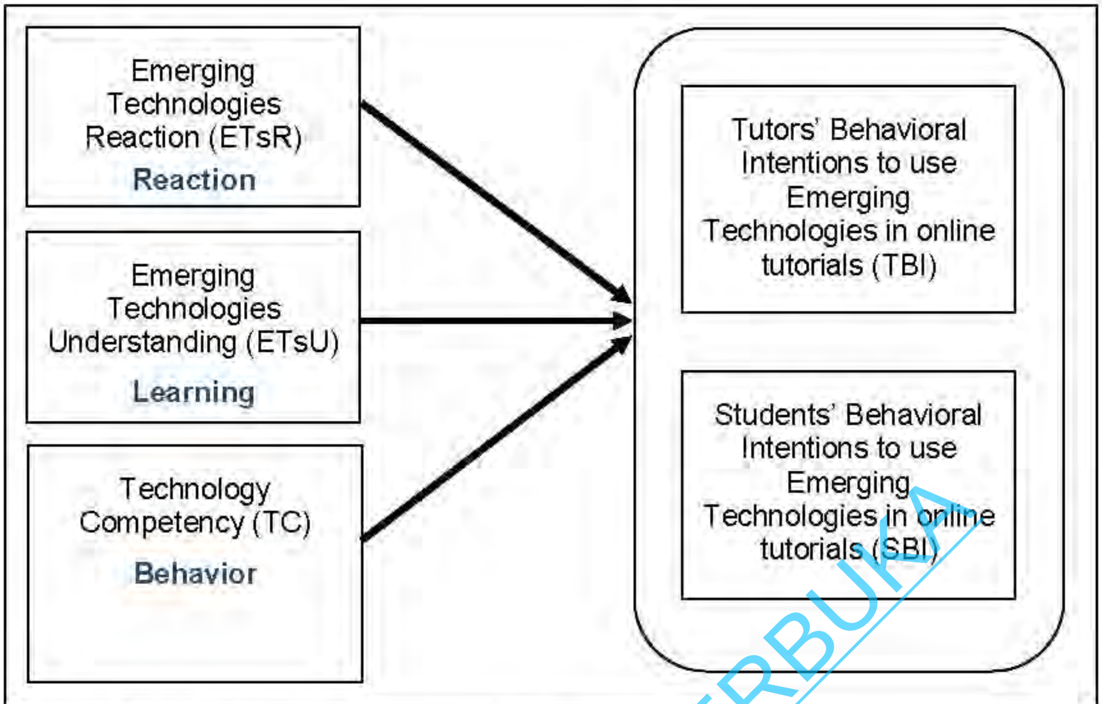

Figure 1.The Conceptual Research Map

In TAM, behavioral intention is determined by attitude towards usage as well as by the direct and indirect effects of two system features: perceived usefulness and perceived ease of use (F. D. Davis, 1989, 1993). The value of TAM in technology-adoption research has been consistently important and widely accepted (Bernadette, 1996; Venkatesh & Davis, 2000). However, as E. M. Rogers (1995) argues, diffusion of innovative technology is highly related to communication channels, individuals, organizational members, and social system in addition to the technology itself. It is clear that technology acceptance could only be partially explained by TAM since both human and social factors should also be incorporated and considered simultaneously (C.-D. Chen et al., 2007).Therefore, together with TAM, TPB is selected to provide a necessary theoretical premise for the research model examined in this study.

1.6. Objectives of the Study

The main goal of this study is to empirically investigate the contribution of tutors' and students' ETsR, ETsU, and TC to their intention to use emerging technologies in distance learning, as measured by the weight of their contributions to the prediction of BI. A secondary, but related purpose of this study is to identify, from the tutor's and student's perspective, the key factors that encourage or inhibit tutors and students to embrace emerging technologies in online tutorial. More specifically, this study aims to address the following research questions that emerged from the literature review (Doyle, Stamouli, & Huggard, 2005; Gong, Xu, & Yu, 2005; Sun & Zhang, 2006; R. Thompson et al., 2006; Venkatesh, 2000). The insights derived from this research provide UT leaders and faculty with credible information on tutors' and students' preferences and overall emerging technologies acceptance in support of their studies in online tutorial environment.

The specific goals of this study are:

1. To empirically assess tutors' and students' emerging technologies reaction (ETsR) and its contribution to their intention to use emerging technologies in online tutorial.
2. To empirically assess tutors' and students' emerging technologies understanding (ETsU) and its contribution to their intention to use emerging technologies in online tutorial.
3. To empirically assess tutors' and students' technology competencies (TC) and its contribution to their intention to use emerging technologies in online tutorial.
4. To determine which construct out of the three independent variables (ETsR, ETsU, or TC) has the most significant contribution to tutors' and students' intention to use emerging technologies in online tutorial.
5. To explain tutors' and students' perceptions of, technology skills, perceived technology barriers, behavioral intentions, and actual use of emerging technologies.

1.7. Relevance of this Study

The rapid diffusion of the emerging technologies has not only generated a renewed interest in the role of new information and communication technologies (ICTs) in higher education and learning, but it has also affected the ways people teach and learn (N. Park, Lee, & Cheong, 2007). One impact of developments in technology is a significant rise in institutions offering online flexible learning opportunities (Monica & Rita, 2005). Higher education institutions can increase their chances of survival by using emerging technologies to improve education (Ozdemir & Abrevaya, 2007). New delivery systems provide an opportunity to tap into more national and international markets than the traditional classroom (Renes & Strange, 2011). Emerging technology is already helping to improve education by eliminating barriers of time and space (Renes & Strange, 2011) and providing accessibility and flexibility to learners who may not have been able to attend traditional educational institution (Conole, de Laat, Dillon, & Darby, 2008). Conole et al. (2008) suggested that students are immersed in a rich, technology-enhanced learning environment and that they select and appropriate technologies to their own personal learning needs.

Garrison and Kanuka (2004) confirmed that higher educational stakeholders should acknowledge and accept that there have been significant and irreversible changes in societal demands, funding shortfalls, competition, technological innovations, and student demographics. Therefore, higher education institution must adopt and utilize educational technology. Ozdemir and Abrevaya (2007) showed that size, public/private status, and location significantly predicted its actual adoption of technology-mediated distance education. One reason institutions are increasing their distance education opportunities is that students are requesting it (Renes & Strange, 2011). Students want the flexibility that distance delivery offers, allowing them to combine work and study demands.

Computer systems and software are often introduced into organizations to increase productivity and performance, however this increase in productivity will not occur if the new technology is not utilized (F. D. Davis et al., 1989). It is still not clear as to how emerging technologies are being used to promote student learning in the classroom (Oncu, Delialioglu, & Brown, 2008). Oncu et al. noted the importance of paying attention to what influences tutors have in integrating emerging technologies in their classrooms, and attending to their individual needs. In addition, many higher education institutions have recommended the implementation of ETs. However, little research has investigated the factors affecting university students' adoption and use of ETs (S. Y. Park, Nam, & Cha, 2012). The TAM is a useful framework to explain the factors that affect users' intention and actual use of emerging technologies in online tutorials (N. Park et al., 2007). Thus, the relevance for the current study was that it investigated factors that contribute to tutors' and students' acceptance of emerging technologies that has been developed specifically to respond to current demands of open and distance learning.

1.8. Significance of this Study

The potential benefits of emerging technologies in distance learning are more visible when they are fully integrated into learning process. According to Casal (2007) social, political and cultural factors are the most important ones influencing the outcomes of an ICT program. Distance learning should be challenged from being based on the model of a traditional classroom and we can propose emerging technologies in the virtual classroom. Distance education uses telecommunicating, audio conferencing and asynchronous learning networks. Learners use computers and the Internet. Interaction among learners also supports the learning process (Alfred P. Rovai, 2002). Little research of teachers' perceptions about distance education is available. Students' perception of teacher is relevant to teacher education program because the perspective comes from the student who is engaging in the distance education and our understanding of these perceptions helps the teacher education program for subsequent students (A. E. Young, 2003).

Demand for non-traditional techniques and technologies in delivering courses seems to be on the rise. This investigation of tutors' and students' behavioral intentions to use emerging technologies may make a useful contribution to the growth and development of strategies that might help higher education institutions introduce online education programs that speak to the specific needs and interactions of their teachers and students. Thus, the significance of the current study lies in investigating key constructs that are contributing to tutors' and students' intentions to use emerging technologies in distance learning. As a result of the information provided by these findings, tutors and students in higher education institutions will be able to accommodate emerging technologies into curriculum reform to embrace distance education as a valid delivery method. Furthermore, I hope that the appropriate emerging technologies will be refined and developed to support teacher education programs as a result of the findings of this study. The findings of this study could also be used in broader studies focused on the instructional emerging technologies that integrate ICT into learning support materials for designing effective distance learning process. Finally, this study could enhance the "design experiments" and other development research as suggested by T. C. Reeves (2000).

1.9. Assumptions of the Research

It is assumed that the tutors and students have working knowledge of the basic technology tools that are available in online teaching and learning environments. It is also assumed that tutors and students engaged in online tutorials at UT have previously used an established technology, enabling them to make comparisons between established and emerging technologies in online learning environments. Emerging technologies are continual and recent innovations that are predicted to continue; their advantages or disadvantages are still unclear. Established technologies are innovations that have been known and steady for their benefits and usefulness, e.g., email. As an important note, tutor and student use of e-mail will not be considered as use of emerging technologies in this study. Additionally, I inquired about the extent to which specific emerging technologies such as Moodle (course management system) and Facebook are used.

1.10. Delimitations

There are several delimitations in this study. This study limited the participants to higher education tutors and students at a distance learning university. Also, although tutors and students may currently be using other technologies, only intention to use emerging technologies for communication, information retrieval and creation in distance learning is investigated. Moreover, although many other predictors of behavioral intentions have been researched, this study only focused on emerging technologies reaction (ETsR), emerging technologies understanding (ETsU), and technology competencies (TC).

All components in four level of learning of Kirkpatrick's model are useful . However, in this study is only focus on the first three levels, namely; reaction, learning and behavior based on two reasons. Firstly, the reasons taken into consideration are the limited time frame, the cost of research, and access to respondents. Secondly, understanding the level of learning and learner support is also important in terms of how to integrate emerging technologies in learner support, particularly in online tutorials. This study hopefully can generate meaningful description, rich interpretation and detailed information concerning emerging technology.

Closed-ended questions are used because the data analysis will be relatively straightforward compared to open-ended questions, even though several open-ended questions are deployed to investigate tutors' and students' perceptions and practices of emerging technologies.

1.11. Barriers and Issues

There are several barriers to this type of research. One barrier that hampers research in this area is the rapid rate of change in technology (Baylor & Ritchie, 2002). This study addressed this issue by investigating multiple emerging educational technologies over a short period of time in online tutorial; for example Learning Management Systems, Web 2.0 tools, communication tools, information retrieval tools, and creation tools. According to Baylor and Ritchie, additional barriers are the differing opinions of tutors and students as to the purpose of using emerging technologies in distance learning and the evolving understanding of how use of emerging technologies promotes tutors and students learning. Some tutors and students view technology as the subject matter for study, and others view technology as a tool to deliver course content. To reduce confusion about the role and purpose of the emerging technologies under investigation, the purpose of technology was clearly communicated to the participants before they took the survey. Another barrier is the difficulty in determining cause and effect in this type of study (Baylor & Ritchie, 2002). Baylor and Ritchie suggested that "the intertwining of complex variables in such a rich environment as a school precludes the pure isolation necessary to determine cause and effect" (p. 396). Baylor and Ritchie addressed this issue by limiting the factors investigated to those most supported in the literature. Accordingly, while there are many variables that contribute to technology acceptance, this study limited the variables investigated to those most supported and validated in the literature.

One issue is that Office of Research Ethics (ORE) approval is required to use tutors and students as survey participants. ORE training completion and approval for the specific research study were attained. Permission for authorization for data collection was received from Simon Fraser University. Access to tutors and students to participate in the survey was also an issue. Permission for authorization for access to tutors and students' email address was received.

Collection of data was another issue, and response rate may have been impacted by the web-based survey method selected. All tutors and students were approached to encourage participation in the survey and technical assistance was provided to those tutors and students who needed help. These steps should ensure greater participation from tutors and students across the country. Participation was voluntary and all responses are anonymous to ensure the confidentiality of the participants.

1.12. Overview of the Dissertation

This chapter presents an introduction to the dissertation, including the background of the problem; problem statement; purpose of the study; research questions; significance, theoretical framework for the research, assumptions of the study; definition of terms; delimitations of the study. Chapter 2 provides the literature review, and Chapter 3 presents the methodology. Chapter 4 presents statistical findings related to tutors' and students' behavioral intentions, technological barriers and challenges in the online tutorial. It also presents the results of the open-ended questions. Chapter 5 discusses the answers to the research questions based on the findings of the study, as well as implications of the findings for UT and recommendations for practice and future research.

1.13. Definition of Terms

- **Asynchronous Communication** – a means of collaboration whereby students and faculty have the option to participate at their convenience (Palloff & Pratt, 2007).
- **Behavioral Intention (BI)** – A measure of the strength of one's intention to perform a specified behavior (Fishbein & Ajzen, 1975).
- **Collaborative Learning** – A procedure in education intended to help students learn by working together (Bruffee, 1995).
- **Computer Understanding and Experience Scale (CUE)** – An instrument developed to assess users' general knowledge of computer uses and the breadth of the users' TC (Potosky & Bobko, 1998).
- **Computer User Self-Efficacy Scale (CUSE)** – A two-part instrument surveying users' ETsR and TC (Cassidy & Eachus, 2002).
- **Computer Self-Efficacy (CSE)** – A judgment of one's capability to use emerging technologies (computers) in the future when faced with a new or unfamiliar situation (Compeau & Higgins, 1995; R. Thompson et al., 2006).
- **Decomposed Theory of Planned Behavior (DTPB)** – Extension to TPB that identified eight additional components to explain some of the antecedents to the original TPB variables more fully (S. Taylor & Todd, 1995b).

- **Digital Divide** – "The chasm between those who use Internet technologies to improve their lives and those who do not" (Quay, 2001, p. 1).
- **Emerging Technologies (ETs)** – Tools, concepts, innovations, and advancements that are utilized in diverse educational settings to serve varied educational purposes, and that can be described as evolving organisms existing in a state of "coming into being" (Veletsianos, 2010).
- Emerging technologies reactions (ETsR) -- somebody's *initial* response to emerging technologies during the learning process
- Emerging technologies understanding -- the way users of ETs understand and enhance their knowledge of ETs in educational contexts
- Technology competencies (TC) -- the user's experience with, ability to select and apply, and capacity to explore information and communication technology (ICT), especially with computers, to solve problems
- **Educational Technology** – "Educational technology is a complex, integrated process that involves people, procedures, ideas, devises, and organizations for analyzing problems and implementing, evaluating, and managing solutions to these problems" (Saettler, 2004, p. 16).
- **Emerging Educational Technology** – Emerging information technology applied to educational settings (Nilsen & Purao, 2005).
- **Emerging Information Technology** – Technological innovations with the potential to significantly change the creation, storage, manipulation or transmission of information; and in the process, create or transform industry or markets (Day, Schoemaker, & Gunther, 2000).
- **Experience With the Use of Technology (EUT)** – The amount and type of computer skills a person acquires over time (B. Smith, Caputi, Crittenden, Jayasuriya, & Rawstorne, 1999).
- **Hyper Text Markup Language (HTML)** – The main markup language for displaying web pages and other information that can be displayed in a web browser.
- **Objective Computer Experience (OCE)** – The totality of externally observable, direct and/or indirect human-computer interactions that transpire across time (B. Smith et al., 1999).
- **Online Courses** – Online courses are courses that do not require face-to-face interaction or meetings between students and faculty. In online courses, students

and faculty collaborate anywhere and at any time over the Internet (Hiltz & Goldman, 2005).

- **Online Tutorial** – A voluntarily online course that complements an offline course. Students use synchronous and asynchronous communication to get advice from their tutors or their peers on assignments and administrative problems. Tutors give advice and tasks in online forums to be solved by students individually or by a group of students.
- **Social web** – A participatory medium that provides the opportunity for participants to engage in individual and collaborative narrative (Ohler, 2009). This collaboration among participants is performed through web-based applications and services that provide blogs, wikis, podcasts, and image, audio and video sharing.
- **Social Networks** – Web-based networks that are created for people to interact, communicate, and collaborate with one another. "Social networks offer the ability to capture and analyze a more complete and objective record of peoples' actions and interactions automatically over time" (Schlager, Farooq, Fusco, Schank, & Dwyer, 2008, p. 87).
- **Synchronous Communication** – Direct communication with each other at the same time, but not necessarily in the same physical location. Presence and temporal coordination of all parties communicating is necessary for successful synchronous communication to occur. Synchronous communication may comprise two-way audio and video teleconferencing, live chat, and instant messaging (Hiltz & Goldman, 2005; Waltz, 2003)
- **Subjective Computer Experience (SCE)** – A private psychological state, reflecting the thoughts and feelings a person ascribes to some existing computing event (B. Smith et al., 1999).
- **Self-Efficacy (SE)** – The belief that one has the capability to perform a particular behavior (Bandura, 1977).
- **Technology Acceptance** – The demonstrable willingness within a user group to employ information technology for the tasks it was designed to support (Dillon & Morris, 1996).
- **Technology Acceptance Model (TAM)** – Classical information systems model developed to explain computer-usage behavior and constructs associated with acceptance of technology (F. D. Davis, 1989; F. D. Davis et al., 1989).

- **Theory of Planned Behavior (TPB)** – Model that includes the influence of perceived behavioral control, attitude, and subjective norm on technology acceptance (Ajzen, 1991).
- **Theory of Reasoned Action (TRA)** – Theory that suggests that the best predictor of behavior is intention (Fishbein & Ajzen, 1975).
- **Unified Theory of Acceptance and Use of Technology Model (UTAUT)** – Integrates elements from eight different technology acceptance models (Venkatesh et al., 2003).
- **Web 2.0.** – A set of web-based applications that are fluid in nature (Lorenzetti, 2009). The content as well as the direction of these applications is established by the users.

1.14. Summary

Chapter One has served to introduce this study, identify the research problem to be addressed, and present a theoretical foundation. The research problem that this study addresses is the continuing limited technology acceptance among tutors and students for using emerging technologies in online tutorials (Belawati, 2005). A definition of emerging technologies has been presented, along with a discussion of the major issues related to the use of emerging technologies within distance education environments. The main streams of research upon which this study was founded have been described. Specifically, research studies related to emerging technology, technology acceptance, and the constructs of ETsR, ETsU, and TC have been presented and discussed. Supporting literature from the fields of information systems (IS), technology, education, business, psychology, management and marketing have been drawn upon.

Chapter One has also presented a measurable research goal and five specific research questions this study have been addressed. The main goal of this study is to predict university tutors' and students' intention to use emerging technologies in online tutorials based on the contribution of ETsR, ETsU, and TC. Evidence of the need for this work was presented from literature (Debevec et al., 2006; Dillon & Morris, 1996; Hiltz & Turroff, 2005; Leidner & Jarvenpaa, 1995; Saadè & Kira, 2006; Woods et al., 2004). Research indicates that, although institutions have made large investments in technology, many technologies have been underutilized or abandoned completely due to low user acceptance. As the specific constructs of ETsR, ETsU, and TC have been identified from technology acceptance literature as having a significant influence on technology acceptance, a discussion of these constructs was presented and provided the framework for the current study (Agarwal & Karahanna, 2000; Ball & Levy, 2009; Compeau & Higgins, 1995; Venkatesh, 2000).

The relevance and significance of this study have also been presented in this chapter. The relevance of this study stems from the need of higher education institutions to compete and serve the needs of an increasingly diverse population of distance-learning students who are scattered throughout the country. Therefore, UT offers a fast, reliable and affordable interactive communication channel using ETs, specifically the Internet, in the structure of online tutorials. UT must implement effective learning support systems for students that suit their needs, characteristics, accessibility, learning cultures and styles, as well as the availability of technology and institutional capacity,. According to the literature, the appropriate use of emerging technologies has the potential to meet these needs (Al-Musawi, 2007; J. C. Collins, 2001; Conole, de Laat, Dillon, & Darby, 2007; Garrison & Kanuka, 2004; Hiltz & Turroff, 2005). Thus, the relevance for this study is that it has investigated factors that contribute to tutors' and students' acceptance of emerging technologies that have been developed specifically to respond to current demands of higher education. The significance of this study was demonstrated by the work of researchers such as Agarwal and Karahanna (2000), Tao and Rosa Yeh (2008), as well as Viswanath, Cheri, and Michael (2002). According to their research, additional research is necessary to more fully examine the factors involved in tutors' acceptance of emerging technologies and its use in the classroom. Thus, the significance of this study is to investigate key constructs that are contributing to tutors' and students' intentions to use emerging technologies in distance learning.

The final sections of the chapter have included a discussion of the known delimitations, barriers and issues associated with this study. The chapter concludes with a definition of terms used in this study, along with their acronyms.

2. Literature Review

2.1. Introduction

In this chapter, a comprehensive literature review is presented to review the relevant literature associated with technology acceptance, especially within educational environments, and I lay the theoretical foundations for the current study. An effective literature review helps the researcher understand existing research and where new research is needed, provides a solid theoretical foundation, justifies the contribution of the study, and validates and frames the research approach (Levy & Ellis, 2006). Conducting a sufficient information system (IS) literature review is especially challenging, as IS literature is interdisciplinary by nature and spread out among many databases and literature vendors (Levy & Ellis). According to Levy and Ellis, "quality IS research literature from leading, peer-reviewed journals should serve as the major base of literature review as it provides sufficient theoretical background" for additional research (p. 185). Following this recommendation, to ensure that a sufficient foundation is laid for this study, a wide search of the IS literature domain is conducted, and supporting literature is drawn from a variety of fields, including IS, technology, education, business, psychology, management and marketing. A methodological approach is used to search quality, peer-reviewed and valid sources to find key, fundamental studies that will support and frame this research. The following main streams of research relevant to this study are identified from the literature domain: (a) history of distance educational technology, (b) educational technology trends and issues, (c) pedagogy of online teaching and learning, (d) tutors' emerging technology acceptance (e) students' emerging technology acceptance, (f) challenges in using emerging technologies in education, and (g) the future of technology in education. Three relevant constructs are also identified in the literature domain as important in technology acceptance literature: emerging technologies reactions (ETsR), emerging technologies understanding (ETsU), and the technology competency (TC). A thorough examination of each of these areas was conducted to discover what is already known within each area, and to frame the constructs, research questions and approach for this study. This process ensured that this study and its approach are sufficient, based on a sound theoretical foundation, and make a significant contribution to current research and practice.

2.2. Philosophical Foundation

Accepting ETs in education requires continuous development, change, experimentation, construction of new methods, and active participation of all involved in the process. Mastering ETs is no longer just the educators' authority, as they are not the only source of knowledge, but also involves the students, who are required to have ETs skills. Educators must transcend one-way methods of teaching and move to multi-dimensional, student-centered teaching that requires active student participation (Ahmed, 2011). Teaching is the ability to use the bond between teacher and student to create a positive and productive way of learning. Distance learning brings with it a possible paradigm shift from linear to multimedia learning, from instruction to construction, from teacher-centric to learner-centric education, from absorbing material to learning how to browse and learn, from school to lifelong learning, from one-size-fits-all to customized learning, from learning as torture to learning as fun and from teacher as transmitter to the teacher as facilitator and guide (Dinevski & Kokol, 2012).

This study explores the emerging technologies acceptance and tutors' and students' behavioral intentions to use ETs in online tutorials. The philosophical framework for this study is comprised of the theories of behaviorism, pragmatism, and constructivism. Behaviorism focuses on mutual connections. Both pragmatism and constructivism emphasize the active contribution of students in the construction of their learning.

2.2.1. Behaviorism

The purpose of emerging technologies acceptance is to transform one's mind and culture, providing a way to explore possibilities and opportunities. ETs must be seen as prospects and should embody a way of thinking that is technical, exploring all possibilities agendas and inherent tendencies. Behaviorism is primarily concerned with observable and measurable aspects of human behavior (J. B. Watson, 1913). Behaviorists believe that all behavior is learned, and they believe that new learning is a result of acquiring new behavior patterns by means of environmental conditioning (Ozmon, 2012). Behaviorists claim that it is possible to determine the stimulus and the response. The identification of the stimulus and the response serves as a determinant for observing behavior. J. B. Watson (1913) believed if stimulus and response can both be identified, the behavior can be observed, studied, understood and perhaps modified, because stimuli direct the behavior. According to Parkay, Anctil, and Hass (2005) prior conditioning and psychological drives existing at the moment of action affect individual decision making. Ozmon (2012) points out the behaviorist perspective that a careful study of how behavior is developed will produce insight into how desirable conditions and behaviors may be created, controlled, and predicted. Conventional-technology-based learning is built around the behaviorist theories of knowledge, assuming that reading, watching videos or operating the digital gadgets refers to "active learning" (L. D. Young, 2003). Learning occurs through the teacher presenting the student with the required stimuli along with the required behavioral responses within an effective reinforcement regime.

Skinner (1972) also believed that behavior could be controlled through reinforcement. It is similar to rewards. Reinforcement may not work in different situations. A successful reinforcement in one situation may not be a successful one in another situation. An appropriate reinforcement is whatever works get a significant change in behavior (Roberts, 1975). Faculty and student support have been identified as critical factors in the success of educational technology adoption. Therefore, assisting faculty and students in the emerging technologies acceptance process with competent advice and convincing perspectives is crucial. To establish a support network, UT must also initiate a strategic process to establish favorable support conditions and a support culture.

2.2.2. Pragmatism

John Dewey was an American philosopher whose ideas have been influential in education and social reform. Dewey was an important early developer of the philosophy of pragmatism, which emphasized the need for students to be actively involved in their learning. He believed that students learn much more from practical experimentation than from classroom-taught lessons (Hickman, Davidson, & Davidson, 2001; Spring, 2011). Dewey placed educators in a pivotal role in student learning and asserted that the science of education did not exist in books, laboratories, and classrooms but, rather, in the minds of the educators (Biesta & Burbules, 2003). Dewey argued that education and learning are social and interactive processes. In the pragmatic method of education, knowledge is considered holistic because students learn through cooperative group activity (Spring, 2011). Deweyan learning takes place outside and inside the walls of the classroom; it leads to more questions and never to a perfect, absolute answer (Hickman et al., 2001).

The pragmatic method is "a method for settling metaphysical disputes that might otherwise be interminable" (James, 1907, p. 45). James believed pragmatism supported the principle that human being could be wrong about their beliefs, expectations, or their understanding of the world, and it views truth as contemporary, ever-changing and a matter of degree. The pragmatists emphasis on the purpose of research inquiry was simply to "fix" a situation, or as outlined by Dewey, "the controlled or directed transformation of an indeterminate situation into one that is so determinate in its constituent distinctions and relations as to convert the elements of original situation into a unified whole" (Dewey, Hickman, & Alexander, 1998, p. 171).

One of the concerns of this research is to investigate the acceptance of the emerging technologies that are being used in online tutorials. These emerging technologies consist of Learning Management Systems, Web 2.0 tools, communication tools, information retrieval tools, and creation tools. The success of these technology tools depends on the active participation and engagement of students, which connects this concern with pragmatism as it relates to education. Pragmatic theory emphasizes active student participation in learning and highlights the need for social and collaborative learning methods. It provides both a philosophical or methodological middle ground, allowing both quantitative and qualitative data collection and analysis methods to be used to answer certain research problems.

2.2.3. Social Constructivism

There are different perspectives on constructivism, but for pedagogical purposes relevant to this study, constructivism is concerned with how learners construct their own knowledge (Kivinen & Ristelä, 2003). Learners are identified as 'active seekers' who come into the learning environment with innate goals and interests. The theory states that truth or knowledge is made or constructed by the learner and not discovered or uncovered, and that humans are constantly involved in growing and transforming their knowledge through the active construction of new knowledge (Ozmon, 2012). Social constructivism emphasizes collective learning, where the role of teachers, parents, peers and other community members in helping learners becomes prominent (Kundi & Nawaz, 2010). Social constructivist learners construct new knowledge based on what they already know from their previous experiences and interactions with others. Social constructivists believe that learning is active, contextual and social; therefore, the best method is 'group learning' where the teacher is a facilitator and guide (Tinio, 2012).The focus is on the student, where fundamentals include discovery learning, teachers as facilitator and information provider, and students as agents of their own learning (Cadiero-Kaplan, 1999). Vygotsky, who was a major contributor to social constructivism, believed the importance of students' social interaction and defined students' everyday experiences as "spontaneous learning." Vygotsky claimed that, in order to gain experience in their conceptual understanding, students require spontaneous learning through everyday activities inside and outside a formal classroom environment (Ozmon, 2012).

Technology tools provide opportunities for students to engage in spontaneous learning away from the typical classroom environment. As such, constructivist theory also provides a framework for this research and helps explain the factors that affect tutors' and students' behavioral intentions to use ETs in online tutorials. Social constructivists clarify technology acceptance as a process of involving social groups into the innovation process where learning takes place via the learners' experiences, knowledge, behaviors, and preferences (Bondarouk, 2006).

2.3. Theoretical Foundation

A proliferation of literature has been generated to explain the acceptance of technology, including the most relevant articles from E. M. Rogers (1995) and F. D. Davis (1989). Rogers's diffusion of innovation theory describes the evaluation, selection, adoption and diffusion process, using a combined explanation of theories, including the decision process and perceived attributes of an innovation (Powell, 2008). Davis's technology acceptance model (TAM) is a way to explain and predict technology acceptance of an information system by its end users (Visuvalingam, 2006). Classification of technology levels from Tomei (2005) and the learning evaluation model from D. L. Kirkpatrick (1998) also give relevant frameworks for this study.

2.3.1. Classification for Technology Competencies Levels

Integrating technology into the learning process encompasses more than teaching basic computer literacy or using technology for collaboration and decision-making. Lawrence Tomei (2005) developed a classification for technology levels to correspond with the taxonomy levels of Bloom's taxonomy. Tomei includes six progressive levels for classification of objectives, and includes specific verbs to activate thinking and learning at each level: (1) **Literacy**: this level is the minimum degree of competency expected of teachers and students with respect to technology, computers, educational program, office productivity software, the Internet, and their synergistic effectiveness as a learning strategy; (2) **Collaboration**: learners are able to employ technology for effective interpersonal interaction such as word processing, desktop publishing, email, and newsgroups; (3) **Decision-making**: helps the learners to use technology in a new and concrete situation to analyze, assess and judge via technology through spreadsheets, and brainstorming software; (4) **Infusion**: learners analyze available technology, and identify, harvest, and apply technology to learning strategies; (5) **Integration**: learners create new technology-based learning material; and (6)**Tech-ology**: learners are able to appraise, argue, judge, assess, compare, and defend the universal impact, shared values, and social implications of technology and its influence on teaching and learning.

According to Tomei (2005), true integration of technology does not occur until the fifth level of hierarchy. Technology integration should support four key components of student learning: active engagement, group interaction, feedback, and replication of real world situations (Tomei, 2011). For the purpose of this study, I use three categories of emerging technologies adapted from Tomei's taxonomy. These categories are: (1) communication technologies, including synchronous and asynchronous communication (i.e., email, audio or video conferencing); (2) information retrieval technology—technology for searching and retrieving information in the forms of text, images, audio and video (i.e., online library, Google Scholar and YouTube); and (3) creation technology—technology for creating learning materials (i.e., Wikipedia, blogs).

This study explores issues and concerns relating to the pedagogical uses of certain emerging technologies for learning across the curriculum—particularly distance learning. Within the classification of technology domain proposed by Tomei's taxonomy and the technology acceptance evaluation model proposed by D. L. Kirkpatrick (1994, 1998), there is a need for a paradigm shift beyond the acquisition of tools (i.e., literacy), their use for communication (i.e., collaboration) and decision-making if tutors and students want to get the benefit of a greater access to technology. A review of the literature has suggested that the integration of technology into teaching and learning is typically affected by the following four factors: teachers' technology skills, teachers' technology beliefs, teachers' perceived technology barriers (Hew & Brush, 2007) and "authentic experiences" (Brush & Saye, 2009). Accordingly, the problem addressed in this study is the tutors' and students' perceptions of, knowledge, skills, behavioral intentions, and actual use of emerging technologies in UT. Institutions considering emerging technologies may be able to predict the value of those technologies by better understanding the tutors' and students' perceptions of and behaviors toward the systems. Understanding the tutors' and students' perception of, knowledge, skills, behavioral intentions related to, and actual use of emerging technologies, institution decision makers can align the organization's strategic goals, the educational objectives of the tutors' and students, and the technologies themselves to take advantage of their opportunities and capabilities.

2.3.2. Learning Evaluation Models

This study adopts Kirkpatrick's learning evaluation model (D. L. Kirkpatrick, 1994, 1998; D. L. Kirkpatrick & Kirkpatrick, 2006). It is the most well-known and widely used framework for classifying areas of learning evaluation. In this model, he developed a conceptual framework to aid in determining what data are to be collected. Kirkpatrick's model calls for 4 levels of evaluation and gives answers to very important questions.

Kirkpatrick's model provides a strong basis for examining factors that contribute to users' (teachers and students) acceptance of technology. Kirkpatrick's model represents a sequence in which technology acceptance can be evaluated. A meta analysis by Alliger et al. (1997) examine the results of 34 studies that yielded 115 correlations among the four levels of training evaluation. The researchers augmented Kirkpatrick's model by further dividing reactions into affective reactions and utility judgments. Affective reactions reflect how much the trainees liked or enjoyed the training. Utility judgments reflect the perceived usefulness of the training. Utility reactions had a significant correlation with learning (r=0.26). Reaction measures that combined affective and utility measure also correlated significantly with learning (r=0.14). The way in which D. L. Kirkpatrick (1998) and Alliger et al. (1997) perceive the learning process will be used in this study.

D. L. Kirkpatrick and Kirkpatrick (2006) describe the four levels of learning in their evaluation model as representative of a sequence of ways to evaluate instruction and learning support material. Kirkpatrick suggest that with each progressive level, evaluation becomes more difficult, but more useful information is obtained (D. L. Kirkpatrick, 1998).

Level 1: **Reaction**. Reaction may be defined as how well learners like instruction and instructional material or parts thereof. In the past, cognitivists explored mental processes from the perspective of cognition rather than affect. According to D. L. Kirkpatrick and Kirkpatrick (2006) learners' initial reaction to instruction will influence the quality and quantity of learning that takes place. D. L. Kirkpatrick (1998) emphasizes that a positive reaction may not guarantee learning, but a negative one will almost certainly preclude it. A positive reaction would be evident in how much learners "like" an instruction. How much they enjoy it, and how easy and understandable they find it, will be reflected in affective expressions of general satisfaction (Alliger et al., 1997), which will cultivate a positive attitude towards instructional material. In addition to this, perceived usefulness of instructional material will also contribute to feelings of satisfaction. One way in which learners express their perceptions of its usefulness is through utility judgments in which they convey their beliefs about the value and usefulness of the instruction, as well as their beliefs about the potential for practical application in related tasks (Alliger et al., 1997). The objective at this basic level is to gauge learners' reactions to the new technology. The typical course evaluation survey measures reaction. D. L. Kirkpatrick and Kirkpatrick (2007) emphasize that the feedback contributes significantly to the improvement of future programs and to the enhancement of the learning environment. However, researchers have empirically demonstrated the weak correlation between trainee reactions and other evaluation criteria, suggesting that trainee reactions should not be utilized as their only indicator for training evaluation(Alliger & Janak, 1989; Alliger et al., 1997).One effort to overcome this problem was to distinguish trainee reactions into affective and utility reactions(Alliger et al., 1997). In their meta-analyses, Alliger et al. (1997) showed that stronger correlations were found between utility reactions and learning or job performance than between affective reaction measures and learning or job performance.

Level 2: **Learning**. Kirkpatrick considers learning as change on an intellectual level, namely increasing knowledge, developing or improving skills and changing attitudes (D. L. Kirkpatrick, 1998). Alliger and Janak (1989, p. 331) defined level 2 as “principles, facts, and techniques understood and absorbed by the trainees”. According to Kirkpatrick no change in behavior will occur without learning. For Kirkpatrick, increased knowledge refers to the amount of content learned: in effect, concepts and principles mastered; skills refer to improvement of performance and technique; and attitude refers to how positive a person feels towards the training. Learning can also refer to which principles, facts, elements and techniques were understood and absorbed by learners (Clementz, 2002).

There are different kinds of learning. For example, momentary learning and temporary retention of knowledge; relevant, unintended learning; acquisition of inert knowledge serving a purpose only when placed into a context and; formal learning (Price, 1998). Alliger et al. (1997) refine Kirkpatrick’s model in their meta-analysis by classifying learning (level 2) into three categories: immediate knowledge, knowledge retention, and behavior/skill demonstration. The first category, immediate knowledge, utilizes multiple choice test responses, open-ended questions, and listing of facts to evaluate trainees’ knowledge. The second category, knowledge retention, is similar to immediate knowledge but is administered at a later point of time rather than just after training. Course exams, tests, or surveys measure this kind of change. The last category, behavior/skill demonstration, comprises any indicators of behavioral proficiency that are measured during the training. D. L. Kirkpatrick (1998) emphasizes immediate retention as the amount of knowledge acquired at the conclusion of an intervention. D. L. Kirkpatrick and Kirkpatrick (2007) recommend that a skills assessment after instruction will measure the learning that has taken place.

Level 3: **Behavior**. Behavior is regarded as the extent to which change in behavior has occurred because the participants attended the training program (D. L. Kirkpatrick & Kirkpatrick, 2006). True learning can be considered to have taken place when knowledge and skills learned in one domain are applied in another situation (Osman & Hannafin, 1992). The implication is thus that change in behavior is constituted by demonstrated transfer and application of knowledge, skills and attitudes in new situations (D. L. Kirkpatrick, 1998). According to Kirkpatrick, behavior cannot be changed unless learners' have had the opportunity to demonstrate it. He also claimed that it is impossible to predict when a change in behavior will occur. Change can take place at any time, ranging from immediately after the intervention to a situation where it may never happen. However, behavior can only be changed if transfer of knowledge has taken place (D. L. Kirkpatrick, 1998). To assess this level, an evaluator must determine whether participants' new knowledge, skills, or attitudes transfer to the job or another situation, such as a subsequent course.

Level 4: **Result**. Result refers to the achievement of goals of training in terms of reduced costs, higher quality, increased production and lower rates of employee turnover and absenteeism. This level measures the success of the program in terms managers and executives can understand. From a business and organizational point of view, this is the overall reason for a training program, yet level four results are not typically addressed in an educational institution. It is not possible to evaluate "results" as it is difficult to measure and is hard to separate from other variables. The fourth level could refer to assessing how students perform on the job after graduation.

All four levels of evaluation may be useful for both formative and summative purposes. The first two levels of reactions and learning focus on the learning environment or experience, and are captured at the close of training in the training setting by the training facilitator. In contrast, the next two levels of behavior and results focus on the transfer of training to the work environment are captured in the work setting and require management involvement. As such, the first two levels are the most often examined by trainers and researchers because they are more immediate and are often easier to measure. As mentioned earlier, the first level of trainee reactions is by far the most popular measure for those organizations that evaluate training. Therefore, this study only focus on exploring the utility of the reaction and learning measure. Due to time limitations, level 4 is not investigated. Kirkpatrick recommended the use of control group comparisons to assess a program's effectiveness at the last level or the higher levels.

2.3.3. Theory of Technology Acceptance Model

In this review of the technology acceptance literature, two theories have emerged that have been used to explain teachers and students acceptance of various technologies. These two theories are Technology Acceptance Model (TAM) (F. D. Davis, 1989, 1993; F. D. Davis et al., 1989) and Theory of Planned Behavior (TPB) (Ajzen, 1991; Fishbein & Ajzen, 1975; Schifter & Ajzen, 1985).In 2003, Venkatesh et al. (2003) identified eight models of information technology acceptance research. Their study formulated a unified model integrating elements from each of the eight models. The unified and extend of technology acceptance model are described below.

2.3.3.1. Theory of Reasoned Action

The Theory of Reasoned Action (TRA) is a model which states that a "person's performance of a specified behavior is determined by his or her behavioral intention to perform the behavior" (F. D. Davis et al., 1989). This intention is determined by the attitude and perception that the people important to the user would influence behavior (Fishbein & Ajzen, 1975). This is the theory that Davis modified to develop the Technology Acceptance Model. Igbaria (1994) utilized both TAM and TRA to the study of microcomputer technology acceptance. Her research concluded that both individual attitudes and situation variables impact whether an individual will accept a new technology (Igbaria, 1994; Igbaria, Guimaraes, & Davis, 1995).

Fishbein and Ajzen (1975) described how attitudes are formed by asserting that understanding human behaviors required separate evaluation of four key variables: (1) beliefs, (2) attitudes, (3) intentions, and (4) behaviors (p. 10). Fishbein and Ajzen suggested readiness is a mental state or attitude and is, therefore, tied to predispositions toward new situations or innovations. They stressed the importance of experiences to the formation of attitudes as well as belief systems, knowledge, and intention. They emphasized that positive or negative past experiences affected how individuals learned and contributed to how they accepted or rejected innovations.

The theory of reasoned behavior from Fishbein and Ajzen (1975) suggested that separate analyses of beliefs, attitudes, intentions, and behaviors are essential in evaluating attitude formation, change, and resulting behaviors. The researchers observed, "Attitude is probably the most distinctive and indispensable concept in contemporary American social psychology" (Fishbein & Ajzen, 1975, p. v). They indicated that attitude is a general feeling of "favorableness or unfavorableness towards some stimulus objects" (Fishbein & Ajzen, 1975, p. 216). One key element presented by Fishbein and Ajzen is "cognition," defined as "knowledge about behavioral intentions, opinions, beliefs, and thoughts"; another key element is "conation," which defined behavioral intentions (Fishbein & Ajzen, 1975, p. 12). Another element is "behavior or observed overt acts". They found that past events, beliefs and experiences all affect the elements that form attitudes that lead to behaviors. Fishbein and Ajzen believed favorable and unfavorable behaviors and favorable and unfavorable responses consistently provided knowledge of attitudes. When those attitudes are understood, then behaviors could be predicted in one or more ways, and when an individual's predisposition is established, it is expected he or she will or will not perform the behavior in question (Fishbein & Ajzen, 1975, p. 9). Fishbein and Ajzen (1975) asserted that contributors to predispositions and attitudes are measured in multiple ways and one method of determining the attitudes is through single question interviews and surveys that measured likes and dislikes.

2.3.3.2. Technology Acceptance Model

The technology acceptance model was developed by F. D. Davis (1989)and F. D. Davis et al. (1989) and it has been applied widely in understanding behavioral and motivational issues in computer and software adoption and usage. Two of Davis' articles are particularly relevant to this study. The first is titled "User Acceptance of Computer Technology: A Comparison of Two Theoretical Models". In this longitudinal study, Davis and his team surveyed 107 users about their intent to use a particular system. Fourteen weeks later, the same users were surveyed again. The study found that perceived usefulness strongly influenced intentions (F. D. Davis et al., 1989). The second study was in two parts. The first section surveyed 112 users determining their opinions about software programs they already used. The second part of the research focused on 40 users after they had received training. Both perceived usefulness and perceived ease of use were determinants of current usage and predicted future usage (F. D. Davis, 1989).

The behavioral intention to use information technology is jointly determined by the perceived usefulness (PU) of the information technology and the attitude toward using it. It means that individual attitudes toward using computers and software are in turn determined jointly by PU and perceived ease of use (PEU). Davis' studies specify the causal relationships among system design features, perceived usefulness, perceived ease of use, attitudes toward usage, and actual usage behavior (F. D. Davis, 1993). In his studies, perceived usefulness and perceived ease of use are the two independent variables and system usage is the dependent variable. Davis' findings indicated that, although indirectly affecting attitude through its effect on usefulness, perceived ease of use has a "fairly small direct effect on attitude" (F. D. Davis, 1993, p. 482). Davis mentioned that perceived usefulness, however, demonstrated a very strong effect on actual use through attitude. Venkatesh et al. (2003) also studied TAM extensively and evaluated its use as a predictor of user behaviour.

TAM is linked to Social Cognitive Theory by these two key constructs determining use: PU and PEU (S. Davis & Wiedenbeck, 2001). PU is defined as user's subjective perception of the extent to which a computer system or software will aid work performance while PEU refers to the extent to which the user expects a computer system or software to be easy to learn and use. Therefore, PU is a measure of outcome expectations for using information technology and PEU is a measure of users' perceptions on how easy it is to carry out desired courses of actions using computer systems or software. It is notable in TAM that PEU is used as a measure of process expectations and PU, as a measure of outcome expectations after actions. In addition, The TAM has been proven as a promising theoretical model among the various models developed to examine users' intentions to use computer and communication technology (Bernadette, 1996; Gefen & Straub, 1997; Moon & Kim, 2001; S. Taylor & Todd, 1995b; Venkatesh, 1999; Venkatesh & Davis, 1996).

Extensive research has been conducted investigating the variables associated with technology acceptance in a wide variety of settings (Agarwal & Prasad, 1998; Dillon & Morris, 1996; S. Taylor & Todd, 1995b). As a result, several theoretical models have been developed to explain both users' intention to use technology and actual technology use (Agarwal & Prasad, 1998; Venkatesh et al., 2003). The Technology Acceptance Model (TAM), proposed by F. D. Davis (1989), is the classical model developed to explain how users perceive and use technology. The TAM is based on the Theory of Reasoned Action (TRA), which posits that the best predictor of behavior is intention (Fishbein & Ajzen, 1975). Although research on TAM has provided insights into technology usage, it has focused on PEU and PU as the determinants of usage rather than on other factors affecting users' determinants. Additionally, TAM suggests that users will use computer technology if they believe it will result in positive outcomes. In TAM, it does not explicitly consider how users' capabilities influence their perceived behaviors. The TRA is especially helpful regarding behavior, as it asserts that other factors that influence behavior do not do so directly but indirectly by influencing attitudes and subjective norms (F. D. Davis et al., 1989). The TAM extends the TRA and suggests that PU and PEU determine an individual's behavioral intention to use a technology.

Legris et al. (2003), identified a shortcoming of TAM to be the non-inclusion of external variables, however the TAM model was generally consistent, and that both TAM and TRA predict intention well. And after an extensive investigation of technology acceptance factors identified in IS studies, Legris et al. suggested that TAM should be integrated into a broader model that identifies additional variables that influence technology acceptance. According to Davis et al. (1989), there is a substantial body of empirical data in support of TRA. However, Davis et al. suggested that a model comprised of elements from both TAM and TRA might provide a more complete view of the determinants of user acceptance. In an empirical assessment of the model, Davis et al. found that the combined model predicted intention better than either model by itself. However, TAM has been used to explain or predict user's behavioral intentions on a variety of emerging technologies, such as electronic commerce (Çelik & Veysel, 2011; Ha & Stoel, 2009), wireless Internet (S. Kim & Garrison, 2009), intranet systems (Horton, Buck, Waterson, & Clegg, 2001), telemedicine technology (P. J. Hu, Chau, Sheng, & Tam, 1999; Kowitlawakul, 2011), Internet-based course management systems (Brett, Rodger, & Sandra, 2006; Hashim, 2008), learning management systems (Al-Busaidi & Al-Shihi, 2012; Kamla Ali & Hafedh, 2010), smart phones (Yong-Wee, Siong-Hoe, Kung-Keat, Check-Yee, & Shahril Bin, 2010), Internet banking (V. S. Lai & Li, 2005) and digital library systems (N. Park, Roman, Lee, & Chung, 2009).

R. Thompson et al. (2006) also believed that technology adoption needs to be approached in a more holistic fashion, and developed an integrative model that extended DTPB. Thompson et al. revealed strong influences of personal innovativeness and self-efficacy. In another study that integrated TAM and TPB, C.-D. Chen et al. (2007) believed the overall explanatory power of their research model was high and explained a high proportion of the variance in BI. Chen et al. suggested that integrating

TPB with TAM might provide a more complete understanding of BI, and recommended further research into possible moderating factors that may contribute to BI.

Integrating constructs from various models into a single model, with the goal of providing one comprehensive model that would predict intention more accurately, has been done by researchers (Sun & Zhang, 2006; Venkatesh et al., 2003). Venkatesh et al. developed the Unified Theory of Acceptance and Use of Technology model (UTAUT), which integrated elements from eight different technology acceptance models. The UTAUT investigated four main variables and four moderating variables to determine their influence on technology acceptance. The UTAUT was a useful tool to predict factors associated with technology acceptance. Although the new model outperformed the eight individual models, Venkatesh et al. recommended further research to identify additional constructs that will improve the ability to predict the user's intentions and behavior.

2.3.3.3. Theory of Planned Behavior

Some researchers believed that technology acceptance is more complex than originally thought, and have investigated other variables that influence acceptance (S. Taylor & Todd, 1995b; R. Thompson et al., 2006). TRA and TAM have strong behavioral elements and predict intention well, but they are limited in explanatory power and do not account for other factors that may influence technology acceptance (Sun & Zhang, 2006; R. Thompson et al., 2006; Venkatesh & Davis, 1996). Ajzen (1991) extended the TRA theory and developed the Theory of Planned Behavior (TPB) by empirically investigating the influence of perceived behavioral control, attitude, and subjective norms on technology acceptance. TPB is a well-researched model which is widely used in predicting and explaining human behavior across a variety of settings while also considering the roles of individual and social systems in the process (Ajzen, 1991). TPB identifies three attitudinal antecedents of behavioral intention. Two reflect the perceived desirability of performing the behavior: attitude toward outcomes of the behavior and subjective norms. Perceived behavioral control also reflects perceptions that the behavior is personally controllable (Ajzen, 1987, 1991). Ajzen found that the TPB is highly accurate in its predictions of user's behavioral intention, and that people generally behave in accordance with their intentions. As the focus of this study in on the ETs setting, which is considered as an instance of the acceptance of innovative technology intertwined with social systems and personal characteristics, the integration of TAM and

TPB for in this study framework should be performed in a more comprehensive manner to examine the intention and acceptance of emerging technologies.

S. Taylor and Todd (1995b) test a decomposed TPB model that in some cases provided a better understanding of relationships than TAM. S. Taylor and Todd (1995b) use a decomposed TPB to examine the specific antecedents to attitude, subjective norms, and perceived behavioral control in attempting to make TPB consistent and generalizable across different settings. The TPB is a valid model to explain pre-service teachers' acceptance of technology, specifically in terms of their behavioral intention to use technology (T. Teo & Tan, 2012).

2.3.3.4. Model Combining Technology Acceptance Model and Theory of Planned Behavior

As researchers used the TAM in their studies, they began to add other factors from the TPB. Since there are several studies linking the two theories, Venkatesh et al. (2003) identify such studies in a separate category. F. D. Davis, Bagozzi, and Warsawa (1992) believed usefulness and enjoyment mediated the perceived usefulness and ease of use of the participants. Lim (2003) used a combination of the TAM and TPB to study the adoption of negotiation support systems and found it to be valid. Combining the TAM and the TPB, Chau and Hu (2002) did not find that these theories are effective for studying technology acceptance by individual professionals in a healthcare setting. On the other hand, other studies found that the integration of TAM and TPB confirms its robustness in predicting users' intention to use new technology (Hongwei "Chris", Hui, & Liuning, 2012; H. Yang & Zhou, 2011)

2.3.3.5. Motivational Model

The effect of motivation on user acceptance has developed into a separate model. Both extrinsic and intrinsic motivation have been found to impact new technology adoption (Lee, Cheung, & Chen, 2005; Malhotra, Galletta, & Kirsch, 2008; Shang, Chen, & Shen, 2005; Shroff & Vogel, 2009; T. S. H. Teo, Lim, & Lai, 1999; Venkatesh et al., 2003; Zhang, Zhao, & Tan, 2008).

2.3.3.6. Model of PC Utilization

The Model of PC Utilization (MPCU) is based primarily on Triandis' theory of human behavior (Triandis, 1977). The constructs for the model include social factors and long-term consequences. R. L. Thompson, Higgins, and Howell (1991) modified and developed Triandis' model for information system contexts and used the model to predict PC utilization. They wanted to predict usage behavior rather than intention. Bagchi, Hart, and Peterson (2004) addressed one of these constructs in their research on the impact of national culture. Culture is likely to play a role in Information Technology (IT) adoption.

Waiman, Man Kit, and Vincent (2000) utilized the MPCU in a study of World Wide Web users. Their study confirmed that facilitating conditions and social factors should be part of an acceptance theory. A study of a groupware application by Li, Lou, Day, and Coombs (2004) used attachment theory to research individual motivation and intention to use a technology. The theory seems to be subset of MPCU (Ball, 2008).

2.3.3.7. Theory of Diffusion Innovations

Change is measured and assessed by a method known as diffusion (Banks, 2002). According to E. M. Rogers (1995, p. 10), "diffusion is a process through which a new innovation is communicated through specific channels over a period of time, among the members of a social system" (p. 10). Diffusion theory has been used for years to determine the acceptance and spread of any new technology within an organization, and it is most relevant in describing the evaluation, selection, and adoption of any new technology (Banks, 2002; Powell, 2008). Rogers' innovation decision process theory states that an innovation's diffusion is a process that occurs over time through five stages: Knowledge, Persuasion, Decision, Implementation, and Confirmation. Accordingly,

> the innovation-decision process is the process through which an individual (or other decision-making unit) passes from first knowledge of an innovation to forming an attitude toward the innovation to a decision to adopt or reject to implementation of the new idea, and to confirmation of this decision. (E. M. Rogers, 2003, p. 168).

E. M. Rogers (1995) described innovation, communication channels, time, and social systems as the four main elements that constitute to diffusion. All four of these elements are relevant to this research. Introduction of new emerging technologies tools within the online environment is representative of innovation. Various communication channels, such as tutorials, lessons, and training sessions, are used by educators and administrators to introduce and train students and faculty in new technologies. The element of time in this research is reflected in the time that it takes for instructors to adopt a certain technology and for students to learn to use it. Social systems are the fourth element of diffusion. Students in online tutorials create and engage in learning communities to help each other learn new technology tools. Faculty are engaged in similar social systems among peers and often receive formal support from their educational institution through faculty training and development programs.

According to E. M. Rogers (2003), people's attitudes toward a new technology are a key element in its diffusion. Since Rogers used the terms 'innovation' and 'technology' interchangeably, the diffusion of an innovation framework seems particularly suited for the study of the diffusion of ICT. Due to the novelty of emerging technologies and their related technologies, studies concerning technology diffusion in education have often focused on the first three phases of the innovation decision process. This is also because the status of newer forms of emerging technologies in education are, to a great extent, still uncertain. Albirini (2006) observed in cases where such technologies have been very recently introduced into the educational system, as is the case in most developing countries, studies have mainly focused on the first two stages—that is, on knowledge of an innovation and attitudes about it.

E. M. Rogers (2003, p. 267) made the observation that "individuals in a social system do not all adopt an innovation at the same time". He classified individuals in "adopter categories" based on when they first began using an idea and identifies five adopter categories, called "ideal types," based on "abstractions from empirical investigations" (E. M. Rogers, 2003, p. 282). Based on Rogers' analysis, it should be possible to understand the ideal types among tutors and students; and to design approaches for each type in order to establish frameworks that increase knowledge regarding TA. Rogers defined five stages of the adoption process categories in table 1.

Table 1. Five Stages of the Adoption Process (E. M. Rogers, 2003)

Stage	Definition
Knowledge	The individual is first exposed to an innovation but lacks information about the innovation. During this stage of the process the individual has not been inspired to find more information about the innovation.
Persuasion	The individual is interested in the innovation and actively seeks information/detail about the innovation.
Decision	The individual takes the concept of the change and weighs the advantages/disadvantages of using the innovation and decides whether to adopt or reject the innovation. Due to the individualistic nature of this stage, Rogers notes that it is the most difficult stage to acquire empirical evidence.
Implementation	The individual employs the innovation to a varying degree depending on the situation. During this stage the individual determines the usefulness of the innovation and may search for further information about it.
Confirmation	The person finalises his/her decision to continue using the innovation. This stage is both intrapersonal and interpersonal; confirmation that the group has made the right decision.

The definitions presented by E. M. Rogers (2003) are significant when determining how to prepare individuals and communities for new ideas in the form of technologies and innovations. Rogers believed ideas and innovations are diffused by organizations and social systems through opinion leaders and change agents with defined roles who support or block adoption of the new ideas (E. M. Rogers, 2003). He observed that innovators who are the most technologically ready are often not connected to social networks, but that early adopters and early majority are connected to such networks.

E. M. Rogers (2003) discussed the role of opinion leaders in the adoption of new ideas. He indicated that new ideas are adopted by social units or social systems where leaders perform key roles in introducing new ideas. He showed that opinion leaders function in “diffusion networks” that are systems of communications and dictate “the degree to which an individual is able informally to influence other individuals’ attitudes or overt behavior in a desired way with relative frequency” (E. M. Rogers, 2003, p. 300). Rogers underlined the importance of understanding how to overcome the barriers of getting new ideas adopted and how the absence of local input can delay adoption of innovations. He emphasized that authority figures, followers, and change agents promote change through spontaneous or the planned spread of new ideas. Rogers’ views are summarized in his observation, “Getting a new idea adopted, even when it has obvious advantages, is difficult” (E. M. Rogers, 2003, p. 1).

There are many characteristics cited by E. M. Rogers (2003) that are important to comprehend in order to understand how ideas spread through cultures. Opinion leadership is a significant category in diffusion theory where opinion leaders have access to external communications and as a result of travel have access to mass media, exposure to change agents, and interface with different groups of professionals. The opinion leaders are accessible to interpersonal networks where they participate socially and have higher economic status than do followers. Opinion leaders will generally adopt new ideas before followers and are innovative even if they are not innovators. The opinion leaders will reflect the norms of their social systems and will be part of organizations used to diffuse innovations (E. M. Rogers, 2003).

Table 2. Intrinsic Characteristics to Adopt or Reject an Innovation (E. M. Rogers, 2003)

Factor	Definition
Relative Advantage	The improvement of an innovation over the previous generation.
Compatibility	The level of compatibility that an innovation has to be assimilated into an individual’s life.
Complexity or Simplicity	If the innovation is perceived as complicated or difficult to use, an individual is unlikely to adopt it.
Trialability	How easily an innovation may be experimented with. If a user is able to test an innovation, the individual will be more likely to adopt it.
Observability	The extent that an innovation is visible to others. An innovation that is more visible will drive communication among the individual’s peers and personal networks and will in turn create more positive or negative reactions.

The characteristics of opinion leaders are relevant to tutors who incorporate the characteristics of well-educated people with exposure to learning materials and access to external communications. Opinion leaders are individuals who are part of networks that can diffuse innovations and ideas rapidly. Rogers’ diffusion theory should have significant application to diffusion of emerging technologies among learner groups.

The theory of diffusion innovations was developed to study any innovation, not only technological ones (Venkatesh et al., 2003). L. Chen, Gillenson, and Sherrell (2002) combined the Innovation Diffusion Theory (IDT) with the TAM to study consumers and online virtual stores and found that they were valid theories. The key issue explored in my research is how tutors' and students' accept emerging technologies in online tutorials. Roger's diffusion theory provides a theoretical framework to answer this research question.

2.3.3.8. Social Cognitive Theory

Social Cognitive Theory (SCT) addresses constructs such as self-efficacy, affect, and anxiety in determining usage behavior (Bandura, 1986; Bandura, Adams, & Beyer, 1977; Venkatesh et al., 2003). In a study of the relationship between the enjoyment users get from the software and their perceived usefulness and ease of use, Agarwal and Karahanna (2000) found that that the amount of "playfulness" in the software or skill being studied could positively influence the perceived usefulness and ease of use.

SCT has been used in several studies. These include: a study supporting the significance of self-efficacy and outcome expectations by D. Compeau, C. A. Higgins, and S. Huff (1999) and research supporting the impact of computer playfulness and computer anxiety by Hackbarth, Grover, and Yi (2003). A study which is relevant to this research, in that it utilized Blackboard course management software, was performed by M. Y. Yi and Hwang (2003). Their research combined SCT and TAM. Enjoyment, learning goal orientation, and application-specific self-efficacy affected use positively.

2.3.3.9. Unified Theory of Acceptance and Use of Technology

Venkatesh et al. (2003, p. 425) tested the eight models—The Technology Acceptance Model, the Theory of Planned Behavior, the model combining the Technology Acceptance Model and the Theory of Planned Behavior, the Theory of Reasoned Action, the Motivational Model, the Model of PC Utilization, the Innovation Diffusion Theory, and the Social Cognitive Theory—and found that they "explained between 17 and 53 percent of the variance in user intentions". They then developed the Unified Theory of Acceptance and Use of Technology (UTAUT). It uses core determinants and moderators from the previous models. Tests using UTAUT produced higher percentages than the other models, indicating that it may be a more accurate model for predicting technology acceptance.

2.3.3.10. The Extension of the Technology Acceptance Model (TAM 2 and 3)

Venkatesh and Davis (2000) proposed an extension of TAM—TAM2—by identifying and theorizing about the general determinants of perceived usefulness—that is, *subjective norm, image, job relevance, output quality, result demonstrability,* and *perceived ease of use*—and two moderators—that is, *experience* and *voluntariness*. The first two determinants fall into the category of social influence and the remaining determinants are system characteristics. TAM2 presents two theoretical processes—*social influence* and *cognitive instrumental* processes—to explain the effects of the various determinants on perceived usefulness and behavioral intention. In TAM2, subjective norm and image are the two determinants of perceived usefulness that represent the social influence processes. Both social influence processes (subjective norm, voluntariness, and image) and cognitive instrumental processes (job relevance, output quality, result demonstrability, and perceived ease of use) significantly influenced user acceptance (Venkatesh & Davis, 2000). In addition, TAM2 theorizes that three social influence mechanisms—compliance, internalization, and identification—will play a role in understanding the social influence processes (Venkatesh & Bala, 2008).

As in the original TAM constructs by F. D. Davis (1989), Venkatesh and Bala (2008) determined there is some relevance among employees at companies regarding perceived usefulness, job relevance, output equality, results and perceived ease of use. However, when those factors are not present, employees may not have engaged the technology, and IT investments could be wasted (Venkatesh & Bala, 2008). In other words, a major capital investment in technology can be lost if there is not sufficient attention paid to ease of use and perceived usefulness. Venkatesh and Bala found that experience with technology and a feeling of voluntariness rather than compulsory requirements are factors that influenced employee acceptance of new technologies.

In TAM 3, Venkatesh and Bala (2008) identified disparities between large investments in IT and the potential for non-use or low acceptance levels among employees. They determined there is some relevance among employees at companies regarding perceived usefulness, job relevance, output equality, results and perceived ease of use; however, when those factors are not present, employees may not engage the technology and IT investments could be wasted (Venkatesh & Bala, 2008). Findings by Venkatesh and Bala could be useful for administrators introducing new technologies who need to determine if non-use or low-use among users could result in costly delays or rejection of technologies.

Findings in TAM 3 indicated that low adoption and underutilization of technology are in conflict with large investments in IT and expected increases in productivity. Venkatesh and Bala (2008) suggested that managers need assistance with determining the elements of perceived usefulness and ease of use that address individual differences, system characteristics, social influences and facilitating conditions.

There was a need to understand how various interventions can influence the significant predictors of ETs adoption and use. In view of the fact that these predictors have important implication for managerial decision making on ETs implementation in institutions, managers can proactively help teachers and students make appropriate decisions about adopting and utilizing new ETs.

2.4. The History of Distance Educational Technology

According to Warschauer (1998), cited by Gruba and Hinkleman (2012) in their book *Blending Technologies in Second Language Classroom*, the history of technology in education started with the concepts of computers and other devices as 'deterministic' transformers of education. The next era, an 'instrumental' view, saw computers as aids in support of learning, and, nowadays, computers are seen to be 'embedded' in learning environments. A broader definition of technology based on Howland, Jonassen, and Marra (2012) states:

> Technology consists of the designs and the environments that engage learners. Technology can also consist of any reliable technique or method for engaging learners, such as cognitive learning strategies and critical thinking skills. (p.7)

The Internet has had a significant effect on education and has led to unprecedented development and innovation in the field of education. Ubiquitous access to the Internet across the globe has revolutionized teaching and learning and has taken distance learning in new directions (Valentine, 2002). In addition, Tuomi (2007) noted that the industrial and communication revolution of the current decade relies on broadband communication networks and has resulted in a global division of labor. Specialization of human skills and knowledge are no longer limited by place or distance.

These innovations in technology have resulted in the physical delocalization of knowledge. In this regard, Bindé (2002) defined distance education as education that is democratic and adaptable to every person's needs. It is a form of education that is omnipresent and can be provided to everyone, everywhere, at any time. Developing and underdeveloped nations that do not possess the resources for conventional brick-and-mortar education must rely upon distance education as a viable alternative. Bindé further noted that the goal of education in the 21st century is to make distance education the key to unbounded education.

Distance education theoretical frameworks have been evolved differently in different parts of the world. Distance education is a complex global phenomenon with multiple terms, meanings, theoretical concepts and models. Given that distance education relies on technical modes of communication, its structure changes with the use of varying modes. Based on the mode of communication used, distance education has been categorized into five generations (J. C. Taylor, 2001). These are the correspondence model, multimedia model, tele-learning model, flexible learning model, and intelligent flexible learning model.

The first generation of distance education refers to correspondence model. Print-based modes of communication are primarily used for delivery of instruction and communication between teacher and learners; student and content; and teacher and content in this model (Garrison, 1989). One of the disadvantages of this model is tutor response. Although the learners have flexibility in place, time and pace, the late response from tutors cannot be avoided in the indirect communication between learners and teachers. The direct and indirect communication and interaction between students and peers are almost not available (Collis, 1996; Collis & Moonen, 2001).

The conceptual orientations of distance education develop primarily in the areas of independence and autonomy, and interaction and communication, especially with respect to the use of technology. Independence and autonomy refer to the student's independent study (Wedemeyer, 1981). Wedemeyer emphasized technology adoption as a way to implement that independence. Following Wedemeyer's theory, Moore (1994,

2007) categorized distance education programs into autonomous (learner autonomy) and non-autonomous (teacher autonomy). There is a relationship of learner autonomy and transactional distance. More autonomous learners appear more comfortable with less dialogue. If there is minimal dialogue in a program of high transactional distance, students are motivated to find their own resources and make decisions for themselves about what to study, where, when, how and to what extent. The greater the transactional distance, the more the learners have to be more autonomous (M. G. Moore, 2007). An additional concept of distance education is proposed by Borje Holmberg (1995, 2007). He emphasized interaction and emotional involvement as a core to the teaching process. The independence promoted by students' flexibility of choice can make an important contribution to their continuing education as life-long independent learners (Holmberg, 1995, 2007).

The second generation of distance education is characterized by the use of various modes and the rise of open universities or institutions primarily focused on distance education (Bates, 1995, 2005). The establishment of Open University in the United Kingdom in 1971 indicated that distance education received recognition (L. M. Black, 2007; Garrison, 1989; Holmberg, 1986, 1995). The term 'distance teaching' also emerged during this period, which is associated with the use of communicative modes other than print and the Open University. The multimedia model integrates print-based modes with computer based learning, interactive videos and audiocassettes (J. C. Taylor, 2001). The integration of multimedia and print-based modes provides a range of modes for delivery of instruction. The direct and indirect communication and interaction between the teacher and learners is not different from the first generation, but is more intense through individual support by telephone and face-to-face tutorials (Nipper, 1989).

The third generation of distance education is the tele-learning model that is characterized by the use of ICT-based synchronous modes of communication in distance education (Peters, 2003). This era is the era of transforming the distance education paradigm (Bates, 1995, 2005; Garrison, 1989). The synchronous and asynchronous communication and interaction modes used in the tele-learning model involve audio and video broadcasting; audio graphics; audio and video teleconferencing. One of the important factors of these modes is their capability for delivering synchronous face-to-face instruction to the learners. The concept of communication and interaction between teacher and content; teacher and learner; and learner and content are similar to traditional face-to-face education but mediated through synchronous modes of communication. In the tele-learning model, for the first time in the history of distance education, the learners are able to participate in virtual classes in real time and communicate directly with their tutor and peers and vice versa (Bates, 1995). It creates opportunities for tutors to be more present to widen their perspective and reach out to distance learners (Collis, 1996).

The fourth generation of distance education known as the flexible learning model, characterized by the use of asynchronous model of communication, includes interactive multimedia online, Internet-based access to web resources and computer-mediated communication (J. C. Taylor, 1995, 2001). The flexible learning model provides flexibility and independence both for tutor and learner. The learners can learn not only at their own place and pace, but also have access to external resources through the Internet and two-way communication with their tutor and peers (Garrison, 1989). Teachers play a great role in the fourth generation of distance education in the instructional design and pedagogical aspects of the course by integrating subject knowledge and research into designing the appropriate pedagogy for learning to occur (T. Anderson, 2003; T. Anderson & Kuskis, 2007; J. C. Taylor, 1995).

The fifth generation of distance education or the intelligent flexible learning model is a "derivation of the fourth generation, which aims to capitalize on the features of the Internet and the web" (J. C. Taylor, 2001, p. 2). Some emerging technologies of fifth generation distance education are interactive multimedia online, Internet-based access to Web resources, computer mediated communication using an automated response system, and campus portal access to institutional processes and resources. The intelligent flexible learning model "has the potential to deliver a quantum leap in economies of scale and associated cost-effectiveness" (J. C. Taylor, 2001, p. 4). It has the capability to distribute the packages of self-instructional materials online so it will decrease significantly the costs associated with providing access to institutional processes and online tuition, which does not happen in the first and second generation of distance education.

Gruba and Hinkleman (2012) provide a new design for blending technology into teaching and clarifying the new relationship between computers and pedagogies in the fifth generation of distance learning—in other words, the communicative, interactive models that are achieved via new techniques—and the more active role that can be played by learners in their learning process. The techniques are not simply a set of tools but “a range of dimensions that acknowledge what, when and how to stimulate learning” (p. 16). Therefore, blended learning is seen as at its best when used to boost learning, to engage learners, and to support their actions.

The emerging technologies in fifth generation distance education are capable of enabling content-content interaction, which involves Internet-based software programmes responding to each other, such as intelligent agents; teacher-content interaction could turn into a form of content-content interaction (T. Anderson, 2003). The other promising sophisticated emerging technologies include the development of tools of online education which could be used to expand distance learning, such as communication and interaction (synchronous and asynchronous), information retrieval (search engines) and creation (e.g., text, HTML, image, audio and video).

2.5. Emerging Technologies in Distance Education

Many educators believe that the future of emerging technologies in distance education is very bright. High-speed Internet will be common. ETs will likely fundamentally change faculty and students’ behaviors and practices. Faculty have the ability to accommodate ETs, therefore they can launch effective and engaging distance education initiatives in responses to technological advancements, changing mindsets, and economic and organizational pressures (Veletsianos, 2010). Historically, distance education has been negatively known for feelings of learner isolation and alienation (Galusha, 1997), lack of participant interaction, and high student attrition (Peters, 1992). The rise of ETs has attracted attention to the use of popular online learning tools to enhance distance education and address the aforementioned problems (George & Cesar, 2012).

The tools discussed in this section, including LMS, Web 2.0, and asynchronous tools, account for just a few of the most popular technology tools that are being utilized in distance education. These educational technology tools reflect the tendency of paradigm shift of modern education whereby educators and administrators are engaged in utilizing new and emerging technologies to enhance and augment teaching and learning. The three categories of emerging technologies used in this study were communication, information retrieval and creation. These categories come into being in different tools in LMS, Web 2.0, and asynchronous and synchronous technology tools.

2.5.1. Communication Tools

Beldarrain (2006) predicted that use of emerging technologies by online educators would foster learning environments that will produce global collaborations among students and will make them lifelong learners. That is exactly what is taking place in the field of online education. Faculty members are utilizing asynchronous and synchronous collaboration tools, including audio and video conferencing, to help create a borderless and open learning environments in which students are encouraged to think critically and learn collaboratively through global partnerships. Daley, Spalla, Arndt, and Warnes (2008) reported that students were satisfied on the opportunity to learn from each other's experiences across different cultures and systems from a cross continental synchronous collaborative leadership seminar.

Conole (2004, p. 2) claimed that “e-learning is still marginal in the lives of most educators, with technology being used for little more than acting as content repository or for administrative purposes”. But, Gunga and Ricketts (2008) found that e-learning can compete with face-to-face learning in terms of psychosocial and emotional flexibility. They added, however, that there is a need to enhance the audio-visual and interactive capabilities of LMS to compensate for the sensory and emotional loss. Asynchronous tools bring the online experience a step closer to being face-to-face. According to Palloff and Pratt (2007), recent enhancements in synchronous technology highlight the usefulness of this technology in community building and delivery of online courses. However, Newman's (2007) study indicated that there was no significant difference in online communication, online learning, and online community when a synchronous communication tool was added to an online course.

According to Greener (2009), the learning purpose must be clearly communicated in order for the perceived usefulness of the communications tool to encourage students to contribute. This is supported by T. Anderson, Rourke, Garrison, and Archer (2001, p. 6): “Students also need to have a sense of the ‘grand design’ of the course and reassurance that participating in the learning activities will lead to attainment of their learning goals". Faculty are using discussion boards in their online courses to increase active student participation in group-led discussions. These discussions are generally led by students, and the instructor acts as a facilitator. Moffett, Claxton, Jordan, Mercer, and Reid (2007) noted that students who are quiet in face-to-face class meetings are most often the most expressive in online discussions. Such discussions foster a pedagogy in which instructors become facilitator and are mostly responsible for the dynamics of the discussion; the bulk of content is presented and discussed by the students. Face-to-face group meetings are being replaced by online discussions that are much more convenient for students because they eliminate the need for everyone to present at a specific place and time (Christopher, Thomas, & Tallent-Runnels, 2004). Students are able to review and join in discussion threads at their convenience. LMS and online discussion applications are also being employed by administrators and staff personnel in higher education institutions for communication and collaboration.

According to Ludlow and Duff (2009), the Internet has had the most dramatic influence on education as compared to any previous technological innovation because it has allowed individuals of all ages to access education and training programs. Falvo and Johnson (2007) noted that the United States is on the brink of a revolution in education that involves the integration of web-based technology in the learning environment. Web 2.0 technologies are viewed as tools that will elevate teaching and learning from the structured and linear LMS environment to a dynamic and multi-dimensional environment.

Communication and collaborative technologies that involve voice, video, social networking, and sharing of content constitute some of the basic elements of Web 2.0. Web 2.0 technologies add a new dimension to online teaching and learning and provide opportunities for instructor-to-student as well as student-to-student real-time and time-delayed collaboration. These technologies have shifted the role of instructors from deliverers of instruction to that of facilitators of learning and have made learners the center of attention (Askov & Bixler, 1998; Beldarrain, 2006; Gunga & Ricketts, 2008).

Once teachers begin using the online learning tools and sustaining ongoing conversation, they feel less isolated and begin to create a community of learners committed to each other's growth. Harlen and Doubler (2007) emphasized that through online discussion, teachers can share knowledge perceptions and concerns about their practice. Distance learning also helps teachers move away from the traditional model of learning in which an expert presents information; instead, teachers begin to learn from each other, especially with the guidance of a skilled facilitator. It also is an opportunity for teachers to experience and learn to use ICT tools such as databases, simulation, and videos that are applicable in their own teaching of students. They can develop online study groups to collectively examine student work and engage in threaded discussions. Viewing other teachers' practice can help expand teachers' perspectives on their teaching. In addition, study of innovations in teacher professional development suggest that online learning can offer teachers opportunities to participate in a professional community, engage in reflective dialog, and build knowledge collectively (Harlen & Doubler, 2004).

2.5.2. Information Retrieval Tools

A web search engine is designed to search information on the World Wide Web. The Web and especially Web search engines are essential tools for information retrieval (Jansen & Spink, 2006). The search results are generally presented in a list of results. The information may consist of web pages, images, audio, video and other types of files. In order to explore individual attitudes toward search engines, it is necessary to understand the factors that shape individual perceptions toward this kind of technology. In general, the quality of search systems, individual computer and Internet experience, individual acceptance of technology and individual motivation are major factors that affect users' acceptance and use of search engines (Liaw & Huang, 2003, 2006).

The functions of search engines should be mentioned before exploring users' acceptance of them. The term 'search engine' is sometimes used to describe a search tool, but it is more accurate to define this term as a program than a search tool used to perform searches (Liaw & Huang, 2003, 2006). Although various search engines have similar search functions, each one has its own unique search methods.

In general, information-retrieving services on the Web are derived from two basic paradigms: directory services and query-based search engines. Directory services, such as Yahoo!, provide a hierarchical organization of resources, most often developed by human cataloguers who select, index, and annotate links (Callery & Proulx, 1997).

Directory services' careful organization of resources enables rapid discovery and browsing of resources by topic or category—a more intuitive mode of access than keyword selection and query refinement for users (Dempsey, Vreeland, Sumner, & Yang, 2000).In addition, assembling resource links using human indexers offers high quality control when filtering the chaotic resources on the Web (Walters, Demas, Stewart, & Weintraub, 1998). In contrast, directory services are limited primarily due to the high cost of creating, maintaining, and expanding resource lists in the face of constant change and explosive growth on the Web (Beall, 1997).

In contrast to directory services, query-based search engines, such as Excite, provide broad coverage of the Web through intensive automation of the indexing and retrieval process. These services construct databases that are built from robotic collection of remote Web pages and rely primarily on textual input from the user to match a request with a set of Web links. In general, query-based search engines should be comprised of the following components to create powerful retrieval systems (Jenkins, Jackson, Burden, & Wallis, 1999): (1) a robot that continually retrieves documents and analyses them from hyperlinks to other documents in an attempt to provide comprehensive Web coverage; (2) an indexer that uses an information retrieval indexing strategy to extract accurate index terms from the documents; (3) a database where metadata describing each resource is stored; (4) a retrieval mechanism that takes user queries and quickly retrieves and ranks relevant documents from the database; and (5) a good user interface that encourages the user to input a coherent, well-focused query and subsequently presents a clear set of results.

The quality of information system (IS) would affect the use of information technology. DeLone and McLean (1992) suggested that IS quality measures which include information quality and system quality are crucial constructs related to the success of information systems. Since using search engines was within the framework of IS, the beliefs about search engines, such as perceived ease to use, enjoyment, and usefulness, were functions of the IS quality. Although, quality of search engines and Internet response time are important factors that measure the IS success (Chuan-Chuan Lin & Lu, 2000; DeLone & McLean, 1992), people may resist using it due to the slow response time and the information generated by search engines is not what they need. Therefore, the quality of search systems measured by these two variables is considered important in affecting users' perceptions of using search engines (Liaw & Huang, 2003).

2.5.3. Creation Tools

The creation tools in this study refer to authoring work in web 2.0. The tools allow users to create or manipulate—referred to hereafter as authoring—by commenting, editing, mashing, rating and tagging. The term Web 2.0 is commonly associated with web applications in which there is interactive information sharing, interoperability, user-centered design and collaboration on the World Wide Web (Wikipedia, 2012b). Web 2.0 authoring is different from and more promising than previous forms of documenting teaching process and student learning by virtue of the way that it is co-constructed, interconnected, collaborated, continuously updated and composed using mixed media (Alexander, 2006; Richardson, 2010; Zdravkova, Ivanovic, & Putnik, 2012). Some basic terms of Web 2.0 are blogs, wikis, and podcasting. A blog, or web log, is a form of an information or discussion site published on the Internet maintained and updated by the author on a regular basis consisting of discrete entries displayed in reverse chronological order (Wikipedia, 2012a). Blogs may be completely personal in nature or highly technical and professional. In education, blogs lend themselves to explanatory topics or enhancing writing skills, as they provide students with a captive audience (Beldarrain, 2006). Blogs are powerful web tools for teaching and students' learning (Hsi-Peng & Kuo-Lun, 2007; H.-M. Lai & Chen, 2011; Richardson, 2010).

Podcasting is a tool used to distribute content, often audio and video, through a technology known as Real Simple Syndication (RSS). Each content file is known as a feed or episode. Users download and install an RSS application that allows them to sign up for their favorite audio or video feeds and receive notifications when a new feed becomes available (Beldarrain, 2006). Podcasting has transformed higher education by allowing anytime-anywhere delivery of instructional content (Molina, 2006). Podcasts may be downloaded to websites such as iTunes, iGoogle, or MyYahoo and saved on the user's personal computer or smart phone. Beldarrain (2006) reported that podcasting allows new models of teaching by taking advantage of RSS technology to deliver up-to-the minute expert commentaries or enabling students to broadcast their analysis of topics studied.

Wikis are another form of Web 2.0 technologies that have become fairly popular over the last few years. Unlike blogs that are usually authored by one person, a wiki is a collaborative website that is authored by multiple contributors and writers. The concept of a Wiki is to share information on a common page that is accessible to everyone and on which anyone can add or edit the information. Beldarrain (2006) defined a Wiki as a collection of web pages that are linked together and are authored by several individuals. These collaborative web pages often contain embedded resources. A. H. Moore, Fowler, and Watson (2007) added that the usage of Wikis can help build collaboration and communication skills and assist students in generation of new ideas.

The successful development and implementation of emerging technologies depends on students' and faculty's comfort level with technology, monetary resources available to the institution, and visionary leadership of the administrators. The trend in education, however, is moving from conservative use of technology to a more open and collaborative Web 2.0 styles.

2.5.4. Online Tutorial

The online tutorial is a part of a learning management system. A learning management system (LMS) is a software application or web-based technology used to plan, implement, and assess a specific learning process (Techtarget, 2005). It consists of Internet-based applications that integrate a wide range of pedagogical and course administration tools on a single platform. Web CT, Blackboard, Desire to Learn, E-College, Moodle, and Sakai are some of the popular LMSs. Typically, a LMS provides a tutor with a way to create and deliver content, monitor student participation, and assess student performance (Techtarget, 2005).

Internet based online learning has grown significantly over the past decade to provide additional training and education for non-traditional students (Welsh, Wanberg, Brown, & Simmering, 2003). Because intranet sharing is accessible only within the campus where the network resided, Internet-based content management systems are needed (Ahmed, 2011).One structure of the technology enhanced learning environments, called blended learning, combines the Internet with traditional, face-to-face in-class instruction and, depending on the curriculum, can be implemented in a variety of ways where the curriculum, teaching materials, and evaluation are centrally developed, delivered online over the Internet, and implemented in a face-to-face learning environment with live teachers (Delialioglu & Yildirim, 2007). It allows teachers and learners to use the same teaching and learning materials, regardless of region, minimizing the impact of curricular differences between regions. Cakir (2006) says that the risks of achievement differences due to variation in teaching practices and teacher qualities in schools are minimized by blended learning.

LMS has the capacity to create virtual learning environments for face-to-face or online courses (Coates, James, & Baldwin, 2005). Crawford and Thomas-Maddox (2000) described LMS as online computer software that provides instructors with the option of creating and teaching entire courses online or using online components as supplements to face-to-face instruction. LMSs are integrated web-based systems that incorporate course management tools, group chat and discussion, assignment submission, and course assessment on a single platform (Hsiu-Ping & Shihkuan, 2008). They are used to process, store, and disseminate content as well as support administration and communication associated with teaching and learning (E. W. Black, Beck, Dawson, Jinks, & DiPietro, 2007).

LMSs are usually implemented on a large scale across an entire university or college and adopted by the faculty and staff, who use them in a variety of ways to support course management and student learning, including the scaffolding of existing teaching methods (McGill & Klobas, 2009). A relation has been established between students' use of online components of LMS and their overall success in courses (Cavus & Ibrahim, 2007; DeNeui & Dodge, 2006). DeNeui and Dodge noted that individual differences in learning styles influence how students utilize online components and the degree to which they derive benefit from these components.

LMS brings new efficiencies to the teaching process, help in flexible course delivery and use of resources, and finally result in cost savings (Aczel, Peake, & Hardy, 2008; Coates et al., 2005). The use of LMS has become integral to online content delivery. Cavus and Ibrahim (2007) stated that the most important feature of LMS is that it enables students and instructors to meet in a virtual environment.

Numerous LMS are available to college administrators. Falvo and Johnson (2007) found that the most popular LMS used in colleges is Blackboard, followed by WebCT, which was recently acquired by Blackboard. Larger universities with more resources are likely to use open-source LMS for which they have access to the source code of the application and are able to modify it according to their needs (Cavus &

Ibrahim, 2007; Powell, 2008). The greatest benefit of open-source LMS is that it is free and can be modified.

There are a number of studies that have empirically investigated the learners' acceptance, use and/or satisfaction of LMS such as McGill and Klobas (2009), Liaw (2008) and van Raaij and Schepers (2008). This indicates that technology is being utilized to engage students and create an environment of active learning (Ahmed, 2011). Instead of passively listening with the LMS, students are involved and responsible for information and discussions posted online. Students who use LMS are engaged in reading, writing, and discussing. This kind of student involvement requires a higher order of thinking, including analysis, synthesis, and evaluation (Crawford & Thomas-Maddox, 2000).

For instructors to be able to fully utilize the vast functionalities and features available within LMS, it is imperative that instructors are provided with proper training and support (Ahmed, 2011). Faculty should feel comfortable and confident in using the LMS to enhance their classes. McGill and Klobas (2009) concluded that, if instructors have doubts about the value of LMS in their teaching, this can affect student perceptions of technology and, as a result, have a negative impact on learning outcomes. As the developers of LMS continue to add functionalities to meet the diverse needs of educational institutions, the use of LMS is rapidly increasing. For example, administrators are utilizing the secure LMS platform to share and collaborate with fellow administrators, faculty, and staff. Moffett et al. (2007) noted that LMSs provide an effective online structure and help educators and administrators make informed decisions. In addition, Jackson (2007) stated that an online library can be integrated with the LMS by delivering library resources and content within the LMS environment, making it more convenient for students to access library content. Jackson emphasized that educational technologies can be utilized to promote the usage of library resources by students.

(Chang, 2008) asserted that LMS are inefficient and insufficient to meet the needs of faculty trying to engage students in interactive activities and noted that Web 2.0 technologies offer better options for an e-learning environment. Educational institutions have already started to take advantage of the push technology used in podcasting to make content available to students on their handheld devices or computers. Universities such as Stanford and Harvard have made a substantial amount of course content available as podcasts.

UT provides online tutorials to help students to success in their studies. It also triggers and motivates students to be self-learners and independent learners. UT provides the online tutorial as an option to the face-to-face tutorial, particularly for students who have access to the Internet. Online tutorials facilitate two-way asynchronous communication, and they also offers interactive human touch for distance learners (Suparman, 2007).

Tutors can ask students to explore and elaborate what they learn by using available online learning resources. Tutors can give students assignments that require students to retrieve information via the Internet. Through exploring available learning resources via the Internet, students will achieve new meaningful understanding about new knowledge. In order to make use of available learning materials, students have to manage their time, effort, and learning strategies. These activities in online tutorials make students more independent (Noviyanti & Wahyuni, 2007).

The first time UT provided an online tutorial was in 1999 using an electronic mailing list. By the end of 2002, the electronic mailing list system was replaced by the more efficient and comprehensive Manhattan Virtual Classroom (MVC) software. In September 2002, an electronic tutorial system using the MVC application software was socialized with the new title called “online tutorial". In 2004, this MVC-based online tutorial system was replaced with learning management system (LMS), using free ,open-source Moodle. In this new online tutorial system, the students can be served individually, and they can also have access to other learning services, such as dry lab, academic calendar and independent examination learning materials.

2.6. Emerging Technology Trends and Issues

Over the last two decades, the use of ICT has been an important topic in education. Many studies have shown that ICT can enhance teaching and learning outcomes. For example, in science and mathematics education, scholars have documented that the use of ICT can improve students’ conceptual understanding, problem solving, and team working skills (Culp, Honey, & Mandinach, 2005). The quality of education can be enhanced in several ways using ICT by facilitating the acquisition of basic skills, increasing learner engagement, motivation, and enhancing teacher professional development (Wadi & Sonia, 2002). As a result, most curriculum documents state the importance of ICTs and encourage teachers to use them. However, teachers need to be specifically trained in order to integrate ICT into their teaching (Markauskaite, 2007). However, many opponents are still in doubt because the evidence supporting its benefits remains questionable (Reynolds, Treharne, & Tripp, 2003; Underwood, 2004; Wellington, 2005). The most common research problem is an inability to isolate ICT as an independent variable (Chandra & Lloyd, 2008; Gunawardena & McIsaac, 2004; Ritter & Lemke, 2000).

A major challenge for adult educators has been to discern the effect of ICT use on student learning outcomes. Demirbilek (2009) investigates how recent potential uses in ICT have created new opportunities and challenges for adult education, impacting on the way we teach, learn and deliver education. Furthermore, the use of ICT facilitates adult learning principles, namely: non-linearity; instant feedback; allowing the learners to reflect their opinions and experiences; and motivation. D. Watson (2006) emphasizes that ICT is seen by educationalist as both a means and a catalyst to innovate education. However, many adult learners use ICT in informal learning rather than in formal settings (Selwyn & Gorard, 2004). Since informal learning is an extremely important part of an individual's learning experience and can have all kinds of social and, in some cases, economic benefit, promoting engagement in informal learning online could potentially raise an interest in more formal, certified types of learning among adult learners (Eynon & Helsper, 2011). Perraton and Creed (2000) describe three main approaches to the use of ICT for adult education, specifically the use of mass media: to support state literacy campaign; to offer equivalence to schooling, both for adult and for disadvantaged children; and to reach scattered audiences particularly in agriculture and health sector. In addition, they suggest that education needs to builds on the general local state of development of technology rather than lead it.

One of the impacts that ICT produces in face-to-face education is immediate access to facts, information, people, services, and live events (Bates & Poole, 2003; Harasim, 1990; Palloff & Pratt, 2001). Traditional classes can use educational resources that are available on the Internet. Online communication opens access to the teachers, students and other stakeholders (Casal, 2007). Teachers as consultants are available in person or online to help (Bates, 2000). According to Sangra and Gonzalez-Sanmamed (2010), the contribution of ICT to the improvement of the teaching and learning process is higher in the schools that have more completely integrated ICT. In addition, ICT is a key factor for innovation, teaching and improvement of learning processes. It involves attention, perception, responding mechanisms, application of learning and understanding to successfully integrate ICT in teaching and learning.

Chandra and Llyod (2008) show that ICT through an e-learning intervention, can improve student performance as measured in test scores. They identify that ICT can be a positive agent in learning in both the attainment of knowledge and more affective outcomes, but the agency will not be evidenced in the same way by all students. Lockyer, Patterson, and Harper (2001) support the online technologies, specifically web-based applications, as delivery mechanisms in higher education. They have the capability to facilitate communication and collaboration among students and tutors that could overcome the increasing barriers to effective teaching and learning in higher education. Lockyer et al. (2001) evaluate ICT in health education and they found that web-based environments, with embedded collaborative activities, can effectively enhance fruitful learning experiences that result in attaining learners' positive learning outcomes. A study by Leask (2004) found that ICT has opened up many new opportunities. ICTs can be used effectively to assist students in developing international perspectives, interacting with students from other cultures, and engaging actively in intercultural learning. In addition, she identifies the need for strategic support for students in both online learning and cross-cultural communication. Leask (2004, p. 348) also proposes a model of support involving "integration of resources and activities" which is not just part of the orientation program but are "embedded into programs offered to domestic students".

The growth of ICT has added new options for teachers' professional development (Leach, Ahmed, Makalima, & Power, 2006), and, as well, has raised concerns about the inclusion of disadvantaged groups because of the lack of access to ICT and distance learning. The use of distance education and ICT has the potential to distribute opportunities for learning more widely and equitably across the teaching force (Perraton, 2007). It can also improve the quality and variety of the resources and provide available support to teachers, and opening up new avenues to professional development.

Educational technology has been defined in several ways over its history (Roblyer, 2006). According to Spector (2012, p. 5) “technology involves the practical application of knowledge for a purpose”. Spector also defined educational technology based on the common elements of purpose, knowledge and change: “educational technology involves the disciplined application of knowledge for the purpose of improving learning, instruction and/or performance” (p.10). In addition, Roblyer defined educational technology as "a combination of the processes and tools involved in addressing educational needs and problems, with an emphasis on applying the most current tools: computers and other electronic technologies" (p. 9). Roblyer described 4 historical views of educational technology: (a) media and audio visual communications, (b) instructional systems and instructional design, (c) vocational training, and (d) computer systems. The focus of media and audio visual communications consists of primarily media, such as slides and films used to deliver information. Instructional systems and instructional design address the need to use technology in conjunction with the planned, systematic and effective use of educational technology for addressing instructional needs. Vocational training, also known as technology education, emphasizes the use of educational technology in preparing students to work in a world that uses computers. Educational technology as computer systems is associated with a combination of: media, instructional systems, and computer-based support systems.

2.7. Technology Acceptance

T. Teo (2011, p. 1) defined technology acceptance as “a user’s willingness to employ technology for the tasks it is designed to support”. Over the years, acceptance researchers have become more interested in understanding the factors influencing the adoption of technologies in various settings. From the literature, much research has been done to understand individual-level technology awareness, acceptance, and use (Sia, Lee, Teo, & Wei, 2001) in various contexts, such as digital libraries (Weiyin Hong, 2002), collaboration systems (Choon-Ling, Hock-Hai, Tan, & Kwok-Kee, 2004; Sia, Tan, & Wei, 2002), etc. In fact, technology acceptance research is one of the most, if not the most, mature streams in IS research (Sun & Zhang, 2006; Venkatesh et al., 2003). This maturity is underscored by a review and synthesis of eight models from theory bases in IS—psychology and sociology—into a unified theory of acceptance and use of technology (UTAUT) (Venkatesh et al., 2003). This is understandable, given the close relationship between the appropriate uses of technology and profit margin. In most of the acceptance studies, researchers have sought to identify and understand the forces that shape users' acceptance so as to influence the design and implementation process in ways to avoid or minimize resistance or rejection when users interact with technology. This has given rise to the identification of core technological and psychological variables underlying acceptance. From these, models of acceptance have emerged, some extending the theories from psychology with a focus on the attitude-intention paradigm in explaining technology usage, and allowing researchers to predict user acceptance of potential emerging technologies applications.

In a systematic analysis of technology acceptance studies, Sun and Zhang (2006) identified three main factors and 10 moderating factors that were associated with technology acceptance models in the literature (Ball, 2008). From these factors, Sun and Zhang developed an integrative model and corresponding propositions associated with each of the factors. Sun and Zhang argued that even though technology acceptance models have received much empirical validation and confirmation, there is room for improvement. Despite growing pressure for increased IT integration and considerable investments in technology, research studies report inconsistent results as to why people use IT (Legris et al., 2003; Sun & Zhang, 2006). Further research is needed into additional factors related to technology acceptance.

According to G. C. Moore and Benbasat (1991), poor definition and measurement of constructs is one reason for mixed and inconclusive outcomes in technology acceptance research. Korukonda (2007) also believed that measurement of constructs was an issue, and stated that "precision in the specification of variables is one basic problem with the existing models of computer anxiety" (p. 1923). To address these problems, Moore and Benbesat conducted an extensive review of the technology acceptance literature to identify existing instruments for measuring perceptions of using an IT innovation. Their results showed that a 38-item instrument was a valid and reliable tool for predicting technology acceptance.

Two main themes often appear in most technology acceptance models: parsimony and instrumental determinants (R. Thompson et al., 2006). Thompson et al. found a strong influence of personal innovativeness on self-efficacy and perception of ease of use. P. J.-H. Hu et al. (2003) examined other factors related to technology acceptance and their results provided evidence for the TAM constructs, as well as job relevance. According to Thompson et al., these themes have well served our understanding of technology adoption, but could lead to a limited understanding of technology acceptance. Despite the accolades given to the TAM for its predictive ability, it is crucial to explore further into the contribution of external variables (Wong, Teo, & Sharon, 2012). Indeed, many recent studies have found the effects of the external variables, which include perceived enjoyment (T. Teo & Noyes, 2011), facilitating conditions (Terzis & Economides, 2011), social influence (Moran, Hawkes, & El Gayar, 2010; Terzis & Economides, 2011), self-efficacy (R.-J. Chen, 2010; Moran et al., 2010), as extension variables toward the TAM to explain the intention to use technology. Since the TAM has been tested and validated in many Western cultures, further validations of the TAM in different cultures would not only further enhance our understanding of the efficiency and parsimony of the TAM but strengthen the cultural validity of the TAM (T. Teo, 2009, 2010; T. Teo, Ursavas, & Bahcekapili, 2011). Further research into the generalizability of factors associated with technology acceptance and refinement of acceptance models has been recommended (Sun & Zhang, 2006; T. Teo et al., 2011; R. Thompson et al., 2006).

2.8. Emerging Technologies Reactions (ETsR)

The term of “emerging technologies reactions” is created to define specific perceptions and attitudes on emerging technologies. In this study, I assume emerging technologies reactions as somebody’s instant response to emerging technologies during the learning process. The responses can be negative, positive or neutral. This concept is similar to technology perceived enjoyment, which is defined as the degree to which the activity of using technology is perceived to be enjoyable in its own right apart from any performance consequences that may be anticipated (F. D. Davis et al., 1992). Within the framework of the TAM, they recommended that perceived enjoyment is similar to intrinsic motivation which drives the performance of an activity that is not linked for any reason other than the process of performing the activity per se, whereas extrinsic motivation refers to “the performance of an activity because it is perceived to be instrumental in achieving valued outcomes that are distinct from the activity itself” (p.

1112). They found that usefulness and enjoyment were significant determinants of behavioral intention.

According to Alliger et al. (1997) to assess “reactions” is to ask users how they liked and felt about training. In addition, reactions were emotionally based opinions or instant response. Alliger and Janak (1989) suggested that reaction measures that directly ask users about the transferability or utility of the training should be more closely related to other criteria than would reactions measures that ask about “liking”. Alliger et al. (1997) have broken reactions into two basic components, affective and utility reactions and they also combined these components into third component. The first component, reactions as affect, referred to liking of using emerging technology. For example, “I found this emerging technology to be enjoyable” is a typical reaction item. The second component, reactions as utility judgments, attempted to ascertain the perceived utility value or usefulness. It is made operational by asking such questions as “To what degree will this emerging technology influence your ability later to perform your job?”

Venkatesh (2000) discovered the effect of enjoyment on perceived ease of use (PEU) became stronger as users gained more direct experience with the system over time. He demonstrated that enjoyment influenced perceived usefulness via ease of use. These findings suggest that perceived ease of use is influenced by the extent to which users perceive using the system to be enjoyable (T. Teo & Noyes, 2011). In their study on technology use among pre-service teachers, Teo and Noyes explained a significant positive influence of perceived enjoyment on the intention to use technology. Furthermore, they found a significant positive influence of perceived enjoyment on perceived usefulness (PU) and perceived ease of use.

Emerging technologies reaction (ETsR) is different when coupled with computer anxiety (CA). Korukonda (2007) defined CA as being "synonymous with negative thoughts and attitudes about the use of computers" (Korukonda, p. 1921). However, research results are mixed, and there is no agreement on a specific definition of CA. According toVenkatesh (2000), CA is a negative affective reaction toward computer use, and has a significant impact on attitudes toward computer use. Scholars generally agree that computer anxiety plays an important role in technology acceptance among tutors (Christensen, 2002; Korukonda, 2007; Venkatesh, 2000).

In an effort to define CA, Heinssen, Glass, and Knight (1987) developed the 19-item Computer Anxiety Rating Scale (CARS), which measured the behavioral, cognitive, and affective components of CA. Heinssen et al. empirically tested the instrument among 270 introductory psychology students. Heinssen et al. found the scale to be highly valid and reliable. According to the results, "Computer anxiety was found to be related to a consistent pattern of responding: lower expectations, poorer performance, more subjective anxiety and attention to bodily sensations, and a higher frequency of debilitative thoughts" (Heinssen et al., 1987, p. 57).

Perceived usefulness (PU) measures how people believe their productivity and effectiveness can be improved as a result of using technology. Perceived enjoyment has also been found to be significantly related to the intention to use computers (Igbaria et al., 1995). The study on the impact of PU and PE on Internet use showed that respondents' enjoyment of the Internet was influenced by PU and PE (Moon & Kim, 2001; T. S. H. Teo et al., 1999). Therefore, it can be concluded that PE may have a significant influence on a user's intention to use, PU, and PEU of technology (T. Teo & Noyes, 2011; M. Y. Yi & Hwang, 2003).

Based on these findings, I believe that ETsR, which is comprised of affective, utility reactions, perceived enjoyment and computer anxiety, will play an important role in the use of emerging technologies. Therefore, ETsR will be added as an antecedent in the TAM. I argue that ETsR will have a positive influence on the behavioral intention to use emerging technologies.

2.9. Emerging Technologies Understanding (ETsU)

Understanding of the effective use of ETs in the teaching process is an essential skill for educators in order to simplify complex subject matter ideas; therefore, the use of emerging technologies is more accessible to students while preparing them for the demand of the modern technological workplace and the reality of their future (Department of Education, 2010). On another hand, urban students need to be equipped with the technological knowledge and skills required in their future lives to close the gap in the field of information technology (Tettegah & Mayo, 2005). Even so, evidence indicates that teachers' adoption of emerging technologies into instruction remains sporadic and less than optimal (Ertmer & Ottenbreit-Leftwich, 2010).

Emerging technologies understanding is a component of learning that is indexed by results of traditional tests of declarative knowledge. Alliger et al. (1997) incorporated three subcategories of learning: knowledge that is assessed immediately after training, knowledge that is assessed at a later time, and behavior demonstration assessed immediately after training. This study only used the first and second category. Immediate post-training knowledge is usually assessed by multiple choice test responses, answers to open-ended questions, listings of facts and so forth. Knowledge retention is assessed at a later time rather than immediately after training (Alliger et al., 1997). Emerging technologies understanding in this study is also assumed as the way users of ETs understand and enhance their knowledge of ETs in educational contexts. My study refers to self-efficacy with regard to ETs—the confidence shown by tutors and students in their own ability to utilize these ETs in online tutorials—which possibly influences perceived ease of use and acceptance of ETs.

Self-efficacy (SE), the belief that one has the capability to perform a particular behavior, has often been investigated as a construct in technology acceptance research (Compeau & Higgins, 1995). Bandura (1977) defined SE is as people's beliefs about their capabilities to produce effects. Computer self-efficacy (CSE) refers to SE as it relates to computing behaviour (Compeau & Higgins, 1995). In addition, computer teaching efficacy is referred to teachers' capability to teach with computers and their personal belief in using computers as an effective teaching tool to improve students' performance in learning (Wong et al., 2012). Research generally suggests that an individual's beliefs about or perceptions of IT have a significant influence on their usage behaviour (Agarwal & Karahanna, 2000). According to Compeau and Higgins, researchers generally agree that a positive relationship exists between CSE and IT use, and that understanding CSE is important to the successful implementation of systems in organizations. In their study, based on the work of Bandura, Campeau and Higgins developed a 10-item, reliable and valid measure of CSE, and empirically tested their model in a study of managers and other professionals. Results confirmed that CSE was an important individual trait to organizations in the successful implementation of computer systems. In a further empirical test of the CSE instrument developed by Compeau and Higgins, D. R. Compeau, C. A. Higgins, and S. Huff (1999) confirmed the findings of the prior CSE study. The results of their study provided strong confirmation and evidence that CSE impacts an individual's affective and behavioral reactions to IT.

CSE has often been included in models developed to extend TAM (Gong et al., 2005; Igbaria & Livari, 1995). In a study designed to investigate the influence of CSE on acceptance of a Web-based learning system, Gong et al. (2005) extended TAM and included the additional construct of CSE. Gong et al. (2005) also hypothesized that, before an individual has any experience with a system, CSE will be based on the individual's perceived ease of use. In an empirical test of their model, Gong et al. (2005) surveyed 280 instructors and found that CSE had a strong direct effect on both perceived ease of use and intention to use information technologies. Igbaria and Livari (1995) also extended TAM to explicitly incorporate CSE and its determinants. In an empirical test of their model among 450 business users, Igbaria and Livari found that CSE had both direct and indirect effects on system usage. Gong et al. and Igbaria and Livani's studies provided additional evidence of the relationship between CSE and other variables, and clearly indicate the importance of the role of CSE in technology acceptance.

2.10. Technology Competencies (TC)

This study uses the term of technology competencies (TC) to describe the user's experience with, ability to select and apply, and capacity to explore information and communication technology (ICT), especially with computers, to solve problems. There are several ways in which computer experience can be defined and conceptualized. In general, computer experience can be considered to be an act where users engage in applications that are often centered on computers. In addition, computer experience also can be defined in two different ways: as perceived use and variety of use. ‘‘While perceived usage refers to the amount of time spent interacting with a microcomputer and [the] frequency of use, variety of use refers to the importance of use and the collection of software packages use'' (Igbaria et al., 1995, p. 109). Essentially, the computer would often be a tool for wider and more diverse use. Users are increasingly using computers for information retrieval, data analysis, programming, word processing, creating graphics, and communicating using electronic mail or online conferencing.

Technology competencies also incorporated transferability to emphasize the on-the-job skill performance. According to Alliger et al. (1997) a measure was classified as "transfer" whenever it appeared that the measure was not only taken some time after training, but that it was in fact some measurable aspect of job performance. For example; work samples, work outputs, and outcomes. Behavior that was retained and applied to the workplace was considered transfer (Alliger et al., 1997).

There is agreement in the literatures that experience in using technology (EUT) plays a significant role in technology acceptance (S. Taylor & Todd, 1995a; R. Thompson et al., 2006; Venkatesh et al., 2003). The role of EUT has also been fairly consistent across acceptance models, with TC playing both a direct role and an indirect role through its influence on other variables (S. Taylor & Todd, 1995a; Venkatesh et al., 2003). In a review of eight acceptance models, Venkatesh et al. found EUT to be a key moderator of other variables. Additional evidence of the role of EUT was provided in Venkatesh et al.'s study, as EUT was found to have a significant moderating influence and to be an integral feature of the Unified Theory of Acceptance and Use of Technology (UTAUT). Similarly, in their empirical study assessing the influence of EUT on IT usage, Taylor and Todd found that EUT influenced both the determinants of intention to use and actual IT usage. They created a model that investigated the influence of seven variables relative to EUT. Results indicated a stronger link between BI and behavior for experienced users.

Some researchers have attempted to define EUT in more comprehensive ways (Potosky & Bobko, 1998; B. Smith et al., 1999). Potosky and Bobko and Smith et al. mentioned that uni-dimensional and objective definitions, such as computer ownership, years of use, frequency of use and computer training have been found to be deficient and do little to indicate how well or why computers were used (Ball, 2008). Potosky and Bobko suggested that EUT should be based in one's knowledge of computers, thereby adding additional value to current approaches to determining EUT. Moreover, Smith et al. suggested that EUT consists of both objective computer experience (OCE) and subjective computer experience (SCE) components and they defined each component separately. According to Smith et al., the subjective aspect of EUT needs to be included in technology acceptance models, and future models might also include SCE as a mediating factor. In another attempt to measure EUT more accurately, Potosky and Bobko developed the Computer Understanding and Experience Scale (CUE). The CUE consisted of 12 items that assesses both the users' general knowledge of computer use and the breadth of users' EUT. Potosky and Bobko (1998) empirically tested their model with 279 students with various levels of EUT and the results provided evidence of the CUE's validity for measuring EUT.

Research suggests that instructors' technology acceptance and usage may be influenced by both the extent and the type of EUT to which they are exposed (Christensen, 2002; Igbaria & Livari, 1995; Woods et al., 2004). In an empirical study of 862 instructors from 38 colleges and universities, Woods et al. examined how instructors of varying levels of EUT and teaching experience used emerging educational technology in traditional courses. Results indicated that instructors use of emerging educational technology was very limited and that EUT played a key role in determining whether instructors used emerging educational technology to enhance face-to-face teaching. In an empirical study among 450 business users, Igbaria and livari investigated EUT as a determinant of CSE, and measured both participants' extent and diversity of EUT. The results suggested that providing opportunities for users to gain EUT may be helpful in improving their CSE perceptions and speeding up their decision to utilize computer applications (Igbaria & Livari, 1995). The current research study followed the approach of Cassidy and Eachus (2002), as well as Igbaria, measuring EUT by asking participants about the extent of their experience with seven types of software.

2.11. Behavior Intention (BI)

Behavioral Intention (BI) is a measure of the strength of one's intention to perform a specified behavior (Fishbein & Ajzen, 1975). A motivational perspective has also been widely used to understand individual behaviour. It can be defined as the degree to which people believe that using a particular system would enhance their job. In more wide definition, motivation can be described as the force which propels us in anticipation of intrinsic or extrinsic rewards of benefits. F. D. Davis et al. (1992) found that intrinsic motivation (enjoyment) and extrinsic motivation (usefulness) were key drivers of behavioral intention to use computers. Intrinsic motivation emphasizes the pleasure and inherent satisfaction derived from a specific activity (Vallerand, 1997), while extrinsic motivation highlights the performing of a behavior to achieve a specific goal, such as rewards. In other words, intrinsic motivation is based on the performing of an activity purely for the enjoyment of the activity itself and extrinsic motivation refers to the performance of an activity with the belief that it is instrumental in achieving valued outcomes that are separate from the activity. Recent research has shown that the intrinsic motivation factor (enjoyment) not only had a positive effect on the extrinsic motivation factor (usefulness), it also had a positive effect on the intention to use information technology (Atkinson & Kydd, 1997; Venkatesh, 1999); additionally, the extrinsic motivation factor (usefulness) was also found to have a positive effect on the intention to use computers (Igbaria, 1993). Furthermore, the perceived usefulness, constructed by TAM and extrinsic motivation, reflects beliefs about outcomes. From the aspect of motivation, perceived enjoyment has a positive effect on perceived usefulness; and from the perspective of TAM, perceived ease of use can influence users' perceptions of usefulness. Therefore, from previous evidence, while perceived usefulness emerged as the major determinant of computer acceptance and use, perceived enjoyment had a significant effect beyond PU (Liaw & Huang, 2003).

2.12. Key Factors Related to the Effective Use of ICT in Teaching and Learning

Technologies are developing continuously. We should understand the development and the appropriate circumstances for applying various technologies in teaching and learning effectively (Bates, 2005, p. 3). Bates emphasized that technologies should be selectively utilized to maximize outcomes in student learning and efficiencies of operation because each technology offers different affordances. In this era of industrialization, the adoption of ICT has received considerable attention within the scholarly literature as a focus in the strategy for responding to the demands associated with consumerism whilst also facilitating the student learning experience (Mazzarol, Soutar, & Seng, 2003). The adoption of ICTs to provide increased accessibility to discipline content and contact with peers and teaching staff is no longer a luxury but a necessity for all higher education institutions (Dawson, Heathcote, & Poole, 2010). Dawson et al. (2010) examined the adoption and analysis of ICT systems for enhancing the student learning experience. They found that data captured from students' activities can be used to inform teaching and learning practice and enhance their learning experiences.

Merriënboer, Bastiaens, and Hoogveld (2004) proposed that the central concept in handling of ICT in learning currently is the focus on ‘content’. They pointed out the unavailability of forms of ICT that emphasize the active engagement of learners in rich learning tasks and active, social construction of knowledge and acquisition of skills. In essence, the potential of the technology to transform the teaching and learning environment is still far from being realized in the institutions of higher education.

As the area of distance education is continuing to develop, there is a concurrent need to consider the theories that support its use. As Gunawardena and McIsaac (2004) advised, one of the critical challenges in the field of distance education has been brought about by rapid changes in the development of new ICT. Due to that reason, T. Anderson (2010) promotes heutagogy as an emerging pedagogical theory in distance education whereby control of the learning process shifts from teacher to learner, making learning significantly more student centered. Anderson stated that educators should concentrate on supporting learners in developing the capacity “to learn in new and unfamiliar contexts” (2010, p. 33). Palloff and Pratt (2001) acknowledged that technology and content are only two contributing factors to online learning. The most important thing is pedagogy that most influences the learning experience.

Palloff and Pratt (2001) also suggested essential ways to ensure success in the online learning community:

> Ensuring access to and familiarity with the technology in use; establishing guidelines and procedures that are relatively loose and free-flowing and generated with significant input from participants; striving to achieve maximum participation and ‘buy-in’ from the participants; promoting collaborative learning; and creating a triple loop in the learning process to enable participants to reflect on their learning, themselves as learners, and the learning process. (p.26)

Chambers (1999) said that the majority of pre-packed multimedia education products are educationally poor, because they simply deliver content without assisting students to construct their own understanding or problem solving skills. The problem-based learning format attempts to give students increasingly difficult problems supported by helpful hints and Socratic style interaction. Based on that reason, Sam and Niall (2002) suggested fostering a distance learning community by creating Collaborative Virtual Environments (CVE) that can become the unifying element in which many of the tools of distance education are deployed. It offers flexible learning and flexible delivery and provides tools for synchronous work practices. It is in accordance with D. Kirkpatrick and Jakupec (1999) who suggested that flexible learning and flexible delivery reflect an intention to increase learner's access and control over particular teaching and learning environments.

Based on the seven principles for good practice in undergraduates education from Chickering and Gamson (1987), educators can incorporate and adapt these principles into their teaching with technology, although these principles may be addressed without technology. ICTs offer rich and efficient tools for educators to address them. Chickering and Gamson's seven principles are useful in determining which technologies to employ and when to use them, and in what ways they are useful (Ritter & Lemke, 2000; Testa, 2000). Chickering and Ehrmann (1996) used the Seven Principles along with other ways of evaluating the impact of technology on student learning. They evaluated some of the most cost-effective and appropriate ways to use computer, video, and telecommunication technologies to advance the Seven Principles.

The results from studies which addressing the Seven Principles with ICT-enhanced education provide an important look at how ICT are changing the way that faculty teach. When compared to what is known about effective teaching, evidence of the value of ICT can be seen:

- Good practice encourages student-faculty contact. Student-faculty contact is a most important factor in student motivation and involvement (Chickering & Ehrmann, 1996). The most preferred technology that promotes student-faculty contact is electronic mail (e-mail). E-mail increases access to faculty members, helps them share useful learning materials, and provides online advising services (Ritter & Lemke, 2000; Testa, 2000). E-mail as a low-tech innovation has an essential impact on curriculum, commuting patterns, frequency of class meeting, and student-tutor roles (Press, 1993).
- Good practice encourages cooperation among students. Learning is enhanced when it is collaborative and social, not competitive and individual (Chickering & Ehrmann, 1996). The use of Internet technologies enhances student's collaboration and cooperation (Chickering & Ehrmann, 1996; Testa, 2000), and barriers of time, place, and distance between teacher and learners are more easily minimized (Testa, 2000).

- Good practice encourages active learning. Chickering and Gamson (1991) say that students learn by not only sitting in class, listening to teachers, and memorizing lectures, but students must communicate with peers, apply knowledge to their daily lives, and relate it to past experiences. Chickering and Ehrmann (1996) divide technologies that encourage active learning into three categories: tools and resources for learning by doing, time-delayed exchange, and real-time conversation. Today, all three categories can be supported by Internet technology, for example, virtual (dry) laboratory, mailing list (group discussion) and audio/video teleconference.
- Good practice with prompt feedback. Teachers and students consider teacher feedback as the most important part in the teaching process (Zacharias, 2007). Students need to know about their strengths as well as areas where improvement is needed. The use of appropriate feedback consistently emerges as a powerful tool to promote student learning (Kathryn, Susan, & Kyle, 2004; Stronge, 2002) and encourages student reflective practice (Brandt, 2008). Discussion boards, email, telephone, audio/video teleconference can be used to provide feedback (Woolsey & Rodchua, 2004). Feedback can also be uploaded on web pages. Web pages not only deliver course content, but also in many ways give students feedback, either statically or interactively (Testa, 2000).
- Good practice emphasizes time on task. Good time management means effective learning for students and effective teaching for faculty (Chickering & Gamson, 1991). Some specific software in the market can help students to learn more efficiently. Word processors, for example, from Microsoft Office, help students become more organized and efficient, as does presentation software that creates slide, outlines and handouts (Testa, 2000).
- Good practice communicates high expectations. Chickering and Gamson (1991) emphasize the importance of high expectations for everyone. Strongly expecting students to perform well becomes a self-fulfilling prophecy. Teachers can suggest extra readings or reference sources from the Internet that support learning materials, celebrate students' success by giving them prompt feedback via email or a chat room, and set a goal in every learning process provided, in the forms, for example, of an online syllabus or PowerPoint handout.
- Good practice respects diverse talents and ways of learning. Different students have different talents and learning styles. Good teaching practice should allow students to

express their talents and learn in the best ways that work for them (Chickering & Gamson, 1991). Internet and instructional technologies promote diverse talents and ways of learning (Testa, 2000). For example: students use different approaches to retrieve information on the Internet, and using computer, email or mailing lists allows students to give input according to their style of interaction; as well, interactive software that uses audios, videos or pictures provides learning tools for students from a different perspective. These technologies provide appropriate tools for audio and visual learners.

A framework for selecting and using technology from Tony Bates and Gary Poole (2003) complemented the Seven Principles from Chickering and Gamson(1991). Bates and Poole (2003) defines "SECTIONS" model, as follows:

S = Students: what is known about the students—or potential student—and the appropriateness of the technology for this particular group or range of students?
E = Ease of use and reliability: how easy is it for both teachers and students to use? How reliable and well tested is the technology?
C = Costs: what is the cost structure of each technology? What is the unit cost per learner?
T = Teaching and learning: what kinds of learning are needed? What instructional approaches will best meet these needs? What are the best technologies for supporting this teaching and learning?
I = Interactivity: what kind of interaction does this technology enable?
O = Organizational issues: what are the organizational requirements, and the barriers to be removed, before this technology can be used successfully? What changes in organization need to be made?
N = Novelty: how new is this technology?
S = Speed: how quickly can courses be mounted with this technology? How quickly can materials be changed? (pp.79-80).

Identification of technology should enhance and support learning and result in the selection of appropriate learning technologies (Bates, 2005). The development of ICTs has affected almost all the content of the curriculum. Therefore, ICTs are essential for developing these skills. Use of ICTs means integrating technology within the teaching to develop a foundation digital literary within a particular subject area (Bates & Sangra, 2011).

2.13. Challenges of Using Technology in Education

According to Convery (2009), there is an apparent gap between technologists' expectations of the technology and teachers' ability to apply such technology in classrooms. Saettler (2004) noted that the existence of sophisticated equipment does not automatically result in an enhanced learning environment. New technologies are often pushed for rhetorical appeal and not necessarily to meet the needs of faculty or students. Regardless of the reason for the introduction of new technologies, instructors are expected by administrators to adopt these technologies and produce positive results.

Technology tools are usually not pedagogically analyzed, and instructor perspectives are not generally sought before these tools are added to the curriculum. Convery (2009) further noted that technology is generally tested in a controlled environment by academic technologists who are disconnected from the real-world classroom environment that faculty experience. Convery also asserted that benefits of technology are often exaggerated due to political and strategic purposes, leading to wasting money on technologies that may be impractical to implement in an actual classroom and outside of a controlled environment.

D. B. Reeves (2009) emphasized several challenges to the use of web-based technologies. Reeves stated that decision makers are often biased toward the use of certain brands of technology that often do not conform to the best interest of the faculty or students. On the usage of Web 2.0 and online tools by students, Reeves noted that a lack of personal relationships between faculty and students and among students causes a lack of trust between students and instructors, and among students. Reeves also expressed concern about the ability of students to conduct scholarly research when they are exposed to excessive online content through search engines and related technology. He suggested that students may be unable to differentiate between irrelevant data and knowledge.

Using technology can negatively affect student cognition. Carr (2008) stated that technology's emphasis on efficiency and immediacy, especially in regard to the Internet, has resulted in a chipping away of the capacity to concentrate and contemplate and has altered mental habits. Educators are critical of non-conventional Internet sources such as Wikipedia and generally do not accept the validity of the content that comes from such Internet sources. Educators also are concerned about the significant increase in the availability of unrestricted content on the Internet. Molina (2006) believed that making more scholarly content available on the Internet is useful as students can be pointed toward the appropriate content.

Two arguments against online teaching and learning are the lack of interaction with peers and the time required to prepare for and participate in an online class (Liaw, 2008). Proponents of the traditional classroom also question whether the online learning experience, which lacks classroom discussions, is as valuable as the traditional one (Steve, 2005). Online education has been criticized for minimizing the level of contact and discussion among students and for lacking face-to-face and direct interaction among students and teachers. According to Liaw, when compared to the face-to-face learning format, e-learning requires students to dedicate more time to learn the subject matter.

Although Palloff and Pratt (2007) recommended the use of online learning communities among students, these communities also lend themselves to certain challenges. Correia and Davis (2008) noted that group activities in an online environment may be more problematic and challenging because students do not meet face-to-face and collaboration and communication must be done mainly through email or other means such as over the telephone or through web conferencing.

There are also concerns among faculty and administrators about the safety and security of both students and faculty when engaging in Web 2.0 technologies in the course of teaching and learning. Demski (2009) noted that students must be exposed to more secure, age-appropriate, and safe forms of Web 2.0 or social networking technologies. Regulation is needed for both students and for instructors for their own protection and for the protection of the institutions against online posting of inappropriate content, harassment through electronic communication, and misuse and inappropriate or illegal use of technology tools. The content made available and posted on social networking sites, blogs, and wikis, should be regularly monitored and reviewed for appropriateness. It should be ensured that the content is not offensive, prejudicial, or threatening to students or faculty.

2.14. Strategies to Overcome the Barriers of Technologies Acceptance in Education

Many educational institutions are finding it difficult to impose the adopting of technology-based learning on faculty members in their classrooms. Although teachers are aware of the importance of technology integration into the daily process of teaching and learning, they often have problems when it comes to effectively integrating technology into their curricula (Su, 2009). Many factors contribute to these problems (Bates, 2011; Bates & Sangra, 2011; Dusick, 1998; D. L. Rogers, 2000). One is resource related ICT availability and support; others originate from fundamental beliefs and processes of current education system (Su, 2009). The problem which comes from basic beliefs is that many faculty members lack conceptual and technical skills for creating and implementing technological applications in the teaching and learning process. Another factor is the perception of many teachers that applications of technology serve only to “replace” textbooks and lectures as ways of presenting information. Indeed, up to now, technology-enhanced learning has consisted largely of information delivery, rather than stimulating the development of concepts or critical analysis (Jonassen, Carr, & Yueh, 1998; Su, 2009). A third factor is the organizational culture (Bates, 2011; Bates & Sangra, 2011).

Inadequate access to technology, training, and support are often seen as the first barriers of technology integration (Su, 2009). Overcoming the technology resources and support unavailability is critical, because it determines the success of subsequent steps, and trying to skip this stage may result in failure. Some developing countries provide free computers to rural areas to cope with inadequate access to technology. Indonesia is one of countries which implemented the Intel Teach Program. Intel Corporation has donated a total of 4,000 computers to schools in Indonesia over the period of the 5 years under the World Ahead Program since 2007. The donation aims to enhance the integration of ICT in teaching and learning in the classroom. In addition, Intel Teach – Getting Started training is also offered in these schools.

Bates and Sangra (2011) pointed out that faculty need training not just in technology skills, but also in teaching methods based on modern pedagogy if technology is to be used well. Some students also need training because they have difficulty accessing technology, particularly students from remote areas in which technology infrastructure are not available. Students from urban areas generally have the capability to master the technology. They are known as the “Net Generation”. The Net Generation or “Digital Natives” develop cognitively differently as a result of their birth in the digital age (Evans, 1995; Alfred P. Rovai, Ponton, & Baker, 2008). Prensky (1995, p. 2) defined today’s students as “native speakers” of the digital language of computers, video games and the Internet. Claims about Net-Gen are empirically tested. Oliver and Goerke (1995) reported that students are highly tech-savvy but do not frequently use technology in their learning. Therefore, multi-vision of teaching and learning is needed to accommodate all types of students to provide ease of access to 21st century students (Bates & Sangra, 2011). Individuals' confidence and skill in using technology and the ultimate diffusion of technology within an organization may be affected by the behavioral traits of individuals who belong to different generations (Ahmed, 2011). Traditional students belong to a younger generation, and faculty generally belong to an older generation.

Howe and Strauss (2000) noted that individuals from each generation demonstrate certain behavior and show certain characteristics that are reflective of the political environment, the socioeconomic conditions, and any cultural and social movements of the time. Strauss and Howe defined individuals born between 1943 to 1960 as baby boomers, individuals born between 1961 and 1981 as Generation X, and individuals born between 1982 and 2002 as Millennials. Tapscott (2009) classified this last group as the Net Generation or "Net Gen."

Baby boomers saw technology evolve in the shape of the television and the communication revolution (Tapscott, 2009). Tapscott described Generation X as the best-educated group in history; they are media-centered, and they possess enhanced technological and computer skills similar to those of the Millennials. Howe and Strauss (2000) characterized the Millennial generation as team oriented, confident, hardworking, opportunistic, confident, optimistic, and trend setters.

Some studies that put attention on implementing technology in developing countries tend to focus on cost issues (Phipps, Merisotis, & Bullen, 1999). In many developing countries the funding appears as a problem for using technologies (Katz, Educause, & Pricewaterhouse Coopers, 1999). The problem of technology selection in distance learning differs from the problem of technology selection in traditional distance education (Stephenson, 2001). According to Hülsmann (2005), traditional distance education uses technologies that have implications for costs and pedagogy, while standard a e-learning environment uses technologies both with respect to cost-structure and with regard to teaching and learning, on the same platform. Perraton and Lentell (1999, p. 250) asserted that distance learning policy “is likely to help the cost-effective and educationally sound expansion of open and distance learning”.

People’ beliefs that are incompatible with technology mediated change are a major barrier to effective technology integration. People tend to resist change when their old beliefs and values are challenged (Su, 2009). Overcoming this barrier is more difficult and time consuming since it requires stakeholders to change their attitudes, beliefs, and behaviors. Some studies have looked at teacher’s attitudes towards ICTs. Chin and Hortin (1994) and Dupagne and Krendl (1992) found change in teachers’ perceptions and attitudes toward technology-enhanced instruction. Chin and Hortin (1994) discovered that teachers need more time to acquire the knowledge and understand technology and to absorb what instructional technology can do for them. Bai and Ertmer (2008) found a relationship between pre-service teachers’ beliefs and technology attitudes. They suggest pre-service teachers need to witness and experience technology use in a pedagogically sound manner as students in order to implement it in their own teaching. In addition, Bradley and Russell (1997) studied the level of computer anxiety among teachers. They identify three sources of computer anxiety: damaging the computer’s hardware, being unable to perform computer-related task efficiently, and exposing themselves to social embarrassment when working with computers. They emphasize the importance of a school environment that supports the use of computers to prevent and reduce computer anxiety. Schools can provide computers for teachers and students use in class and common-rooms. Furthermore, the relationship between teachers’ personal teaching philosophy and ICT use was studied by Briscoe (1991), (Rich, 1990) and (Sparks, 1988). Briscoe (1991) realized that teachers need time to experiment in their classroom and construct knowledge; and teachers must be given the opportunity to form support networks for change and the time to observe each other and reflect on what works for them. Staff developers need to attend to philosophical acceptance, self-efficacy, and the importance of the suggested practices during in-service training (Sparks, 1988).

Technology integration needs time and stages to be implemented (E. M. Rogers, 2003). Therefore, we need to integrate an approach to evaluate ICT for improving quality and effectiveness and verifying design assumptions (Bastiaens, Boon, & Marten, 2004). Bastiaens et al. discussed the need for a multi-level continuous evaluation approach that incorporates reactions to learning experiences, learning process results, learning performance changes, and organizational results based on the Kirkpatrick's (1998) evaluation model. Bastiaens et al. (2004) also mentioned that a four level evaluation is unnecessary for every event, but recommended that reactions are considered when implementing new learning events.

The organizational culture barriers that constrain integration of technology are in the form of faculty beliefs about traditional teaching methods, the privileging of research over teaching, and the mistrust of formal training in teaching (Bates & Sangra, 2011). In addition, senior academic administrators are lacked formal training in the management issues around technology decision-making and some of them are not familiar with the technology itself. Mullins (2002) has said that "despite the potential outcomes, change is often resisted at both the individual and the organizational level" (p.99). The integration and implementation of ICT needs management (Sangra, 2008). Sangra asserted that the integration of technology, organization, and pedagogy is crucial for success, as all of the elements are crucial in increasing productivity and processes. Bates and Sangra (2011) have given recommendation to handle these barriers: (1) all tutors should receive comprehensive training and continuous professional development in teaching and new technology; (2) all administrators should be provided with technological skills that could assist them with technology decision-making; and (3) high incentives should be given to tutors to encourage them for innovating in teaching with technology.

Bates (2011, pp. 9-12) identified seven systemic barriers to online and distance education based on several publications in 2010. These barriers are:

- Faculty resistance. This is the main systemic barrier to online learning and distance education that is always increasing.
- Lack of training in teaching for faculty. One of the key reasons for faculty resistance to online and distance education is their lack of knowledge or understanding of pedagogy and theories of teaching and learning.
- Lack of institutional ambition for the use of technology for teaching. Bates and Sangra (2011) summarize that while universities and colleges have easy access to

technology, they have not been ambitious enough in their goals for the technology integration, focusing more on improving the quality of classroom teaching (more cost) rather than restructuring teaching to meet new needs (enhancing learning) or improving efficiency.

- Lack of adequate costing methods. Bates and Sangra (2011) also found that most educational institutions did not recognize the costs of online learning.
- Lack of system-wide provision for distance education programs. There is a lack of flexibility in the course accreditation system, particularly if students want to take another course in different institution in same province or in difference province. Special permission has to be requested and it does not always work.
- Poor quality offerings. Many public institutions do not follow best practices in teaching, hiring tutors without preliminary training in online teaching. There is a tendency for all online education to be treated similar with traditional education, especially by faculty resistant to change.
- Lack of data on online and distance education. It is particularly problematic that there are many online educational institutions that simply do not provide reliable data, or if it is collected it is not published or available in a comparable form to data from other institutions.

Bates (2011, p. 12) suggested actions to tackle these barriers: (1) more and better training of tutors in modern teaching methods, and senior administrators in technology management; (2) more ambitious institutional goals and strategies for learning technologies; (3) better costing methodologies; (4) more flexibility in transferring credits and combining courses from different institutions; (5) more open access and better prior learning assessment to enable those without the current necessary qualifications to be able to access post-secondary education, and (6) better tracking and analysis of data on online learning and distance education enrolments and the quality of online learning.

2.15. Future of Technology in Education

According to Kingsley and Lock (2007), an empowering characteristic of using digital tools is that it provides instructors with means to identify, develop, and apply technology to recognize and validate the diverse backgrounds of their students.

Buzzetto-More (2008) reported that due to lack of resources, minorities are less likely to be technologically literate and are less likely to use the Internet and technology for educational purposes. Advocates of online technology view technology as a means to provide equal access to education and to reduce the "Digital Divide". It is imperative to overcome the Digital Divide that separates individuals who have full access to the Internet and technology tools from individuals who are deprived or have limited access to the Internet and related technologies.

According to Vogel and Klassen (2001) recently there are alternatives to the conventional education approaches due to the combination of lack of effectiveness of traditional approaches and the increasingly cost-effective availability of technology. Traditional educational approaches become ever less popular, because they do not provide flexible time. Technology is coming to the fore in providing additional degrees of freedom, enabling the exploration of alternatives to traditional education (Vogel & Klassen, 2001).These days, engagement with education is likely to mean engagement with technology (Hung & Khine, 2006). Technology is enabling education to become more effective and capable of supporting disadvantages groups. Individualised and on-demand education programmes are becoming available to meet the needs and desires of an ever-broadening student population no longer bound by time and space. Faculties are expanding their focus on the delivery of material to include an interesting design of learning spaces. For teaching to be effective, cognitive, emotive, and social factors must work together (M. Wang & Kang, 2006). Institutions are recognising that partnering may be critical to providing comprehensive educational experiences in a cost-effective fashion. Vogel and Klassen (2001) noted that integration between emerging technology and educational pursuits is important consideration factor for supporting individualized learning.

Development in ETs has revealed new concepts in education like distance-learning, e-learning and mobile learning (Keser & Özcan, 2011). In addition, the Internet and related technologies must be made accessible to all learners. For example, people with special needs approach technology not just for convenience but as a means of access (Wehmeyer, Palmer, Smith, Davies, & Stock, 2008). Online education provides a level playing field for an economically and socially diverse population of students. Technology will continue to be used to provide greater access and resources for at-risk students with special needs and individuals with physical or intellectual disabilities.

2.16. Summary

This chapter builds upon and contributes to scientific knowledge about what motivates people to accept technology in general, based largely on the technology acceptance model (TAM). The application domains for TAM and its many extensions and refinements have broadened out in several directions. TAM has emerged as a leading scientific paradigm for investigating acceptance of educational technology by students, teachers, and other stakeholders. This literature review contains an exemplary sampling of current research in this tradition. According to the literature, the use of emerging educational technology may enable higher education institutions to compete and serve the needs of an increasingly diverse population of students (Hiltz & Turroff, 2005; Leidner & Jarvenpaa, 1995). Evidence for the importance of this study in identifying factors associated with tutors' and students' technology acceptance has been drawn from the literature (Blumenstyk, 2006; Cheurprakobkit, 2000; Conole et al., 2007; Healy, 1999; Hiltz & Turroff, 2005; Leidner & Jarvenpaa, 1995).

The literature review provides support and a context for this study investigating the factors associated with tutors' and students' technology acceptance in distance educational environments. It also describes the theory of technology acceptance developed by previous researchers. The influence of three key constructs (ETsR, ETsU, and TC) identified in literatures that contributed to technology acceptance is presented. The literature review demonstrates that technology acceptance among higher education teachers and students still remains an issue, especially in distance learning environment.

Technology tools provide opportunities for students to engage in spontaneous learning away from the typical classroom environment.   Constructivist theory also provides a framework for this research and helps explain the factors that affect tutors' and students' behavior intentions to use ETs in online tutorial. Social constructivists clarify technology acceptance as a process of involving social groups in the innovation process where learning takes place through the learners' experiences, knowledge, behaviors, and preferences (Bondarouk, 2006).

This study explores issues and concerns relating to the pedagogical uses of certain emerging technologies for learning across the curriculum—particularly distance learning. Within the classification of technology domain proposed by the Tomei's taxonomy and the technology acceptance evaluation model proposed by Kirkpatrick, there is a need of paradigm shift beyond the acquisition of tools (i.e., literacy), their use for communication (i.e., collaboration) and decision-making if tutors and students want to benefit from greater access to technology. A review of the literature has suggested that the integration of technology into teaching and learning is typically affected by the following four factors: teachers' technology skills, teachers' technology beliefs, teachers' perceived technology barriers (Hew & Brush, 2007) and "authentic experiences (Brush & Saye, 2009). Accordingly, the problem addressed in this study is the tutors' and students' perceptions of, knowledge, skills, behavioral intentions, and actual use of emerging technologies in UT. Institutions considering emerging technologies may be able to predict the value of those technologies by better understanding the tutors' and students' perceptions and behaviors toward the systems. Understanding the tutors' and students' perception of, knowledge, skills, behavioral intentions, and actual use of emerging technologies, institutional decision makers can align the organization's strategic goals, the educational objectives of the tutors' and students, and the technologies themselves to take advantage of their opportunities and capabilities.

Further research into the generalizability of factors associated with technology acceptance and refinement of acceptance models has been recommended (Sun & Zhang, 2006; T. Teo et al., 2011; R. Thompson et al., 2006). In 2003, Venkatesh et al. (2003) identified eight models of information technology acceptance research. Their study formulated a unified model integrating elements from each of the eight models.

According to E. M. Rogers (2003), people's attitudes toward a new technology are a key element in its diffusion. Due to the novelty of computers and their related technologies, studies concerning technology diffusion in education have often focused on the first three phases of the innovation decision process. This is also because the status of technology in education is, to a great extent, still uncertain. In cases where technology is very recently introduced into the educational system, studies have mainly focused on the first two stages, that is, on knowledge of an innovation and attitudes about it (Albirini, 2006).

3. Methodology

This study used a quantitative and qualitative methodological approach that helps to complement its strengths and reduce its weaknesses. The quantitative research tools used in the study provided an understanding of and helped answer the research problem (Creswell, 2009; Creswell & Plano Clark, 2011; Tashakkori & Teddlie, 1998; Wilson & Rossman, 1985). Cohen, Manion, and Morrison (2011) affirmed that the quantitative approach comes from the positivist tradition and can accommodate small or large research projects. On other hand, the qualitative approach comes from the naturalistic tradition that is rich in interpretation. Furthermore, they stated that two research methodologies can be mixed. The combining of different methods within a single piece of research raises the validity of research. Gliner and Morgan (2000) suggested that when attitudes and perceptions are being measured, then the researcher can use the Likert scale because it is more acceptable to the quantitative approach. A mixed method is applied to gather data in order to gain a holistic view of the levels of technological categories achieved by respondents in this study and to collect meaningful data in the "natural" learning environments of the respondents (Cohen et al., 2011). Other reasons for a mixed-methods approach are: (1) the insufficient argument in the quantitative or qualitative models by themselves; (2) it provides a 'multiple angles' argument; (3) it provides more evidence; (4) It may be the preferred approach within a scholarly community; (5) it is eager to learn argument; and (6) it mirrors "real life" (Creswell & Plano Clark, 2007). In addition, Palak and Walls (2009) suggested that research on teacher use of technology should employ a mixed-methods design if the investigation involves teachers' beliefs.

This study was a predictive study, as it attempts to predict tutors' intention to use emerging technologies in distance learning based on the contribution of ETsR, ETsU, and TC. This study used a survey and an interview methodology to investigate the contribution of tutors' and students' ETsR, ETsU, and TC to their behavior intention to use emerging technologies in distance learning. This study is a partially empirical study and collected data through a Web-enabled survey instrument administered to tutors and students in Open University of Indonesia.

This study addressed the following specific research questions:

1. To what extent does ETsU contribute to tutors’ intention to use ETs in online tutorial, as measured by the weight of ETsU's contribution to the prediction of BI?
2. To what extent does ETsR contribute to tutors’ intention to use ETs in online tutorial, as measured by the weight of ETsR's contribution to the prediction of BI?
3. To what extent does TC contribute to tutors’ intention to use ETs in online tutorial, as measured by the weight of TC's contribution to the prediction of BI?
4. Which construct out of the three independent variables (ETsU, ETsR, or TC) provides the most significant contribution to tutors’ and students’ intention to use ETs in online tutorial?
5. What are tutors’ and students’ perceptions of, technological skills, perceived technology barriers, behavioral intentions, and actual use of ETs in UT?

In order to address the specific research questions noted above, first a survey instrument was developed based on validated literature. The following sections addressed relevant steps and issues: (a) research design; (b) setting and participants; (c) sampling and sampling technique; (d) data collection; (e) instrument development; (f) data analysis; (g) reliability and validity; and (h) theoretical model development.

3.1. Research Design

This research employed a mixed method design. Figure 2 explains the research design that will be implemented in this study. It is adapted from Alliger’s augmented version of Kirkpatrick’s model for levels of learning evaluation. Quantitative and a qualitative method were applied concurrently to interpret the result. An online survey (Appendix C) represents a quantitative method, and an in-person interview (Appendix D) represents a qualitative method and it included questions that sought data that would address the research questions. Creswell (2009, p. 12) noted that surveys as research tools provide a numeric description of "trends, attitudes, or opinions of a population by studying a sample of that population". Creswell (2012) also emphasized qualitative research as an approach to data collection, analysis, and report writing that differs from the traditional, quantitative method. Currently, the educational research methods have changed to embrace both quantitative and qualitative techniques, which are often used in an eclectic mix according to the research aims (Cox, 2010; Phillips, McNaught, & Kennedy, 2012).

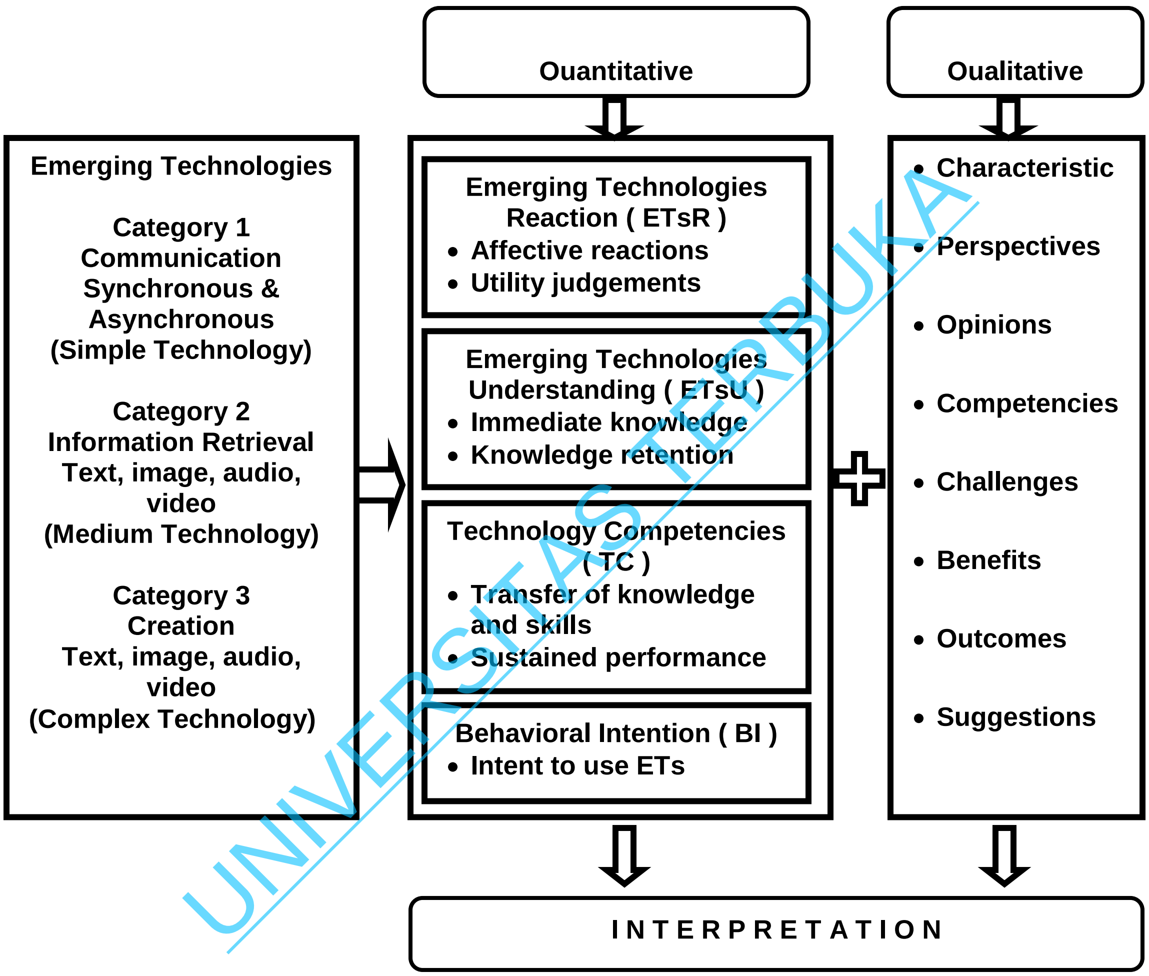

Figure 2. My Methodological scheme of emerging technologies acceptance based on Kirkpatrick's model (1998) and Alliger et al. (1997)

3.2. Setting and Participants

The research took place in the Open University of Indonesia (*Universitas Terbuka/* UT), both in the head office and all regional offices in 33 provinces in Indonesia. The population was comprised of tutors from the head office and regional offices and students from the thirty three (33) provinces of Indonesia, who are from all four faculties and the graduate school of UT. Based on a survey undertaken in 2012, the total number of tutors is 759 and the number of students who have graduated from UT is more than 850,000 and the number of active non-teacher training students is 157,175 (UT, 2012). Because of geographical and time limitations, it was not feasible to survey all these respondents. Therefore, a minimum sample was actually required to guarantee the reliable data collection. Tutors and non-teacher training students (regular students) from various regional technical executive units (UPBJJ) at UT who had been subscribing to online tutorials were invited to participate. The UPBJJ functions as students' forum for academic administration as well as academic activities. Its task is to provide day-to-day distance learning services.

Due to the requirements of the Office of Research Ethics (ORE) that all participants are volunteers, this sample might not be truly representative. Mendenhall and Sincich (2003) defined a representative sample as one that "exhibits characteristics typical of those possessed by the population" (p. 6). An example of a potential biasing reason which would reduce the representativeness of the sample would include tutors who are extremely anxious about computers who may not want to disclose their fears and either not be honest with answers or choose not to participate. Demographic data were collected from the participants in order to determine if the sample was representative of the population. Discussion of the findings included how the sample differed from an ideal sample and who may have been left out or underrepresented in the sample. This analysis allowed for identification of bias and a more accurate interpretation of the findings.

Tutors and students were surveyed as to their intention to use specific emerging technologies in distance learning. Although the population was relatively large, online contact was made with all tutors and students informing them of the purpose and importance of the survey. Once the survey was deployed, a follow-up contact was made to each tutor and student to answer any questions and determine if assistance was needed. The emerging technologies that provide the basis for this study are available in online tutorials. Online tutorials provide an educational learning system that can be used in distance learning to meet and engage students and tutors. Online tutorials are used to support face-to-face learning. Online tutorials support multiple teaching approaches and do not force tutors/students to change the way they teach/learn. Online tutorials also seamlessly integrate with online course platforms such as text messaging, audio or video conferencing. All tutors need to do is click a button to login in an online tutorial room and click another button to end the session when done. The session is automatically deployed to enrolled students, so tutors can keep their focus on teaching and not be concerned with technological issues and concerns. Online tutorials also support multiple student learning styles. Students benefit from online tutorials as they can focus their attention on understanding the lecture topic and participating in the discussion board, instead of trying to take notes they will have to decipher later during their study time. Online tutorials allow students to collate and collaborate with many learning materials as often as needed to reinforce what they have learned or to help them better understand parts of the lecture they may not have completely understood in the printed material. Online tutorial advocates maintain that these features address many of the continuing obstacles to acceptance of emerging technologies among higher education tutors and students.

3.3. Sampling and Sampling Technique

According to Cohen et al. (2011) there were four strategies to determine sample. They were: the sample size; representativeness and parameters of the sample; access to the sample; and the sampling strategy to be used. Cochran's sample size determination formula (Cochran, 1977) for n with continuous data was used to determine the minimum sample size from the large population to yield a representative sample for proportions. The sample size was calculated as follows: $n_0 = \frac{Z^2 pq}{e^2}$, which was valid where n_o is the sample size, Z^2 was the abscissa of the normal curve that cuts off an area α at the tails (1- α equals the desired confidence level, e.g. 95%), *e* is the desired level of precision, *p* is the estimated proportion of an attribute that is present in the population, and *q* is 1-p. The value for Z is found in statistical tables which contain the area under the normal curve (Israel, 2009, p. 3). Application of Cochran's formula determined that a minimum sample size of 400 should be delivered from the population larger than 100,000 (Israel, 2009, p. 2). To determine the sample size of tutors can be obtained by calculating the confidence level (95%), confidence interval (5) and total population 759, which is equal to 255 respondents (AAPOR & AMA, 2011). Therefore, the minimum sample was 255 respondents from tutors and 400 respondents from students. To fulfill the minimum sample, the candidate's respondents were contacted by e-mail, mail or telephone. Only those willing to participate in person interview were sent a questionnaire.

The total sample for in person interview was 5 (five) tutors and 5 (five) students. Five tutors were selected based on having representatives of each faculty (faculty of education, natural sciences, economics, teacher training, social and political sciences, and graduate school) and based on the domicile area (outside main office or outside Java Island). The selection of students also followed the tutor criteria.

The sampling technique was based on a non-probability sampling and convenience sampling. This approach is reliable and representative since there is no bias among tutor and student respondents. All tutors and non-teacher training students who have been registering for online tutorials were given the opportunity to participate in the research without any prerequisite. For the interview respondents, once the participating representatives are identified, a follow-up e-mail, mail or telephone call was made, reminding them of the procedures to be used in the study as well as requesting a letter of commitment—the letter was used as a part of ethical research requirement.

3.4. Data Collection

3.4.1. Online Survey

An online survey and interviews have been used to collect data. Firstly, data was obtained through questionnaires (web-based/online survey) with a mixture of closed and open ended questions, which produce both quantitative and qualitative data. Arrangement has been made for the electronic delivery of data collected through the web-based version of the instrument. The link is provided in UT's website and other mirror websites. Ethical consideration and study approval have been obtained before the pilot study was conducted. The administrator of the computer centre was contacted to obtain permission for faculty and students to participate in the online survey. The pilot study was conducted from March to April 2012 during face-to-face tutorials in main and selected regional offices. The respondents were given sufficient time to fill in the online questionnaires in the presence of the researcher without any interference. To provide validity of the sample proportion, a link of the online survey was also sent to tutors and students who represent the tutors' and students' demography. Two weeks after the first survey have been sent, follow-up emails were sent to those individuals who did not respond to the initial online survey, to request a response. The decision was made to include any questionnaire received.

The survey was accessible over the Internet, and the participants were able to complete the survey at home or at a location of their choice. The participants had approximately two months to complete the survey, from the middle of April 2012 to the end of May 2012. The survey was sent to more than 3,385 students and 436 tutors. The rate of participation of students in the survey was 51.2% at 1,734 returned (1,201 completed) student surveys and 36.5% for tutor with 159 returned (126 completed) tutor surveys.

To minimize non-response error, the procedures established by Lindner, Murphy and Briers (2001) was followed. Thirty (30) non-respondents were randomly selected and contacted via email for inclusion in a follow–up survey, and were asked to respond to 10 randomly selected items from the survey instrument. The data was statistically compared to the data from the respondents. It was decided if statistically significant differences found in more than two scale items, it was concluded that respondents differed from non-respondents.

No monetary incentive was offered to tutors or students to participate in the online survey and the in-person interview. One of the strategies to enhance participation was to highlight the benefits of participation as it related to greater long term advantages. An introductory email and a research consent form for online survey were sent to tutors and students (Appendix D) and (Appendix E) that explained the potential benefits of their participation in regard to emerging technologies related to online teaching and learning.

Zoomerang, an online survey tool, was used to develop and present the online survey. Participants of the research were able to access the online survey from their home or work computers, ideally using a high-speed Internet connection such as Digital Subscriber Line (DSL) or cable. In addition, online survey tools such as Zoomerang enabled the researcher to quickly create and deploy surveys and harvest the results and reports that can be downloaded to a spreadsheet or a database processing application, such as Microsoft Excel or transformed into SPSS data. Faculty and student participation in the survey was completely voluntary, and participation was anonymous. As a motivational incentive, the faculty and students who completed the survey were automatically included in a drawing for ten T-shirts.

3.4.2. In-Person Interview

An in-person interview was used as a second source data. Open-ended questions were asked to encourage the participants to responds with in-depth answers. Interview arranged in face-to-face meeting, by telephone, audio or video conferencing. Stage and Manning (2003) mentioned the effectiveness of open-ended questions beginning with "how" rather than "why," while (Bogdan & Biklen, 2007) noted that open-ended questions assisted the researcher in probing the participants' answers more deeply. Consultation with the supervisor about using these techniques helped in the effective validation of the interview instruments. The interview questions consisted of respondents' characteristics, perspectives, opinions, competencies, and suggestions; and their reponses to the issues of ETs' challenges, benefits, and outcomes.

Data collection of qualitative data was performed by using Skype, a video conferencing tool, and Evaer, software for audio and video recording. Data was collected during June to July 2012. The data gathering consisted of 30 - 45 minutes of recorded online interviews with the participants. Text messaging was also used in interview if a bad Internet connection occurred. The participants responded to questions directly using an instant messaging menu based on the interviewer instructions. In addition, the participants agreed to be recorded in this interview process to have their responses analyzed. The interviews conducted in *Bahasa* (Indonesian) to standardize the communication language, although some of participants have skills to speak English fluently.

3.5. Instrument Development

3.5.1. Online Survey

The primary data collection instrument used in the online survey was adapted from the Brush et al. (2008) instrument to measure pre-service teachers' technology skills, technology beliefs, and technology barriers. The instrument has been modified to accommodate the evaluation models of Alliger et al. (1997) and D. L. Kirkpatrick (1998), and translated into Indonesian language to provide clear understanding for respondents and it was provided in the online form. In addition, the instrument was developed and evaluated in terms of its reliability and validity. The open-ended questions are embedded in an online form to investigate ETs' barriers and challenges in online tutorials.

The study of Brush et al. (2008) provided the most appropriate instrument. The study contained a questionnaire that consists of six sections: characteristic of respondents, technology skills, emerging technologies acceptance, behavior intentions, perceived technology barriers, and open ended questions on the respondents expectation of emerging technologies in online tutorial. Each item in the instrument was accompanied by a 5-point Likert scale with "1" representing "strongly disagree" and "5" representing "strongly agree" for positive items, and vice versa for negative items. The questionnaire was pilot tested, and statistically tested using the Cronbach coefficient alpha. In addition, two major procedures were employed to establish construct validity for the adapted instrument. First, review of literature was conducted to ensure the three levels were based upon established concepts. Second, the instrument was reviewed by my supervisor, who is mastering technology and technology integration.

Leidner and Jarvenpaa (1995) suggested that it might be more useful to use well-established variables in IS research than to create new variables. Prior to developing an instrument to measure the perceptions of adopting an IT innovation, G. C. Moore and Benbasat (1991) conducted a search for measures that were already developed and evaluated in terms of their reliability and validity. Consequently, this study developed a survey instrument by using survey items from the following valid research sources: Compeau and Higgins (1995), Fuller, Vician, and Brown (2006), Cassidy and Eachus (2002), Igbaria and Iivari (1998), as well as the most relevant ones from C.-D. Chen et al. (2007) and Ball and Levy (2009).

3.5.2. In-Person Interview

Instrument development is vital for ensuring validity data. Applying the concept to be measured into survey question is difficult and requires significant development and testing. The instrument for this study has been tested in a local environment to ensure that the concepts and language understood and acceptable in Indonesian language (*Bahasa*). Language is a factor that needs to be managed seriously when developing questions and undertaking surveys to describe emerging technologies acceptance because too many technical term that should be translated into *Bahasa*. The words translated accurately to national standard *Bahasa* in order to be accepted by participants who have different perspectives because the existence of different groups in the population, such as age, gender or ethnic groups.

The questionnaires have been pre-tested with the participants to provide information on the acceptability of the language of the participants. In the pre-testing, the researcher made a summary on time spent and the way in which the questions were received, misunderstandings that occurred, and terms that were not understood. Pre-testing reduced errors by improving survey questions (Creswell & Plano Clark, 2011). Field testing conducted after the pre-testing has produced a questionnaire that was ready to be tested systematically on a set of respondents. The final test was a full test of the survey instrument and full survey procedures, offering an introduction to the research, describing the participant rights based on the ethics research board standards, and closing the interview. The final version of interview instrument was approved by my supervisor and was ready to be used in online interview using Skype (a video conference software), and Evaer (an audio and video recorder software).

3.5.3. Independent Variable Measure

Emerging technologies reactions (ETsR), emerging technologies understanding (ETsU), and technology competencies (TC) were measured using the twenty seven-item (nine items each) instrument developed by researcher. This instrument exhibited high reliability and validity, with a reliability measure being established using Cronbach's Alpha. Participants responded using self-reported measures to define their level of ETsR, ETsU and TC. Participants indicated their level of agreement with a series of items using a five-point Likert scale, where one indicated "Strongly disagree" and five indicated "Strongly agree."

3.5.4. Dependent Variable Measure

Behavior Intention (BI) was measured using the instrument developed by Chen et al. (2007) and Ball and Levy (2009). This instrument measured instructors' intentions to use an Internet-based emerging educational technology. Participants indicated their level of BI using two items and a five-point Likert scale, where one indicated "Strongly disagree" and five indicated "Strongly agree." According to Ball and Levy (2009), the instrument exhibited high reliability and validity, with a reliability measure using Cronbach's Alpha of over 0.94. Confirmatory factor analysis was used to test the validity of the instrument. Results indicated that the measurement model provided a very good fit based on their data (C.-D. Chen et al., 2007). The wording of the two BI items was adapted to reflect the specific technology being investigated in the current research study.

3.5.5. Tutor and Student Demographics

Following the approach of Venkatesh and Morris (2000) and Albirini (2006), the current study collected the following demographic information from tutors: gender, age, number of years teaching or learning using online tutorial, and number of subjects that tutors taught or students registered in online tutorial. The descriptive statistics that were generated included frequencies, measures of central tendency and dispersions. This demographic information was used to provide descriptive information of the data set to ensure that the sample collected was representative of the population.

3.6. Data Analysis

3.6.1. Online Survey

The data collected were downloaded onto a personal computer from the online survey website and transferred to a Microsoft Excel spreadsheet. The Excel spread-sheet, in turn, was imported into computer software known as Statistical Package for Social Science (SPSS), which was utilized to code and analyze the data. Data on the emerging technologies reactions were used to address research question 1. Data on the emerging technologies understanding were used to address research question 2. Data on the technology competencies were used to address research question 3.The data combination from ETsR, ETsU and TC were used to address research question 4.

Data on the barriers of technology were used to address research question 5. The responses to the structured close-ended questions were rated in percentages. The percentage of respondents for each alternative was analyzed. The data collected was analyzed descriptively using the SPSS. With descriptive statistics the researcher describing what is or what the data show. The responses to the open-ended questions were analyzed using inferential statistics. With inferential statistics the researcher simply trying to infer from the sample data what the population might think and trying to reach conclusions that extend beyond the immediate data alone.

The strength of the relationship between variables, known as the strength of ordinal relationship, was measured using Kendall's tau_b and Spearman's rho correlation coefficient values (Field, 2009; Morgan, 2011). Both Kendall's tau_b and Spearman's rho required that the two variables, X and Y, were paired observations, with the variables measured being at least at the ordinal level (Wasserman, 2005). Cross tabulations were conducted to analyze the data collected. The dependent variable was behavior intentions (BI). The independent variables were emerging technologies reactions (ETsR), emerging technologies understandings (ETsU) and technology competencies (TC).

A study of this nature calls for certain assumptions. Therefore, the researcher made the following assumptions in investigating the tutors' and students' perceptions of emerging technologies. Responses of students were deemed to be true and reflective of their experiences. The instrument used to measure the tutors and students perceptions accurately measured what it designed to measure. Finally, the researcher used an objective approach for analysis in order to eliminate the effects of the researcher's biases.

3.6.2. In-Person Interview

In addition to the quantitative use of online survey, qualitative data was collected concurrently with the quantitative survey data. Open-ended questions were employed at an in-person interview to accomplish this objective. The first question of the open-ended questions addressed the perspectives of participants on emerging technologies. The second to fourth questions asked the participants to expand on how emerging technologies have been learnt to support their learning. The fifth to ninth questions were related to the technology competencies of participant. The tenth question requested participants to give reasons why they intended to use emerging technologies. The last three questions related to the challenges, benefits and results of the ETs program. Participant characteristics were addressed in the participant introduction at the beginning of interview.

It has been demonstrated in previous research that qualitative text can be transformed into quantitative findings when using similarly worded survey questions, thus, the researcher needed to triangulate the data gathered to see if they would be supportive or contradictory in nature when compared to the quantitative findings. This was essentially a process for encoding qualitative information. The qualitative data were coded to generate a codebook using as many categories as possible. A codebook is the compilation or integration of a number of codes/themes in a qualitative study (Creswell, 2009). Coding is the process of organizing the information into segments of text before bringing meaning to data (Rossman & Rallis, 2012). A code in qualitative research is “a word or short phrase that symbolically assigns a summative, salient, essence-capturing, and/or evocative attribute for a portion of language-based or visual data” (Saldaña, 2009, p. 3). According to Boyatzis (1998) there were stages to developing and using an inductively derived code, and further, the stages depend on the desired approach. Information was organized categorically and chronologically, reviewed repeatedly, and continually coded. A list of major ideas was saved to be identified and described from the perspective of the participants.

The data analysis process used qualitative computer software called Maxqda version10. Maxqda facilitates the recording and analysis of textual and graphic data. Maxqda is powerful analysis tools to organize and analyze unstructured information, to explore and visualize data, and justify the findings. It offers a range of resources for mixed methods research. Responses to open-ended questions from survey research can be imported to the program, demographic variables and categorized survey responses can be associated with text documents in a MAXQDA project, counts of coded segments are available throughout an analysis, and new functions invite the use of numbers as heuristic devices and provide for export of tables with code counts that can be analyzed within statistical packages (Maietta, 2008).

3.7. Reliability and Validity

Ensuring validity and reliability is closely connected to the approach of this study. All measures should be taken to ensure validity and reliability. Internal validity was achieved through accurate descriptions of results. External validity was achieved through detailed and in-depth descriptions creating deep and rich reports. The solid reports were achieved by using multiple data gathering strategies and instruments on each level of evaluation, but it was time consuming and labor intensive.

3.7.1. Online Survey Reliability

Reliability refers to the extent to which the constructs were free from error and yielded consistent results across units of observation (Straub, 1989). Cronbach's Alpha is the most commonly used measure of reliability for a set of multiple indicators for a given construct (Hair, Black, Babin, & Anderson, 2009) According to Sekaran (2003), Cronbach's Alpha is "a reliability coefficient that indicates how well the items in a set are positively correlated to one another" (p. 307). Internal consistency is achieved when the items used to measure a construct are "capable of independently measuring the same concept so that the respondents attach the same overall meaning to each of the items" (Sekaran, p. 205). Cronbach's Alpha measures range from 0 to 1, with values of 0.60 to 0.70 deemed the lower limit of acceptability (Hair et al., 2009). According to Sprinthall (2012), reliability scores estimated over 0.70 are desirable. The closer the measure is to 1, the higher the internal consistency reliability (Sekaran, 2003).

Cronbach's Alpha reliability coefficients were calculated for each of the five scales using the actual data collected. Given that all the scales for this study were used previously, some items were initially reverse-scored based on the recommendations of the authors of each of the scales. Along with looking at the overall Cronbach's Alpha reliability coefficient, three other measures of reliability were examined: (a) the inter-item correlation matrix was assessed to ensure that all items have positive correlations with each other; (b) the "corrected item-total correlation" statistics for each item were examined to ensure that all scale items have at least a r = 0.20 correlation with the total scale; and (c) the "Cronbach's Alpha if item deleted" statistics were also assessed to determine whether the summated scale would be better off without that specific item. If a final scale failed to attain a coefficient alpha of at least $r = 0.70$, then the relevant hypothesis testing was performed on the individual items.

3.7.2. In-Person Interview Reliability

Qualitative reliability means that the researcher’s approach is consistent across different researchers and different projects (Gibbs, 2007).To ensure reliability in qualitative research, examination of trustworthiness is crucial (Golafshani, 2003). Reliability procedures are undertaken as suggested by (Gibbs, 2007): cross check the transcript to avoid mistakes during transcription and compare data with the codes and their definitions to eliminate a shift in the meaning of the codes during process of coding.

3.7.3. Online Survey Validity

Validity provides "evidence that the instrument, technique, or process used to measure a concept does indeed measure the intended concept" (Sekaran, 2003, p. 425). According to Straub (1989), many IS researchers continue to use un-validated instruments, or instruments that have had major changes made to them, but were not retested. F. D. Davis (1989) stated that "those who base business decisions on un-validated measures may be getting misinformed about a system's acceptability to users" (p. 320). Straub stated, "Lack of validated measures in confirmatory research raises the specter that no single finding in the study can be trusted" (p. 148). The threat to validity in the current study was reduced by using previously validated instruments without making any major changes to them. The only change that was made was in the names of the specific technologies investigated.

3.7.3.1. Internal Validity

Internal validity refers to the issue of "whether the observed effects could have been caused by or correlated with a set of un-hypothesized and/or unmeasured variables (Straub, 1989, p. 151). This study addressed research questions using instruments that have been validated in prior research. Using valid and reliable instruments minimized the threat to internal validity in the current study.

3.7.3.2. External Validity

External validity refers to the generalizability of the results to other field settings (Sekaran, 2003). It was anticipated that generalizability of the current study would be limited, as the participants were comprised of a relatively small number of tutors at a single, small private university from a single geographic location. Moreover, tutors who have little computer experience or do not use computers in the classroom may have chosen not to participate in this study. These factors may limit the generalizability of the findings to tutors at other institutions. According to Hair et al. (2009), including only relevant variables as identified in research, and excluding irrelevant variables, will increase a study's generalizability. According to Havelka (2003), ETsR, ETsU, and TC have all been identified in prior research as important variables in predicting technology acceptance. Consequently, the inclusion of ETsR, ETsU, and TC in the current study increased its generalizability, thereby reducing the threat to external validity.

Sample size played a role in generalizability (Hair et al., 2009). According to Hair et al., in order for the results to be generalizable, there should be 15 to 20 observations for each independent variable. This study included three independent variables; therefore, 45-60 observations were required for the results to be generalizable. It was anticipated that more than 100 tutors and students would participate in the research study. This number was attained, and the sample was representative of the population, and therefore the results were generalizable to the population.

3.7.4. In-Person Interview Validity

Qualitative validity indicated that the researcher checks for the accuracy of the findings by employing certain procedures (Gibbs, 2007). In ensuring internal validity, the following procedures have been followed:

- Multiple data sources – Information was collected through multiple sources to include interviews, observations and document analysis.
- Participant cross check – The participants served as editor throughout the analysis process. An ongoing dialogue regarding researcher’s interpretations of the participant’s reality and meanings will ensure the truth value of the data.
- Peer examination – a graduate student from the Faculty of Education served as peer examiner.

In addition, to ensure external validity, three techniques have been employed in this study. First, the researcher provided a detailed account of the focus of the study, researcher's role, the participant's position and basis for selection, and the contexts from which data were gathered. Second, multiple sources of data were collected. Finally, data collection and analysis strategies were reported in detail in order to provide a clear and accurate description of the methods used in this study. The first and third techniques are based on Merriam (1998) and the second technique is suggested by LeCompte, Preissle, and Tesch (1993). All phases of this research have been audited by my supervisor who is experienced in qualitative research methods.

3.7.5. Instrument Validation

According to Straub (1989), instrument validation is a "prior and primary process in confirmatory empirical research" (p. 162), and refers to whether the instrument actually measures what it was supposed to be measuring. There are two parts to instrument validation: content validity and construct validity. According to Sekaran (2003), content validity "ensures that the measure includes an adequate and representative set of items that tap the concept" (p. 206). Construct validity refers to whether the data is a reflection of true scores of the chosen instrument (Straub, 1989). According to Straub "researchers should use previously validated instruments wherever possible, being careful not to make significant alterations in the validated instrument without revalidating the instrument content, constructs, and reliability" (p. 161). Consequently, the current study used items from previously validated instruments. The wording of the BI items was modified only to reflect the emerging technologies acceptance. The specific TC items were modified only to reflect current technologies.

3.7.5.1. Pre-Analysis Data Screening

Pre-analysis data screening is required to ensure that no data or data entry errors existed with the collected data, as errors may impact the validity of the results (Mertler & Vanatta, 2010). According to Levy (2006), there are four main reasons for pre-analysis data screening: (a) to ensure accuracy of the data collected; (b) to deal with the issue of response-set; (c) to deal with missing data; and (d) to deal with extreme cases, or outliers. The first reason for pre-analysis data screening is to ensure the accuracy of the data collected. If the collected data is not accurate, then the results will not be valid either. As data are input directly into the database via a Web-enabled survey, common data entry errors that can occur when manually inputting data from paper-and-pencil surveys into the database are avoided. The survey software is also able to restrict available responses to ensure that respondents are able to input only valid responses. Therefore, accuracy of the data collected is not an issue in this survey.

The second reason for pre-analysis data screening is to address the issue of response-set. Response-set refers to a "series of systematic responses by a respondent that reflect a 'bias' or consistent pattern" (Hair et al., 2009, p. 479). Kerlinger and Lee (2000) suggested analyzing data for possible response-sets and to consider eliminating them from this study. Therefore, response sets were considered for elimination prior to data analysis.

The third reason for pre-analysis data screening is to deal with missing data. According to Hair et al. (2009), missing data, by definition, is not directly represented in the results, and can have a substantial impact on the results. The threat of missing data in this study is reduced by the Web-enabled method of deploying the survey instrument. The survey software made all questions mandatory to be answered.

The fourth reason for pre-analysis data screening is to deal with extreme cases, or outliers. As the uniqueness of outliers may cause a serious distortion in statistical measures, examination of outliers must be conducted to determine if they should be retained or eliminated (Hair et al., 2009). Hair et al. stated, "The researcher needs a means to objectively measure the multidimensional position of each observation relative to some common point" (p. 65), and noted that Mahalanobis D^2 measure can be used for this purpose. Thus, the fourth pre-analysis data screening procedure that this study employed was the Mahalanobis D^2 analysis, in order to determine if outliers should be included or eliminated from the final data analyses.

3.8. Theoretical Model Development

This study examined three independent variables: ETsR, ETsU, and TC; and their contribution to the dependent variable: BI. The current study followed the example of others (Baek, Jung, & Kim, 2006; F. D. Davis, 1989; Hasan, 2006; Sahin & Thompson, 2007; Webster & Hackley, 1997; Wozney et al., 2006) and used regression analysis to test the strength of the prediction model. This study proposed a theoretical model, tested it using Multiple Linear Regression (MLR) and Ordinal Logistic Regression (OLR), and empirically validated it based on the data that was collected. According to Hair et al. (2009), "the basic relationship represented in multiple regression is the *linear* association" (p. 173). However, MLR lacks the ability to directly model nonlinear relationships (Hair et al., 2009). Therefore, an OLR model was also developed to test the prediction of BI based on a nonlinear combination of the independent variables. Statistical analysis (MLR and OLR) was performed to address the four research questions noted above.

In order to answer general research questions, a factor analytic solution was also employed. Factor analysis is based on the fundamental assumption that some underlying factors, which are smaller than the number of observed variables, are responsible for the co-variation among the observed variables(Fabrigar & Wegener, 2012; Tabachnick & Fidell, 2013). Exploratory factor analysis (EFA) is used when the researcher does not know how many underlying dimensions there are for the given data (J.-o. Kim & Mueller, 1978). Factor analysis is a statistical technique applied to a single set of variables when the researcher is interested in discovering which variables in the set form coherent subsets that are relatively independent of one another (Tabachnick & Fidell, 2013). According to Costello and Osborne (2005) many researchers in the social sciences have made extensive use of factor analysis. They found over 1,700 studies that used some form of EFA.

3.8.1. Exploratory Factor Analysis

The purpose of an exploratory factor analysis applied in this study is that it has the potential to reveal new, more conceptually valid factors relative to technology acceptance. Thus, this study answered the call by many researchers for the development of stronger technology acceptance theory.

Factor analysis is an analysis that aims to find the main factors that most influence the dependent variable from a series of tests conducted on a set of independent variables as factors. Factors are reflected underlying processes that created the correlations among variables (Tabachnick & Fidell, 2013).

According to Tabachnick and Fidell (2013), to do factor analysis, some assumptions must be met:

a. The correlation between the independent variables: Correlations among the independent variables must be strong.
b. Partial correlations: Partial correlation should be high.The correlation between two variables to consider other variables fixed, it should be small. At SPSS detection of partial correlation is given by the choice Anti-Image Correlation.
c. Testing the entire matrix of correlation (correlation between variables), as measured by the magnitude Bartlett Sphericity Test or Measure of Sampling Adequacy (MSA). This test requires the existence of significant correlations among at least some of the variables.
d. In some cases, the assumption of normality of the variables or factors should be obtained.

Tabachnick and Fidell (2013, p. 614) stated, “In exploratory factor analysis (EFA), one seeks to describe and summarize data by grouping together variables that are correlated.” The value of factor analysis is that it provides a meaningful organizational scheme that can be used to achieve a more parsimonious explanation of the variables (Tinsley & Tinsley, 1987). In factor analysis, although the results are objective, determining the number of components and assigning conceptual meaning to the components is a heuristic process. Applying a factor analysis needs four aspects to be fulfilled: sample size, correlation, factor extraction and factor rotation (Kerlinger & Lee, 2000; Tabachnick & Fidell, 2013).

3.8.1.1. Sample size

Tabachnick and Fidell (2013) mentioned that correlation coefficients tend to be less reliable when estimated from limited sample size. The meaningfulness of the components that emerge in factor analysis is dependent on the meaningfulness of the variables. An adequate sample size relative to the number of variables, the number of participants, and the conceptual relatedness of the variables is compulsory in order to interpret the data and make valid and generalizability of the results.

3.8.1.2. Correlation

Producing a correlation matrix is a very important step in the process of conducting a factor analysis. A correlation matrix is a set of correlation coefficients among all the variables being considered in the study. Factoring is not worthwhile unless there are a substantial number of large correlations (Nunnally & Brenstein, 1994).

3.8.1.3. Factor Extraction

Factor extraction is the method of identifying the components that best characterize a set of variables. Three factor extraction methods are frequently used in factor analysis. They are principal-axis factoring (PAF), principal components analysis (PCA), and the maximum likelihood (ML) method. Of the methods, PCA is the most popular and prominent (Conway & Huffcutt, 2003; Henson & Roberts, 2006).

Principal components analysis is intended to simply summarize many variables into a few components (Henson & Roberts, 2006). The goal of PCA is data reduction, reducing a large number of variables to a smaller set of components that account for a large amount of observed variance (Kashy, Donnellan, Ackerman, & Russell, 2009). PCA is appropriate if the researcher's purpose is pure reduction of variables without interpreting the resulting variables in terms of latent constructs (Conway & Huffcutt, 2003). PCA explains all the variance in any particular correlation matrix (Kline, 1994). PCA assumes that there is as much variance to be analyzed as the number of achieved variables and all the variance can be explained by extracted components (Pett, Lackey, & Sullivan, 2003).

In addition, according to Tabachnick and Fidell (2013), most researchers using factor analysis begin by using principal components extraction. Therefore, PCA was used in this study as a method for extracting factors.

3.8.1.4. Factor Rotation

Factor rotation is a process of rotating the two reference axes of the factor. These rotations permit a virtual infinity of different solutions. Each rotary motion of a factor into a new position changes the position relative to the other factors and each new position would give new loadings (Kline, 1994).

According to DeCoster (1998), there are two major approaches to factor rotation, oblique and orthogonal. Factor rotation allows the researcher to better interpret the relationships that exist among the factors. For any set of correlations and numbers of correlations, there can be many ways to define the factors and still account for the same amount of covariance in the measures. Furthermore, Tinsley and Tinsley (1987) noted that rotations generally result in a more interpretable solution and one that is more likely to generalize to other samples from the same population. Interpretability results from the emergence of a simple structure. Both approaches to factor rotation seek to achieve the same results: a simple structure and thus an interpretable solution.

Nunnally and Brenstein (1994) recapitulated the relative merits of orthogonal versus oblique rotations by commenting that both are mathematically legitimate and "use boils down to a matter of taste" (p. 501). Regardless of the type of rotation method used, the results will explain the same amount of variance. The authors gave alternatives for researchers to use orthogonal solutions when conducting an exploratory factor analysis. The rotation of the variables should result in a simple structure. Simple structure is the criterion most commonly used for selecting among solutions in EFA (Fabrigar & Wegener, 2012). According to Thurstone (1947), each factor should have a few high loadings and the remaining loadings should be zero or close to zero. Cattell (1978) suggested that simple structure factors are usually simple to interpret because they have only a few high loadings.

Brandon (2011) revealed that orthogonal rotations are better than oblique rotations in producing a simple and interpretable factor structure. Therefore, this research used an orthogonal rotation (Varimax method).

3.8.2. Multiple Regression Analysis

To make predictions to the dependent variable, a multiple regression equation can be used (Sprinthall, 2012). The standard regression coefficient (SRC) for each independent variable is as follows: ETsR(b_R), ETsU (b_U), and TC (b_C). The value of the SRC will tell how much change in the criterion will occur for a given unit change in the predictor. With three independent variables and one dependent variable, the multiple regression equation is:

$$Y = a + b_1X_1 + b_2X_2 + b_3X_3$$

The results of the analysis of the model are:

BI = b_R*ETsR + b_U*ETsU + b_C*TC + c_{BI}

Where b_R, b_U, b_C are the SRC of ETsR, ETsU, TC respectfully and c_{BI}, is the intercept of coefficient for BI.

3.8.3. Ordinal Logistic Regression

OLR uses independent variables to directly predict, in a non-linear way, the probability that the dependent variable will occur. OLR uses a binary dependent variable and requires that binary values be imputed from the ordinal values (5>4>3>2>1) that were used in this study. OLR uses a logistic transformation on the dependent variable to make predictions as to whether the event will or will not occur. According to (Hair et al., 2009), "if the predicted probability is greater than 0.50, then the prediction is that the outcome is 1 (the event happened); otherwise, the outcome is predicted to be 0 (the event did not happened)" (p. 321). The general logistic regression model (Sprinthall, 2012) can be stated as:

$$\rho(Y) = \frac{1}{(1+\exp(-(b_1 X_1 + b_2 X_2 + ... + b_i X_i + c)))}$$

The current model's analysis using OLR of the model is:

$$\rho(BI) = \frac{1}{(1+\exp(-(b_{ETsR} * ETsR + b_{ETsU} * ETsU + B_{TC} * TC + c_{BI})))}$$

Where $\rho(BI)$ is the probability *(p)* that the construct is a significant factor increasing the probability of technology acceptance, and b_R, b_L, b_B are the SRC of ETsR, ETsU, TC respectfully and c_{BI} is the intercept of coefficient for BI.

3.8.4. Data Interpretation

In the current study, Multiple Linier Regression (MLR) was used to answer the four research questions and determine to what extent ETsR, ETsU, and TC contributed to tutors' intention to use emerging educational technology in online tutorial. Analysis was done to determine whether any of the three independent variables were significant.

The variable coefficients were then interpreted to determine the influence of each independent variable. Each independent variable was analyzed, holding the other two independent variables constant. This analysis determined how much the dependent variable changed for every one unit of change in the independent variable. The direction of the relationship between each independent variable and the dependent variable was determined by looking at the regression coefficient associated with each independent variable. If the variable coefficient was positive, then a positive relationship existed between the independent variable and the dependent variable. If the regression coefficient was negative, then a negative relationship existed between the independent variable and the dependent variable. If the variable coefficient was not significant, then no relationship existed between the independent variable and the dependent variable. The significance levels also indicated if the model allowed a prediction of a participant's BI based on their ETsR, ETsU and TC. MLR also calculated the R^2, which was used to measure the overall prediction accuracy of the model and determine how much of the variation in the dependent variable was explained by the independent variables. The coefficients of the independent variables were compared to determine which independent variable (ETsR, ETsU, or TC) had the most significant contribution to the dependent variable (BI).

OLR analysis presented a model similar to the MLR model and was also used to address the four research questions in this research. Maximum likelihood estimation provided estimates for each of the independent variables (ETsR, ETsU, and TC) in order to predict the probability of BI. OLR applied maximum likelihood estimation after transforming the dependent variable into a logit variable, which is the natural log of the odds of the dependent variable occurring or not. These estimates were used to calculate the probability of the dependent variable occurring or not. The probability ranges from zero to one and were used to form the odds ratio, which acted as the dependent variable in the regression. Logistic coefficients for ETsR, ETsU, and TC were calculated to predict the probability of BI. The logistic coefficient compared the probability of an event occurring with the probability of its not occurring and determined the odds ratio. A positive coefficient for an independent variable increased the probability of the dependent variable occurring, while a negative coefficient decreased the probability of the dependent variable occurring. A coefficient of zero resulted in no change in the odds. The Wald statistic was used to determine whether any of the three independent variables were significant. The logistic coefficients of the independent variables were compared to determine which independent variable (ETsR, ETsU, or TC) had the most significant contribution to the dependent variable (BI). The likelihood ratio test was used to test the statistical significance of each coefficient in the model, and the overall fit of the logistic model. If the model was significant at the 0.05 level or better, then the model was considered to be well-fitted.

3.9. Resources

The approval from both the Head of Research and Community Services and the Head of Computer Centre at Indonesian Open University (UT) was obtained to collect data from tutors and students. Survey software was applied to design, create and deploy a Web-enabled survey. Software was also required to collect and analyze data. Survey software from the Zoomerang website was used in the current study for this purpose. Following data collection, this study used the Statistical Package for the Social Sciences version 20 to conduct the analysis of the data.

3.10. Anticipated Findings

The findings of this preliminary study could be used in broader studies focused on the instructional emerging technologies that integrated ICT into learning support materials for designing effective distance learning process. It could also enhance the “design experiments” and other development research as suggested by T. C. Reeves (2000).

3.11. Summary

This chapter presents the methodology used in this concurrent triangulation mixed methods study. The chapter begins with a restatement of the research questions, followed by a description of the setting and participants and then the research design, which includes a presentation of the instrumentation, data collection, and data analysis. It described the current study as a predictive study that attempted to predict the tutor's intention to use emerging educational technology in distance learning based on the contribution of ETsR, ETsU, and TC. In addition, the relevant issues and methods that were used to answer the research questions were discussed, including instrument development, reliability and validity, population and sample, pre-analysis data screening and theoretical model development.

Following the recommendation of (Leidner & Jarvenpaa, 1995), the survey instrument was developed using well-established variables in IS research. The survey instrument consisted of items relating to ETsR, ETsU, and TC. Demographic data were also collected from the participants in order to provide a basic description of the sample.

Issues of reliability and validity, including internal validity, external validity and instrument validation were presented and discussed in this chapter. Relevant issues on each topic were drawn from literature (F. D. Davis, 1989; Hair et al., 2009; Sekaran, 2003; Sprinthall, 2012; Straub, 1989). This discussion provided specific steps that were taken to ensure that the results of the current study were both reliable and valid.

The study was set at the Open University of Indonesia (UT) and included faculty who had previously taught online and undergraduate and graduate students who had subscribed to online tutorial. Data were collected for the study using separate survey instruments for faculty and students. The survey was made available online using Zoomerang, a web- based survey application. After collection of the data, they were analyzed using the Statistical Package for the Social Sciences (SPSS) software.

The subsequent sections in this chapter addressed data collection and the specific statistical methods that were used to analyze the data. The first issue discussed was pre-analysis data screening, which was used to ensure the accuracy of the collected data. The final section discussed theoretical model development, and described the statistical methods that were used to analyze the collected data and to test the strength of the prediction model. The statistical methods (MLR and OLR) that were used to formulate models and test predictive power were described, along with their respective equations. MLR was selected to model linear relationships between the variables. OLR was selected to model non-linear relationships between the variables. The chapter was closed with the anticipated findings of this study.

4. Presentation of Findings

4.1. Overview

In this chapter, the results of the current study are presented and organized in the following way. The survey procedures are presented first, followed by the results of the pre-analysis data screening. Next, demographic data for the sample are presented, then the results of the reliability analysis. After the reliability analysis, the results of the Principal Component Analysis (PCA), Multiple Linear Regression (MLR), Ordinal Logistics Regression (OLR) and Binary Logistic Regression (BLR) analyses are presented. The chapter concludes with a summary of the results of this study.

The survey instrument, in Appendix C, was designed to be delivered in a Web-based format. This delivery method was selected because the electronic format allowed the survey to be designed in a way that would minimize data entry errors. A request message was distributed by email with a link to the survey web page and took place over a 45-day period in April – May, 2012. Email messages were sent to all respondents at UT. This constituted 436 potential survey tutor participants and 3,385 student participants. A total of 159 responses were collected from tutors (126 completed), representing a response rate of approximately 36.5% and 1,734 responses were collected from students (1201 completed), representing a response rate of approximately 51.2% . There were possibility of numerous potential influencial on low response rate of tutors, including survey length, respondent contacts, design issues, and compensation. Tutors need more time to complete the online survey because they have overload work in the office. Respondents should be contacted more frequent to remind them to fill in the survey. The respondents need acces to the internet to fill in the survey, whereas not all respondents have online access. The medium response rate from students ensured that the samples were representative of the population, and thereby increased the generalizability of the results.

4.2. Quantitative Data Findings

4.2.1. Pre-Analysis Data Screening

Pre-analysis data screening was conducted on the data before final analyses. This screening was conducted for four reasons: (a) to ensure accuracy of the data collected; (b) to deal with the issue of response-set; (c) to deal with missing data; and (d) to deal with extreme cases, or outliers. Accuracy of the data collected was not an issue, as the survey software used drop-down lists to restrict the responses the participants could select to only those that were acceptable answers. All responses were mandatory by the online survey software, so missing data was also not an issue. The data were automatically collected by the software, so no manual input was required after data collection. These safeguards eliminated the need for a manual check for human error.

To address the issue of response-set, a visual inspection of the responses was conducted to discover if any participants had answered all of the answers in the same way. Although there is a possibility that a respondent may answer honestly, but not in accordance with expectations, an analysis may reveal an unexpected pattern with two respondents in particular. These respondents may answer most of the questions in the same way, including both positive and negative items, indicating that the respondents may not pay attention to the questions, or are not completely honest. These participants' answers are identified as potentially biased and should be eliminated from the dataset before further analyses are conducted.

Outliers were identified by conducting Mahalanobis Distance analysis. Table 5 shows the results of the Mahalanobis Distance analysis. The extreme values box show the highest and lowest values for the Mahalanobis distance variable and the ID number of the person that recorded these scores. I was looking for the people (or cases) who had values than critical value of 18.47 (critical value for 4 dependent variables). The table shows only one person had a score that exceeded the critical value. This was the person with case number 67 (for tutor) and 1144 (for student). Because it was only one person and theperson's score is not too high, I left this person in the data file. If there had been a lot of outlying cases, I might have needed to consider removing the cases from the data file.

Table 3. Mahalanobis distance value

	Minimum	Maximum	Mean	Std. Deviation	N
Mahal. Distance (Tutor)	**26.063**	**96.961**	54.563	14.916	126
Mahal. Distance (Student)	**7.860**	**341.501**	54.954	33.392	1201

a. Dependent Variable: Session ID

Table 4. Mahalanobis distance extreme values

			Tutor			Student		
			Case Number	Session ID	Value	Case Number	Session ID	Value
Mahalanobis Distance	Highest	1	67	599949701	96.96112	1144	608400895	341.50098
		2	13	599407083	96.27840	138	599943462	291.72460
		3	101	605431017	86.14058	74	599918718	251.20201
		4	62	599939618	85.85502	1170	608838287	249.10841
		5	121	607368627	85.08716	170	599956669	226.02933
	Lowest	1	31	599597801	26.06295	493	601606459	7.85971
		2	89	603148722	26.56696	281	600478615	8.07542
		3	49	599791530	28.91364	1066	607023135	9.34238
		4	23	599593594	29.33027	899	605583069	9.37912
		5	57	599927779	30.37550	1014	606572256	10.21365

a. Only a partial list of cases with the value 6.30575 is shown in the table of lower extremes.

As a result of the pre-analysis data screening, 126 completed responses from tutors and 1201 from students were available for further analyses.

4.2.2. Demographic Analysis

To provide useful and accurate answers to the research questions, the sample used must be representative of the population (Sekaran, 2003). In order to determine the representativeness of the sample, demographic data were requested from the survey participants. The population of all instructors who participated in online tutorial in 2012.1 academic years at the UT consisted of approximately 54.5% males and 45.5% females. The respondents in the final data set were approximately 46% male and 54% female. Similar to the data distribution of tutors, the distribution of the data students collected appears to be representative of the population of students at UT. The population of non-teacher training students at UT consisted of approximately 51.6% males and 48.4% females. The respondents in the final data set were approximately 59.2% male and 40.8% female. More than eighty-six percent of the population of non-teacher training students at the university were 40 years of age or younger, with 52.5% of the potential participants between the ages of 17-28. Eighty-eight percent of the respondents in the final data set were 40 years of age or younger, with 54% of the population of non-teacher training students at the university between the ages of 17 – 28. The distribution of the data collected appears to be representative of the population of instructors at the university. Tables 6 and 7 show the demographic data of the participants.

Table 5. Comparison between Population and Sample of Tutors based on Gender

Characteristic		Population		Sample		
		Frequency	Percent	Characteristic	Frequency	Percent
Gender	Male	414	54.5	Male	58	46.0
	Female	345	45.5	Female	68	54.0
	Total	759	100.0	Total	126	100.0
Age	17 - 28 years	16	2.1	17 - 28 years	3	2.4
	29- 43 years	186	24.5	29 - 40 years	40	31.7
	44- 53years	299	39.4	41 - 50 years	33	26.2
	54 - 63years	251	33.1	51 - 60 years	49	38.9
	>63years	7	0.9	>60 years	1	0.8
	Total	759	100.0	Total	126	100.0

The sample of individuals between the ages of 17-28 was only 2.4%, so there was no reliable data that described the technology acceptance of younger tutors. Limited time and availability were the reasons of the low responses from younger tutors. Some of the younger tutors were in continuing study in home country and overseas. They were not aware of this research. The high responses from female respondents indicated they more active than their counterparts. In addition, some of male respondents did not complete the survey.

Table 6. Comparison between Population and Sample of Students based on Gender and Age

Characteristic		Population		Sample	
		Frequency	Percent	Frequency	Percent
Gender	Male	81,079	51.6	711	59.2
	Female	76,097	48.4	490	40.8
	Total	157,176	100.0	1,201	100.0
Age	17 - 28 years	82,531	52.5	648	54.0
	29- 40 years	54,022	34.4	410	34.1
	41 - 50 years	16,883	10.7	127	10.6
	51 - 60 years	3,495	2.2	15	1.2
	>60 years	244	0.2	1	0.1
	Total	157,175	100.0	1201	100.0

4.2.3. Technology Skills Analysis

The findings from the technology skills analysis from data tutor are as follows:

Table 7. Technology Skills of Tutors

Type of Technological Skills	Mean	Std. Dev.
A. Communication		
Send, receive, open, and read email	4.29	.809
Use advanced email features (e.g., attachments, folders, address books, distribution lists)	3.94	.927
Subscribe to and unsubscribe from a listserv	3.50	1.158
Audio and video conferencing (e.g., Skype, Windows Live)	3.03	1.193
Instant messaging (e.g., Yahoo messenger, ICQ)	3.05	1.258
B. Information Retrieval		
Use a search tool to perform a keyword/subject search in an electronic database (e.g., CD-ROM, library catalog)	3.95	1.011
Use advanced features to search for information (e.g., subject search, search strings with Boolean operators, combining searches)	3.11	1.266
Use a search engine (e.g., Google, Yahoo, Lycos) to search for information on the web	4.03	.903

Type of Technological Skills	Mean	Std. Dev.
C. Creation		
Use a web authoring tool (e.g., Wordpress) to create a blog	2.41	1.410
Format a blog using tables, backgrounds, internal and external links	2.22	1.430
Use Wikipedia to add content	2.69	1.582
Create online pooling/survey	2.13	1.541

Specific technology skills have been identified as a major factor affecting technology acceptance. The tutors in this study in general had high technology skills in communication and information retrieval, but low technology skills in creation. They felt most comfortable using communication and information retrieval technology. They also were fairly confident in their mastery of basic emerging technology operations.

The findings from the technology skills analysis from data student are as follows:

Table 8. Technology Skills of Students

Type of Technological Skills	Mean	Std. Dev.
A. Communication		
Send, receive, open, and read email	4.03	1.064
Use advanced email features (e.g., attachments, folders, address books, distribution lists)	3.66	1.202
Subscribe to and unsubscribe from a listserv	3.35	1.363
Audio and video conferencing (e.g., Skype, Windows Live)	3.03	1.415
Instant messaging (e.g., Yahoo messenger, ICQ)	3.42	1.311
B. Information Retrieval		
Use a search tool to perform a keyword/subject search in an electronic database (e.g., CD-ROM, library catalog)	3.53	1.266
Use advanced features to search for information (e.g., subject search, search strings with Boolean operators, combining searches)	2.85	1.514
Use a search engine (e.g., Google, Yahoo, Lycos) to search for information on the web	3.92	1.103
C. Creation		
Use a web authoring tool (e.g., Wordpress) to create a blog	2.67	1.560
Format a blog using tables, backgrounds, internal and external links	2.48	1.599
Use Wikipedia to add content	2.71	1.622
Create online pooling/survey	2.40	1.793

The results from student data are similar to the data from tutors. Students had high technology skills in communication and information retrieval, but low technology skills in creation. They felt least comfortable with the skills associated with creation technology because creation technology was more difficult and complex to be competent. In addition, more complex technology skills were self-rated lower by students and tutors than simple technology skills.

4.2.4. *Perceived Technology Barriers*

Adequate technology is needed by tutors to integrate it into curriculum. Nevertheless, even in cases where technology is available, it cannot be assumed that tutors have access to that technology for instructional purposes.

Table 9. Perceived Technology Barriers of Tutors

No.	Perceived Technology Barriers	Not a Barrier	Minor Barrier	Major Barrier	Do not know
		(%)			
1.	Lack of or limited access to computers in university	35.7	26.2	34.9	3.2
2.	Not enough software available in university	25.4	36.5	34.1	4.0
3.	Lack of knowledge about technology	11.9	31.7	54.8	1.6
4.	Lack of knowledge about ways to integrate technology into the curriculum	9.5	31.7	52.4	6.3
5.	My assignments do not require technology use	23.8	23.8	46.0	6.3
6.	Lack of technology accessibility in my classes	28.6	27.8	40.5	3.2
7.	Too much material to cover	23.8	44.4	27.8	4.0
8.	Lack of mentoring or support to help me increase my technology skills	16.7	35.7	44.4	3.2
9.	Technology-integrated curriculum projects require too much preparation time	14.3	39.7	38.9	7.1
10.	There is not enough time in class to implement technology-based lessons	17.5	38.9	39.7	4.0

Table 10. Perceived Technology Barriers of Students

No.	Perceived Technology Barriers	Not a Barrier	Minor Barrier	Major Barrier	Do not know
		(%)			
1.	Lack of or limited access to computers in schools	20.2	27.8	35.3	16.7
2.	Not enough software available in schools	15.9	28.5	36.4	19.2
3.	Lack of knowledge about technology	19.0	26.9	49.0	5.1
4.	Lack of knowledge about ways to integrate technology into the curriculum	13.7	25.9	50.6	9.8
5.	My assignments do not require technology use	24.4	18.0	44.9	12.7
6.	Lack of technology accessibility in my classes	24.2	30.2	42.5	3.0
7.	Too much material to cover	27.5	36.2	32.0	4.3
8.	Lack of mentoring or support to help me increase my technology skills	19.3	34.4	42.3	4.0
9.	Technology-integrated curriculum projects require too much preparation time	24.2	37.2	30.4	8.2
10.	There is not enough time in class to implement technology-based lessons	18.2	33.1	42.9	5.9

Access to technology involves providing the proper amount and right types of technology in locations where tutors and students can use them appropriately (Fabry & Higgs, 1998). The tutors and students reported similar perceived technology barriers that suggest that the lack of knowledge about technology and the lack of knowledge about ways to integrate technology into the curriculum are the biggest barriers to use technology in online tutorial.

4.2.5. Normality Test

According to Sekaran (2003), characteristics of the population are generally normally distributed, meaning that most characteristics will be clustered around the mean, with few at either the high or low extremes. If the distribution of the sample is normally distributed, an estimation of the population characteristics will be reasonably accurate (Sekaran, 2003). The Kolmogorov-Smirnov test is a common statistical test used to test the level of significance for the differences from a normal distribution (Hair et al., 2009). The Kolmogorov-Smirnov test was conducted to analyze the data to ensure that the distribution of the data corresponded to a normal distribution. The p-values for ETs reaction, ETs understanding, technology competencies (TC), and behavior intention (BI) that resulted from the Kolmogorov-Smirnov test were all >0.05, so there appear to be no significant deviations from normality. Tables 12 and 13 show the results of the Kolmogorov-Smimov test.

Table 11. One-Sample Kolmogorov-Smirnov Test for Tutor Data

		Reaction	Understanding	Competencies	Intention
N		126	126	126	126
Normal Parameters[a,b]	Mean	37.1111	32.3016	35.9524	8.3571
	Std. Deviation	5.94134	6.39909	6.68952	1.63200
Most Extreme Differences	Absolute	.124	.094	.106	.200
	Positive	.092	.059	.088	.157
	Negative	-.124	-.094	-.106	-.200
Kolmogorov-Smirnov Z		1.395	1.055	1.190	2.246
Asymp. Sig. (2-tailed)		.041	.215	.118	.000

a. Test distribution is Normal.
b. Calculated from data

Table 12. One-Sample Kolmogorov-Smirnov Test for Student Data

		Reaction	Understanding	Competencies	Intention
N		1201	1201	1201	1201
Normal Parameters[a,b]	Mean	36.6370	33.1715	35.9600	8.4638
	Std. Deviation	6.02327	6.44856	6.32654	1.54183
Most Extreme Differences	Absolute	.126	.082	.104	.217
	Positive	.082	.082	.084	.174
	Negative	-.126	-.072	-.104	-.217
Kolmogorov-Smirnov Z		4.353	2.854	3.614	7.514
Asymp. Sig. (2-tailed)		.000	.000	.000	.000

a. Test distribution is Normal.
b. Calculated from data

4.2.6. Reliability Analysis

Cronbach's Alpha reliability tests were conducted for the reaction, understanding, competencies and BI constructs to determine consistency across items for each scale. The results demonstrated high reliability for all constructs, with Cronbach's Alphas well above the desired minimum of 0.70 (Sprinthall, 2012). Reliability analysis results for these scales are presented in Table 14.

Table 13. Results of Reliability Analysis

Variable	Cronbach's Alpha	
	Tutor	Student
ETs Reaction	.897	.926
ETs Understanding	.906	.929
Tech. Competencies	.936	.927
Behavior Intention	.905	.890

4.2.7. Factor Analysis

Initially, the 27 items representing the three theoretical constructs were subjected to an exploratory principle components factor analysis. Items of each construct were carefully examined to make sure that all items were loaded based on theory. The coefficient alpha for each of the measures was computed to estimate the reliability. As is shown in Table 14, the coefficient alphas range from 0.897 to 0.936 (tutor) and 0.890 to 0.929 (student), indicating satisfactory levels of reliability for the measures (Nunnally & Brenstein, 1994).

4.2.7.1. Factor Analysis Test Assumptions

Research methods section has been mentioned that the factor analysis requires the fulfillment of a series of assumptions. Researchers will test the assumptions one by one the factors before performed factor analysis. The correlation between the independent variables in the factor analysis must be > 0.5, with a significance of <0.05. Independent test results on the correlation between the variables output KMO and Bartlett's Test, as follows:

Table 14. The result of KMO and Bartlett's Test

		Tutor	Student
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.899	.944
Bartlett's Test of Sphericity	Approx. Chi-Square	3377.824	32699.562
	df	351	351
	Sig.	.000	.000

KMO value and Bartlett's Test for correlations between the variables of interest is>0.5. Significance of the study is 0.05. From the above results, it was obtained KMO values of tutor 0.899 and student 0.944, which means greater than 0.5. Meanwhile, significance of Bartlett's Tests of Sphericity of tutor and student are 0.000.

Based on the results, it can be noted that the variables in sample are allowed for further analysis. Furthermore, to see the correlation between the variables can be considered to look at Anti-image Matrices table. Value of the MSA (Measure of Sampling Adequacy) ranged from0 to 1, with the following conditions:

a. MSA=1, the variable can be predicted without error by the other variables.
b. MSA>0.5, the variables are predictable and can be analyzed further.
c. MSA<0.5, variables cannot be predicted and could not be further analyzed, or removed from the other variables.

Based on the MSA values in table 16, all the independent variables can be analyzed further because their values are > 0.5. The MSA complete result of each variable is attached in the appendix G and H.

4.2.7.2. Grouping factors

The next step is that this study attempted to determine whether the independent variables can be grouped into one or several factors. Thus, the twenty-seven agents of the independent variable will be whether they actually can be simplified into one or several factors.

4.2.7.2.1. Explanation of Variables by a Factor

The purpose of the explanation of variables by a factor is to show how big a factor that will be formed to explain the variable. Table 17 describes commonalities.

Table 15. Measures of Sampling Adequacy (MSA)

		Tutor	Student
Anti-image Correlation	X11a	.838a	.943a
	X11b	.877a	.943a
	X11c	.918a	.962a
	X12a	.881a	.951a
	X12b	.937a	.951a
	X12c	.885a	.958a
	X13a	.940a	.949a
	X13b	.937a	.946a
	X13c	.895a	.958a
	X21a	.929a	.950a
	X21b	.914a	.942a
	X21c	.939a	.967a
	X22a	.882a	.945a
	X22b	.899a	.939a
	X22c	.886a	.956a
	X23a	.887a	.933a
	X23b	.873a	.932a
	X23c	.902a	.952a
	X31a	.913a	.938a
	X31b	.884a	.924a
	X31c	.934a	.959a
	X32a	.875a	.921a
	X32b	.869a	.917a
	X32c	.940a	.954a
	X33a	.858a	.935a
	X33b	.854a	.925a
	X33c	.955a	.959a

Table 16. Communalities

	Tutor		Student	
	Initial	Extraction	Initial	Extraction
X11a	1.000	.634	1.000	.700
X11b	1.000	.661	1.000	.734
X11c	1.000	.749	1.000	.751
X12a	1.000	.704	1.000	.700
X12b	1.000	.724	1.000	.752
X12c	1.000	.793	1.000	.785
X13a	1.000	.706	1.000	.730
X13b	1.000	.745	1.000	.751
X13c	1.000	.749	1.000	.807
X21a	1.000	.593	1.000	.646
X21b	1.000	.692	1.000	.682
X21c	1.000	.735	1.000	.712
X22a	1.000	.633	1.000	.753
X22b	1.000	.673	1.000	.727
X22c	1.000	.770	1.000	.781
X23a	1.000	.759	1.000	.802
X23b	1.000	.771	1.000	.774
X23c	1.000	.752	1.000	.760
X31a	1.000	.747	1.000	.740
X31b	1.000	.737	1.000	.770
X31c	1.000	.746	1.000	.726
X32a	1.000	.840	1.000	.792
X32b	1.000	.849	1.000	.810
X32c	1.000	.753	1.000	.791
X33a	1.000	.706	1.000	.614
X33b	1.000	.736	1.000	.596
X33c	1.000	.750	1.000	.686

Extraction Method: Principal Component Analysis.

Since the average of communalities value over 0.5, therefore all the variables can be used to further analysis.

4.2.7.2.2. Factors that may be formed

How many factors may have been formed can be seen in table18 as follows:

Table 17. Total variance explained

Component	Tutor			Student		
	Initial Eigenvalues			Initial Eigenvalues		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	**12.981**	48.076	48.076	**14.353**	53.158	53.158
2	**2.929**	10.847	58.924	**2.510**	9.297	62.455
3	**1.830**	6.779	65.702	**1.684**	6.236	68.692
4	**1.299**	4.811	70.513	**1.325**	4.907	73.599
5	.952	3.525	74.038	.938	3.475	77.074
6	.869	3.218	77.256	.665	2.462	79.536
7	.739	2.738	79.994	.649	2.405	81.941
8	.640	2.370	82.364	.530	1.963	83.904
9	.633	2.345	84.709	.496	1.838	85.742
10	.533	1.973	86.682	.441	1.634	87.376
11	.451	1.671	88.353	.403	1.491	88.867
12	.374	1.385	89.737	.358	1.327	90.194
13	.352	1.304	91.041	.303	1.123	91.317
14	.297	1.099	92.140	.240	.891	92.208
15	.271	1.005	93.145	.226	.838	93.046
16	.260	.964	94.110	.220	.815	93.860
17	.229	.848	94.957	.207	.767	94.627
18	.221	.817	95.774	.199	.735	95.362
19	.202	.750	96.524	.196	.726	96.088
20	.189	.698	97.222	.179	.662	96.750
21	.151	.561	97.783	.165	.612	97.362
22	.143	.528	98.311	.145	.535	97.898
23	.133	.492	98.803	.138	.511	98.409
24	.118	.435	99.239	.126	.467	98.875
25	.083	.309	99.548	.124	.459	99.334
26	.069	.254	99.801	.100	.369	99.703
27	.054	.199	100.000	.080	.297	100.000

Components range from 1 to 4, which represented the number of independent variables and those that had Eigenvalues of more than 1 are taken for further analysis.

4.2.7.3. Factor loading

As we can see in table 15, the maximum factors that can be formed is 4; then we should determine which independent variables will be categorized into the factors 1, 2, 3 or 4. To specify each variable that can be categorized into factors 1 to 4 can be seen in the table 19 component matrixes, as follows.

Table 18. Component matrix

	Tutor				Student			
	Component				Component			
	1	2	3	4	1	2	3	4
X11a	.728	-.118	.173	.243	.740	-.286	.003	-.265
X11b	.725	-.278	.097	.220	.734	-.338	-.017	-.285
X11c	.599	.551	-.093	.278	.714	.376	.152	-.276
X12a	.722	-.354	-.070	.230	.744	-.314	-.011	-.220
X12b	.712	-.415	.017	.212	.755	-.359	.011	-.229
X12c	.710	.378	-.330	.194	.718	.367	.219	-.295
X13a	.714	-.412	.035	.159	.763	-.256	.006	-.286
X13b	.695	-.491	-.013	.142	.767	-.314	.028	-.252
X13c	.668	.377	-.343	.206	.699	.438	.191	-.300
X21a	.749	-.029	.143	.102	.763	-.075	-.241	.021
X21b	.771	-.172	.177	.192	.769	-.195	-.228	.026
X21c	.677	.501	-.063	.146	.702	.450	-.082	-.098
X22a	.688	.117	.376	.072	.760	.075	-.403	.083
X22b	.714	-.096	.391	-.022	.749	-.084	-.386	.098
X22c	.568	.649	.142	.078	.673	.556	-.139	-.016
X23a	.613	.110	.574	-.204	.708	.146	-.475	.231
X23b	.636	.039	.577	-.177	.708	.042	-.458	.247
X23c	.541	.620	.272	.029	.637	.542	-.231	.086
X31a	.807	-.227	-.198	-.069	.763	-.242	.235	.212
X31b	.784	-.278	-.173	-.123	.763	-.299	.243	.199
X31c	.786	.057	-.338	-.103	.691	.084	.444	.211
X32a	.786	.001	-.033	-.471	.748	-.148	.249	.384
X32b	.758	-.008	-.027	-.522	.743	-.148	.242	.422

	Tutor				Student			
	Component				Component			
	1	2	3	4	1	2	3	4
X32c	.703	.350	-.179	-.321	.669	.353	.394	.251
X33a	.742	-.266	-.258	-.133	.752	-.207	.035	.064
X33b	.739	-.353	-.208	-.149	.735	-.232	.022	.047
X33c	.738	.277	-.352	-.073	.696	.389	.223	-.036

Extraction Method: Principal Component Analysis.
a. 4 components extracted.

Table 20 describes the grouping of independent variables into different factors.

Table 19. Rotated Component Matrix

Variable	Tutor Component[a]				Student Component[b]			
	1	2	3	4	1	2	3	4
X11a	.640	.304	.063	.358	.754	.229	.197	.200
X11b	.733	.196	.118	.267	.792	.188	.195	.182
X11c	.158	.829	.044	.186	.342	.765	.152	.157
X12a	.792	.188	.178	.103	.749	.190	.222	.230
X12b	.812	.106	.158	.169	.788	.170	.201	.248
X12c	.316	.790	.262	.009	.360	.783	.093	.185
X13a	.789	.086	.194	.197	.761	.271	.201	.193
X13b	.822	.025	.222	.138	.780	.221	.190	.240
X13c	.296	.777	.239	-.021	.309	.823	.114	.146
X21a	.539	.340	.193	.387	.492	.244	.537	.235
X21b	.679	.266	.125	.380	.566	.157	.515	.269
X21c	.184	.775	.176	.263	.200	.698	.410	.131
X22a	.382	.344	.093	.601	.368	.297	.709	.163
X22b	.495	.160	.186	.607	.450	.168	.674	.203
X22c	-.019	.751	.096	.443	.075	.723	.487	.125
X23a	.212	.150	.207	.805	.218	.258	.808	.188
X23b	.285	.117	.198	.798	.272	.177	.786	.226
X23c	-.046	.663	.075	.552	.009	.637	.581	.130
X31a	.648	.256	.499	.112	.486	.169	.209	.657

Variable	Tutor Component[a]				Student Component[b]			
	1	2	3	4	1	2	3	4
X31b	.642	.180	.526	.128	.528	.132	.190	.662
X31c	.447	.486	.556	.040	.244	.437	.054	.687
X32a	.313	.230	.739	.379	.330	.179	.270	.760
X32b	.279	.191	.767	.383	.306	.162	.287	.780
X32c	.107	.544	.619	.248	.049	.607	.135	.634
X33a	.607	.190	.548	.041	.540	.192	.312	.435
X33b	.651	.104	.545	.072	.553	.167	.304	.412
X33c	.289	.641	.504	.042	.196	.702	.180	.349

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.

Table 20. Summary of Rotated Common Matrix

	Tutor	Student
Factor 1	Dominated by X1 variable, it is **obvious**, but that is still influenced by X2 and X3 variables	Dominated by X1 variable, it is **obvious**, but that is still influenced by X2 and X3 variables
Factor 2	Common factor. It was represented by X1, X2, X3 variables	Common factor. It was represented by X1, X2, X3 variables
Factor 3	Represented by X3 variable (**obvious**)	Represented by X2 variable (**obvious**)
Factor 4	Represented by X2 variable (**obvious**)	Represented by X3 variable (**obvious**)

Note: X1=ETsR, X2=ETsU and X3=TC

For further analysis, we can use variables in factor 1, 3, and 4. I use variables that have correlation value equal to or more than 0.4 (R. A. Johnson & Wichern, 2007; Tabachnick & Fidell, 2013). For the tutors, the variable X11c, X12c, X13c; X21a, X21b, and X21c, and for student the X11c, X12c, X13c; and X33c should be eliminated because less than 0.4.Therefore, the total number of analyzed variables that should be retained are 21 variables for the tutors and 23 variables for the students. The next analysis of variables for tutors and students are as follows:

Table 21. KMO and Bartlett's Test

		Tutor	Student
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.887	.894
Bartlett's Test of Sphericity	Approx. Chi-Square	2556.257	2808.789
	Df	210	253
	Sig.	.000	.000

Table 22. Communalities

Tutor			Student		
Variable	Initial	Extraction	Variable	Initial	Extraction
X11a	1.000	.589	X11a	1.000	.594
X11b	1.000	.632	X11b	1.000	.645
X12a	1.000	.681	X12a	1.000	.689
X12b	1.000	.718	X12b	1.000	.714
X13a	1.000	.724	X13a	1.000	.705
X13b	1.000	.758	X13b	1.000	.745
X22a	1.000	.652	X21a	1.000	.632
X22b	1.000	.666	X21b	1.000	.702
X22c	1.000	.719	X21c	1.000	.803
X23a	1.000	.705	X22a	1.000	.666
X23b	1.000	.706	X22b	1.000	.649
X23c	1.000	.750	X22c	1.000	.808
X31a	1.000	.744	X23a	1.000	.800
X31b	1.000	.726	X23b	1.000	.802
X31c	1.000	.740	X23c	1.000	.741
X32a	1.000	.721	X31a	1.000	.766
X32b	1.000	.692	X31b	1.000	.734
X32c	1.000	.768	X31c	1.000	.770
X33a	1.000	.703	X32a	1.000	.898
X33b	1.000	.721	X32b	1.000	.894
X33c	1.000	.734	X32c	1.000	.783
			X33a	1.000	.683
			X33b	1.000	.714

Extraction Method: Principal Component Analysis.

Table 23. Total Variance Explained

	Tutor			Student		
Component	Initial Eigenvalues			Initial Eigenvalues		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	10.925	52.023	52.023	11.938	51.906	51.906
2	2.376	11.314	63.337	2.542	11.052	62.958
3	1.548	7.373	70.710	1.458	6.339	69.297
4	.933	4.441	75.151	1.001	4.350	73.647
5	.903	4.299	79.449	.911	3.961	77.608
6	.755	3.595	83.044	.804	3.494	81.102
7	.638	3.039	86.084	.685	2.980	84.082
8	.485	2.311	88.395	.581	2.526	86.608
9	.411	1.957	90.352	.472	2.051	88.659
10	.304	1.449	91.801	.418	1.818	90.477
11	.285	1.358	93.159	.307	1.335	91.812
12	.239	1.136	94.295	.287	1.247	93.059
13	.214	1.017	95.311	.252	1.098	94.156
14	.185	.882	96.193	.236	1.027	95.184
15	.177	.841	97.035	.191	.831	96.015
16	.160	.764	97.799	.178	.772	96.787
17	.144	.686	98.485	.166	.723	97.509
18	.121	.577	99.061	.156	.678	98.187
19	.087	.416	99.477	.123	.536	98.724
20	.065	.309	99.786	.105	.455	99.179
21	.045	.214	100.000	.086	.373	99.552
22				.059	.257	99.809
23				.044	.191	100.000

Extraction Method: Principal Component Analysis.

Table 24. Rotated Component Matrix

Tutor Component [a]				Student Component [b]				
Variable	1	2	3	Variable	1	2	3	4
X11a	.609	.194	.425	X11a	.603	.244	.159	.380
X11b	.718	.173	.294	X11b	.704	.094	.168	.336
X12a	.771	.241	.167	X12a	.798	.128	.138	.129
X12b	.809	.160	.193	X12b	.805	.053	.120	.219
X13a	.809	.165	.207	X13a	.787	.038	.152	.247
X13b	.847	.154	.129	X13b	.824	-.031	.167	.194
X22a	.390	.169	.687	X21a	.581	.463	.159	.235
X22b	.531	.156	.600	X21b	.696	.338	.081	.311
X22c	-.103	.482	.690	X21c	.244	.826	.243	.037
X23a	.286	.128	.779	X22a	.417	.542	.042	.442
X23b	.355	.107	.754	X22b	.528	.355	.116	.481
X23c	-.109	.405	.758	X22c	.024	.849	.184	.230
X31a	.669	.526	.141	X23a	.209	.266	.216	.800
X31b	.688	.485	.132	X23b	.279	.242	.196	.792
X31c	.434	.726	.156	X23c	-.031	.731	.203	.406
X32a	.423	.658	.331	X31a	.727	.255	.415	.013
X32b	.399	.659	.315	X31b	.716	.173	.435	.059
X32c	.124	.791	.355	X31c	.520	.405	.575	-.067
X33a	.645	.534	.044	X32a	.371	.169	.786	.338
X33b	.687	.498	.023	X32b	.342	.148	.803	.332
X33c	.238	.792	.223	X32c	.166	.447	.728	.159
				X33a	.691	.146	.429	.000
				X33b	.733	.086	.412	.031

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.

Table 25. Component Transformation Matrix

Tutor				Student				
Component	1	2	3	Component	1	2	3	4
1	.706	.544	.453	1	.736	.390	.424	.355
2	-.652	.251	.716	2	-.604	.712	.107	.343
3	.276	-.801	.531	3	.159	-.057	-.755	.634
				4	.260	.582	-.489	-.596

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.

4.2.7.4. The Result of Principal Component Analysis

As can be seen in table 23, all of the communalities value at more than 0.5. Table 26 shows that data from tutors produced 3 factors and data from students 4 factors. In addition, table 26 reveals which group of variables is categorized in each factor. Furthermore, the table 26 of the data from tutors consists of 3 factors that influence the dependent variable, its rotation shows the variables converge into three factors, but only 2 significant factors. The correlation value of the factor 2 (0.251) is less than 0.5.The value of this rotation indicates degree of likelihood of structure from factor 2 before rotation and factor 2 after rotation. Meanwhile table 26 of the student data consists of 4 factors that influence the dependent variable, its rotation shows the variables converge into four factors, but only 2 significant factors. The correlation value of factors 3 and 4 is less than 0.5.

Table 26. Summary of PCA of Tutor Data

Factor	Variables load	Interpretation
Factor 1	Dominated by X1 variable, it is **obvious**, but that is still influenced by X2 and X3 variables	*ETs Reaction* (X1)
Factor 2	Represented by X3 variable	*Technology Competencies* (X3)
Factor 3	Represented by X2 variable	*ETs Understanding* (X2)

Note: X1=ETsR, X2=ETsU and X3=TC

Table 27. Summary of PCA of Student Data

Factor	Variables load	Interpretation
Factor 1	Dominated by X1 variable, it is **obvious**, but that is still influenced by X2 and X3 variables	*ETs Reaction* (X1)
Factor 2	Represented by all variables	*Combination of all variables*
Factor 3	Represented by X3 variable	*Technology Competencies* (X3)
Factor 4	Represented by X2 variable	*ETs Understanding* (X2)

Note: X1=ETsR, X2=ETsU and X3=TC

The study yielded a simple, interpretable structure. As can be seen in table 24, 70.71% of the variance is explained by the three components solution (tutor data) and 73.65% of the variance is explained by the four components solution (student data). Known relationships among the study variables were confirmed by the results. Based on tutor data in table 25, applying Reise, Waller, and Comrey (2000) and Comrey and Lee (1992) guideline for evaluating the communalities and strength of a loading, 47.6% of the variables in component one fall into the very good category (>0.63), while 23.8% are in the poor category (<0.32). Likewise, component two has 23.8% of the variables loading in the very good category and 47.6% loading in the poor category. Component three also has 23.8% of the variables loading in the very good category and 57.1% of the variables in the poor category.

4.2.8. Multiple Regression Analysis of Tutor Data

Multiple Linear Regression (MLR) was used to develop a predictive model to measure the contribution of ETsR, ETsU, and TC to instructors' and students' intention to use emerging educational technology in distance learning, as measured by the weight of the combined contribution of the three independent variables to the prediction of BI. In order to perform the MLR analysis, an aggregated measure for each construct was created for ETsR, ETsU, TC, and BI. MLR was then performed using these measures. Four methods of selection—enter, backward, forward and stepwise—were used to analyze multiple linear regressions. The overall model for predicting BI from the three predictors (ETsR, ETsU, and TC) was found to be significant with $F(3,125)=23.489$

($p<0.05$). Results indicated that only one of the three individual predictors (TC) was significant ($p <0.05$), with a positive regression weight, indicating that BI increased as scores on TC increased. In addition, the positive regression weights for ETsR and ETsU indicated that higher scores on ETsR and higher scores on ETsU both indicated higher scores on BI; however, neither of these two independent variables were significant predictors of BI. The MLR coefficients are shown in Table 29. The proportion of the variance in BI that was explained by ETsR, ETsU, and TC in combination was adjusted R^2=0.351, or 35.1%. The overall model summary is shown in Table 30.

Table 28. MLR Coefficients

Method: Enter [a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	2.308	.752		3.067	.003		
	ETsR	.061	.035	.222	1.760	.081	.327	3.053
	ETsU	.048	.028	.188	1.701	.091	.423	2.362
	TC	.062	.030	.255	2.109	.037	.355	2.817

Method: Backward [a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.308	.752		3.067	.003
	ETsR	.061	.035	.222	1.760	.081
	ETsU	.048	.028	.188	1.701	.091
	TC	.062	.030	.255	2.109	.037

Method: Forward [a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	3.446	.664		5.192	.000
	TC	.137	.018	.560	7.526	.000
2	(Constant)	2.407	.756		3.184	.002

TC	.078	.028	.319	2.754	.007
ETsR	.085	.032	.309	2.668	.009

Method: Stepwise [a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	3.446	.664		5.192	.000
	TC	.137	.018	.560	7.526	.000
2	(Constant)	2.407	.756		3.184	.002
	TC	.078	.028	.319	2.754	.007
	ETsR	.085	.032	.309	2.668	.009

a. Dependent Variable: Intention

Table 29. MLR Model Summary

Method: Enter

Model[b]	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.605[a]	.366	.351	1.31521

a. Predictors: (Constant), Competencies, Understanding, Reaction

b. Dependent Variable: Intention

Method: Backward

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.605[a]	.366	.351	1.31521

a. Predictors: (Constant), Competencies, Understanding, Reaction

Method: Forward

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.560[a]	.314	.308	1.35760
2	.593[b]	.351	.341	1.32530

a. Predictors: (Constant), Competencies

b. Predictors: (Constant), Competencies, Reaction

Method: Stepwise				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.560[a]	.314	.308	1.35760
2	.593[b]	.351	.341	1.32530
a. Predictors: (Constant), Competencies				
b. Predictors: (Constant), Competencies, Reaction				

4.2.9. *Multiple Regression Analysis of Student Data*

The overall model for predicting BI from the three predictors (ETsR, ETsU, and TC) was found to be significant with F(3,1200)=214.618 ($p < 0.05$). Four methods of selection—enter, backward, forward and stepwise—were used to analyze multiple linear regressions. Results indicated that only two of the three individual predictors (ETsR and TC) were significant ($p < 0.05$), with a positive regression weight, indicating that BI increased as scores on ETsR and TC increased. In addition, the positive regression weight for ETsU also indicated that higher scores on ETsU indicated higher scores on BI; however, this independent variable was not a significant predictor of BI. The MLR coefficients are shown in Table 31. The proportion of the variance in BI that was explained by ETsR, ETsU, and TC in combination was adjusted R^2=0.348, or 34.8%. The overall model summary is shown in Table 32.

The discovered value of adjusted R^2 in this study indicated that the independent variables account for 35% of the accumulated variance. That is, aforementioned predictive constructs ETsR, ETsU, and TC have significant effects on dependent variable BI. In particular, as shown in table 31, weight-wise the impact of TC on dependent variable BI was greatest (β=0.357, $p < .001$), followed by ETsR (β=.242, $p < .001$), ETsU (β=0.031, $p > .01$). These weights represent the strength of independent variables in their effect on dependent variable. The β=0.357 for TC represents that for a one unit increase in TC, BI would increase by 0.357 units.

Table 30. MLR Coefficients

Method: Enter [a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	2.821	.228		12.356	.000		
	ETsR	.062	.011	.242	5.815	.000	.315	3.179
	ETsU	.007	.009	.031	.838	.402	.398	2.511
	TC	.087	.010	.357	8.981	.000	.343	2.914

Method: Backward [a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.821	.228		12.356	.000
	ETsR	.062	.011	.242	5.815	.000
	ETsU	.007	.009	.031	.838	.402
	TC	.087	.010	.357	8.981	.000
2	(Constant)	2.835	.228		12.453	.000
	ETsR	.066	.010	.256	6.803	.000
	TC	.090	.009	.368	9.766	.000

Method: Forward [a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	3.474	.211		16.443	.000
	TC	.139	.006	.569	23.985	.000
2	(Constant)	2.835	.228		12.453	.000
	TC	.090	.009	.368	9.766	.000
	ETsR	.066	.010	.256	6.803	.000

Method: Stepwise [a]						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	3.474	.211		16.443	.000
	TC	.139	.006	.569	23.985	.000
2	(Constant)	2.835	.228		12.453	.000
	TC	.090	.009	.368	9.766	.000
	Reaction	.066	.010	.256	6.803	.000

a. Dependent Variable: Intention

Table 31. MLR Model Summary

Method: Enter [b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.591[a]	.350	.348	1.24485

a. Predictors: (Constant), Competencies, Understanding, Reaction

b. Dependent Variable: Intention

Method: Backward

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.591[a]	.350	.348	1.24485
2	.591[b]	.349	.348	1.24469

a. Predictors: (Constant), Competencies, Understanding, Reaction

b. Predictors: (Constant), Competencies, Reaction

Method: Forward

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.569[a]	.324	.324	1.26798
2	.591[b]	.349	.348	1.24469

a. Predictors: (Constant), Competencies

b. Predictors: (Constant), Competencies, Reaction

Method: Stepwise				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.569[a]	.324	.324	1.26798
2	.591[b]	.349	.348	1.24469

a. Predictors: (Constant), Competencies

b. Predictors: (Constant), Competencies, Reaction

4.2.10. Ordinal Logistic Regression (OLR)

4.2.10.1. OLR of Tutor Data

An OLR model was also developed to test the prediction of the dependent variable (BI) based on a combination of the three independent variables (ETsR, ETsU, and TC) without the requirements of interval-level data and normal distribution of variables that are required by MLR. The overall model for predicting BI based on the three predictors (ETsR, ETsU, and TC) showed a significant improvement in fit over a null model with no predictors: -2 Log Likelihood = 84.184, $\chi^2(3) = 55.759 p < .01$. The results of the OLR analysis are presented in Table 33.

Table 32. OLR Model Significance

Model	-2 Log Likelihood	Chi-Square	df	Sig.
Intercept Only	267.467			
Final	212.902	54.565	3	.000

Link function: Logit.

The results of the OLR analysis indicated that only one of the three individual predictors (ETsU) were significant (p < .05), with a positive parameter estimate, indicating that BI increased as scores on ETsU increased. The positive parameter estimates for ETsR and TC indicated that higher scores on ETsR and TC relate to higher scores on BI; however, these independent variables were not significant predictors of BI. These results were different with the MLR results. The OLR parameter estimates are presented in Table 34.

Table 33. OLR Parameter Estimates

		Estimate	Std. Error	Wald	Df	Sig.	95% Confidence Interval	
							Lower Bound	Upper Bound
Threshold	[BI = 1.00]	4.531	1.336	11.507	1	.001	1.913	7.149
	[BI = 2.00]	5.089	1.325	14.751	1	.000	2.492	7.686
	[BI = 3.00]	7.455	1.403	28.246	1	.000	4.705	10.204
	[BI = 4.00]	10.310	1.549	44.302	1	.000	7.274	13.346
Location	ETsR	.088	.054	2.695	1	.101	-.017	.193
	ETsU	.115	.046	6.112	1	.013	.024	.206
	TC	.082	.045	3.292	1	.070	-.007	.171

Link function: Logit.

4.2.10.2. OLR of Student Data

OLR analysis results, as presented in tables 35 and 36, show that all three predictors were significant ($p < .001$) with an overall reliable model: -2 Log Likelihood =1773.6, χ^2(df =3)=448.7, $p < .001$. Parameter estimates show good four cut-off points, which represent the cut-off between1-2, 2-3, 3-4, and 4-5 scale options in BI (see Table 35).

The likelihood ratio test showed that all three independent variables combine significantly contribute to the probability of students' intention to use emerging technologies in distance learning classified above or below the four cut-off points (1-2, 2-3, 3-4, and 4-5). The likelihood ratio test is a test of the significance of the difference between the likelihood ratio (-2LL) for the theoretical model minus the likelihood ratio for a reduced model, that is 222.344-1773.646.This difference value, called model chi-square=448.646, was strongly significant (given the df=3). In addition, the finding of significance, p<=.001 (whereas, p<=0.05 is the cut-off for good model) demonstrates that all three independent variables combined have a significant effect in predicting the probability of the dependent variable to be classified above or below the four cut-off points. Consequently, OLR results indicated that three independent variables ETsR, ETsU, and TC jointly have significant effect on dependent variable BI.

OLR analysis, as shown in table 36, also demonstrates that TC has the strongest effect (Estimate=0.153, p <.001) on BI followed by ETsR (Estimate=0.094, p <0.001), and ETsU (Estimate=0.010, p >.01). That is, for one unit increase in TC (i.e., going from 1 to 2), participants are 0.153 likely to be classified in one cut-off point higher on BI, given that all of the other independent variables in the model are held constant.

The OLR model analysis results are close to being consistent with the results of the MLR model analysis. Both model analyses showed that two predictive variables ETsR and TC have significant effect on dependent variable BI. Additionally, results in both models indicate that, weight-wise, the order of impact of predictive variables on dependent variable BI was: TC greatest and ETsU lowest.

Table 34. OLR Model Significance

Model	-2 Log Likelihood	Chi-Square	df	Sig.
Intercept Only	2222.344			
Final	1773.646	448.698	3	.000

Link function: Logit.

Table 35. OLR Model Parameter Estimates

		Estimate	Std. Error	Wald	df	Sig.	95% Confidence Interval	
							Lower Bound	Upper Bound
Threshold	[BI = 1.00]	3.400	.434	61.454	1	.000	2.550	4.250
	[BI = 2.00]	4.008	.428	87.725	1	.000	3.170	4.847
	[BI = 3.00]	6.772	.450	226.410	1	.000	5.890	7.654
	[BI = 4.00]	9.624	.489	387.223	1	.000	8.665	10.582
Location	ETsR	.094	.017	28.798	1	.000	.060	.128
	ETsU	.010	.015	.426	1	.514	-.019	.039
	TC	.153	.016	87.125	1	.000	.121	.185

Link function: Logit.

4.2.11. Binary Logistic Regression (BLR)

4.2.11.1. BLR for Tutor Data

A logistic regression was applied to 112 observations to predict the probability of having the intention to use emerging technologies (ETs) from variables dealing with gender, age, emerging technologies reaction (ETsR), emerging technologies understanding (ETsU) and technology competencies (TC). Two blocks of independent variables were utilized. Block one consisted of gender and age. Gender was re-coded so that being female was 1 and male was 0. Block two consisted of the ETsR, ETsU and TC. The binary dependent variable b*ehavior intention (BI) to use ETs* was re-coded into a dummy with 1 as *I have intention to use ETs* (true) and 0 as *I do not have intention to use ETs (*false). Multiple regression analysis has been run to test for multi-collinearity among independent variables. The results for Tolerance and VIF for all individual independent variables indicate there is no problem with multi-collinearity.

Table 36. Prediction of Having Intention to Use ETs

					MEASURES OF MODELFIT				
Block	r	Variable Exp (B) (>1=+) (<1=-)	Variable Exp (B) FINAL (>1=+) (<1=-)	Block Chi-Square	Model Chi-Square	Model -2 Log Likelihood (lower)	Model Cox & Snell R-Square (higher) 0-near1 (1=perfect	Model Nagelkerke R-Square (higher) 0-1 (1=perfect)	Model Hosmer & Lemeshow Test Chi-Square
BLOCK 1				0.376	0.376	27.262*	0.003	0.015	4.498
E1.Gender (F)	0.055	2.129	1.175						
E2.Age	0.005	1.115	1.146						
BLOCK 2				10.551*	10.928	16.710*	0.093	0.425	7.340
ETsR	0.182	8.491	8.491						
ETsU	0.192*	1.425	1.425						
TC	0.147	2.795	2.795						
				incremental	cumulative	cumulative	cumulative	cumulative	cumulative

NOTE: Hosmer & Lemeshow Test Chi-Square is not significant, meaning the observed and the expected do not differ significantly (they are similar). The model is fit.

Table 37. Classification Result for Having Intention to Use ETs

Observed		Predicted: Not having intention to use	Predicted: Having intention to use	Predicted: Percentage Correct
Actual Group	Not having intention to use	1	2	33.3%
	Having intention to use	0	109	100%
	Overall Percentage			98.2%

The cut value is .500

Press' Q for Logistic Regression
N =Total sample size =112

n =Number of observed correctly classified =1+109=110

K=Number of groups =2

Press' Q= [N - (nK)]^2/N(K-1)

= [112 - (110*2)]² / (112*(2-1)) = 0.57

df=1 and 1% Significant Level, X^2critical =6.63

df = 1 and 5% Significant Level, X^2 critical = 3.84

Press' Q= 0.57>X^2–critical (5%) =3.84>X^2–critical (1%) =6.63

The value of Press' Q is statistically not significant at the 5% and 1% significant levels. Therefore, we can conclude the classification is not statistically significantly beyond chance.

Block One (consisting of gender and age) is not significant at the p<0.05 level, with a Block One Chi-Square value of 0.376. Model One is also not significant at the p<0.05 level, with a Model One Chi-Square value of 0.376. The Model One-2LogLikelihood [-2LL] measure is significant at the p<0.05 level with a value of 27.262, indicating that Model One (consisting of only Block One) is a significant model estimation fit. Specifically, Cox & Snell R-Square (0.003) and Nagelkerke R-Square (0.015) estimate that 0.3% to 1.5% of the variance in the dependent variable is accounted for by Model One. The Model One Hosmer & Lemeshow Chi-SquareTest (4.498) is not significant—the observed and the expected do *not vary* significantly—indicating another measure of good model fit.

Gender is a not significant contributor to the dependent variable. The gender Exp(B) of 2.129 is not significant at the p<0.01 level, and the gender Exp(B) FINAL of1.175 is also not significant at the p<0.05 level.

Block Two (consisting of ETsR, ETsU and TC) is significant at the p<0.05, with a Block Two Chi-Square value of 10.551, suggesting that ETsR, ETsU and TC traits alone predict the likelihood of having intention to use ETs. In addition, Model Two (consisting of both Block One and Block Two) is not significant at the p<0.05 level, with a Model Two Chi-Square value of 10.928. However, an improvement over Model One in model estimation fit, since the value of Model Two-2LL is less than the value of Model One-2LL. Testing the Model Two-2LL measure of model fit, with a value of 16.710. The Cox & Snell R-Square (0.093) and Nagelkerke R-Square (0.425) indicate 9.3% to 42.5% of the dependent variable variance accounted for by Model Two. The Model Two Hosmer & Lemeshow Chi-SquareTest (7.340) is not significant—the observed and the expected do *not* vary significantly—indicating another measure of good model fit.

The Press' Q was calculated and valued at 0.57. It is not statistically significant at the p<0.05 and p<0.01 levels. Therefore, I can conclude that the ability to predict the likelihood of having intention to use ETs based on these two blocks is statistically not significant beyond chance.

4.2.11.2. BLR for Student Data

A logistic regression was applied to 1081 observations to predict the probability of having intention to use emerging technologies (ETs) from variables dealing with gender, age, emerging technologies reaction (ETsR), emerging technologies understanding (ETsU) and technology competencies (TC). Two blocks of independent variables were utilized. Block one consisted of gender and age. Gender was re-coded so that female was 1 and male was 0. Block two consisted of the ETsR, ETsU and TC. The binary dependent variable b*ehavior intention (BI) to use ETs* was re-coded into a dummy with 1 as *I have an intention to use ETs* (true) and 0 as *I do not have an intention to use* (false). Multiple regression analysis was run to test for multicollinearity among independent variables. The results for Tolerance and VIF for all individual independent variables indicate there is no problem with multicollinearity.

Table 38. Prediction of Having Intention to Use ETs

Block	r	Variable Exp (B) (>1=+) (<1=-)	Variable Exp (B) FINAL (>1=+) (<1=-)	Block Chi- Square	MEASURES OF MODELFIT Model Chi-Square	Model -2 Log Likelihood (lower)	Model Cox & Snell R-Square (higher) 0-near1 (1=perfect)	Model Nagel-kerke R-Square (higher) 0-1 (1=perfect)	Model Hosmer &Leme-show Test Chi-Square
BLOCK 1				0.947	0.947	251.622*	0.001	0.04	2.210
E1.Gender (F)	0.024	1.441	2.036						
E2.Age	0.023	1.166	1.256						
BLOCK 2				118.50**	119.45**	**133.120***	**0.105**	**0.502**	**15.764***
ETsR	0.237**	2.886*	2.886*						
ETsU	0.239**	3.775*	3.775*						
TC	0.235**	1.473	1.473						
				incremental	cumulative	cumulative	cumulative	cumulative	cumulative

Key:Significance

*p<0.05

**p<0.01

NOTE: Hosmer & Lemeshow Test Chi-Square is significant, meaning the observed and the expected differ significantly (they are different). The model is not fit.

Chi Square (0,05; df=8) = 15.507

Table 39. Classification Result for Having Intention to Use ETs

Observed		Predicted: Not having intention to use	Predicted: Having intention to use	Percentage Correct
Actual Group	Not having intention to use	13	14	48.1%
	Having intention to use	6	1048	99.4%
	Overall Percentage			98.1%

a. The cut value is .500

Press' Q for Logistic Regression
N =Total sample size =1081
n =Number of observed correctly classified =13+1048=1061
K=Number of groups =2

Press' Q= [N - (nK)]^2/N(K-1)
= [1081 - (1061*2)]² / (1081*(2-1)) = 1002.48
df=1 and 1% Significant Level, X^2critical =6.63
df = 1 and 5% Significant Level, X^2 critical = 3.84
Press' Q= 1002.48>X^2–critical (1%) =6.63>X^2–critical (1%) =3.84

The value of Press' Q is statistically significant at the 5% and 1% significant levels. Therefore, we can conclude the classification is statistically significantly beyond chance.

Block One (consisting of gender and age) is not significant at the $p<0.05$ level, with a Block One Chi-Square value of 0.947. Model One is also not significant at the $p<0.05$ level, with a Model One Chi-Square value of 0.947. However, the Model One-2 LogLikelihood [-2LL] measure is significant at the $p<0.05$ level with a value of 251.622, indicating that Model One (consisting of only Block One) is a significant model estimation fit. Specifically, Cox & Snell R-Square (0.001) and Nagelkerke R-Square (0.004) estimate that 0.1% to 0.4% of the variance in the dependent variable is accounted for by Model One. The Model One Hosmer & Lemeshow Chi-Square Test (2.210) is not significant—the observed and the expected do *not vary* significantly—indicating another measure of good model fit.

Gender is a not significant contributor to the dependent variable. The gender Exp (B) of1.411 is not significant at the $p<0.01$ level, and the gender Exp (B) FINAL of 2.036 is not significant at the $p<0.05$ level. However, both are indicating a positive relationship between gender and behavior intention (r positive).

Block Two (consisting of ETsR, ETsU and TC) is significant, with a Block Two Chi-Square value of 118.503, suggesting that ETsR, ETsU and TC predict the likelihood of having intention to use ETs. The Exp (B) and Exp (B) FINAL values for the variables ETsR, ETsU and TC are also significant. In addition, Model Two (consisting of both Block One and Block Two) is significant at the $p<0.01$ level, with a Model Two Chi-Square value of 119.450 (testing the Model Two-2LL measure of model fit, with a value of 133.120, and an improvement over Model One in model estimation fit, since the value of Model Two-2LL is less than the value of Model One-2LL). The Cox & Snell R-Square (0.105) and Nagelkerke R-Square (0.502) indicate 10.5% to 50.2% of the dependent variable variance accounted for by Model Two. The Model Two Hosmer & Lemeshow Chi-Square Test (15.764) is significant—the observed and the expected vary significantly—indicating there is not another measure of good model fit.

The Press' Q was calculated and valued at 1002.48. It is statistically significant at the p<0.01 level. Therefore we can conclude that our ability to predict the likelihood of having intention to use ETs based on these two blocks is statistically significant beyond chance.

The findings from this binary logistic regression analysis are that ETsR, ETsU and TC are strong predictors for a person to use ETs. And, overall, a model consisting of ETsR, ETsU and TC can predict whether a person indicates that they have intention to use emerging technologies.

4.3. Qualitative Data Findings

4.3.1. Inter-Rater Reliability Test

The first qualitative data is collected from embedded questions in the online survey. The completed comments from tutors are 122 responses and from students 1,176 responses. To verify the responses from the respondents, inter-rater reliability was applied in this study. It is expected to have the same insights from a limited data base. Two raters verified the responses from respondents. The embedded question is as follows:

> "Based on your experiences, do you think online tutorials which have been running so far have met your expectations? Please explain. What should be fixed if they have not met your expectations"?

The researcher (rater 1) perceives no difference between his interpretation and rater 2's interpretation. The inter-rater reliability rates are satisfactory. Both the Kappa value for tutor and student more than 0,70. Kappa value for tutors is 0.925 and for students is 0.881. The result of inter-rater reliability is as follows:

Table 40. Cross Tabulation between Rater 1 and Rater 2 of Tutor Data

			Rater 2			Total
			1	2	3	
Rater 1	1	Count	30	1	2	33
		% of Total	24.6%	0.8%	1.6%	27.0%
	2	Count	0	44	3	47
		% of Total	0.0%	36.1%	2.5%	38.5%
	3	Count	0	0	42	42
		% of Total	0.0%	0.0%	34.4%	34.4%
Total		Count	30	45	47	122
		% of Total	24.6%	36.9%	38.5%	100.0%

1= Satisfied, 2= Not Satisfied and 3=Mixed

Table 41. Symmetric Measure of Tutor Data

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Measure of Agreement	Kappa	.925	.030	14.374	.000
N of Valid Cases		122			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

Table 42. Cross Tabulation between Rater 1 and Rater 2 of Student Data

			Rater 2			Total
			1	2	3	
Rater 1	1	Count	54	0	7	61
		% of Total	47.8%	0.0%	6.2%	54.0%
	2	Count	1	14	0	15
		% of Total	0.9%	12.4%	0.0%	13.3%
	3	Count	0	0	37	37
		% of Total	0.0%	0.0%	32.7%	32.7%
Total		Count	55	14	44	113
		% of Total	48.7%	12.4%	38.9%	100.0%

1= Satisfied, 2= Not Satisfied and 3=Mixed

Table 43. Symmetric Measure of Student Data

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Measure of Agreement	Kappa	.881	.041	12.216	.000
N of Valid Cases		113			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

4.3.2. *Expectation of Respondents*

Based on the embedded question, there are many themes that came out from the responses. The summary of the respondents' expectation is as follows:

Table 44. Expectation of Respondents

Emerging Technologies in Online Tutorial Meet the Respondents' Expectation			
Tutors		Students	
Expectation	Percentage	Expectation	Percentage
Yes	27.0%	Yes	54.3%
No	38.5%	No	21.5%
Mixed	34.4%	Mixed	24.1%
	100%		100%

It can be seen from table 45 that the tutors are not satisfied with the emerging technologies in online tutorials. In another hand, the students are satisfied with the available emerging technologies in online tutorials. Based on the tutor's perspective, the most urgent factor that should be developed or fixed is students' and tutors' skills. From the student's perspective, the tutor and technology are the most crucial factors that should be improved (Table 46).

Table 45. Recommendation of respondents related to the online tutorial

Tutor		Student	
Improvement in the area of:	**Percentage**	**Improvement in the area of:**	**Percentage**
Student TC	26.9%	Student TC	7.1%
Tutor TC	26.9%	Tutor TC	31.5%
Infrastructure	16.0%	Infrastructure	12.2%
Technology	18.6%	Technology	21.0%
Institution/UT	11.5%	Institution/UT	15.9%
		Learning Material	12.4%
	100%		100%

4.3.3. *In-Depth Online Interview*

The respondents of the online interviews are as follows:

Table 46. The Characteristic of in-depth interview's respondents

Respondent	Age	Gender	Domicile	Status	Education	Experiences (Semester)
T1	42	Male	Urban	Tutor	Graduate	>5
S1	28	Female	Urban	Student	Undergraduate	1
T2	28	Female	Urban	Tutor	Graduate	4
T3	44	Male	Urban	Tutor	Graduate	>5
S2	27	Female	Overseas	Student	Undergraduate	3
S3	28	Female	Overseas	Student	Undergraduate	3
T4	42	Female	Urban	Tutor	Graduate	>5
S4	32	Male	Rural	Student	Graduate	1
T5	41	Male	Urban	Tutor	Graduate	4
S5	25	Female	Rural	Student	Undergraduate	1

From the perspective of TAM, the perspectives of emerging technologies seem quite obvious because it is everyone's concern in such a modern community. Thus, the observation of these perspectives challenged the researcher to read and understand tutor and student subjects' subjective understanding. In order to resolve and advance to the second level of interpretive understanding of the phenomenon, I conducted qualitative interviews in order to further explore users' perceptions and experiences with the ETs.

Using purposive sampling, I recruited a total of 10 respondents with "maximum variation" (Patton, 1987) for interviews. The strategy of maximum variation attempts to cut across participant variation so that a great deal of information can be obtained from a limited number of participants. The sample included both tutors and students, female and male, and undergraduate and graduate students, from a variety of departments. I interviewed the participants individually. The interview was semi-structured, with open-ended questions. The purpose of the interviews was three-fold. First, qualitative interviews provide a holistic view of the emerging technologies as they are perceived by their users or potential users. A holistic picture needs to be drawn before one can proceed to select interesting theoretical constructs on which to focus the study. Second, the codes and themes developed from qualitative data analysis inform the design of the questionnaire drawn up for the subsequent quantitative data collection. Finally, qualitative data collected from interviews can be used to cross-validate, explain, and enrich data obtained from quantitative methods and to minimize the bias inherent in one particular method.

Using the study constructs as a basis for coding, the interview documents were analyzed within that framework while attempting to triangulate data findings from the survey analysis. The research questions and the interview questions both contributed to the analysis framework for the interviews. Emergent themes were noted and coded appropriately. Using an interpretational analysis approach (Gall, Gall, & Borg, 2010; Saldaña, 2009), the interview data was examined iteratively to find evidence of constructs and themes that could be used to describe and explain the topic under study. These constructs represent the proposed factors included in the conceptual technology acceptance model and in the organizational structure of the interview guide questions. Of the 102 original codes used to segment the data, 42 remained after collapsing categories. The data presented in Table 48 assist in seeing the constructs more readily addressed by the interviewees. It was decided to break out the codes due to the large number of codes for each of the categories. Perspectives on emerging technologies consist of a set of more general statements and phrases concerning the 'negative reaction' and 'positive reaction'. In analyzing the study data, barriers were embedded within constructs of the survey data with a controlled number of items. Within the interview data, barriers emerged individually. It was decided to group them into categories within the 'challenges' construct for the purpose of analysis and discussion. The interviews revealed the perceptions of a cross-section of tutors and students from a variety of disciplines, a variety of years of facilitating/participating experience in online tutorial, and a variety of tutors and students domicile. The frequencies in Table 48 illustrate the prevalent topics of conversation from tutors and students regarding the emerging technologies acceptance.

Some key interview questions included:

- What are your perspectives on emerging technologies (ETs)?
- With respect to the current development of ETs, in your opinion how can online and electronic learning delivery modes contribute to interaction: first student-teacher interaction, second student-content interaction, and third student-student interaction?
- Based on your involvement and experience in the online tutorial program, do you think that personal relations between your tutor and you are important in order to promote study, pleasure, and motivation? Why or Why not? If yes, how do you foster these things?

One thing to be noted here is that the interview instrument was used more as a guideline for conversation than as a rigid questioning protocol. In fact, I constantly refined the interview protocol as the interviews accumulated. This type of open-ended inquiry allowed me to elicit responses in a non-leading, natural manner (Kvale & Brinkmann, 2009; Rubin & Rubin, 2012). The main points covered in each interview were the same, but the wording and order of questions were spontaneous in order to accommodate the flow of the conversation. The length of interviews ranged from 25 minutes to 35 minutes, with an average of 30 minutes. I imported all the interview and focus-group transcripts into the MAXqda software program for coding and analysis (Gibbs, 2007). I labeled segments of transcripts with keywords (codes), and then categorized codes into the evolving coding scheme. If the integration failed, I revised the coding scheme to accommodate the new codes.

The interviews confirmed that "inter-activity" and "simplicity" are still the main factors affecting respondents' intention to use an emerging technology. However, the interviews clarified what exactly these broad terms meant in the use context. Briefly, the thematic analysis of the interview transcripts suggested that “useful” emerging technologies should be accessible by anyone, any device, anywhere, and anytime. The following excerpts from the interview transcripts are illustrative:

Subject #1: I use emerging technology to connect with my students. I also provide another option to share and to collaborate in the online tutorial. I offer video conference and text messaging service to students that are not available in the online tutorial.... I am as a tutor providing learning material on schedule, but the students often do not respond to it appropriately.

Subject #2: UT employs emerging technologies in online tutorials. I think it is good. I think it works. I can use it to ask many questions to my colleagues and tutor.... I participate in online tutorials actively, but sometime the tutor does not provide the learning materials on time.

Table 47. Emerging Themes based on in-depth interview

No	Theme	Sub-Theme	Category	Coding	Freq	Category (%)
1	Reaction				22	
		Negative			1	4.5
			Over-estimating technology		1	
		Positive			21	95.5
			Communication channel for problem solving	Conversation	1	19.0
				Communication channel	2	
				Being connected	1	
			Convenience	Changing life aspects	1	33.3
				Doing something easily and quickly	2	
				Giving flexibility	1	
				Giving alternatives	1	
				Offering interactivity	1	
				Providing easy access	1	
			Supporting distance education	Affecting education	2	23.8
				Offering usefulness for distance learning	3	

No	Theme	Sub-Theme	Category	Coding	Freq	Category (%)
			Retrieving information	Retrieving information	2	9.5
			Changing paradigm	Changing paradigm	1	14.3
				Developing a society	1	
				Creating concepts	1	
2	ETs Understanding				55	
		Personal Relation			24	
			Characteristic	Supplementing	1	
				Giving personnel attention	1	
				Depending on student's motivation	1	
				Replying promptly	1	
				Feeling comfortable	2	
				Using emoticon	1	
				Using a polite language	2	
			Purpose	Improving academic performance	1	
				Increasing motivation	5	
				Solving a problem	3	
				Supporting study process	3	
				Introducing a new innovation	1	
				Providing communication channel	2	
		Tutor-Student Interaction			15	
			Characteristic	Friendly	1	
				Mutual respect	1	
				Well-mannered	1	
			Challenges	Technology illiteracy	1	

No	Theme	Sub-Theme	Category	Coding	Freq	Category (%)
				of student		
				Passive Tutor	4	
				Passive Student	3	
			Purpose	Guiding student	2	
				Discussion forum	2	
		Student-Student Interaction			8	
			Characteristic	Multi direction	1	
			Purpose	Giving feedback	3	
				Sharing information	4	
		Student-Learning Material Interaction			8	
			Purpose	Guidance	4	
			Expectation	On time	1	
				Clear	1	
				Interesting	1	
				Comprehensive	1	
3	Technology Competencies				52	
		Using ETs			12	
			Communication		5	
			Information Retrieval		4	
			Creation		3	
		Learning Support			31	
			None	None	2	6.5
			Asynchronous	Weblog	1	54.8
				Email	6	
				Social Network	10	
			Synchronous	Video Conference	2	38.7
				Telephone	1	
				Text Messaging	9	
		Teach/Help Others			9	
4	Having Intention to Use ETs				10	
		External motivation			3	30.0

No	Theme	Sub-Theme	Category	Coding	Freq	Category (%)
		Internal motivation			7	70.0
5	Benefit of ETs				12	
		Self-learning	Facilitating learning process		1	58.3
			Economical		1	
			Flexibility		1	
			Time Efficiency		3	
			Access to literatures		1	
		Collaborative learning	Learning community		3	41.7
			Sharing information		2	
6	Challenges to ETs acceptance				28	
		Tutor skills	Tutor skill		2	21.4
			Low Response from Tutor		4	
		Infrastructure	Learning Materials		1	46.4
			Infrastructure		7	
			Hardware		1	
			Technical Error		4	
		Asynchronous communication	Asynchronous communication		1	17.9
			Distance		1	
			Time Constrains		3	
		Student skills	Student skills		2	14.3
			Low Response from Student		2	
7	Upgrading Intention to accept ETs				14	
		Improving infrastructure	Software		1	21.4
			Infrastructure		1	
			Online Learning Material		1	
		Adjusting institutional policy	Institutional Policy		2	35.7
			Tutor Course Ratio		1	
			Training		2	
		Providing ETs alternatives	Hardware		1	42.9
			Simple Devices		3	

No	Theme	Sub-Theme	Category	Coding	Freq	Category (%)
			Software		1	
			SMS Centre		1	
				Total	193	

4.3.4. Tutors' and Students' Perceptions of Technology Skills, Perceived Technology Barriers, Behavioral Intentions to Use, and Actual Use of Emerging Technologies in UT

4.3.4.1. Tutors' and Students' Perceptions of Emerging Technologies

Several themes emerged from the qualitative data gathered in the study. The following themes were generated from both tutors and students. One common theme that was derived from the interviews was the development of learning communities in the online course. Online tutorials provide opportunities for students to form groups where they can support each other in the group. There is also a sense of inclusion within the community of learners, especially when the instructor recognizes the importance of bringing students together through their work. According to one tutor:

> In my opinion, ETs are indispensable in building a better community of learning. ETs should act as an effective communication channel, which is able to convey the message properly. ETs are as a channel to provide information so that the meaning of the message received by receiver will be the same with the message intended by the sender. In addition, the ETs as a media should be able to change the paradigm of thinking and behavior of the tutor and student to interact better.

Although one respondent indicated that he learned new programs "by mandatory", most commented that they began using technology due to some type of positive benefit. "I am of the opinion that online and electronic learning delivery modes are able to connect all parties involved in a learning process. Current technology development enables us to carry out and drive student-teacher and student-student interactions either in synchronous or asynchronous mode"; "They enable us to do anything more easily and of course much more quickly" and "It offers usefulness; learning materials can be uploaded to a website that students may read or download at any time" are quotations representing perceptions of the positive benefits of using technology. Reasons for negative reaction were prevalent throughout the interviews, as well. The interviewees focused upon the reason of over-estimating technology. One tutor stated “but when viewed globally, the technology in online tutorial still left far behind compared to the progress of existing technology”. The five sub-themes summarize reasons to seek out and use new technology: (1) as a communication channel for problem solving, (2) convenience, (3) supporting distance education, (4) retrieving information, and (5) changing paradigm.

4.3.4.2. Technology Skills

Tutors and students discussed their history using computers. Tutors were proud because they were early adopters and described the “today’s technology” warmly. They were dedicated to their current platforms. All the respondents were PC users who preferred PCs for ease of use and they were especially enthusiastic when talking about them. They expressed their comfort with computers. Tutors are using computers daily, and the time that they spend using them has increased. One tutor said that she use ETs more than her colleagues. Tutors suggested that the abundance of ETs provide for broader access to information as well as acknowledging the prevalence of computer technology.

Tutors and students used a variety of tools and techniques to achieve the educational goals of the course, help students/peers to take advantage of communication technology in the process of learning, encourage students/peers to use the Internet to get information, and have the skills to create the digital sources of information.

4.3.4.3. Perceived Technology Barriers to Accept ETs

A number of participants discussed the challenges for accepting emerging technologies. They believed the importance of tutor technological skills, infrastructure, communications and student technological skills. Because online learning environments rely vastly on written communication, while lacking non-verbal indicators, it is critical for tutors to maximize the communication efforts when using online discussion platform. This insight overlaps with the theme *technological challenges to accept ETs* that was expressed in the following ways:

> We need to adapt our culture so that we can cope with the development of technology

> Inactive tutors in tutorials online makes communication between tutor and students become less intense. This might be due to the tutor's limitations in the use of technology

> The obstacles are all dependent on the Internet when the Internet is often impaired. Students often get into trouble due to the lack of infrastructure in the rural area.

Many of the respondents acknowledge that communication is the key factor in online tutorials, not only for the purpose of exerting social presence, but also for imagining good role models.

One overwhelming technology acceptance barrier mentioned was the infrastructure. This is predominant in current research literature, as well, and is a common complaint heard from tutors and students. Low response rates from tutors, as a barrier, appeared consistently. "A major problem faced by our students and teachers is the infrastructure. The Internet is currently enjoyed by a small number of people living in our country. In addition, the Internet speed in our country is very slow compared to the Internet speed in Malaysia, for example" and "The other constraints are passive tutors. Many tutors do not pay attention to their students. Tutors are not active at all. Tutors just make an announcement that he/she does not have time, it makes students reluctant to interact with tutors" were two such comments.

One student said that those who registered for online tutorials feel dissatisfied because the personal relation between the tutor and student is not good. She said that the quality of personal relationship is important when registering for an online tutorial. If an instructor is not active to give responses to students, then she will not likely be active in online discussions. For her, the quality of learning was important but the quality of personal relation was just as important. Her personal view on this issue is:

> Tutor could develop good personal relationships, but some of them do not have interpersonal skill; the interaction between the tutor and student does not exist. If students need a tutor, the tutor does not even respond it. The lack of a tutor's response prevents the interaction between tutor-student relationships. Students are interested in conversation in any forms.

Additional statements are related to student skills, "Indonesia has many remote areas that are difficult to reach by the technology and the lack of knowledge about the technology can also be a major obstacle to accept technology". One student summed up the time element in using technology as, "... time constraint. Most students are workers whose time is not fixed. We usually finish work at night and our conditions are tired so we do not focus more to learn."

The predominant statement within general barriers concerned technology that did not function properly. There seemed to be no blame placed, but the concerns for this were overwhelming. "I get very frustrated when things don't work the way they are supposed to work. Technical supports sometimes are not in the workplace and they are unable to solve problems quickly.... I do not know where the technical fault is". A culminating comment addressing this issue was stated by one tutor as, "Most of distance learning students feel they are alone and do not have access to find help".

As a consequence of the development of emerging technologies, problems and difficulties do occur. Although some tutors and students had positive experiences with their online tutorial, they still encountered technological problems in terms of technical skill, time constraints and infrastructure. One student provided this statement about her experience:

> There is no problem with technology, but a constraint is in terms of time. Most students are domestic workers whose time is not fixed. We usually finish work at night and our condition is very tired, therefore we do not participate actively in online tutorial.
>
> ... there are also some friends who ask me for help on a tutorial online to find learning materials or to upload their courses, whereas they have already attended online tutorial training.
>
> There are no obstacles for technology infrastructure in overseas; the problem is in UT's infrastructure, the Internet connection is sometime down. It is frustrating students who want to login into online tutorial website, because we only have limited time to access it.

One of the dominant themes in improvement area to accept technology throughout dialogues with the interviewees was their emphasis on emerging technologies alternative procurement. Participants strongly felt that ETs acceptance requires the optional technologies. Some described these technology alternatives as *ubiquitous technology*. In order to deal with the technological challenges, tutors and students demanded improvement in the areas of: infrastructure, tutor-student ratios, training in technology use, and emerging technologies options. According to them:

> I want to integrate video conferencing in a tutorial online to support student services. I also need an infrastructure for video conferencing, such as web cameras and headsets. Training is also important, not only just "how to use the application "but also "a sense of belonging and a sense of teaching well" for the tutor. Tutors often forget to upload and update the learning material. There are some tutors who failed to manage their time. UT should limit the subjects that are held by tutors as it would be neglected by them. The tutor-student ratio should also be considered. In my experience usually only 1/3 of students submit their tasks, so that this figure could be used to calculate the maximum number of students that can be handled by one tutor.
>
> For the future, I wish the technology might be more accessible, simpler, and available in a large range of devices, such as Smartphones. Thus, students who are located far away from main campus can follow courses through available emerging technologies around them.

4.3.4.4. Behavioral Intentions to Use

The repetitive occurrences concerning intention throughout the interview data were viewed as those consisting of an internal nature and those of an external nature. Intention for using technology created a total of two major groups of comments. The overriding theme within intention for change was the need for an internal perception of relevance. “Yes, I think they will make the tutorial more interesting” and “Yes, as long as the technology useful and easy to use, I would definitely use it” are statements demonstrating this. One interviewee stated it this way: “I am willing to use the technology provided by UT on tutorial online if my students need it.”

Many comments referred to a desire to use technology. Often these statements were directed toward particular types of technology, such as synchronous communication systems, audio and video learning materials, or new ways of discussion forum. One student indicated that “We've been waiting for the new technology, especially video conferencing. This technology is very useful, very good for students...” Aptly stated by faculty member is this statement: “Of course I will use new technology; however, I must consider the capabilities of my students, both their skills and resources to access it”.

The following quotes illustrate the tutors' intention to use ETs:

> Yes, as long as the emerging technologies are useful and easy to use, I will definitely use them.

> I am willing to use emerging technologies provided by UT in online tutorial if students need it.

> Of course, I would use it, but UT must considers the capabilities of the students, whether their skills and ability to access are available or not.

The findings of the interviews revealed that these tutors viewed ETs in online tutorial as a communication channel, but it was not stable yet. This can be due to the fact that they are not only teaching face to face, but they are also doing administrative works. The comment of one tutor included the following:

> Education must use emerging technologies in all areas. Internet and email for education should be utilized to the maximum extent possible. Now in the age of information age and globalization, teachers should communicate quickly and accurately in order to be accepted by students. UT has implemented ETs because UT is a distance learning institution. However, UT is still not stable yet in the use of ETs.

Findings from the interviews indicate a similar result regarding students' intention to use ETs. For example, student A recognized the benefits of using ETs in online classes. This student views ETs in online tutorial as having flexibility. The student stated that tutors should use ET as well. The student said the following in the interview:

> From my point of view, ETs give more flexibility for students compared to using conventional learning where students and teachers must interact in the same room, in the same time and meet face to face. I am a working student and I must manage my time wisely; therefore, I like the idea of ETs in online tutorials.

In terms of conditions that facilitate effective teaching and learning, some tutors and students indicate that they are willing to use the emerging technologies in online tutorial to provide a better interaction. Tutor and student personal views on this topic are:

> In online tutorial, I sometimes provide time to communicate with students via a chatroom. At the beginning of the online tutorial I give information to the students that I provide online consulting services at certain hours. I serve them through text messaging and video conferencing. However, no

> students were interested to do a videoconference with me. It gives me extra workload. The problem is the computer in the office is not facilitated for video conferencing (e.g., web camera and headset). I should ask for headset and web camera from UT to provide better service to the students, especially for videoconferencing.

> Students majoring in English literature form a separate group on Facebook to replace online tutorial that is sometimes susceptible to interference and the tutor is not active. Students feel more comfortable (convenient) using Facebook. We hope that some tutors will guide the group. There was once a guiding teacher, but now this does not exist anymore. The group is run by students, summarizing the learning materials, and looking for course materials outside the online tutorial website.

4.3.4.5. Actual Use of Emerging Technologies in UT

Perceived benefits from using technology were stated in a variety of ways. Most saw technology use as a means for time efficiency, economical, and flexibility. "I can work faster" and "The use of technology has many benefits, especially the efficiency in the use of time, due to the presence of technology in our online tutorial, I can perform learning activities anywhere, or at any time without being tied down to one place, and we also can work without having excessive constraints" are comments illustrating the need to see usefulness in using technology in order to bring about a change.

One faculty member felt that ETs in online tutorials was not a good tool for learning process because they are obsolete. However, the same person believed that it is useful because it offers accessibility both for students and the instructors. Another tutor was pleased that online tutorial assists with the instruction of large online classes. Many tutors were pleased by, and enthusiastic about, using ETs. Faculty expressed how much they love using ETs and feel that they add value and allow choices. "ETs enable us to do anything more easily and of course much more quickly".Others explained that they are comfortable using ETs, are flexible in adapting to new advanced technology, and are confident in learning new technology if given assistance.

Participants were impressed by the current capacity of ETs, and excited by their potential uses. They were thrilled by the rapid migration of technology, and the discovery involved in new technology. "Yes, I am more likely to use a social network to share information with other students. It is not only because Facebook is easier but also more accessible." For some respondents, the rewards of using ETs exceed the costs. "I also give them my Skype account so that they may contact me if I am online in Skype. It is easier and cheaper".

4.4. Summary of Results

The purpose of this chapter was to provide the results of all analyses performed and the results of the five research questions. The chapter presented the results of an empirical examination designed to measure the contribution of ETsR, ETsU, and TC to instructors' and students' intention to use emerging technology in distance learning, as measured by the weight of their contribution to the prediction of BI. Before any statistical analysis, pre-analysis data screening was performed to ensure the accuracy of the collected data. Following this screening, Cronbach's Alpha reliability tests were conducted for the ETsR, ETsU, and TC constructs to determine how well the items were positively correlated to one another. The results demonstrated high reliability for all variables. In order to determine the representativeness of the sample, demographic data were requested from the survey participants. The distribution of the data collected appeared to be representative of the population of instructors at the university. The data also appeared to be consistent with a normal distribution.

Based on exploratory factor analysis (EFA), a surprising study result was found that the factor of TC was not the significant predictor of the tutor behavioral intentions. Meanwhile, TC and ETsU were not the significant predictor of student behavioral intentions. Several measures of validity appropriate to an EFA were discussed in the context of the study results. The study results yielded a simple, interpretable structure. There is 70.71% of the variance explained by the three components' solution of tutor data and 73.65% of the variance is explained by the four components' solution of student data. Known relationships among the study variables were confirmed by the study results.

Results confirmed that for the tutor data, all regression models were found to be significant, but presented different results. Results were mixed since each variable was significant in the different analysis. However, from the qualitative data TC was most important contributor to BI. For students, both regression models were found to be significant and presented identical results. ETsR and TC were found in particular to be significant predictors of BI in both models. This finding can be interpreted that higher levels of ETsR and TC were associated with higher levels of BI. Higher levels of ETsU were also associated with higher levels of BI; however, ETsU was not found to be a significant predictor in either model of student data.

The findings from the binary logistic regression analysis from tutor data show that ETsR, ETsU, and TC are weak predictors ($p<0.05$) for a tutor to use ETs, while the findings from the binary logistic regression analysis from data student show that ETsR, ETsU, and TC are strong predictors ($p<0.01$) for a student to use ETs. Overall, a model consisting of ETsR, ETsU and TC can predict whether a person indicates that they have intention to use emerging technologies.

The qualitative results of open-ended questions reveal that based on the tutors' perspectives, the most urgent factors that should be managed are students' and tutors' technological skills. From the students' perspectives, the tutor and technology are the most crucial factors that should be improved. The findings from quantitative data also confirmed that technological skill is still the main factors affecting respondent's intention to use emerging technologies.

5. Discussion of Research Findings, Conclusions and Implications

This chapter is divided into five sections. Utilizing the five research questions as a frame work, section 1 analyzes and discusses the research findings, comparing the findings to the information presented in the literature review; section 2 outlines the conclusions derived from the data analysis; section 3 and 4 discusses recommendations and potential implications of the conclusion on the Open University of Indonesia (UT). The last section contains the researcher's final thoughts.

The aim of this chapter is to analyze and explain the results as presented in the previous chapter. This is accomplished by analyzing the data generated by the online questionnaire and the semi-structured interviews. In this mixed-methods research study, the quantitative and qualitative findings both supported and validated each other, which was critical in that the purpose of this study was to gain a deeper understanding and appreciation of the tutors' and students' emerging technologies reaction, understanding, competencies, and behavior intention in online learning at UT. This chapter ends with a discussion of the conclusions and implications of this study for UT, and to a lesser extent, its potential impact on the distance education sector. It should be noted that the research findings are specific only to the tutors and students who participated in this study, and that the findings cannot be generalized or extrapolated beyond the participants.

The main purpose of this study was to gain insights into the contribution of emerging technologies reactions (ETsR), emerging technologies understanding (ETsU), and technology competencies (TC) to tutors' and students' behavioral intention (BI) to use emerging technologies in online tutorials. This study collected data utilizing a mixed-methods study design, consisting of a comprehensive online questionnaire, adapted from Brush et al. (2008) instrument to measure pre-service teachers' technology skills, technology beliefs, and technology barriers. The instrument was modified to accommodate the evaluation model of Alliger et al. (1997) and D. L. Kirkpatrick (1998), and translated into Indonesian language to provide clear understanding to respondents, complemented with semi-structured interviews of 10 participants. The research questions posed in this study were:

1. To what extent does emerging technologies reaction (ETsR) contribute to tutors' and students' intention to use emerging technologies in online tutorial, as measured by the weight of ETsR's contribution to the prediction of BI?
2. To what extent does emerging technologies understanding (ETsU) contribute to tutors' and students' intention to use emerging technologies in online tutorial, as measured by the weight of ETsU's contribution to the prediction of BI?
3. To what extent does technology competencies (TC) contribute to tutors' and students' intention to use emerging technologies in online tutorial, as measured by the weight of TC's contribution to the prediction of BI?
4. Which construct out of the three independent variables (ETsR, ETsU, or TC) provides the most significant contribution to tutors' and students' intention to use emerging technologies in online tutorial?
5. What are tutors' and students' perceptions of, technology skills, perceived technology barriers, behavioral intentions to use, and actual use of emerging technologies in UT?

5.1. Analysis of Research Findings

The analysis of the research findings is presented using the five research questions outlined in Chapter 1.

5.1.1. Contribution of Emerging Technologies Reaction (ETsR) to Behavior Intentions (BI)

Research question 1:

To what extent does emerging technologies reaction (ETsR) contribute to tutors' and students' intention to use emerging technologies in online tutorial, as measured by the weight of ETsR's contribution to the prediction of BI?

Evidence from the multiple linear regression and ordinal logistic regression analyses demonstrated that the results of the analysis of the tutor data was consistent with the research of Venkatesh (2000), who found that intrinsic motivation did not have a direct influence on technology acceptance, and with other researchers who suggested that computer anxiety (CA) generally acts as an antecedent to and a moderator of other variables rather than having a direct influence (Hackbarth et al., 2003; Igbaria & Livari, 1995; Saadè & Kira, 2006; H. H. Yang, Mohamed, & Beyerbach, 1999). For example, Venkatesh (2000) found CA to be an antecedent to perceived ease of use. Saadè and Kira (2006) found CA to have a moderating influence on perceived ease of use and perceived usefulness. Moreover, Hackbarth et al. (2003) found that CA had a negative influence on perceived ease of use through direct system experience.

Although the results from the multiple linear regression and ordinal logistic regression analyses of data tutors showed that ETsR was not the predictor of BI, ETsR of students' data had a strong influence on BI. The weak influence of ETsR on BI for tutors could be due to the fact that tutors are urged to use the ETs in online tutorials; hence perceptions of usefulness are influenced by the institution. It appeared that greater positive reaction to emerging technologies among the students in online tutorials also fostered higher negative reaction in their tutors. Christensen (2002) found that instructor CA tended to increase along with the level of technological skill of students. Results also suggested that greater levels of perceived importance of computers in students fostered higher levels of CA in instructors. The finding implies that tutors need some training to reduce their negative reaction more rapidly than the advancing skill level of their students.

CA has often been investigated as an antecedent to the perceived ease of use and perceived usefulness constructs in the Technology Acceptance Model (TAM) (Saadè & Kira, 2006; Venkatesh, 2000). Venkatesh investigated the determinants of perceived ease of use through a model that integrated three groups of constructs—control, intrinsic motivation, and emotion—into the TAM. Emotion was conceptualized as computer anxiety (CA). Results suggested that computer anxiety (CA) played an important role in forming users' perceived ease of use about a new technology. In the study on technology use among pre-service teachers, T. Teo and Noyes (2011) showed a significant positive influence of perceived enjoyment on the intention to use technology. Moreover, they found a significant positive influence of perceived enjoyment on perceived usefulness and perceived ease of use. Although the variables of enjoyment, anxiety, and playfulness seem to be conceptually similar, all tapping into intrinsic motivation, they are indeed distinct (Venkatesh, 2000). Enjoyment, anxiety and playfulness function as distal determinants of system use, achieving their effects indirectly through PEU and PU (M. Y. Yi & Hwang, 2003). Based on this research finding, I believe that emerging technologies reaction (ETsR) have an important role in the use of ETs. Therefore, ETsR construct is added as an antecedent in the TAM in this study.

5.1.2. Contribution of Emerging Technologies Understanding (ETsU) to Behavior Intentions (BI)

Research question 2:

To what extent does emerging technologies understanding (ETsU) contribute to tutors' and students' intention to use emerging technologies in online tutorial, as measured by the weight of ETsU's contribution to the prediction of BI?

Results demonstrated that ETsU was a significant predictor of BI in ordinal logistic regression analysis of data tutor, but it was not significant predictor in other analyses. The findings on ETsU represented the main strength and further validated the findings of other researchers—such as Compeau and Higgins (1995), Igbaria and Livari (1995), P. J.-H. Hu et al. (2003), Gong et al. (2005), and R. Thompson et al. (2006)—that CSE is an important contributing factor in predicting BI as it relates to technology usage. In addition, Holden and Rada (2011) found technology self-efficacy (TSE) was more beneficial to the TAM than their computer self-efficacy (CSE).

ETsU did not affect the BI of students to use ETs. Although in general students had a high perception of ETsU, this was not a useful predictor of technology acceptance. Indonesian students, who are from a collectivistic society, are dependent on their social group; their individual confidence level and their ETsU were not varied. Therefore, their ETsU did not influence BI. However, based on the interviews with students, the results indicated that students still used alternative ETs (e.g., Facebook, text messengers, Whatsapp) in order to keep up with the courses. Most of the students did not participate actively in online tutorials because of lack of tutor support; participation levels did not associate with ETsU. In addition, when taking online courses, students used search engines a lot in order to obtain more information. They also reported that the e-mails and discussion board in Facebook were very useful in terms of interacting with their peers.

According to Sánchez and Hueros (2010), perceived ease of use is an important factor that links the exogenous variable to perceived usefulness, attitude and system usage. Therefore, based on findings of this study, it is important to enhance tutors and students self-confidence so they understand that the ETs are easy to use. ETs advance rapidly, tutors and students need time to adapt to changes. Adults more than young students fear the unknown and are prone to myths and prejudice against new technology that often has no logical reason (Sánchez & Hueros, 2010). In addition, they advised teachers should provide support constantly to their students, resolving any doubts that arise in the online environment. Therefore, UT might increase tutors' and students' acceptance and use of ETs by focusing on increasing the influential individual external factors, such as technology self-efficacy.

5.1.3. Contribution of Technology Competencies (TC) to Behavior Intentions (BI)

Research question 3:

To what extent does technology competencies (TC) contribute to tutors' and students' intention to use emerging technologies in online tutorial, as measured by the weight of TC's contribution to the prediction of BI?

Evidence from the multiple linear regression, ordinal logistic regression and binary logistic regression analyses of data students in this study demonstrated that TC was a significant predictor of BI among the three independent variables investigated. These results were consistent with the findings of Baek et al. (2006), who found that instructors with more teaching experience generally decided to use technology involuntarily in response to external forces, while instructors with less teaching experience were more likely to use technology on their own will. The results further validated the recommendations of other researchers that more research is necessary regarding the construct of TC and its role in technology acceptance (Doyle et al., 2005; Sun & Zhang, 2006).

The findings from Varma (2010) indicated that technology proficiency has direct effects on perceptions of information technology's usefulness and ease of use. The results also indicated that beyond a certain level of usage, individuals may automatically reject a newer technology that required more computers use/time.

In spite of these findings, however, it seems there is little agreement on a precise definition of EUT (Sun & Zhang, 2006; R. Thompson et al., 2006) (Doyle et al., 2005;). Sun and Zhang (2006) claimed that no specific definition of EUT has been provided to date, and stated, "Considering the key role of experience in understanding the belief-intention acceptance relationship, researchers might use more finely grained detail in its conceptualization of experience" (p.69). R. Thompson et al. (2006) also suggested that, although EUT influences other factors in technology acceptance models, previous research findings do not define EUT clearly. In their research, Thompson et al. defined an individual's EUT as partly "exposure to the tool" and partly "the skills and abilities that one gains through using a technology" (p. 43). However, Thompson et al. suggested that EUT may also entail habit, skill or simply exposure. In their integrative model, Thompson et al. investigated the influence of seven variables on BI. Results indicated that EUT moderated some relationships in their model, specifically perceived usefulness, affect and perceived behavioral control. In an analysis of the explanatory and situational limitations of existing technology acceptance studies, Sun and Zhang (2006) also identified EUT as one of the factors found to have a moderating effect in previous models and included EUT in their proposed integrative model and propositions.

5.1.4. The Most Significant Contributor of Behavior Intentions

Research question 4:

Which construct out of the three independent variables (ETsR, ETsU, or TC) provides the most significant contribution to tutors' and students' intentions to use emerging technologies in online tutorial?

Evidence from the multiple linear regression and ordinal logistic regression analyses from tutor data and student data demonstrated that TC provided the only significant contribution out of the three independent variables investigated in this study. This validated the results of other studies that identified the importance and role of TC in technology acceptance models. The tutors are expected to be the leaders of tomorrow, not only with innovative learning techniques, but also with the infusion of technology into curriculum. The only way to accomplish this challenge is to have benchmark for the teachers to achieve levels of competency with technology (Krueger, Hansen, & Smaldino, 2000). The instructors' competencies are different for face-to-face, online and blended settings (Dabbagh, 2003; Klein, 2004; Yuksel, 2009).

An important study result was the finding that TC played a significant role in affecting emerging technologies use. One possible explanation for this may be justified by motivational theory. TC may be considered an intrinsic motivational factor to affect BI. Previous study conducted by S. Y. Park (2009) with TAM proposed self-efficacy (SE) is a powerful variable in explaining BI to use e-learning. Mobile-learning SE may be also considered an intrinsic motivational factor. In Indonesia, people are encouraged to use ETs in every field to catch up with the rapid social change caused by the ubiquitous environment. UT's tutors and students may want to adopt ETs because they think such experiences will be beneficial for future job preparation in the society.

5.1.5. Tutors' and Students' Perceptions of, Technology Skills, Perceived Technology Barriers, Behavioral Intentions to Use, and Actual Use of Emerging Technologies in UT

Research Question 5:

What are tutors' and students' perceptions of, technology skills, perceived technology barriers, behavioral intentions to use, and actual use of emerging technologies in UT?

5.1.5.1. Tutors' and Students' Perceptions of Emerging Technologies

In the themes identified in this study, the views of students and teachers were almost always polarized. For example, the student survey demonstrates that the majority of the students have found technology useful and effective in their learning. The students actively search other ETs and engage in more frequent use of current technology. They mentioned various reasons, including increased efficiency, sharing, collaboration, motivation, and confidence, as well as preparation for the future, the workforce, and other learning benefits. Their tutors, on the other hand, are far less enthusiastic. However, some of these tutors appear to have significant appreciation of advanced technology in teaching practices and are keen to consider the idea of engaging students in ETs-supported activities. In addition, most tutors perceive technology integration as a mandatory and extra workload. There are logical reasons and credible explanations behind such social norms significance in this study, such as that the structure of Indonesia's higher educational institution follows traditional hierarchical system models. The attitude of UT is largely bureaucratic, and a message passed through superiors (such as the rector and dean) gets higher importance because of academics' beliefs about obedience. This is the reason when academics were asked about the nature of the ETs usage in online tutorials; they rated it as mandatory. These results confirm the study of Qing (2007) that teachers' attitude towards technology tends to be negative, while student attitudes can be summarized as enthusiastic.

The findings are congruent with studies conducted by Lao and Gonzales (2005), Koschmann (1994), Wells and Chang-Wells (1992), and Tharp and Gallimore (1988). They indicated that the World Wide Web provides a learning experience and a place to build upon knowledge within a learning community. Online learning is a rich environment where learner-centered instructional techniques show opportunities for significant developments and offer new ways for learning, research, work and socializing (Bonk & King, 1998; Bonk & Reynolds, 1997).

During the semi-structured interviews, most students preferred a moderate amount of information technology use in support of their learning. The studies from Salaway, Caruso, and Nelson (2008), S. D. Smith, Salaway, and Caruso (2009) and Kennedy, Judd, Churchward, Gray, and Krause (2008) also concluded that, if given the choice, their respondents preferred a moderate amount of technology use in their courses. Salaway et al. (2008, p. 16) found "a widespread attitude that IT resources are best suited in learning environments where technology is balanced with other learning activities, especially face-to-face interactions, with faculty and students in the classroom". Siemens and Tittenberger (2009) labeled the moderate use of educational technologies in support of learning as augmented learning. More specifically, they defined augmented learning as the "use of technology to extend a physical classroom" (p.16).They also mentioned "augmenting traditional classrooms and distance education courses with emerging technologies is one such approach" (p. 16).

Notwithstanding that some campus based faculty already use this approach in classroom instruction, it is interesting to note that in this study, the augmented approach to teaching and learning, that is using web-based technologies to augment and complement traditional classroom instruction, is the preferred choice of educational instruction. Not only is augmented learning the preferred learning method, the students in this research study perceive that the augmented learning approach to teaching and learning encourages student engagement with faculty and peers, enhances quality of effort in academic endeavours, and improves the motivation of students for success. Since the augmented learning approach seems to be the preferred method of instruction of the Net Generation in this study, UT's administrators and faculty should consider this relevant piece of data when discussing strategic information technology plans in relation to the future of online learning initiatives.

During the semi-structured interviews, a number of students reported enjoying the connectedness online group work had to offer. The ability to correspond, research and send assignments and course related information via the Internet, proved beneficial to the online learning experience.

During the interviews, the students added much about the convenience that information technology offers. A number of students discussed their ability to work at their own pace as beneficial to the learning experience. One student believed that her/his time was better spent participating in discussion forums with their colleagues in online tutorial and searching information on the Internet, rather than waiting for the response from the tutor. Others appreciated the option of conducting their studies anytime and anywhere.

Similar to Lopes' findings (2008), an emergent theme from the student interviews suggested that a valuable benefit of a course management system was unfettered access to information anywhere and anytime, and improved organization of course related documents and material. As a follow up question, and inspired by Lopes' (2008) study, students were asked if course management systems were a utility or an option. Most students stated that the use of a course management system was an integral part of the teaching and learning process, not only for online learning, but also to complement face-to-face instruction.

Students described the online tutorial system as a “weekly homework” which clearly outlined not only the subject matter to be discussed, but also listed and provided ready access to the articles and learning material to be discussed. As one student described it, the online tutorial is now an essential and integral component of distance education.

The flexibility online tutorials offered was another benefit perceived by students. The ability to organize and schedule online assignments around face-to-face courses, was popular amongst most respondents, although not always for the right academic reasons. Some Net Generation students suggested that the more demanding nature of online tutorials allowed them to dedicate more time to those online courses. For some Net Generation students, the online tutorial was less important than their core courses and many Net Generation students gave the researcher the distinct impression that the quality of online learning was rated and assessed as second tier learning. The students tended to give their online tutorials lower priority, dedicating their minimal efforts in completing those online tutorials because its contribution is low. As will be discussed later in this chapter, the reasons why Net Generation interviewees perceived online tutorials to be less academically demanding than face-to-face tutorials may have little do with the quality of online instruction or mode of delivery; rather, some Net Generation students may not have the maturity, motivation and self-direction to be able to function as effective online learners.

Virtually all the comments made by students relating to the conveniences of online tutorials reflected those found in the literature review and those studies reviewed in the theoretical section of this study. The reasons the students cited in this study as to the benefits of taking online tutorials are consistent with the studies reviewed in this study. Based on the O'Malley and McCraw (1999) study that online courses offered students an advantage, in that online courses fit better with students’ schedules and saved time, which allowed students to take more courses, a study by P.-S. D. Chen, Gonyea, and Kuh (2008) concluded that 96% of their respondents cited the convenient schedule of course offerings as the major factor in enrolling in online courses.

The Young and Norgard (2006) study similarly concluded that the primary reason students select online learning courses is the convenience factor. The students in this study often referred to the flexibility offered by online programming as a benefit of online learning. Young and Norgard concluded that “the most common reason students take online courses is convenience. Students reported that their family and work obligations as well as their distance from campus made online learning a convenient option and one that would allow them the flexibility to continue with their education in the midst of their hectic lives”(p. 113). The convenience factor is consistent with and corroborated by the Braun (2008) and Wyatt (2005) studies. Similar to the data analysis in this study, Braun (2008) and Wyatt (2005) concluded that the desire for flexibility outweighed any need for peer and faculty interaction as one of the main driving forces behind students' participation in online courses.

5.1.5.2. Technological Skills

Gender representation among the 126 respondents was 46 percent (58) male and 54 percent (68) female tutors; and its representation from students was 59.2 percent (711) male and 40.8 percent (490) female. The results from student data is similar to the tutor data. Students had high technology skills in communication and information retrieval, but low technology skills in creation. They felt least comfortable with the skills associated with creation technology. In addition, they rated themselves lower in having complex than simple technology skills. According to Snoeyink and Ertmer (2001), limited computer skills contributed to the lack of technology integration by teachers. Overall findings revealed that the technology skills of tutors and students participating in this study were relatively high in communication and information retrieval, while providing a basis upon which to identify prerequisite skills and instructional objectives for teaching emerging technology skills and integration practices. There was an overall lack of the higher order skills typically used in distance education (web authoring tools, etc.). In planning for tutors' and students' training, UT could consider some skills as prerequisite, such as multimedia creation and skills associated with web 2.0.

The older tutors had higher ratings in the area of communication skills. Conversely, younger tutors with more years of experience in emerging technologies had higher ratings in the area of creation. These findings were very consistent with the literature (M. A. Anderson, 2000; Brush et al., 2008; Hanson, 2011; Koroghlanian & Brinkerhoff, 2008; Whale, 2006) and the researcher's expectations. It appears that younger faculty have more familiarity with these higher-order technical skills than do older faculty. Such findings point to the need to include all members of the faculty in terms of professional development. As reflected in society, commonalities regarding technology competency is atypical. The "digital divide" apparent in society is also reflected in academia (Lamboy & Bucker, 2003).

Based on the findings of this study, the critical mass required to effectively integrate emerging technologies was evident. Yet, the variations in skills level provided a great disparity among tutors. Tutors appear interested, albeit at different levels. However, this is not acceptable in higher education, where standards are typically required to ensure equal outputs in terms of students' objectives. Thus, to improve the learning process, tutors' development should look to raise the technical levels of those determined to be at a "basic level."

These findings demonstrated the weak level of technology competencies, which point to the need for better preparation regarding the technical skills and the integration of these skills into instruction. Bates (1997) suggested faculty members must follow a four-step sequence to develop skills in using technology in teaching: they must understand the importance of using technology for teaching; they need some basic understanding of teaching and learning processes and understand the possibilities of different teaching and learning approaches; they must comprehend the roles that technology can support in teaching and how this changes the organization of content; and they should know how to use a particular type of technology.

5.1.5.3. Perceived Technology Acceptance Barriers

The biggest barriers to use emerging technologies in online tutorials for tutors and students are the lack of knowledge about technology and the lack of knowledge about ways to integrate technology into the curriculum. According to Hew and Brush (2007), perceived technology barriers include some of the following factors: (a) lack of technology, (b) lack of access to available technology, (c) lack of time, and (d) lack of technology-supported pedagogical knowledge. Tutors need to have technology-supported pedagogical knowledge and skills if they want to integrate technology into their online teaching (Hughes, 2005).

A common complaint reported during the interviews was the lack of competent and timely technical support when information technology issues arose. Students were frustrated when the learning management system was disrupted. This caused communication challenges for some students, especially those students who were working as an online group and those students wishing to send assignments.

Feeling isolated and detached from both faculty and fellow students was a repetitive concern raised by students during the interviews. Many of the students expressed concern that this lack of physical contact between faculty and students negatively impacted the teaching and learning experience. A majority of the students participating in the semi-structured interviews reported that online contact improved learning and motivated many of the students to actively participate in online discussion. Some of the students view the online tutorial setting within a learning environment as a means of socialization, which positively impacted on the quality of their learning experience. The students were emphatic in stressing this form of socialization contributed to students feeling connected and integrated into their learning process which positively contributes to their academic retention and success.

Numerous studies, particularly those concerned with student development theories, conclude that increased frequency of faculty to student and student to student interaction, both inside and outside class contributed to a greater amount of student learning and personal development (Astin, 1999). Astin postulated that frequent interaction and contact with faculty:

> is more strongly related to satisfaction with college than any other type of involvement or, indeed, any other student or institutional characteristics. Students who interact frequently with faculty members are more likely than other students to express satisfaction with all aspects of their institutional experience…including the intellectual environment. (1999, p. 525)

Tinto (1997, p. 600) agreed to Astin's claim:

> We also know that involvement influences learning. Generally speaking, the greater the students' involvement in the life of the college, especially its academic life, the greater their acquisition of knowledge and development of skills….. Students who report higher levels of contact with peers and faculty also demonstrate higher levels of learning gain over the course. (p. 600)

The criticality of student engagement, with both faculty and students in the face-to-face context, as discussed by Astin (1999) and Tinto (1997), were themes often mentioned by students during the semi-structured interviews. The students commented on how face-to-face interaction with faculty and students not only improved the quality of their learning experience, but also increased academic achievement.

Tutors under use of the online tutorial was reported as detracting from the learning experience. Some students were frustrated that some course sites contained out-dated material, and when questioned on this oversight by one student, the faculty member ignored the question. Others expressed concern that some faculty members either resisted and/or were technically challenged when instructing an online course which prevented the establishment of a meaningful and productive learning environment. Some students felt that only tutors who are conversant and confident in the use of educational technologies should be instructing online courses. A student also suggested that UT should ensure that adequate support systems and professional development programs are in place for those faculty members who are unsure of how to use effectively the online tutorial and its associated educational technology tools.

Inconsistent use of the online tutorial between faculty members did not add value to the student's learning experience. Some students expressed frustration of having to figure out how each faculty member intended to use the online tutorial. The students reiterated that more consistent use of the online tutorial between courses would significantly improve the quality of learning and contribute to student academic success.

It is apparent from the literature that instructors are not satisfied with the functionality of available instructional technology and that the low levels of competency of typical instructors in the use of advanced information and computer technology is limiting their ability to take full advantage of the features that the instructional technology could provide. While addressing the needs of instructors, McDonald and Reushle (2002) stated, "It is evident from experience and a growing body of literature that well-designed support and resources are required in order to guide teachers through technological and pedagogical change" (p. 439). John Savery (2010) further indicated that the difficulties instructors face in using instructional technology limits their ability to function effectively as both instructors and as designers of advanced instructional materials. As he mentioned regarding teaching in an online environment, "many of the strategies and tactics associated with best teaching practices are somewhat constrained by the primarily text-based environment" (p. 141).

The findings in this study mirror research by Swan et al. (2000) which concludes that students were most satisfied with online tutorials when tutors were available to be contacted, when online discussion was active, and when the online tutorial was easy to access, anytime and everywhere.

5.1.5.4. Behavioral Intentions to Use

Based on the information that was gathered, four of the five tutors who were interviewed indicated a positive assessment about teaching online. Some of the interview findings include the following: (a) Tutors recognized the importance of providing timely feedback to students in spite of the amount of work that is required when writing this feedback; and, (b) All of the five tutors indicated a continued commitment to use ETs in online courses through web-based delivery. After their first teaching experience, they said they were willing to teach courses through this method. It could be said that these tutors' receptivity to online teaching has to do with their background and proficiency in using technology in the distance learning environment. These tutors' expertise and interest in ETs made a difference in their desire to pursue distance teaching method.

In addition, one tutor was very receptive to ETs. It is possible that the tutors' first-time teaching experiences influenced receptivity towards ETs: If the initial experience was a positive one, then the tutors would be more likely to view ETs as positive. This is a view of tutors that is supported by literature: teachers who were more experienced with educational technology had greater intentions to use technology, were more likely to have their students use it, and believed more in its value (Efe, 2011). The tutors' technology competencies could have contributed to their willingness to teach future courses online using ETs. Furthermore, this particular tutor realized the longer time commitment required to prepare for facilitating online courses and to interact with students in a virtual classroom.

The interviews conducted with the tutors and students reveal that a tutor's and student's personal preference to using ETs in online tutorial could be a factor in his or her decision to be active or passive in online tutorials. In addition, an instructor's or a student's level of expertise or technological competencies can positively influence his/her desire to use ETs in online tutorials in the future. As indicated above, the tutors are already teaching various courses in online setting; this contributed to their willingness to use ETs in online course. In addition, tutors are encouraged to use ETs in online tutorial because it is mandatory.

According to T. S. H. Teo et al. (1999), new systems that at first seem easy to use and enjoyable may in the long run be abandoned if they do not provide critically needed functionality. One common observation is that tutors and students are often fascinated by the capabilities of the ETs in online tutorials in giving them access to almost an infinite number of information resources. However, continued usage without any specific purpose or usefulness may decline overtime when the novelty effect of the ETs wears off. This has important implications for tutors and UT in that they must continue to update and make their online tutorials useful and interesting to students.

These emerging themes provide significant information for tutors to consider when providing online services. Opportunities for a better learning experience can be made available to students if tutors can address these concerns, frustrations, and ideas in a constructive manner. As the emerging themes indicate, tutors and students see value in personal relationship. Therefore, continuous methods of improvement should be implemented to encourage and attract more online tutors and students in this risky environment.

5.1.5.5. Actual Use of Emerging Technologies in UT

The developments in technological advances have changed the process of teaching and learning in the online environment (Bonk & King, 1998). Learning in an online environment through the use of web-based course platforms can be a challenging and rich experience for teachers and students, especially if the tool to conduct a class is delivered effectively. It is also important for students to be aware of the time commitment needed to "attend" classes online through a web-based delivery platform (Lao & Gonzales, 2005). Having the tools to provide this information to the students does not necessarily ensure that they will apply these resources for their own understanding (Land & Greene, 2000). Therefore, it is important for tutors who teach online courses to know how to build personal relationship and motivate students in this changing environment. Facilitating online takes a different approach than face-to-face teaching; thus, new methods need to be introduced to the instructors to make the experience meaningful to the students (Brown, Collins, & Duguid, 1989).

As indicated in this research study, tutors' and students' technological challenges can be solved by providing training and standard operational procedures for delivering courses online. Knowledge of the online process, understanding the potential of using an online tutorial platform for teaching, and being aware of the responsibilities involved in teaching online courses can help facilitate a meaningful and positive experience for learners (Lao & Gonzales, 2005). Valentine (2002) noted that tutors' negative attitudes toward e-learning systems have created a major barrier to the use of such systems in universities. In addition, G. M. Johnson and Howell (2005) stated that tutors' negative attitude is difficult to be converted in order to meet the demands of the new dynamics of e- learning systems, even in the cases in which institutional support is high (Johnson & Howell, 2005). Some tutors believe that the online tutorial as more of an extension of their faculty work, because its use is made mandatory by the institution. Therefore, they were more willing to use the online tutorial as an extension of their duties. However, they participate in online tutorials reluctantly. According to Badu-Nyarko (2006), instructors' attitudes toward e-learning systems play a significant role in their intentions to use e-learning systems. Additionally, Agarwal and Prasad (1997) found that systems used in mandatory conditions enhanced the early system utilisation, but at the same time mandatory use also produced pressure over individuals to overcome the difficulties of first-time-usage, which might produce a lower level in acceptance. Furthermore, UTAUT) model was first introduced by Venkatesh et al. (2003). These are considered as explicit conditions which help us understand individuals' perceptions when they use particular systems. Despite considering them as explicit conditions, F. D. Davis (1989) did not include voluntariness as an explicit factor at the time of TAM development. But this was later included and treated as moderating factor of social norms and perceptions (Agarwal & Prasad, 1997; Hartwick & Barki, 1994; Venkatesh & Davis, 2000; Venkatesh & Morris, 2000; Venkatesh et al., 2003).

The student observations provide crucial information for online tutors. By being aware of students' perceptions, instructors can modify the way they teach an online tutorial to make the course interesting, motivating, and interactive. One way to encourage students to be successful online is to encourage open communication in the online tutorial. Tutors should be able to listen and understand the students, and “not just to talk to them as ‘expert[s]’” (Volery, 2001, p. 90). Because of the absence of face-to-face communication, instructors need to be more visible to the students in the virtual tutorial. This entails answering questions as soon as possible upon receipt of students’ e-mail/text messaging because students may feel ignored when instructors do not acknowledged their note. Even though the students voluntarily accepted the ETs in online tutorial, they preferred to use alternative simpler ETs in other devices, such as Facebook in a smart phone to collaboratively share their learning compare to using Moodle in an online tutorial. The experience also served to validate their preference towards ETs. The more they experience in online tutorials, the more types of ETs they use in learning process.

5.2. Conclusions

The main goal of this study was to investigate empirically the contribution of instructors' and students’ ETsR, ETsU and TC to their intention to use emerging technologies in online tutorials, as measured by the weight of their contribution to the prediction of behavior intention (BI). A secondary but related purpose of this study was to identify, from the tutors’ and students’ perspectives, the key factors that encourage or inhibit students from embracing emerging technologies in online tutorials. The insights derived from this research provide UT leaders and faculty with credible information on tutors’ and students’ preferences and overall emerging technologies acceptance in support of their studies in the online tutorial environment.

This study collected data utilizing a mixed-methods study design, consisting of a comprehensive online questionnaire, adapted from the Brush et al. (2008) instrument and modified to accommodate the evaluation model of Alliger et al. (1997) and D. L. Kirkpatrick (1998), and complemented with semi-structured interviews of 10 respondents. As with all mixed-methods studies, triangulating, corroborating and contrasting the data sets from the quantitative and qualitative methods proved insightful and valuable when developing conclusions and implications from this research.

The population of this study was instructors and students in the Open University of Indonesia (UT). The response rate was approximately 36.5% (tutor) and 51.2% (student), with the sample appearing to be normally distributed and representative of the population. Several measures of validity appropriate to an EFA were discussed in the context of the study results. The study results yielded a simple, interpretable structure. There is 70.71% of the variance that is explained by the three components solution (for tutors) and 73.65% of the variance that is explained by the four components solution (for students).

Based on tutor data, results were mixed since each variable was significant in the different analysis. However, from the qualitative data TC was most important contributor to BI. For student data, MLR and OLR analyses were found to be significant and presented identical results. Particularly, ETsR and TC were found to be significant predictors of BI in both models. Based on the MLR analysis from tutor and student data demonstrated that TC provided the only significant contribution out of the three independent variables investigated in this study. This validated the results of other studies that identified the importance and role of TC in technology acceptance models.

Much IS research has been focused on adoption of various technologies; however this study created an exemplary opportunity to test the new model in new contexts. To that end, this study found that in the context of instructors' use of technology, the most important antecedent was teaching competencies with more complex effects when emerging technologies reaction and emerging technologies understanding were added as an interaction term.

As indicated in this qualitative research study, one common theme that was derived from the interviews was the development of learning communities in the online course. Online tutorials provide opportunities for students to form groups where they can support each other in the group. There is also a sense of inclusion within the community of learners, especially when the instructor recognizes the importance of bringing students together through their work. In terms of conditions that facilitate effective teaching and learning, some tutors and students indicate that they are willing to use the alternative technology in online tutorials to provide a better interaction.

It was intentional in allowing the tutors and students to have perspectives on "emerging technologies" for themselves when responding to the guiding questions. The respondents viewed ETs generally to encompass nearly all sorts of advanced application technologies to support distance education. Those applications included communication, information retrieval and creation. It is especially interesting that they had such broad perspectives on ETs. Most of the participants believe that it is necessary to have a purpose when using emerging technologies, instead of using them whenever they are available, but when they are used, adequate infrastructure and support are necessary for them to be effective.

Some parts of this research were consistent with previous research, whereas others were contradictory. One possible clue is that not all participants of the study used emerging technologies in online tutorials. Therefore, those variables are not directly related to BI but rather may be indirectly related to the intention to use ETs. Particularly, for example: the tutors did not use ETs as a learning convenience, compared to the students, the so-called M-generation, who advance using mobile devices and frequently access emerging technology to get necessary information.

As a consequence of the development of emerging technologies, problems and difficulties do occur. Although some tutors and students had experiences with their online tutorials, they still encountered technological problems in terms of technical skill, time constraints and infrastructure. Some tutors see the online tutorial as more of an extension of their faculty work, because it is made mandatory by the university institution. Therefore, they were more willing to use the online tutorial as an extension of their duties. However, they participate in online tutorials reluctantly. Tutors' and students' technological challenges can be solved by providing training and standard operational procedures for delivering courses online. Knowledge of the online processes, understanding the potential of using an online tutorial platform for teaching, and being aware of the responsibilities involved in teaching online courses can help facilitate a meaningful and positive experience for learners (Lao & Gonzales, 2005).

The issue when it comes to teaching online is not whether this environment is better or lesser in quality compared to face-to-face teaching. Instead, tutors must focus on their approach to teaching, and how they could capitalize on the different technological components to make learning meaningful for students. UT must understand what changes and improvements need to be made by listening to what tutors and students say about their online experiences. A re-examination and restructuring of varying teaching approaches can be applied to deliver an effective online environment (Gold, 2001). By focusing on feed-back, education, and training, UT can continue to offer successful distance learning programs.

The convenience of online tutorials anytime and anywhere entails greater responsibility for educators to deliver quality instruction that is equal or even better than traditional classroom practices. It will be a challenge to have this new vision accepted by everyone in distance learning institutions, but in order to be successful in the field of distance education, UT must take the risk and explore this new field of teaching with a positive frame of mind.

5.3. Recommendations

One of the strengths of this study is its generalizability to other students and tutors at UT (but not outside UT—the generalizability is limited). Statistically, the samples of 126 tutor and 1201 student participants are highly representative of the larger population of interest. However, both the population and the sample are relatively homogenous, thus minimizing the variations that may be present in a more diverse set of participants. Specifically, a study sample that includes a wider range of ages, ethnic diversity, domicile diversity, as well as some additional personal-trait and socio-economic variables is recommended in order to more broadly examine other possible correlational relationships and subsequent emergent factors. Occupation status may also be applicable and contribute to more fully explaining the results.

The results of this study represent a snapshot in time. The questionnaire responses are representative of how participants felt or thought on that particular topic. But people and organizations are not static. Organizations and individuals change and adapt. People have new experiences with new emerging technologies, and learning situations change. This study is limited by the fact it measures a number of variables at just one point in time. A longitudinal design would enable researchers to assess what variables and conclusions are temporal versus those that are more enduring.

Although this study's qualitative inquiry was limited to five tutors and five students in the Open University of Indonesia, the qualitative interviews can be expanded to a larger community of online educators and learners to determine a more accurate assessment of these experiences, perceptions, and attitudes about using emerging technologies in online tutorials. This research study also suggests that feedback from both tutors and students must be addressed and examined to understand the changes and trainings that are crucial for an effective online tutorial program.

Lastly, the study results might be further examined from a generational perspective. The participants in the sample represent a narrow range of ages. Recently, research has suggested that there are distinguishable differences in ETsR, ETsU and TC relative to various generational archetypes, i.e., Traditional, Baby Boomers, Generation X, and Millennials.

One area for additional study is to determine the effect the diffusion of technology has on the retention and retirement of tutors and students. As the tutors and students become older, there is a need to determine if there is a relationship between increased use of technology in education and increased retirements and problems with retention. As part of that study, analysis of data should determine if positive TA beliefs with incentives could delay retirement and promote retention.

A second area of study could be the technology acceptance (TA) of younger tutors and students. The sample of individuals between the ages of 17-28 was only 2.4% (for tutors) and 54% (for students) in this study, so there was no reliable data that described the TA of younger tutors. Future TA research could determine if younger tutors demonstrate higher levels of TA in innovativeness than older members of the educators. If younger tutors have higher TA regarding their willingness to try new technologies, there could be the potential for intergenerational training between age groups that could address TA in innovativeness among older tutors. Matching older tutors with younger technology-savvy tutors could provide opportunities for intergenerational mentorship, technology knowledge transfer, and new workplace models to assist older tutors with acceptance of ETs.

A third area for additional research would be study the influence tutors and students have as opinion leaders in other segments of society. If tutors and students are determined to be individuals of significant influence regarding acceptance of innovations in the workplace and local communities they could be instrumental in introducing non-distance education related innovations to other segments of society. Using tutors and students as leaders to introduce innovations could be useful in education, transportation, energy, community planning, business and other areas. For example, a community seeking to promote home-based solar energy may find local acceptance improves if the first users are the tutors or students in the community.

5.4. Implications for Future Research and Practice

The implications of this study for the research are significant. This study contributes to the body of knowledge of emerging technologies acceptance in online tutorials by constructing a theoretical model introducing new constructs: ETsR, ETsU and TC. The reason for introduction of different constructs in this theoretical model was the complexities of the organizational and social contexts within which instructors and students with varying individual characteristics make their decisions about using ETs. Consequently, this study is expected to contribute to future research that will study acceptance of ETs.

There are two implications of this study for changing practice at the organizational level. The first implication of this study is that it is important to understand the key factors that affect instructors' and students' intentions to use ETs. Understanding individual factors can be expected to lead UT administrators to consider supporting service for instructors and students who want to use ETs in training, software and hardware support.

Second, the findings of this study will help the Department of Information and Technology of UT, especially learning management systems developers, to design and develop those systems that will be more likely accepted by instructors and students. The research findings imply that emerging technologies developers in education should not only concern themselves with basic e-learning management systems or software design but also address individual differences among the systems users.

Implications of this study for the larger society also emerge. Knowledge of technology acceptance (TA) can produce social change in a number of segments of society at-large and in the distance education sector, in particular. Application of the concept of TA evaluation instruments should be a standard component of strategies prior to the introduction of new technologies to designated tutors and students. Evaluation and analysis of the attitudes of tutors and students as they interface with new technologies can be useful to advance the diffusion of technologies in every aspect of education through recognition of tutors and students as TA opinion leaders.

As the distance education sector continues to expand and change in response to worldwide aging populations and innovations, there will need to be identifiable TA pioneers, innovators, and explorers who are prepared and willing to be the first to use new technology applications. These individuals will have the potential to provide leadership in access and of quality care and will lead the way in social change through future experimentation and use of emerging technologies (ETs), and a range of yet to be invented educational technology applications. Based on the similar TA responses of the sample across gender, race and age demographics, it appears that desirable social change through increased use of ETs can be achieved in various parts of society. Social change through TA and greater use of technology can be achieved efficiently by employing diverse groups of tutors and students from every age group, race, and gender.

Tutors and students can individually contribute to social change by recognizing that their personal acceptance or rejection of new technologies can serve to expedite or block efforts societal efforts to introduce ETs in the workplace and at home. Recognition of the tutors and students as pioneers and innovators can also help to diffuse technology in sectors outside of distance education. For example, innovative, pioneering TA tutors and students could be leaders in their communities in introducing technology innovations into non-education sectors. There is also the opportunity to avoid digital divides in distance education and technology by collecting racial, gender and age elements early and monitoring those factors as use of TA and diffusion of technology increases.

With regard to the digital divide which currently exists between the rural and urban sectors of Indonesia, it is important to advocate strongly to the government and private sectors to rapidly develop the technology infrastructure in rural areas in order to close the gap. By doing this, the potential will be increased for providing access to education and consequently developing a better skilled population.

Although, this study did not observe variance in age or gender regarding TA, early data collection and evaluation of emerging disparities or gaps should be determined early to avoid potential gaps in knowledge that could emerge among tutors and students who receive TA training and those who do not receive training. In addition, efforts to track TA based on age and gender could help identify any cultural lack-of-fit issues early and technology paradoxes that may be unique to specific groups, as suggested by Mick and Fournier (1998).

The last implication for future research is to extend the research model framework to incorporate culture in the adoption of technology for use in online tutorial. It is needed in order to further explore and understand the potential application of my model in the higher education context across cultures.

5.5. Study Limitations

There were a number of limitations associated with this study. First, the data collected was self-reported by tutors and students. Although it is extremely common and accepted among adoption studies, the inclusion of objective measures would be preferable. It was limited in nature by the accuracy of the participants' responses (Kerlinger & Lee, 2000). It stemmed from the self-report method of reporting technology competencies (TC). Self-report measures of TC are subjective and may not be a true reflection of an individual's actual TC. Although the researcher took methodological steps to facilitate accurate reporting such as confidentiality and voluntarily participation, these procedures might not rule out the biases associated with self-reported measures, including social desirability. Despite limitations of the instrument, including socially desirable answers, a self-report measure is a strong method to provide great insight on an individual's perception. Therefore, the reliability of the survey data is dependent on the instructors' and students' honesty and completeness of their responses. It was difficult to know how accurately self-reports reflect their actual intention to use e-learning systems. This limitation was somewhat reduced by using a Likert scale for the survey. In addition, all data were initially checked for data accuracy, response-set, missing data, and outliers to minimize the self-report bias. Also, the reliability and validity was tested before final analysis. Because of these measures, the final set of data analyzed was reliable and as complete as possible. Thus, I encourage researchers in this area to explore creating such measures to enhance the quality of these findings

Second, as the survey was distributed through e-mail, UT's webpage and Facebook's page, it was limited to the tutors' and students' willingness to take the initiative to read the e-mail and taking time to complete the survey. Although e-mail is now a common tool for sending Web-based surveys, there was little incentive for the tutors and students to participate in this survey unless they were really interested in the research. The tutors and students self-selected themselves into this study by clicking onto the link of survey website and completing the survey. Based on this self-selection, there can be an under-representation of respondents who are not interested in research or not intending to use emerging technologies in online tutorials. A link to the survey was sent by email to participants asking them to participate in this study. Some tutors and students may not receive the email, or may not feel comfortable with taking online surveys. There was also the possibility that only tutors and students who had more advanced computer skills or TC actually will take the survey. These factors may influence the results of the survey. Most of the tutors and students are approached to encourage participation in the survey and technical assistance is provided to those tutors and students who need help. These steps should ensure greater participation from tutors and students across all levels of TC.

Third, this study was designed to focus on tutors and students and was conducted at a single, distance learning university in Indonesia. It is possible that results might not generalize to other tutors or students in other universities. Consequently, the generalizability of the findings may be compromised somewhat. Gliner and Morgan (2000) emphasize lack of generalizability as a potential threat to the external validity of a study. Moreover, the sample is relatively small and comprised only of tutors and students. Further studies will be needed to replicate the findings in different contexts with different types of users (Healy, 1999). Additional studies need to be done at other, different sized universities in order to generalize the findings of this study in a broader scope.

Fourth, the design of Web-based survey in Zoomerang may have effect on respondents' responses. All items of the four constructs appeared in single Web page in the survey although separated in six different sections; each section started with each construct's instruction. From a visual inspection of the raw data and the mean in SPSS for each construct for each case, it appeared that participants tended to respond to all items roughly in one direction (either choosing a minimum or maximum value). The Web- based survey with enough space between two different constructs' items could have kept participants away from sticking to the same direction while respond in survey. Presenting all items in single Web page, however, may have helped in increasing the response rate.

The final limitation relates to the exclusion of offline tutors from my sample. Particularly, this study took a narrow focus, allowing it to generalize only those tutors teaching online tutorials. However, I created that boundary as a first attempt to increase our understanding of technology acceptance model in the higher education context of online environment. This study can be perceived as a directional one for further research, which presents an opportunity to expand the boundaries to include traditional, offline tutors. Such additional research could also address the benefits of incorporating social networking technology into online instruction, in addition to better understanding the motivation to use it. Perhaps technology use and the significant factors that affect its use vary across different units in a university. Such questions could be examined with a more diverse sample. Along these lines, a further limitation associated with the current study is the size of the sample of tutors.. My desire is that through repetition studies, I can expand the sample to include more male and female tutors from several disciplines.

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Appendices

Appendix A.
Research Ethics Approval

SFU ENGAGING THE WORLD

OFFICE OF RESEARCH ETHICS

ORE

8888 University Drive
Multi-Tenant Facility
Burnaby, BC Canada, V4A 1S6
1 778 782 3447 Manager
1 778 782 6593 Director
Email: dore@sfu.ca
http://www.sfu.ca/vpresearch/ethics

Minimal Risk Expedited Approval

Date	File	Approval	Principal Investigator
29 April 2012	[2012s0271]	Approved	Susilo, Adhi

Title	Start Date	End Date
Evaluating Emerging Technologies Acceptance in Distance Learning: Instructors' and Students' Behavioral Intentions	29 April 2012	29 April 2015

SFU Position	Department / School	Supervisor
Graduate Student	Education	Kaufman, David

Hello Adhi,

Your application has been categorized as 'Minimal Risk' and approved by the Director, Office of Research Ethics on behalf of the Research Ethics Board, in accordance with University Policy r20.01 (http://www.sfu.ca/policies/research/r20.01.htm)

The Research Ethics Board reviews and may amend decisions made independently by the Director, Chair or Deputy Chair at the regular monthly meeting of the Board.

Please acknowledge receipt of this Notification of Status by email to and Include the file number as shown above as the first item in the Subject Line.

You should get a letter shortly. Note: All letters are sent to the PI addressed to the Department, School or Faculty for Faculty and Graduate Students. Letters to Undergraduate Students are sent to their Faculty Supervisor.

Good luck with the project,

Hal Weinberg, Director

Appendix B.
Approval Letter from the Open University of Indonesia

KEMENTERIAN PENDIDIKAN DAN KEBUDAYAAN

UNIVERSITAS TERBUKA

Jalan Cabe Raya, Pondok Cabe, Pamulang, Tangerang Selatan 15418
Telepon [redacted] (Hunting)
Faksimile [redacted] (Sekretaris Rektor)
Laman: www.ut.ac.id

UNIVERSITAS TERBUKA

Name : Drs. Agus Joko Purwanto, M.Si.
Organization : Department of Research and Community Services
The Open University of Indonesia (Universitas Terbuka/UT)
Address : Jalan Cabe Raya, Pondok Cabe Pamulang Tangerang Selatan
Banten 15418 - Indonesia
Date : March 26, 2012

TO WHOM IT MAY CONCERN

Office of Research Ethics
Simon Fraser University
8888 University Drive
Multi-Tenant Facility
Burnaby, B.C. V5A 1S6

Subject : Permit letter to conduct research in Universitas Terbuka

Dear Sir/Madam,

I, Agus Joko Purwanto, the head of Research and Community Services Department, am writing this letter for Adhi Susilo who is currently undertaking a research project for his doctoral study at Simon Fraser University, Canada. The research is entitled **"Evaluating Emerging Technologies Acceptance in Distance Learning: Instructors' and Students' Behavioral Intentions"**.

I give permit to Adhi Susilo to conduct research in Universitas Terbuka. I hope that this study will be significant in developing a better understanding of the complex nature of emerging technology for distance learning. I hope the results of this study will be useful not only for him but also for Universitas Terbuka.

This study cannot be completed without your help and support, and I am very happy and grateful if you are willing to support and be involved in this study. I am also open to any questions, for further contact please email me at ajoko@ut.ac.id .

Sincerely,

[redacted]

Drs. Agus Joko Purwanto, MSi.

Appendix C.
Online Questionnaires

Technology Acceptance Questionnaires

Page 1 - Question 1 - Choice - One Answer (Bullets) [Mandatory]

Please identify the range in which your age appears

- 17-28 years
- 29-40 years
- 41-50 years
- 51-60 years
- More than 60 years

Page 1 - Question 2 - Choice - One Answer (Bullets) [Mandatory]

Gender

- Male
- Female

Page 1 - Question 3 - Choice - One Answer (Bullets) [Mandatory]

How many online tutorials are you participating in 2012.1?

- 1 online tutorial
- 2 online tutorials
- 3 online tutorials
- 4 online tutorials
- 5 online tutorials
- More than 5 online tutorials

Page 1 - Question 4 - Choice - One Answer (Bullets) [Mandatory]

How long have you been participating in online tutorial until semester 2012.1?

- Less than 1 year
- 1 - <2 years
- 2 - <3 years
- 3 - <4 years
- 4 - <5 years
- 5 - 6 years
- More than 6 years

Page 2 - Question 5 - Rating Scale - Matrix [Mandatory]

Using the scale provided, rate your CURRENT level of technology skills using each of the following emerging technologies (Note: N/A = not familiar with/do not use, 1=poor, 2=fair, 3=moderate, 4=intermediate and 5=advance)

Technology Skills	**N / A**	**1**	**2**	**3**	**4**	**5**
Send, receive, open, and read email						
Use advanced email features (e.g., attachments, folders, address books, distribution lists)						
Subscribe to and unsubscribe from a listserv (mailing list)						
Audio and videoconferencing (e.g., Skype, Windows Live, YM)						
Instant messaging (e.g., yahoo messenger, ICQ)						
Use a search tool to perform a keyword/subject search in an electronic database (e.g., CD-ROM, library catalog)						
Use advanced features to search for information (e.g., subject search, search strings with Boolean operators, combining searches)						
Use a search engine (e.g., Yahoo, Lycos, Google) to search for information on the web						
Use a web authoring tool (e.g., Wordpress) to create a blog						
Format a blog using tables, backgrounds, internal and external links.						
Use Wikipedia						
Create online pooling/survey						

Page 3 - Question 6 - Rating Scale - Matrix [Mandatory]

The questions below are based on emerging technologies that are available in online tutorial. These emerging technologies are communication, information retrieval and creation tools. Communication includes synchronous (audio and video conference, text messenger) and asynchronous (email, discussion board). Information retrieval consists of search engine that search for text, audio, picture, and video (Google Scholar, YouTube). Creation includes text, html (blog and Wikipedia), audio, video and image. Therefore, the emerging technologies (ETs) in this questionnaire refer to these three categories. According to Veletsianos (2010) ETs are: "Tools, concepts, innovations, and advancements that are utilized in diverse educational settings, to serve varied educational purposes, and that can be described as evolving or “coming into being”. (Note: 1=strongly disagree, 2=disagree, 3=neutral, 4=agree and 5=strongly agree).

Level of Learning	1	2	3	4	5
I felt comfortable using ETs for communication					
I felt comfortable using ETs for retrieving information					
I felt comfortable using ETs for creating (text, html, audio, video, image)					
I would like use ETs for communication					
I would like use ETs for retrieving information					
I would like use ETs for creating (text, html, audio, video, image)					
ETs were relevant to my task for communication					
ETs were relevant to my task for retrieving information					
ETs were relevant to my task for creating (text, html, audio, video, image)					
It is easy to learn ETs, particularly for communication					
It is easy to learn ETs, particularly for retrieving information					
It is easy to learn ETs, particularly for creating (text, html, audio, video, image)					
I understand ETs and their application for communication					
I understand ETs and their application for retrieving information					
I understand ETs and their application for creating (text,					

Level of Learning	1	2	3	4	5
html, audio, video, image)					
I can use the different tools of ETs for communication					
I can use the different tools of ETs for retrieving information					
I can use the different tools of ETs for creating (text, html, audio, video, image)					
I will improve my skills to learn ETs for communication					
I will improve my skills to learn ETs for retrieving information					
I will improve my skills to learn ETs for creating (text, html, audio, video, image)					
I will teach my colleagues how to use ETs for communication					
I will teach my colleagues how to use ETs for retrieving information					
I will teach my colleagues how to use ETs for creating (text, html, audio, video, image)					
I will always use ETs for completing my task mainly in communication area					
I will always use ETs for completing my task mainly in information retrieval					
I will always use ETs for completing my task mainly in creating something (text, html, audio, video, image)					

Page 4 - Question 7 - Rating Scale - Matrix [Mandatory]

Behaviorial Intentions to Use Emerging Technologies in Online Tutorials

	Strongly disagree	Disagree	Neutral	Agree	Strongly Agree
I intend to use emerging technologies in online tutorials as soon as possible	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
I will use emerging technologies in online tutorials soon after it is available	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

Page 5 - Question 8 - Rating Scale - Matrix [Mandatory]

Perceived Technology Barriers

	Not a barrier	Minor barrier	Major barrier	N/A
Lack of or limited access to computers in UT	☐ 1	☐ 2	☐ 3	☐ 4
Not enough software available in UT	☐ 1	☐ 2	☐ 3	☐ 4
Lack of knowledge about technology	☐ 1	☐ 2	☐ 3	☐ 4
Lack of knowledge about ways to integrate technology into the curriculum	☐ 1	☐ 2	☐ 3	☐ 4
My assignments do not require technology use	☐ 1	☐ 2	☐ 3	☐ 4
Lack of technology accessibility in my classes	☐ 1	☐ 2	☐ 3	☐ 4
Too much learning materials to cover	☐ 1	☐ 2	☐ 3	☐ 4
Lack of mentoring or support to help me increase my technology skills	☐ 1	☐ 2	☐ 3	☐ 4
Emerging technologies-integrated curriculum projects require too much preparation time	☐ 1	☐ 2	☐ 3	☐ 4
There is not enough time in class to implement emerging technologies-based lessons	☐ 1	☐ 2	☐ 3	☐ 4

Page 6 - Question 9 - Open Ended - Comments Box [Mandatory]

Open ended question: “Based on your experiences, do you think online tutorials which have been running so far have met your expectations? Please explain it. What should be fixed if it has not met your expectations”?

Thank You Page

If you require further information regarding this survey, please contact me:
Adhi Susilo Phone: (office) (mobile)

Appendix D.
In Person Interview Instruments

Interview Instruments

You are being invited to take part in a research study. Before you decide, it is important for you to understand why the research is being done and what it will involve. Please feel free to ask me if there is anything that is not clear or if you would like more information.

The objective of this study is to uncover the important factors affecting distance learners' behavioral intentions of using emerging technologies (ETs). These intentions are based on reactions, learning and experience regarding the use of technology. According to George Veletsianos (2010), ETs are: "Tools, concepts, innovations, and advancements that are utilized in diverse educational settings, to serve varied educational purposes, and that can be described as evolving or "coming into being".

ETs in computing and information systems change the way teachers and students meet, communicate, retrieve information and work together outside traditional classrooms. ETs are also dramatically affecting the way people teach and learn (Veletsianos, 2010). Distance learning (DL) is part of emerging technologies and has main roles for advancing student-oriented, active learning, open, and life-long teaching-learning processes.

Distance education allows freedom of choice when it comes to the technologies employed in communication, information retrieval, and creation. ETs offer a wide range of new opportunities for development of education, and the advantages of their use are numerous. The advantages cover administrative, financial, societal as well as pedagogical areas. This study focuses on three functions of ET: communication, information retrieval and creation.

The results of this study will benefit UT in several ways:

1. It will contribute to the improvement of online tutorials.
2. It will assist in creating institutional policies regarding online teachers and learning.
3. It will help to improve the educational experience of learners at UT.

REACTION

1. What are your perspectives on emerging technologies (ETs)?

LEARNING

2. With respect to the current development of ETs, in your opinion how can online and electronic learning delivery modes contribute to interaction: first student-teacher interaction, second student-content interaction, and third student-student interaction?
3. Based on your involvement and experience in the tutorial program, do you think that personal relations between your students and you are important in order to promote study, pleasure, and motivation? Why or Why not? If yes, how do you foster these things?
4. In your opinion can conversation be successfully applied to distance learning or not? Why or why not? If yes, how can this be done?

BEHAVIOR

5. Do you use ETs in your courses? How often? Occasionally, often or always
6. Do you design program and course materials? If yes, please describe how you do this.
7. Are ETs planned during program development and built into the design of the program and course materials? If yes, please describe how this is done.
8. Do you provide online support for your students within your courses? If yes, please describe it.
9. Do you or will you teach your colleagues how to use ETs for communication, information retrieval and creation?

BEHAVIORAL INTENTIONS

10. Will you use emerging technologies in online tutorials soon after they are available? Please describe your reason(s).

CHALLENGES, BENEFITS, AND RESULTS OF THE ET PROGRAM

11. Based on your involvement with ETs, what are the benefits in working with ETs
12. What are the main challenges in developing interaction, communication, and collaboration with your instructor?
13. Based on your real experiences with ETs, what suggestion could you make for future improvements of learner support in distance education?

INDIVIDUAL CHARACTERISTICS

14. Age, domicile, working experience, and access to educational technology.

Appendix E.
Research Consent Form for Online Survey

April 27, 2012

Faculty of Education

RESEARCH CONSENT FORM FOR ONLINE SURVEY

TITLE: Evaluating Emerging Technologies Acceptance in Distance Learning: Instructors' and Students' Behavioral Intentions

PRINCIPAL INVESTIGATOR: ADHI SUSILO

SENIOR SUPERVISOR: DR. DAVID KAUFMAN

INVITATION

You are being invited to take part in a research study. Before you decide, it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully. Ask us questions if there is anything that is not clear or if you would like more information.

WHAT IS THE PURPOSE OF THE STUDY?

The current study is a predictive study as it attempted to predict distance learning university instructors' and students' intentions to use emerging technology in distance learning based on the contribution of Emerging Technology Reaction (ETsR), Emerging Technology Understanding (ETsU), and Technology Experience (TC), as measured by the weight their contribution to the prediction of Behavioral Intentions (BI). This study adopts Kirkpatrick's model(D. L. Kirkpatrick, 1994, 1998; D. L. Kirkpatrick & Kirkpatrick, 2006).

WHY ARE YOU BEING INVITED?

Because you have been identified as a participant in an online tutorial in Universitas Terbuka.

DO YOU HAVE TO TAKE PART?

It is up to you to decide whether or not to take part. If you do decide to take part you will be asked to fill out the online survey. Even if you do decide to take part, you still have the right to withdraw at any time and without giving any reason.

CAN YOU BE ASKED TO LEAVE THE STUDY?

If you are not complying with the requirements of the study or for any other reason, the researchers may withdraw you from the study.

WHAT WILL YOU NEED TO DO IF YOU TAKE PART?

The questionnaire should take you about 15 minutes to complete. Your participation in this research is voluntary and your grades will not be affected by participation or non-participation. Refusal to participate or withdrawal after agreeing to participate will not have any adverse effects on the grades or evaluation in the course or classroom or employment.

WHAT ARE THE POSSIBLE DISADVANTAGES AND RISKS OF TAKING PART?

There are no foreseen risks associated with participating in the interview process. There are potentially minor adverse effects given that the project involves collecting information that might be uncomfortable for some participants.

WHAT ARE THE BENEFITS OF TAKING PART?

Possible benefits to you for participating include the opportunity to reflect on your participation, motives, goals, interests and values in the emerging technology use; share your insights, perceptions and views on emerging technology use in online tutorial and contribute to the development of online tutorial.

WILL MY TAKING PART IN THIS STUDY BE KEPT CONFIDENTIAL?

The confidentiality of your response will be maintained by providing visibility of individual responses only to the researcher. The reports of this survey will not show a specific individual's responses as only group results will be reported. Specific organizational information that you provide will not be published or mentioned in the final reports of this study.

Confidentiality is assured unless otherwise determined by you. You have the opportunity to speak on or off the record, and to determine whether or not your comments are provided on an attributable basis. In writing the dissertation, I may quote you but not identify you, unless you give me written permission, through reviewing my draft report prior to release or publication. You are not obligated to speak on the record.

WHO IS ORGANIZING AND FUNDING THE RESEARCH?

This study is not sponsored but is undertaken as doctoral research through Simon Fraser University, Canada.

PERMISSION

Permission has been obtained by the employer/university prior to the study being conducted.

CONTACT FOR FURTHER INFORMATION

If you have any questions or desire further information with respect to this study, or if you experience any adverse effects, you should contact Adhi Susilo or one of his associates at the Faculty of Education (Dr. David Kaufman, The Senior Supervisor of this Study, or). If you have any questions about your rights as a research subject, you may contact the Director, Office of Research Ethics, Dr. Hal Weinberg or ( ). You may obtain copies of the results of this study, upon its completion, by contacting: Adhi Susilo at or through email at .

By filling out this survey, I am consenting to participate.

- I confirm that I have read and understood the study invitation and study details.
- I give permission for the research team to access and store long-term information about my use of past, current and future emerging technologies from my past, current and future activities.
- I give permission for the research team to access my student record and other online tutorial-related records and for long-term storage and use of this information for online tutorial-related research purposes.
- I understand that I may be re-contacted in the future by the research team to provide further information pertaining to my online tutorial behavior and use of emerging technologies.
- I understand that all data will be kept strictly confidential, and stored securely on a private and secure computer network at Universitas Terbuka, but the confidentiality cannot be assured for data transferred electronically.
- I understand that my participation is voluntary and that I am free to withdraw from the study at any time without giving any reason.

Please click one of the options below

- No, I do not consent to the above

- Yes, I have read and understood the above and what is involved in taking part in the study and I agree to participate

Appendix F.
Research Consent Form for In Person Interview

April 27, 2012

Faculty of Education

RESEARCH CONSENT FORM FOR IN-PERSON INTERVIEWS

TITLE: Evaluating Emerging Technologies Acceptance in Distance Learning: Instructors' and Students' Behavioral Intentions

PRINCIPAL INVESTIGATOR: ADHI SUSILO

SENIOR SUPERVISOR: DR. DAVID KAUFMAN

INVITATION

You are being invited to take part in a research study. Before you decide, it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully. Ask us questions if there is anything that is not clear or if you would like more information.

WHAT IS THE PURPOSE OF THE STUDY?

The current study is a predictive study as it attempted to predict distance learning university instructors' and students' intentions to use emerging technology in distance learning based on the contribution of Emerging Technology Reaction (ETsR), Emerging Technology Understanding (ETsU), and Technology Experience (TC), as measured by the weight their contribution to the prediction of Behavioral Intentions (BI). This study adopts Kirkpatrick's model(D. L. Kirkpatrick, 1994, 1998; D. L. Kirkpatrick & Kirkpatrick, 2006).

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WHY ARE YOU BEING INVITED?

Because you have been identified as a participant in online tutorial in Universitas Terbuka.

DO YOU HAVE TO TAKE PART?

It is up to you to decide whether or not to take part. If you do decide to take part you will be asked to sign this consent form. Even if you do decide to take part, you still have the right to withdraw at any time and without giving any reason.

CAN YOU BE ASKED TO LEAVE THE STUDY?

If you are not complying with the requirements of the study or for any other reason, the researchers may withdraw you from the study.

WHAT WILL YOU NEED TO DO IF YOU TAKE PART?

The interview will last up to 30 minutes, but its duration could be extended if you volunteer additional information and have available time. The interview will take place in person. The interview will include questions focusing on emerging technology use in distance learning. The interview transcript will be emailed to you for your comments and input. Should you wish to confirm how your story is being reported, you can do so at that time. This review process could take 30 minutes.

WHAT ARE THE POSSIBLE DISADVANTAGES AND RISKS OF TAKING PART?

There are no foreseen risks associated with participating in the interview process. There are potentially minor adverse effects given that the project involves collecting information that might be uncomfortable for some participants.

WHAT ARE THE BENEFITS OF TAKING PART?

Possible benefits to you for participating include the opportunity to reflect on your participation, motives, goals, interests and values in the emerging technology use; share your insights, perceptions and views on emerging technology use in online tutorial and contribute to the development of online tutorial.

REFUSE TO PARTICIPATE

Refusal to participate or withdrawal after agreeing to participate will not have any adverse effects on the grades or evaluation in the course or classroom or employment.

WILL MY TAKING PART IN THIS STUDY BE KEPT CONFIDENTIAL?

Confidentiality is assured unless otherwise determined by you. You have the opportunity to speak on or off the record, and to determine whether or not your comments are provided on an attributable basis. In writing the dissertation, I may quote you but not identify you, unless you give me written permission, through reviewing my draft report prior to release or publication. You are not obligated to speak on the record.

In order to protect confidentiality, every attempt will be made to keep confidential records. Recordings of the interview, transcription and interview notes will be coded to a participant key, and personal identifiers will be removed if you chose to comment anonymously. Only code numbers will identify copies of relevant data that identify all participants. Coded, transcribed data will be stored in electronic storage (external drive) separate from campus systems and computers, password protected and in a locked environment. Signed consent forms and other documents that allow the identification of individuals will be stored separately from the coded data. During the interviews, recordings and notes will be taken, which may be made available to the researcher's Senior Supervisor, Committee Members, and auditor trail for inter-rater reliability. However, you still have the right to ask for the audio recording to be turned off at any time during interview to ensure that there is no discomfort or risk to you.

WHO IS ORGANIZING AND FUNDING THE RESEARCH?

This study is not sponsored but is undertaken as doctoral research through Simon Fraser University, Canada.

PERMISSION

Permission has been obtained by the employer/university prior to the study being conducted.

CONTACT FOR FURTHER INFORMATION

If you have any questions or desire further information with respect to this study, or if you experience any adverse effects, you should contact Adhi Susilo or one of his associates at the Faculty of Education (Dr. David Kaufman, The Senior Supervisor of this Study, (1) or). If you have any questions about your rights as a research subject, you may contact the Director, Office of Research Ethics, Dr. Hal Weinberg (1) or ( ). You may obtain copies of the results of this study, upon its completion, by contacting: Adhi Susilo at or through email at .

WHY ARE YOU SIGNING THIS CONSENT FORM?

By signing this consent form, you agree that:

- You have read and understood the information in the consent form dated [include date of Research Ethics Board (REB) approved ethics form] and have had the opportunity to ask questions.
- The principal investigator or research coordinator has answered your questions to your satisfaction.
- You understand your participation is voluntary and that you may refuse to participate or you are free to withdraw at any time.
- You agree to take part in this study.
- You will receive a copy of the signed consent form for your records.

SIGNATURES

____________________________ ____________________________

Signature of subject

Date (written by subject)

____________________________ ____________________________

Signature of Investigator

Date (per investigator)

Appendix G.
Anti-image Matrices for PCA (Tutor)

Appendix H.
Anti-image Matrices for PCA (Student)

Appendix I. Multiple Regression Analysis of Tutor Data

Descriptive Statistics

	Mean	Std. Deviation	N
Intention	8.3571	1.63200	126
Reaction	37.1111	5.94134	126
Understanding	32.3016	6.39909	126
Competencies	35.9524	6.68952	126

Correlations

		Intention	Reaction	Understanding	Competencies
Pearson Correlation	Intention	1.000	.558	.529	.560
	Reaction	.558	1.000	.729	.779
	Understanding	.529	.729	1.000	.701
	Competencies	.560	.779	.701	1.000
Sig. (1-tailed)	Intention	.	.000	.000	.000
	Reaction	.000	.	.000	.000
	Understanding	.000	.000	.	.000
	Competencies	.000	.000	.000	.
N	Intention	126	126	126	126
	Reaction	126	126	126	126
	Understanding	126	126	126	126
	Competencies	126	126	126	126

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Competencies, Understanding, Reaction[b]	.	Enter

a. Dependent Variable: Intention
b. All requested variables entered.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.605[a]	.366	.351	1.31521

a. Predictors: (Constant), Competencies, Understanding, Reaction
b. Dependent Variable: Intention

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	121.895	3	40.632	23.489	.000[b]
	Residual	211.034	122	1.730		
	Total	332.929	125			

a. Dependent Variable: Intention
b. Predictors: (Constant), Competencies, Understanding, Reaction

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.308	.752		3.067	.003
	Reaction	.061	.035	.222	1.760	.081
	Understanding	.048	.028	.188	1.701	.091
	Competencies	.062	.030	.255	2.109	.037

Coefficients[a]

Model		Collinearity Statistics	
		Tolerance	VIF
1	(Constant)		
	Reaction	.327	3.053
	Understanding	.423	2.362
	Competencies	.355	2.817

a. Dependent Variable: Intention

Collinearity Diagnostics[a]

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions		
				(Constant)	Reaction	Understanding
1	1	3.963	1.000	.00	.00	.00
	2	.021	13.888	.83	.00	.16
	3	.011	19.222	.05	.03	.76
	4	.006	25.961	.13	.96	.08

Collinearity Diagnostics[a]

Model	Dimension	Variance Proportions
		Competencies
1	1	.00
	2	.05
	3	.46
	4	.49

a. Dependent Variable: Intention

Casewise Diagnostics[a]

Case Number	Std. Residual	Intention	Predicted Value	Residual
13	-3.683	2.00	6.8445	-4.84451
101	4.364	10.00	4.2599	5.74013

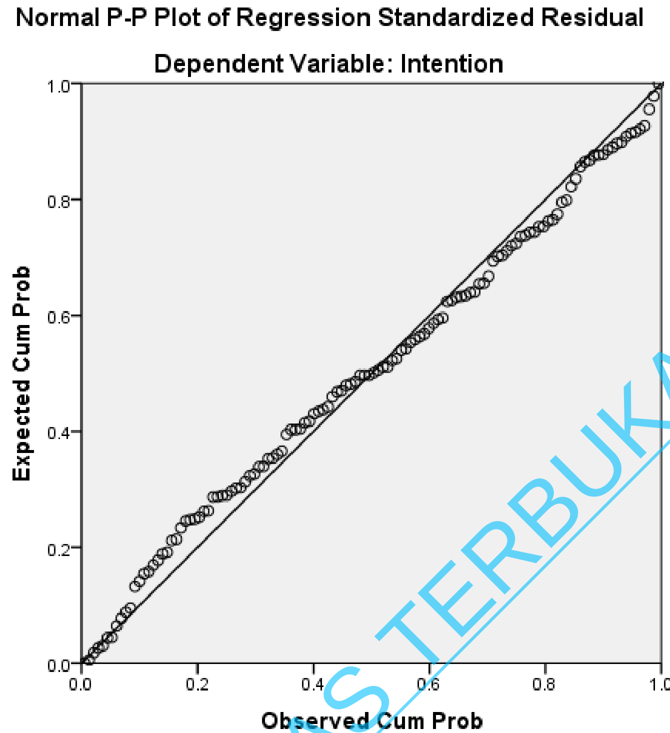
a. Dependent Variable: Intention

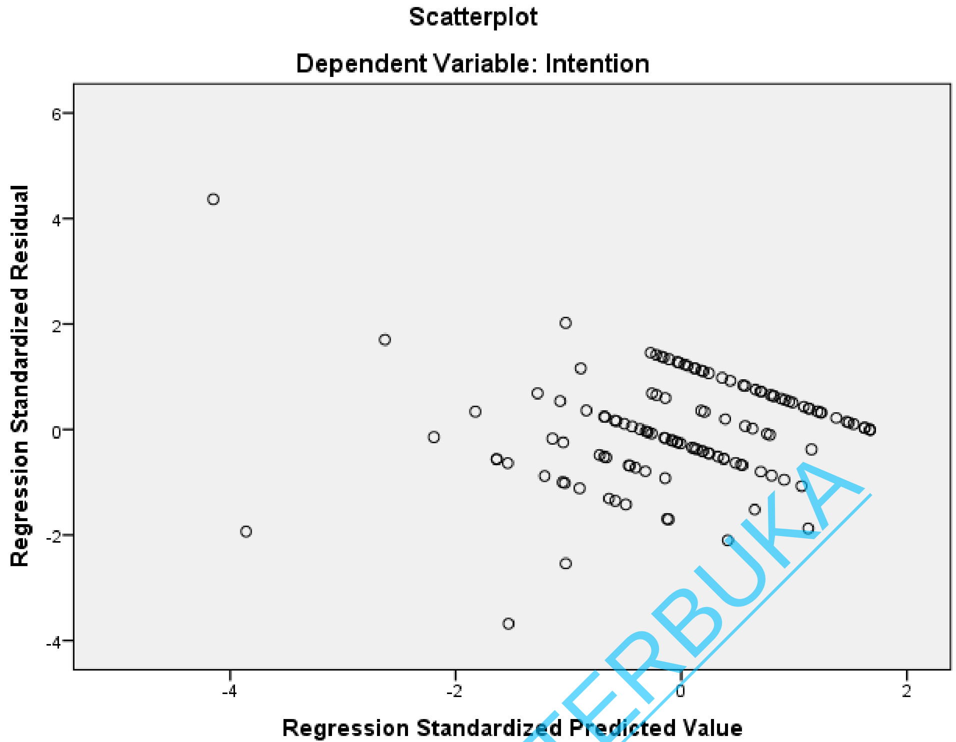
Residuals Statistics[a]

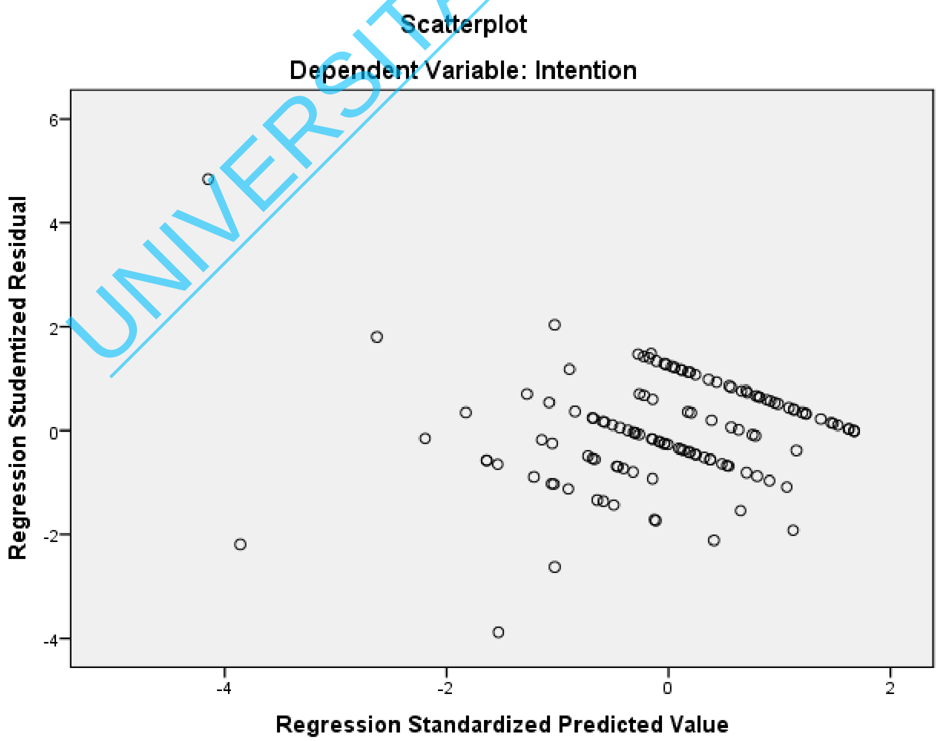
	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	4.2599	10.0108	8.3571	.98750	126
Std. Predicted Value	-4.149	1.675	.000	1.000	126
Standard Error of Predicted Value	.117	.618	.217	.088	126
Adjusted Predicted Value	2.9414	10.0112	8.3531	1.01509	126
Residual	-4.84451	5.74013	.00000	1.29933	126
Std. Residual	-3.683	4.364	.000	.988	126
Stud. Residual	-3.882	4.840	.001	1.027	126
Deleted Residual	-5.38218	7.05857	.00403	1.40902	126
Stud. Deleted Residual	-4.130	5.362	.003	1.060	126
Mahal. Distance	.005	26.618	2.976	4.022	126
Cook's Distance	.000	1.345	.023	.129	126
Centered Leverage Value	.000	.213	.024	.032	126

a. Dependent Variable: Intention

Charts


Normal P-P Plot of Regression Standardized Residual
Dependent Variable: Intention
Expected Cum Prob
Observed Cum Prob
0.0
0.2
0.4
0.6
0.8
1.0


Scatterplot
Dependent Variable: Intention
Regression Standardized Residual
6
4
2
0
-2
-4
-4
-2
0
2
Regression Standardized Predicted Value


Scatterplot
Dependent Variable: Intention
Regression Studentized Residual
6
4
2
0
-2
-4
-4
-2
0
2
Regression Standardized Predicted Value

Appendix J. Multiple Regression Analysis of Student Data

Descriptive Statistics

	Mean	Std. Deviation	N
Intention	8.4638	1.54183	1201
Reaction	36.6370	6.02327	1201
Understanding	33.1715	6.44856	1201
Competencies	35.9600	6.32654	1201

Correlations

		Intention	Reaction	Understanding	Competencies
Pearson Correlation	Intention	1.000	.546	.468	.569
	Reaction	.546	1.000	.746	.786
	Understanding	.468	.746	1.000	.718
	Competencies	.569	.786	.718	1.000
Sig. (1-tailed)	Intention	.	.000	.000	.000
	Reaction	.000	.	.000	.000
	Understanding	.000	.000	.	.000
	Competencies	.000	.000	.000	.
N	Intention	1201	1201	1201	1201
	Reaction	1201	1201	1201	1201
	Understanding	1201	1201	1201	1201
	Competencies	1201	1201	1201	1201

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Competencies, Understanding, Reaction[b]	.	Enter

a. Dependent Variable: Intention
b. All requested variables entered.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.591[a]	.350	.348	1.24485

a. Predictors: (Constant), Competencies, Understanding, Reaction
b. Dependent Variable: Intention

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	997.747	3	332.582	214.618	.000[b]
	Residual	1854.928	1197	1.550		
	Total	2852.674	1200			

a. Dependent Variable: Intention
b. Predictors: (Constant), Competencies, Understanding, Reaction

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.821	.228		12.356	.000
	Reaction	.062	.011	.242	5.815	.000
	Understanding	.007	.009	.031	.838	.402
	Competencies	.087	.010	.357	8.981	.000

Coefficients[a]

Model		Collinearity Statistics	
		Tolerance	VIF
1	(Constant)		
	Reaction	.315	3.179
	Understanding	.398	2.511
	Competencies	.343	2.914

a. Dependent Variable: Intention

Collinearity Diagnostics[a]

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions		
				(Constant)	Reaction	Understanding
1	1	3.965	1.000	.00	.00	.00
	2	.020	14.102	.89	.01	.15
	3	.010	20.425	.08	.06	.79
	4	.006	26.097	.03	.92	.06

Collinearity Diagnostics[a]

Model	Dimension	Variance Proportions
		Competencies
1	1	.00
	2	.03
	3	.41
	4	.56

a. Dependent Variable: Intention

Casewise Diagnostics[a]

Case Number	Std. Residual	Intention	Predicted Value	Residual
7	-3.252	4.00	8.0477	-4.04767
138	3.562	10.00	5.5657	4.43427
193	-4.517	2.00	7.6231	-5.62307
226	4.560	10.00	4.3239	5.67610
269	-3.273	2.00	6.0749	-4.07486
335	3.030	8.00	4.2277	3.77231
470	-3.119	4.00	7.8826	-3.88257
491	3.030	8.00	4.2277	3.77231
502	4.514	10.00	4.3810	5.61899
853	-3.901	5.00	9.8558	-4.85583
888	-3.700	2.00	6.6054	-4.60535
949	3.001	8.00	4.2647	3.73531
985	3.178	10.00	6.0438	3.95622
1102	3.892	10.00	5.1547	4.84534
1124	4.042	10.00	4.9687	5.03128
1135	-3.066	2.00	5.8173	-3.81730

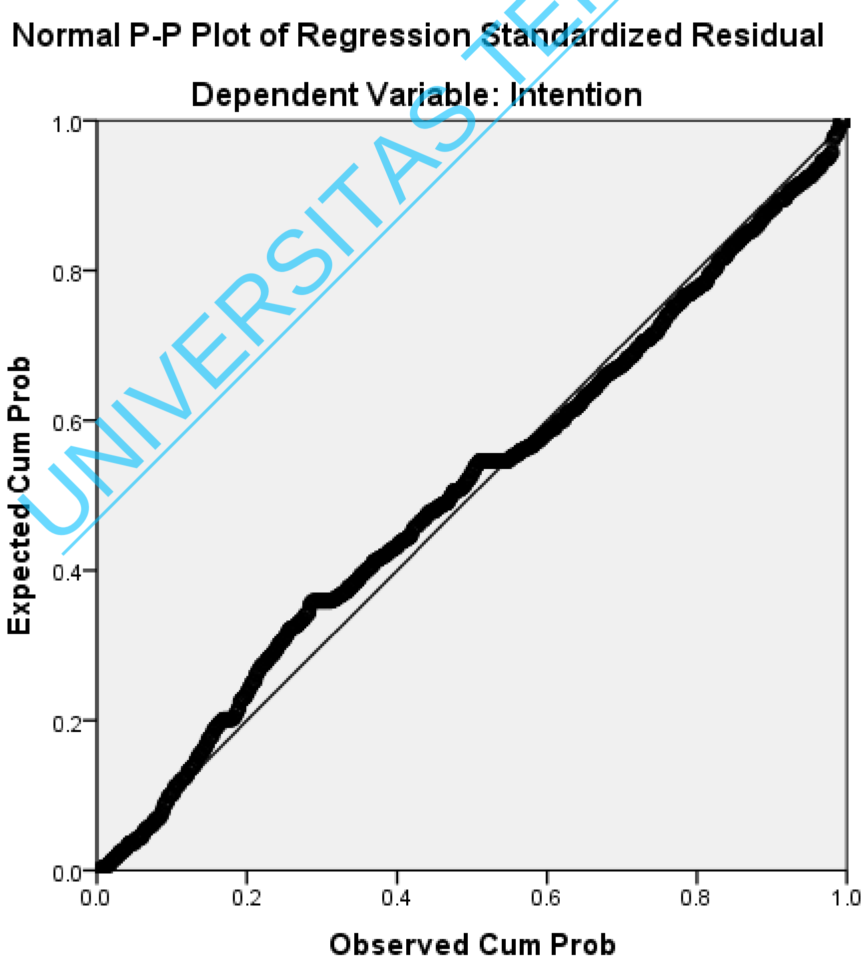
a. Dependent Variable: Intention

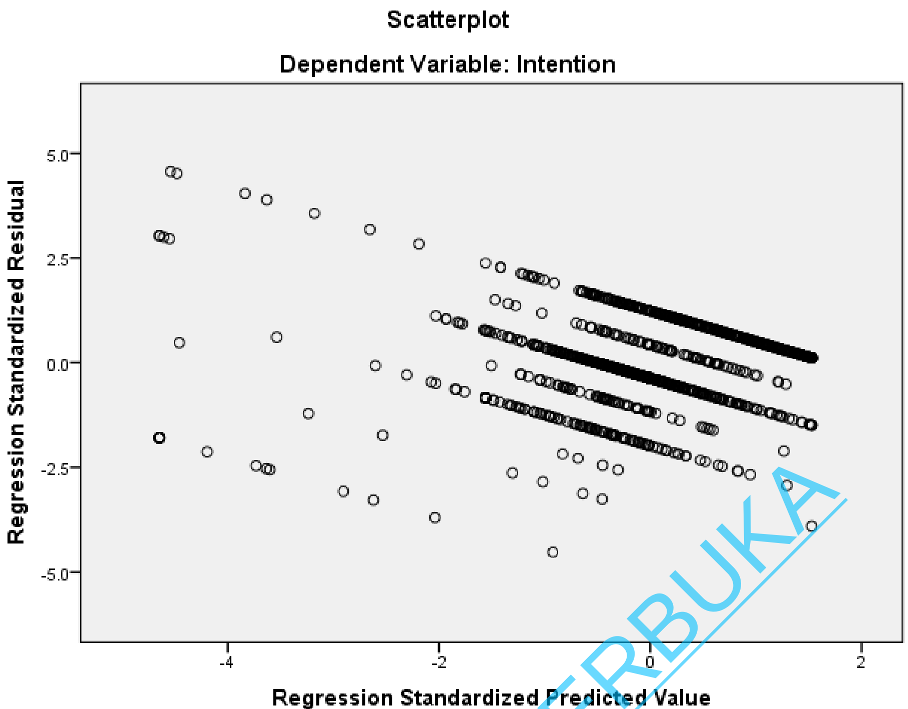
Residuals Statistics[a]

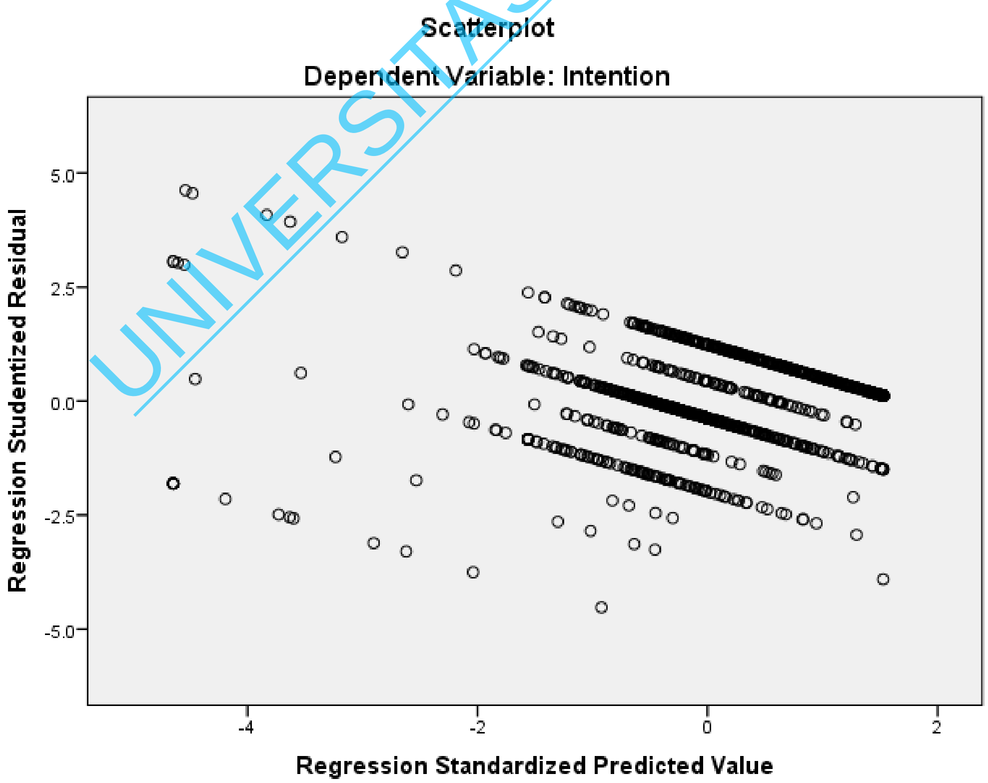
	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	4.2277	9.8558	8.4638	.91184	1201
Std. Predicted Value	-4.646	1.527	.000	1.000	1201
Standard Error of Predicted Value	.036	.283	.066	.028	1201
Adjusted Predicted Value	4.1533	9.8737	8.4635	.91304	1201
Residual	-5.62307	5.67610	.00000	1.24329	1201
Std. Residual	-4.517	4.560	.000	.999	1201
Stud. Residual	-4.523	4.622	.000	1.002	1201
Deleted Residual	-5.63825	5.83356	.00026	1.25179	1201
Stud. Deleted Residual	-4.560	4.662	.000	1.004	1201
Mahal. Distance	.032	60.812	2.998	4.592	1201
Cook's Distance	.000	.148	.002	.009	1201
Centered Leverage Value	.000	.051	.002	.004	1201

a. Dependent Variable: Intention

Charts




Scatterplot
Dependent Variable: Intention
Regression Standardized Residual
5.0
2.5
0.0
-2.5
-5.0
-4
-2
0
2
Regression Standardized Predicted Value


Scatterplot
Dependent Variable: Intention
Regression Studentized Residual
5.0
2.5
0.0
-2.5
-5.0
-4
-2
0
2
Regression Standardized Predicted Value

Appendix K. Binary Logistic Regression of Tutor Data

Case Processing Summary

Unweighted Cases[a]		N	Percent
Selected Cases	Included in Analysis	112	88.9
	Missing Cases	14	11.1
	Total	126	100.0
Unselected Cases		0	.0
Total		126	100.0

a. If weight is in effect, see classification table for the total number of cases.

Dependent Variable Encoding

Original Value	Internal Value
No	0
Yes	1

Block 0: Beginning Block

Classification Table[a,b]

	Observed		Predicted		
			BI		Percentage Correct
			No	Yes	
Step 0	BI	No	0	3	.0
		Yes	0	109	100.0
	Overall Percentage				97.3

a. Constant is included in the model.

b. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 0	Constant	3.593	.585	37.686	1	.000	36.333

Variables not in the Equation

			Score	df	Sig.
Step 0	Variables	Gender	.343	1	.558
		Age	.001	1	.973
	Overall Statistics		.369	2	.832

Block 1: Method = Enter

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	.376	2	.828
	Block	.376	2	.828
	Model	.376	2	.828

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	27.262[a]	.003	.015

a. Estimation terminated at iteration number 7 because parameter estimates changed by less than .001.

Hosmer and Lemeshow Test

Step	Chi-square	df	Sig.
1	4.498	5	.480

Contingency Table for Hosmer and Lemeshow Test

		BI = No		BI = Yes		Total
		Observed	Expected	Observed	Expected	
Step 1	1	1	.606	14	14.394	15
	2	1	.509	13	13.491	14
	3	0	.884	27	26.116	27
	4	0	.065	3	2.935	3
	5	0	.427	22	21.573	22
	6	0	.244	14	13.756	14
	7	1	.264	16	16.736	17

Classification Table[a]

	Observed		Predicted		
			BI		Percentage Correct
			No	Yes	
Step 1	BI	No	0	3	.0
		Yes	0	109	100.0
	Overall Percentage				97.3

a. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B)	
								Lower	Upper
Step 1[a]	Gender	.756	1.270	.354	1	.552	2.129	.177	25.664
	Age	.109	.660	.027	1	.868	1.115	.306	4.065
	Constant	2.949	2.194	1.805	1	.179	19.078		

a. Variable(s) entered on step 1: Gender, Age.

Correlation Matrix

		Constant	Gender	Age
Step 1	Constant	1.000	-.391	-.945
	Gender	-.391	1.000	.217
	Age	-.945	.217	1.000

Block 2: Method = Enter

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	10.551	3	.014
	Block	10.551	3	.014
	Model	10.928	5	.053

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	16.710[a]	.093	.425

a. Estimation terminated at iteration number 8 because parameter estimates changed by less than .001.

Hosmer and Lemeshow Test

Step	Chi-square	df	Sig.
1	7.340	8	.500

Contingency Table for Hosmer and Lemeshow Test

		BI = No		BI = Yes		Total
		Observed	Expected	Observed	Expected	
Step 1	1	2	2.244	10	9.756	12
	2	0	.204	7	6.796	7
	3	0	.322	13	12.678	13
	4	1	.118	10	10.882	11
	5	0	.037	11	10.963	11
	6	0	.028	11	10.972	11
	7	0	.014	11	10.986	11
	8	0	.012	12	11.988	12
	9	0	.009	10	9.991	10
	10	0	.011	14	13.989	14

Classification Table[a]

	Observed		Predicted		
			BI		Percentage Correct
			No	Yes	
Step 1	BI	No	1	2	33.3
		Yes	0	109	100.0
	Overall Percentage				98.2

a. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B)	
								Lower	Upper
Step 1[a]	Gender	.161	1.650	.010	1	.922	1.175	.046	29.804
	Age	.137	.860	.025	1	.874	1.146	.212	6.185
	ETsR	2.139	1.023	4.368	1	.037	8.491	1.142	63.110
	ETsU	.354	1.198	.087	1	.768	1.425	.136	14.924
	TC	1.028	.923	1.241	1	.265	2.795	.458	17.050
	Constant	-10.966	5.335	4.225	1	.040	.000		

a. Variable(s) entered on step 1: ETsR, ETsU, TC.

Correlation Matrix

		Constant	Gender	Age	ETsR	ETsU	TC
Step 1	Constant	1.000	-.090	-.341	-.506	-.162	-.528
	Gender	-.090	1.000	.362	-.424	-.003	.122
	Age	-.341	.362	1.000	-.173	-.299	.234
	ETsR	-.506	-.424	-.173	1.000	-.213	.202
	ETsU	-.162	-.003	-.299	-.213	1.000	-.489
	TC	-.528	.122	.234	.202	-.489	1.000

Appendix L. Binary Logistic Regression of Student Data

Case Processing Summary

UnweightedCases[a]		N	Percent
Selected Cases	Included in Analysis	1081	90.0
	Missing Cases	120	10.0
	Total	1201	100.0
Unselected Cases		0	.0
Total		1201	100.0

a. If weight is in effect, see classification table for the total number of cases.

Dependent Variable Encoding

Original Value	Internal Value
No	0
Yes	1

Block 0: Beginning Block

Classification Table[a,b]

	Observed		Predicted		
			BI		Percentage Correct
			No	Yes	
Step 0	BI	No	0	27	.0
		Yes	0	1054	100.0
	Overall Percentage				97.5

a. Constant is included in the model.
b. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 0	Constant	3.665	.195	353.517	1	.000	39.037

Variables not in the Equation

			Score	df	Sig.
Step 0	Variables	Gender	.623	1	.430
		Age	.159	1	.690
	Overall Statistics		.927	2	.629

Block 1: Method = Enter

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	.947	2	.623
	Block	.947	2	.623
	Model	.947	2	.623

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	251.622[a]	.001	.004

a. Estimation terminated at iteration number 7 because parameter estimates changed by less than .001.

Hosmer and Lemeshow Test

Step	Chi-square	df	Sig.
1	2.210	3	.530

Contingency Table for Hosmer and Lemeshow Test

		BI = No		BI = Yes		Total
		Observed	Expected	Observed	Expected	
Step 1	1	11	8.890	275	277.110	286
	2	4	6.882	253	250.118	257
	3	3	2.052	86	86.948	89
	4	6	6.164	277	276.836	283
	5	3	3.012	163	162.988	166

Classification Table[a]

	Observed		Predicted		
			BI		Percentage Correct
			No	Yes	
Step 1	BI	No	0	27	.0
		Yes	0	1054	100.0
	Overall Percentage				97.5

a. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B)	
								Lower	Upper
Step 1[a]	Gender	.365	.419	.759	1	.384	1.441	.633	3.278
	Age	.154	.281	.299	1	.585	1.166	.672	2.023
	Constant	3.286	.520	39.942	1	.000	26.733		

a. Variable(s) entered on step 1: Gender, Age.

Correlation Matrix

		Constant	Gender	Age
Step 1	Constant	1.000	-.415	-.888
	Gender	-.415	1.000	.172
	Age	-.888	.172	1.000

Block 2: Method = Enter

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	118.503	3	.000
	Block	118.503	3	.000
	Model	119.450	5	.000

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	133.120[a]	.105	.502

a. Estimation terminated at iteration number 8 because parameter estimates changed by less than .001.

Hosmer and Lemeshow Test

Step	Chi-square	df	Sig.
1	15.764	8	.046

Contingency Table for Hosmer and Lemeshow Test

		BI = No		BI = Yes		Total
		Observed	Expected	Observed	Expected	
Step 1	1	23	21.038	85	86.962	108
	2	3	2.308	133	133.692	136
	3	0	1.356	116	114.644	116
	4	0	.875	110	109.125	110
	5	0	.654	118	117.346	118
	6	0	.378	117	116.622	117
	7	0	.197	110	109.803	110
	8	1	.073	72	72.927	73
	9	0	.080	105	104.920	105
	10	0	.040	88	87.960	88

Classification Table[a]

	Observed		Predicted		
			BI		Percentage Correct
			No	Yes	
Step 1	BI	No	13	14	48.1
		Yes	6	1048	99.4
	Overall Percentage				98.1

a. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B)	
								Lower	Upper
Step 1[a]	Gender	.711	.543	1.712	1	.191	2.036	.702	5.908
	Age	.228	.347	.432	1	.511	1.256	.636	2.481
	ETsR	1.060	.441	5.764	1	.016	2.886	1.215	6.855
	ETsU	1.328	.438	9.189	1	.002	3.775	1.599	8.912
	TC	.387	.472	.674	1	.412	1.473	.584	3.711
	Constant	-7.201	1.247	33.373	1	.000	.001		

a. Variable(s) entered on step 1: ETsR, ETsU, TC.

Correlation Matrix

		Constant	Gender	Age	ETsR	ETsU	TC
Step 1	Constant	1.000	-.338	-.519	-.153	-.341	-.098
	Gender	-.338	1.000	.082	.009	.145	-.014
	Age	-.519	.082	1.000	-.039	.044	.044
	ETsR	-.153	.009	-.039	1.000	-.215	-.633
	ETsU	-.341	.145	.044	-.215	1.000	-.400
	TC	-.098	-.014	.044	-.633	-.400	1.000

Appendix M. Sample of In-Person Interview's Transcript

In Person Interview Instruments
Project title: Evaluating Emerging Technologies Acceptance in Distance Learning: Instructors' and Students' Behavioral Intentions
Interview Instruments for Academic Staff/Tutor/Instructor

REACTION

1. What are your perspectives on emerging technologies (ETs)?
   I think that emerging technologies have changed all aspects of our life. They also have brought significant impacts on education. They enable us to do anything more easily and of course much more quickly.

LEARNING

2. With respect to the current development of ETs, in your opinion how can online and electronic learning delivery modes contribute to interaction: first student-teacher interaction, second student-content interaction, and third student-student interaction?
   I am of the opinion that online and electronic learning delivery modes are able to connect all parties involved in a learning process. Current technology development enables to carry out and drive student-teacher and student-student interactions either in synchronous or asynchronous mode. It offers usefulness, learning materials can be uploaded into a website that students may read or download them at any time. A major problem faced by our students and teacher is the infrastructure. Internet is currently enjoyed by a small number of people living in our country. In addition, the internet speed in our country is very slow compare to the internet speed in Malaysia, for example.

3. Based on your involvement and experience in the tutorial program, do you think that personal relations between your students and you are important in order to promote study, pleasure, and motivation? Why or Why not? If yes, how do you foster these things?
   I think yes. Personal relation is important because it may make the student feel comfortable. I mean, they know that the teacher/lecturer is following their study process. They know who to be asked when they face problems. In turn, their motivation to study will be increasing and I think that this may also improve their academic performance.

   I suggest that all email addresses of tutors/lecturers must be attached somewhere in the learning materials or website. The most important thing is that the lecturer must reply the emails sent by the students promptly. Answers to the questions should increase their motivation. It means that the tone of the message should be encouraging as well as clear.

4. In your opinion can conversation be successfully applied to distance learning or not? Why or why not? If yes, how can this be done?
   I am sure it can because technology enables us to make this happen. I have an experience of having real time conversation with a customer service of bank. When I open the website, after several seconds, there was a notice appeared saying ‘Can I help you?’ I used this facility to discuss a problem I had and the customer service explained very clearly. This practice can be applied in a distance learning institution.

BEHAVIOR

5. Do you use ETs in your courses? How often? Occasionally, often or always
   I use ETs every day to help me complete my works.
6. Do you design program and course materials? If yes, please describe how you do this.
   No.
7. Are ETs planned during program development and built into the design of the program and course materials? If yes, please describe how this is done.
   No.
8. Do you provide online support for your students within your courses? If yes, please describe it.
   Yes. I give them my personal email address in addition to the office email address. I also give them my Skype account so that they may contact me if I am online in Skype. It is easier and cheaper.
9. Do you or will you teach your colleagues how to use ETs for communication, information retrieval and creation?
   Sure, I will.

BEHAVIORAL INTENTIONS

10. Will you use emerging technologies in online tutorials soon after they are available? Please describe your reason(s).
    Yes. I think they will make the tutorial more interesting.

CHALLENGES, BENEFITS, AND RESULTS OF THE ET PROGRAM

11. Based on your involvement with ETs, what are the benefits in working with ETs
    I can work faster and more economical (I can save time and money).

12. What are the main challenges in developing interaction, communication, and collaboration with your students?
    The main challenges are, first are internet connection speed and undistributed equally. Second, we need to adapt our culture so that we can cope with the development of technology/

13. Based on your real experiences with ETs, what suggestion could you make for future improvements of learner support in distance education?
    Most of distance learning students feel they are alone and do not have access to find help. Distance learning institution should realize it and utilize ET to provide

academic and administrative supports. Interaction between teacher(s) and students is a necessary in a learning process.

INDIVIDUAL CHARACTERISTICS

14. Age, domicile, working experience, and access to educational technology.
    - ☐ What is your age?
      41years old
    - ☐ Where is your domicile? Rural or urban area?
      Dundee, urban area.
    - ☐ How long are you working as a tutor?
      As an online learning tutor…. 4 years I think
    - ☐ How is your access to educational technology (internet, computer, etc.)?
      I can access to educational technology from my personal computer, office computer or my mobile gadget. I have no problem with the connection and speed. I most of the time use technology to find articles or other learning sources to enrich my knowledge.

Appendix N. Sample of Online Tutorial Web Page