MODELING ADOPTION INTENTION OF ONLINE
EDUCATION IN THAILAND USING EXTENDED
DECOMPOSED THEORY OF PLANNED BEHAVIOR (DTPB)
WITH SELF-DIRECTED LEARNING

By

BUSSAGORN LEEJOEIWARA

A Dissertation
Submitted in Partial fulfillment of the requirements
for the Degree of

DOCTOR OF PHILOSOPHY IN
BUSINESS ADMINISTRATION

MARTIN DE TOURS SCHOOL OF MANAGEMENT
AND ECONOMICS
Assumption University
Bangkok, Thailand
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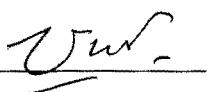
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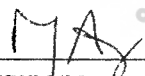This Study by: Ms. Bussagorn Leejoeiwara

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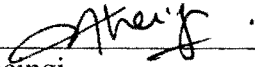

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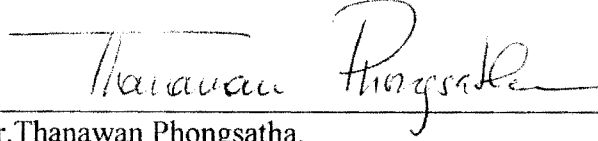
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ABSTRACT

Online education has become a strategic means for internationalization in educational institutions worldwide. Attributable to the forces of globalization and Information and Communication Technology, technological innovations such as Internet, mobility, and social media tools have facilitated student-centered learning, enabling lifelong learning, and extending access to education more widely in the current borderless network and social computing paradigm. Online education has the power to transform the educational industry landscape globally. However, there is a lack of empirical evidence with regards to consumer perception towards online education adoption especially in a developing country, such as Thailand.

This study aimed to explore the determinants of online education adoption based upon integrated model of Diffusion of Innovation and the Decomposed Theory of Planned Behavior. Quantitative research method was employed for data collection from a sample of 542 students in Thailand. Data was analyzed using Structural Equation Modeling (SEM).

Results showed that all four main variables based on the extended DTPB with self-directed learning were significantly related to adoption intention. However, perceived relative advantage and perceived trialability were found to be insignificantly related to attitude towards online education. Subjective norms or social influence were found to be an influential factor related to adoption intention. Interpersonal influences include peers, family, and the community were found to be significantly related to subjective norms, while superiors' influence was not. In addition, self-efficacy, technology and resources facilitations were found to be significantly related to perceived behavioral control, and subsequently related to adoption intention towards online education.

The findings from this study imply that Thai students' decision on whether to adopt online education depends on both cognitive evaluation of the online education's attributes, social influences, personal attributes of being self-directed, as well as personal capabilities and facilitating conditions. However, some attributes, including relative advantage and trialability, were not found to be important in their decision. Surprisingly, more importance was given to factors such as whether online education is personally and socially compatible, simple to use, and seeing other people studying online. Interpersonal referents are influential factors rather than external referents in the students' decisions, with the exception of more distant relationships with superiors or employers. Findings also indicate that if Thai students are autonomous learners (self-directed learning), have confidence in their capabilities, and have sufficient resources and technology, they are more likely to have intention to adopt online education. This study then provides discussion on both academic and practical implications based on the findings.

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CHAPTER I

GENERALITIES OF THE STUDY

1.1   Introduction to the Study

Online educational delivery has transformed from a niche to become the main educational delivery method offering strategic competitive advantages especially for many new forms of emerging educational institutes, namely "virtual university" (The Economist Intelligence, 2008). Attributable to technological innovations, educational institutes have found innovative ways to provide access to education to a far greater number of people than ever before, thus offering mutual benefits to both providers and consumers in the educational service industry. Innovation creates enormous impacts and challenges to the market as a whole as stated by Hauser, Tellis, and Griffin (2006, p. 689) that "by finding new solutions to problems, innovation destroys existing markets, transforms old ones, or creates new ones. It can bring down giant incumbents while propelling small outsiders into dominant positions. Without innovations, incumbents slowly lose both sales and profitability as competitors innovate past them. Innovation provides an important basis by which world economies compete in the global market place." Specifically for consumers, innovation brings new choices with better solutions to the problem at more competitive prices, thus, improving the quality of life. Therefore, the importance of innovation is generally well recognized.

Considering the fact that there has been very limited or no reliable statistical evidence of this form of educational practice in terms of exact number of provisioning as well as number of students attaining online education, especially in a developing country such as Thailand, "online education" can be considered a form of "innovation" in the educational industry. Referring to Rogers (2003, p.12), "innovation" refers to an idea, a

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practice, or an object that is perceived as new by an individual or other unit of adoption. In this study, unit of adoption refers to target students of online education in Thailand. In addition, it includes the process whereby the innovation gains acceptance or is adopted by an individual or the unit of adoption which is called "Diffusion of Innovation (DOI)", which refers to "the process by which an innovation is communicated through certain channels over time among members of a social system" (Rogers, 2003, p.35). Recently, some researchers have raised the argument that enhancement to the traditional perception of DOI is needed to encompass social interdependence of all kinds. For example, Peres, Muller, and Mahajan (2010, p. 92) have proposed that DOI should be defined as "the process of the market penetration of new products and services that is driven by social influences, which include all interdependencies among consumers that affect various market players without their explicit knowledge". This indicates that social influences play a significant role in the process of innovation diffusion.

How online education will diffuse in a global society has become a topic of interest among scholars as well as practitioners around the world. Many academicians and domain experts have shared their views on key drivers of this educational innovation diffusion in the form of online education, which can be summarized as follows:

1.1.1 Key Factors Driving Innovation Adoption in Education

- **Globalization phenomenon with increased global competition and tremendous opportunities**

The globalization phenomenon has brought significant changes and movements in all industries, including education (Hiltz & Turoff, 2005; Tierney & Findlay, 2008; The Economist Intelligence, 2008). Since knowledge or human capital is the key to facilitate the competitiveness and growth of a nation, the education sector does not only play a major role in contributing to economic well-being of people, but also is one that can create large capital in-flows for the country (Tierney & Findlay, 2008).

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It is apparent that there have been major movements in all parts of the world to address globalization of the education industry that brings both opportunities and competition from around the world (Virkus & Wood, 2004; Hiltz & Turoff, 2005; Tierney & Findlay, 2008; The Economist Intelligence, 2008). Tierney and Findlay (2008) described these movements as two waves of globalization in the education industry. The first wave was characterized as mostly the movement of students across borders which happened when out-bound students from mainly Asia-Pacific countries became consumers of education overseas. The second wave is characterized as increased internationalization underpinning commercial motivation with the movement of teachers, course contents, programs, or even whole institutions overseas (Tierney & Findlay, 2008). In the year 2011, the Organization for Economic Co-operation and Development (OECD) has published data revealing the increase in international student mobility with 3.7 million students worldwide. The US was the number one destination country with 5 percent growth rate of international students coming from China and Saudi Arabia as the top sending countries. However, from a regional perspective, Europe was found to be the leading region gaining 50.9 percentage of the overall market share by having international students distributed in 32 countries in the region. Interestingly, long time student-sending countries such as China, Japan, Singapore, and Malaysia were expected to become leading destination countries in the near future (www.universityworldnews.com, 2012; www.oecd.com, 2012).

Specifically in Asia Pacific, Tierney and Findlay (2008) found that there are five key trends. These include: (1) International student mobility continues to increase significantly; (2) providers and programs are increasingly mobile; (3) the importance of public provision is diminishing; (4) the shift from public funding to more private funding; and (5) International research cooperation is widening and deepening. These trends present both challenges and opportunities on a global scale. The challenges at the national level include design of policy, quality standards, and cooperation within the region and others outside of the region. The challenges at the institutional level are the strategic planning and development which take into account the market-driven and globalization contexts (Osborne & Oberski, 2004; Tierney & Findlay, 2008). Therefore, it is obvious

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that the globalization phenomenon has high impact on the education industry, enforcing changes and adaptation with new forms of educational services delivery such as distance online education. It can be said that the response to this phenomenon requires good planning at all levels of stakeholders in the educational industry.

- **Technological innovations in education and network computing technology**

Availability and advancement of the network computing technology such as broadband Internet, multimedia technology such as video, web 2.0, or social network technologies facilitate the innovative ways of teaching and learning (Ajjan & Harthshorne, 2008; Asharaf, 2009; Minocha, 2009). Increasingly, new forms of educational delivery including online education, virtual university, and virtual learning environment are growing rapidly as a result of technological innovation (The Economist Intelligence, 2008). Advanced technological innovations have empowered the learning experience in such a way that there is a blurring of face-to-face traditional classrooms on-campus and the virtual classroom or virtual campus environment (McCullough & Hibel, 2011). Technological innovations are expected to continue to advance, driving adaptation and adoption in consumers as well as providers of education (Henshaw, 2008).

- **Student demographics shift and behavioral changes**

Aging populations in the developed nations are a rising trend, whereas the increasing numbers of youth population in developing nations, along with an increased demand for skills upgrades have been factors driving a student demographic shift (Osborne & Oberski, 2004; Tierney & Findlay, 2008; Henshaw, 2008; Walsh, 2009). Other than that, there is also a paradigm shift from obtaining a terminal degree to lifelong learning (Virkus & Wood, 2004). Students have comprised both traditional and non-traditional students and they are more and more diverse in terms of age, socio-economic,

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and geographic locations (Ashraf, 2009). Non-traditional students are those that are employed full-time, are highly mobile, or have other commitments that limit their capacity to have access to full-time education on-campus. Additionally, increased adoption of the technological innovations such as Internet, World Wide Web, Multimedia, Mobility devices, and convergence of multimedia and network computing technologies has resulted in changes in the way people create, disseminate, exchange, access, and obtain information at their finger tips (Henshaw, 2008). It is now common to see students carrying notebook computers and other mobility devices to class for both study and their personal use (Ashraf, 2009). While distance learning technology was aimed at providing remote access to non-traditional students, the traditional on-campus students have also demanded access to those same technologies anytime and anywhere (Ashraf, 2009). Since students' behavior has changed to be increasingly tech-savvy and increasingly mobile, therefore, educational institutes and instructors are also required to adapt to the changes in students' demographics and behavior in order to attract and retain the number of students, or else, they risk losing competitive advantage, if not killed by the competition (Henshaw, 2008; Ashraf, 2009).

- **Increasing demand for education worldwide**

The demand for education will increase by 70 percent worldwide from 2003-2025 due to the pressure for educational upgrades and re-skilling (Henshaw, 2008). The transformation from labor intensive economy into knowledge economy, where economic productivity and growth depend on information and application of knowledge, has been the driving force behind this increasing demand for education globally due to its critical role in terms of human capital development (Van der Wende, 2002; Carnoy, 2005; Tierney & Findlay, 2008). It is notable that among international students, Asia is expected to account for 70 percent of global demand by 2025 (Tierney & Findlay, 2008). While international students are mainly from the developing part of the world, important destinations for education are the aging developed economies including the US, Europe, and Australia that can enjoy this growing demand economically (Tierney & Findlay,

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2008). However, this is only applicable to English-speaking countries, whereas a non-English speaking developed country such as Japan, might be unable to enjoy this increasing demand due to limitation in the language of instruction. It is notable that challenges for developing nations would be to retain their students in the country in order to protect local institutions. On the other hands, developed nations would be forced to try and capture increasing demand outside their countries due to the declining local student demand as a result of aging population (Tierney & Findlay, 2008). Therefore, how institutions adapt to address or capture this global demand becomes an important issue and challenge in a globalized economy.

1.1.2 The Paradigm Shift in Higher Education

The changes driven by technological innovations, globalization, and competition that occur in higher education have been profound and many observers refer to this phenomenon as a paradigm shift (Heydenrych, 2002). Table 1.1 demonstrates the trend and development in higher education, by comparing the old and new paradigms of higher education contributed by Kathy Tiano, an Australian Vice Chancellor (Inglis et al., 1999 cited in Virkus & Metsar, 2004; Virkus & Wood, 2004).

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Table 1.1: Old and New Paradigms of Higher Education

Old Paradigm of Higher Education	New Paradigm of Higher Education
Take what you can get	Courses on demand
Academic calendar	Year-round operations
University as a city	University as idea
Terminal degree	Lifelong learning
University as ivory tower	University as partner in society
Student = 18-25 year-old	Cradle to grave
Books are primary medium	Information on demand
Tenure	Market value
Single product	Information reuse/info exhaust
Student as a "pain"	Student as a customer
Delivery in classroom	Delivery anywhere
Multi-cultural	Global
Bricks and mortar	Bits and bytes
Single discipline	Multi-discipline
Institution-centric	Market-centric
Government-funded	Market-funded
Technology as an expense	Technology as differentiator

Source: Virkus & Wood, 2004, p. 321.

Table 1.1 illustrates the differences between old and new paradigms in higher education. The shift to courses on demand, year-round operations, and university as idea demonstrate the change in terms of flexibility of time and place that education is accessible. The shift from terminal degree to lifelong learning, and from students' maximum age of 18-25 years old to lifetime students indicate that student demographics will be increasingly diverse. Universities will then extend themselves and become partners in the society supporting the lifelong learning. Information will be available on demand in several formats and media in addition to traditional primary medium such as books. The value of education that used to be based on tenure will be based on market value. Perceptions towards students will be shifted towards being customers that the

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educational institutes must serve as per their needs to attract and retain them with the institutions. Course contents that used to be delivered in physical classroom setting will be delivered from anywhere. Traditional physical institutions will become digitized and virtual institutions will emerge. Students will be able to enroll in multiple disciplines at the same time. Education which used to be institution-centric will become market-centric with funding from private sources or the market rather than relying on government funding. Finally, technology which used to be perceived as expense will become strategic tool for market differentiation among educational institutes. The world of multi-cultural will be transformed to global culture. Based on table 1.1, it is obvious that the overall paradigm shift in higher education will drive adaptation, transform the way education is delivered, and obtained in such a way that changes and adaptation are inevitable. Distance online education is another strategic tool, a product of technological innovation enabling greater market reach with the new form of service delivery anytime anywhere. Issues related to target students' response or adoption of this new form of educational delivery, therefore, are among the best interests of educational institutions around the world.

1.1.3 Online Education Worldwide – The Supply Side

Online education has become an attractive option to the traditional on-campus education with cheaper, more convenience anytime anywhere by anyone on any device, and often more specialized than traditional programs, despite doubts in terms of prestige when compared with traditional means (Chorpothong & Charmonman, 2004). The traditional model of educational delivery has now been threatened since courses are now offered at unusual hours, to unusual students, in unusual places, using unusual techniques (Virkus & Wood, 2004). On top of this, education is considered a way of increasing human capital, thus contributing to the competitiveness of the country, organizations, and individuals themselves (Gunasekaran, McNeil, & Shaul, 2002; Van der Wende, 2002; Carnoy, 2005; Tierney & Findlay, 2008). According to the New-Growth theory, technology and knowledge are included as parts of the production function in the

economic system and knowledge is now no longer a "private good" but it is a social and economic "resource" and a traded commodity (Drucker, 1993 as cited in Bhattacharya & Sharma, 2007). There is no doubt that many initiatives to address these opportunities and threats with regards to distance online education have been apparent in all parts of the world.

Referring to the information provided on the website eLearners.com, there are 203 accredited universities offering online courses with the majority being American in origin (http://www.elearners.com/colleges/colleges.asp, 2011).

In Europe, there have been some concerns that European higher education is lagging behind the US, especially with regards to investment and number of incoming students from overseas (Virkus & Wood, 2004). Europe therefore has launched several innovative approaches to learning such as student-centered, engaged teaching and learning models, and constructivist models of learning (Virkus & Wood, 2004; Osborne & Oberski, 2004). Enthusiasm is high in Europe as for example; the UK government has issued an e-learning strategy consultation document to devise a unified national strategy across all educational sectors (McPherson & Nunes, 2006). Several competitive strategies have been executed include collaborations with universities outside Europe to reach international markets as well as the collaboration with private corporations, along with increased number of new institutions with the title "Open or Virtual Universities" such as Finland's Virtual Open University, a network of universities that can share programs, courses, research, and other collaborative programs to address the change in higher education market demand (Henshaw, 2008). Furthermore, the European Commission has extended the Distance Education Network to non-members in order to promote multi-country cooperation for development of distance education programs, human resources, and long-term distance education strategies (Osborne & Oberski, 2004). It is obvious that Europe has been enthusiastic and progressing well in terms of online education strategy.

In Asia, online education initiatives have also been progressing in developing nations such as India. There is evidence that India is making use of powerful information

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and communication technology (ICT) such as open source, satellite technology, local language interfaces, easy to use human-computer interfaces and digital libraries, with a long-term plan to reach the remotest of villages. Bhattacharya and Sharma (2007) also postulate that India is able to expand its success in Business Process Outsourcing service (BPO) to Education Process Outsourcing services (EPO) since the country has many prominent institutions and is advantageous in terms of high availability of knowledge workers, India being the world's second largest English speaking country after the US. Therefore, India has the potential to be a global hub for exporting educational services (Bhattacharya & Sharma, 2007).

In summary, there are some initiatives in response to the paradigm shift in higher education worldwide. Online education is one strategy used to extend global reach and accessibility to a greater number of students anytime and anywhere. However, global opportunities come with global competition. Developed and mature economies have already a number of institutes providing online education and can capture market opportunities aggressively. Several competitive strategies have been employed, especially co-operation from institutional levels, to national, and regional, or cross-regional levels. Questions remain as to whether these markets can maintain the core objective of education, as well as other concerns which include quality standards and accreditation, or retaining the country's top talents and preventing brain leakages or even protecting the country's national culture. Therefore, these challenges require policy level, strong commitment, and cooperative efforts at all levels.

1.1.4 The Case for Thailand: Supply versus Demand

Thailand is still at the very early stage in terms of online education development. There has been increasing mobility of both inbound and outbound students from the year 2008-2010 as according to Thailand's Office of Higher Education Commission (www.inter.mua.go.th). The number of outbound students has been 24,379 in 2008, 24,802 in 2009, and 25,087 in 2010. On one hand, there has been a slight increase in

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number of foreign students in Thailand. The top sending countries for inbound students were China, Laos, and Myanmar, which accounted for 59.29 percent. The majority of inbound students are from Asia with 17,193 students from a total of 20,155 international students in year 2010. Assumption University has the largest number of foreign students, followed by Mahachulalongkornrajavidyalai, Mahidol University, and Ramkhamhaeng University, respectively (www.inter.mua.go.th). For the number of outbound students from Thailand in 2010, the top destination countries were USA, UK, Australia, Japan, and Malaysia, respectively (www.oecd.org).

With the growing demand for education following the second wave of globalization, an increasing student mobility, and internationalization of education, Thailand's Ministry of Education has been urged to respond by strengthening the country's transnational education with a focus on highly demanded specialties including medical, nursing, tourism, service & hospitality, food, and agriculture. According to The Nation, Thailand's news publisher, in an article written by Khaopa (2011), responsible educational agencies are prepared to propose to the government the afore mentioned strategy and pointed out that a hub strategy alone might be too difficult to achieve since Thailand still faced major barriers in terms of English language literacy and overall quality standards. International programs offered by Thai universities are still perceived as inferior and many have not been able to make a profit. The establishment of the ASEAN Economic Community in the year 2015 would present a challenge for increased competition and the advantage will belong to other countries in the region, which are better prepared. Distance or online education was mentioned as one of the strategies together with others which include: (1) International education that brings foreign students into the country; (2) International education in which foreign universities open branches or offshore campuses in Thailand; and (3) "flying teacher" programs that teachers fly into Thailand from exporting country to teach or Thai teachers fly out to teach outside of Thailand (Khaopa, 2011).

With respect to technological innovation in Thailand's education, the government has promoted the use of information and communication technology (ICT) in education

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system with several mega projects launched, including the SchoolNet project, UniNet, and National Education Network to connect all educational institutes country-wide with linkages to other partnering countries as well to provide educational network infrastructures. In relation to online education (see explanation on definition of eLearning in relation to online education in Chapter 2), the Thai Cyber University (TCU) was established to promote eLearning, with a focus on Learning Management System (LMS) development and National Education Network provision to other pilot universities (www.thaicyberu.or.th). However, successful implementation of the technological innovations in education seems to be limited and lags behind developed countries. There are 150 higher educational institutions in Thailand, while few of them have started to provide formal online courses. However, the current availability of online education is found in a small number of universities including Assumption University (www.elearning.au.edu), University of Thai Chamber of Commerce (www.utcc.ac.th), Rangsit University (www.rsu-cyberu.com), and Ramkhamhaeng University (www.ru.ac.th, www.ramtangdaen.com). Additionally, the number of courses is still limited to the field of business management (www.eduzone.com). There are no statistics available on the total number of enrollment for online education published in Thailand as yet, thus the adoption rate is not known. Pressures to adapt to forces of globalization and technological innovations have created tremendous challenges for developing countries such as Thailand, hence there is a strong need for a clear governmental policy, infrastructure and adoption of technological innovations among local institutions, English language literacy, accreditation and quality standard, as well as overall competitive strategies of the country to protect and retain its own talents while also attracting capital in-flows from international students and foreign investment in the educational sector. There is no doubt, however, that to address these challenges, adaptation and preparation for transformation is necessary and unavoidable at all levels.

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1.2   Statement of the Problem

This section explains problems that are examined in this study. Online education is defined as the delivery or access to learning experience over the Internet, using all kinds of Internet-based tools such as communication tools, learning management system or virtual class environment from legitimate educational institutions, whether traditional physically established universities, open universities, or virtual universities, with formal degree in higher education (Bhattacharya & Sharma, 2007; Gunasekaran et al., 2002; www.onlineeducation.org). In the context of this study, it is considered a form of innovation in education industry, a new practice for educational delivery online.

Firstly, importance of new product or service adoption have been well recognized and the major reasons for that are to attract a new customer or market, gain or maintain a competitive advantage, retain customers, and fill a growth or profit gap. It has become even more important with the drastic changes in business environment include Internet and Communication technology, globalization, consumer demographics and behavior, regulations, changes in business practice and the business model. These changes do not only impact the sustainability to the organization's competitive capability, but also the new product success as a strategic weapon for a firm's survival.

With regards to educational services, the Economist Intelligence Unit (2008) reported that online education service and global presence would become the norm in the years to come driven mainly by globalization and technological advancement. This would impact the overall education industry worldwide both from the supply and demand perspectives, i.e. the educational service providers and the consumers. For suppliers of educational services such as universities, they will be forced into the competition with new services delivery model such as online education, which can be costly and require a lot of strategic changes. Launching new services, however, is a major challenge since the success rate of new product introduction has been low, while the failure rate has been high. In the December 2006 issue of New Products Magazine, AcuPOLL Research Inc reported 80-95 percent failure rate of new product introduction

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(productluanch.typepad.com). Product Development and Management Association (PDMA) concluded that the leading cause of failure is "lack of consumers' insight" (Frost & Sullivan, 2011). Therefore more information of what factors contribute to consumers' or target adopters' decision toward online education will result in a higher success rate, or in other words, reduced failure rate.

This study focuses on addressing the question on the consumer's response towards the innovation in educational service model using the Internet technology termed as "online education" in the context of a developing country such as Thailand. Thailand is a developing country with a high number of outbound students studying overseas, thus it is an attractive market for educational service providers. On the other hand, similarly to other developing economies, Thailand faces limitations and is disadvantaged in several areas including Information and Communication Technology, human resources, and clear supportive governmental and institutional policies. In other words, readiness to participate competitively in the global market is still questionable (Saekow & Samson, 2011). Although Thailand has some initiatives to internationalize and modernize higher educational institutes using information communication technologies, the advancement and readiness for global competition seems to lag behind other developed economies. Online education seems to be a strategic weapon for many new players from developed economies to enter the market, presenting tremendous challenges for Thailand's educational institutes. Though the concept of e-Learning is not new, there is still a lack of data and empirical research available specific to online education adoption worldwide as well as Thailand in particular due to its newness (Bhatiasevi, 2011; Teo, Wong, Thammetar, & Chattiwat, 2011). Consumers' perception towards online education adoption and factors influencing consumers' adoption intention are still unknown, thus requiring significant empirical research in this area.

Additionally, due to social and behavioral changes, continued validity and adjustment of existing theories or addition of new knowledge have been urged by many researchers both in the fields of Diffusion of Innovation (DOI) and Information Systems (IS) since previous studies have not fully addressed the gaps. For example, Peres et al.

(2010) proposed the new definition of DOI to encompass all kinds of social influences. To study consumers' acceptance of new technology, much research has employed the Technology Acceptance Model (TAM), which has been criticized for its lack of accountability for social factors (e.g. Baron, Patterson & Harris, 2006; Vannoy & Palvia, 2010). In the current context of social computing paradigm and voluntary consumer-based technological innovation adoption such as online education adoption, social factors play an important role in consumers' decision making (Gounaris and Koritos, 2008; Vannoy & Palvia, 2010). Thus, a model that is suitable for studying targeted adopter's behavior with respect to factors influencing the adoption decision towards online education will be highly beneficial to the research in these fields.

1.3   Research Objectives

This study attempts to address the gaps explained in the statement of problem by proposing integrated models of the Perceived Characteristics of Innovating (PCI) by Moore and Benbasat (2001) based on Rogers' (1976) Diffusion of Innovation theory (DOI) and the Decomposed Theory of Planned Behavior (DTPB) acceptance model by Taylor and Todd (1995) to examine factors related to consumers' innovation adoption in the education industry in the context of a developing country such as Thailand. The findings from this study aim to validate and add on to theories and the research findings in these areas as applied to this particular social system settings at this particular period of time.

The research objectives for this study are as follows:
- To determine whether the DOI's perceived characteristics of innovation is related to attitude towards online education and their adoption intention toward online education.
- To determine whether, based on DTPB, the reference groups including peers, superiors, family and spouse and the community are related to subjective norms, which in turn, are related to the adoption intention of online education.

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- To determine whether, based on DTPB, self-efficacy, technology facilitating conditions and resources facilitating conditions are associated with perceived behavioral control, which in turn, are related to the adoption intention of online education.
- To determine whether, based on extended DTPB, self-directed learning attributes are related to the adoption intention of online education.

1.4   Research Questions

1. Which factors are significantly related to the adoption intention of online education?

2. Which factors are significantly related to the attitude and the adoption intention of online education?

3. Which factors are significantly related to the subjective norms and the adoption intention of online education?

4. Which factors are significantly related to the perceived behavioral control and the adoption intention of online education?

5. Is self-directed learning related to the adoption intention of online education?

1.5   Scope of the Research

The researcher intends to study adoption intention toward online education in the context of post-graduate degree in higher education. According to the objectives of the study, the researcher focuses on Thai consumers in Thailand studying regular programs (no online education experience) at the undergraduate level in their final semester or who have completed undergraduate degrees. The study employs "the Decomposed Theory of Planned Behavior" as a baseline to develop the conceptual framework. Based on this theory, the study focuses on main variables and sub-variables as the independent variable, which includes: (1) Attitude with sub-variables i.e. perceived innovations' attributes

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based on the diffusion of innovation theory includes perceived relative advantage, perceived simplicity (an inverse of complexity), perceived compatibility, perceived trailability, and perceived observability; (2) Subjective Norms with sub-variables include normative reference group, community's influence, and external reference group; and (3) Perceived Behavioral Control with sub-variables include self-efficacy and facilitating conditions. In addition to the original DTPB framework, the self-directed learning attributes are included into the research framework as an additional independent variable. The dependent variable of the study is behavioral intention which is termed as "Adoption Intention" in this study. The research methodology is quantitative, using survey as the research instrument, with Structural Equation Modeling (SEM) used for the statistical treatment of the data.

1.6   Limitations of the Research

1. The factors being investigated, the adoption intention toward online education, are limited to the chosen factors based on the two main theories (DOI and DTPB) for this particular study. These factors may not represent all possible factors that influence adoption intention toward online education.

2. The study is limited to Thai consumers who are in the final semester of their undergraduate degree, or who have completed their undergraduate degree. These target groups may pursue post-graduate degrees via online education in future. Therefore, the results may differ when testing in different contexts.

3. The timeframe of this study has been conducted within the year 2012. Research suggests that user perceptions change over time as knowledge, familiarity, experiences, and other factors influence online education. As a consequence, the results cannot be generalized to other periods of time.

1.7   Significance of the study

For marketers, institutes, and educational service providers:

Findings of the study will provide insight on factors influencing targeted adopters of online education adoption decision. The implications can be guidelines for marketers in the educational services industry to further develop competitive strategies with respect to distance online education, thus designing suitable marketing mix to attract and retain students, capturing or accommodating the demand growth in a global industry. For developing economies such as Thailand, they can be better prepared for the competition. Developed economies can also find ways to differentiate themselves in the growing market from developing nations such as Thailand. In addition, the findings can be useful as guidelines for policy makers to provide supportive regulatory policies for facilitating and widening access to education. In addition, the policies should also protect domestic educational services providers and retain talents within the country by issuing clear policies that facilitate the competitive strategies of local institutions.

For students or consumers of educational service:

The study provides information and research related to online education with multiple perspectives from academics, practitioners, as well as consumers worldwide. Students therefore gain a better understanding of online education, and subsequently use this information as a basis to further increase the quality of decision making for their educational needs in future.

For research and academicians:

Since there has been little knowledge and empirical research in the area of online education in a developing country such as Thailand, the study adds to the existing knowledge and research in the area of e-Learning and online education in the context of Thailand. By applying the Decomposed Theory of Planned Behavior (DTPB) to test the technological innovation adoption in education, taking into account the social influences (subjective norms), and testing the model in consumer-oriented environments, the study also can also strengthen the application in areas where TAM has been criticized as

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lacking. In addition, the construct of self-directed learning attributes is incorporated in this research framework, which has been a key factor motivating students to enroll in traditional distance education and it has recently been incorporated in the study of online distance education by major researchers. This is an important contribution since information system applications are mostly network-based or groupware applications and the social factors have been found to be key factor influencing consumers' decision. The study contributes by validating the existing theories, integrating them and applying them in the current social and behavioral setting, in the context of a developing country such as Thailand at this particular period of time.

1.8   Definition of Terms

This section presents concepts and definitions of terms used in the study.

Adoption Intention refers to the behavioral intention of an individual or the unit of adoption to accept or adopt the innovation (Ajzen, 1991; Rogers, 2003).

Attitude is defined as an individual's beliefs about the consequences of performing the behavior (behavioral beliefs), weighted by his or her evaluation of those consequences (outcome evaluations). An individual will intend to perform a certain behavior when he or she evaluates it positively. Similarly, if an individual evaluates certain behavior negatively, he or she will not intend to perform such behavior (Ajzen & Fishbein, 1980).

Community is limited to geography or physical boundary such as a neighborhood or region in the Thai cultural context, characterized by shared cultural values, social norms, interaction and bonding or intrinsic connection among members in the society (Shibutani, 1962; Jang et al., 2008; Stanford Encyclopedia of Philosophy, 2011).

Community Influence refers to the social pressures or codes of conducts from the community that influences an individual's decision to adopt or not to adopt online education (Shibutani, 1962; Ajzen & Fishbein, 1980; Jang et al., 2008; Stanford Encyclopedia of Philosophy, 2011).

Decomposed Theory of Planned Behavior (DTPB) is the enhanced version of the Theory of Planned Behavior or TPB to explain acceptance and use of technology, by decomposing the belief structures in the TPB including attitudinal, normative, and control beliefs into multi-dimensional constructs (Taylor & Todd, 1995).

Diffusion of Innovation (DOI) refers to "the process by which an innovation is communicated through certain channels over time among members of a social system" (Rogers, 2003, p.35).

Facilitating Conditions: Resources refers to the degree to which an individual perceives he/she has necessary resources available to study via online education, including time and money (Taylor & Todd, 1995).

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Facilitating Conditions: Technology refers to the degree to which an individual perceives he/she has the necessary technological resources available to study via online education (Taylor & Todd, 1995).

Innovation refers to an idea, a practice, or an object that is perceived as new by an individual or other unit of adoption (Rogers, 2003).

- *Online Education* is defined as the delivery or access to learning experience over the Internet, using all kinds of Internet-based tools such as communication tools, learning management system or virtual class environment from legitimate educational institutions, whether traditional physically established universities, open universities, or virtual universities, with formal degree in higher education (Bhattacharya & Sharma, 2007; Gunasekaran et al., 2002; www.onlineeducation.org).

Perceived Characteristics of Innovating (PCI) refers to the perception of using the innovation i.e. the potential adopters' perception of using online education (Moore & Benbasat, 2001).

Perceived Behavioral Control (PBC) refers to the degree to which an individual feels certain behavior is under his or her volitional control (Ajzen, 1991). It is defined as the individual's perception on how easy or difficult it is to perform the behavior i.e. how confident he or she is to study online based on internal and external factors such as emotions, skills, resources available, and situational or environmental conditions.

Perceived Compatibility refers to the degree to which using an innovation is perceived as being consistent with existing values, past experiences, and needs of potential adopters (Rogers, 1995; 2003).

Perceived Relative Advantage refers to the degree to which using the innovation is better than using its precursor (Moore & Benbasat, 2001).

Perceived Simplicity is the inverse of complexity, which refers to the degree to which an innovation is perceived as easy to understand and use (Rogers, 2003; Moore & Benbasat, 2001; Dearing, 2007).

Perceived Trialability is the degree to which an innovation may be experimented with on a limited basis (Rogers, 2003, p. 258).

Perceived Observability is the degree to which the results of an innovation are visible to others (Rogers, 2003, p. 258). It refers to how visible are the results after an innovation is used by previous adopters (Flight et al., 2011).

Self-Efficacy refers to an individual's confidence of his/her capabilities to perform certain behavior i.e. studying via online education (Taylor & Todd, 1995).

- *Self-Directed Learning* describes an individual's attributes with capabilities to perform autonomous learning activities, self-initiation, self-reliance, and independent process of learning, interacting with various kinds of supporters such as teachers, tutors, mentors, resources, and peers (O'Doherty, 2006).

Subjective Norms refers to the social pressures that make an individual perform a particular behavior (Ajzen, 1991). Subjective Norm is defined as the beliefs that individuals important to him/her who might be a person's family, peers, superiors, or community he/she lives in, approve or disapprove of performing the behavior (Ajzen & Fishbein, 1980).

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CHAPTER II

REVIEW OF RELATED LITERATURE AND STUDIES

This chapter provides an explanation of concepts, definitions, and theories related to the research constructs with a review of related literatures and linkages of each construct. The purpose is for readers to gain background knowledge and understanding of how the conceptual framework and hypotheses for this study are derived. The chapter starts by defining what online education is, a discussion on consumer behavior, the adoption of online education globally and specific developments in Thailand. Next, the basis for studying the adoption intention with respect to online education are reviewed including constructs and related theories, along with the findings of empirical studies.

2.1   Online Education

This section provides the background as well as definitions of online education and related concepts, and consumer behaviors as well as the current state of online education diffusion. The discussion can provide rationale and understanding as well as issues and concerns related to the overall evolution and transformation of the educational industry and the consumers' responses, of which online education is a part.

2.1.1 Defining Online Education

Online education is characterized by the use of computer network to present or distribute educational contents and the provision of two-way communication via a computer network (Paulsen, 2003 cited in Zondiros, 2008). Distance higher education is a

learning method that takes place with the instructor and student being geographically remote from each other, with the course contents being delivered using media such as printed mail, videotape, interactive TV, radio, satellite, or any number of Internet technologies such as message boards, chat rooms, audio and conferencing (Kwok, Tsui, Zhang, Jegede, & Ng, 1999; Van der Wende, 2002; Bray, 2004; Phillips, 2010; McCullough & Hibel, 2011). Following the definition, online education can be considered as a subset of "Distance Education" (Gunasekaran et al., 2002). Since the Internet has become a primary medium for delivery of distance learning these days, the term "online education" has become a more popular term to describe today's distance education (Phillips, 2010).

Since online education and eLearning are often used interchangeably, the evolution of online education should also refer to the initial evolution of eLearning. According to Bhattacharya and Sharma (2007), Jay Cross, a CEO of eLearning Forum and founder of Internet time group and a veteran of the software industry and training business coined the term "eLearning" in 1998. eLearning is, however, a vast and a multifaceted topic, and there is a difficulty in finding a generally established definition (Dublin, 2004). According to Gunasekaran et al. (2002), eLearning is defined as Internet enabled learning and it is considered an integral part of distance learning. Urden and Weggen (2000) defined eLearning as the delivery of course content via electronic media such as Internet, Intranet, extranet, satellite broadcast, audio/video tape, interactive TV, and CD-ROM. While Bhattacharya and Sharma (2007) refer to online coursework or assignments for learners at a distance, others use this term to imply virtual learning environments to facilitate the delivery of education. Therefore, they argued that the term "eLearning" can be referred to as blended or hybrid learning or just online learning (Bhattacharya & Sharma, 2007).

With regards to distance education, as described by Phillips (2010), several synonyms refer to distance learning in the United States including: distance education, correspondence learning, eLearning (electronic learning), online learning, online education, virtual learning, remote learning, external learning, CBT (computer-based

training), or WBT (web-based training). In Europe, the terms "open learning" and "open university" is more popular than the terms higher education distance learning or online learning.

For the purpose of this study, the term "Online Education" is defined based on the discussion above as "the delivery or access to learning experience over the Internet, with the instructor and student being geographically remote from each other, using all kinds of Internet-based tools such as communication tools, learning management system or virtual class environment from legitimate educational institutions, whether traditional physically established universities, open universities, or virtual universities" (Kwok et al., 1999; Urden & Weggen, 2000; Gunasekaran et al., 2002; Paulsen, 2003; Van der Wende, 2002; Bray, 2004; Bhattacharya & Sharma, 2007; Phillips, 2010; McCullough & Hibel, 2011).

2.1.2 Consumer Behavior, Adoption and Growth of Online Education Worldwide

The numbers of online courses has been increasing along with a growing number of students studying online courses. According to a study by Sloan Consortium (2010) in the US, over 5.6 million students were taking at least one online course during the fall semester of 2009, as compared to 1.6 million in 2002 and 1.9 million in 2003. Nearly thirty percent of higher education students in the US take at least one course online (Bray, 2004; Sloan-C, 2010). However, worldwide figures for the actual number of students studying online have so far been unknown (Van der Wende, 2002; Sloan-C, 2010). The lack of data indicates newness and immaturity of this online education sector, but growth potentials are believed to be high as some research analysts including Henshaw (2008) and the Economist Intelligence Unit (2008) have predicted, based on their studies, that online learning will be commonly available worldwide in the near future. The growing acceptance of online learning has been driven by continued development in Information Communication Technology (ICT) and the globalization of the educational industry (Henshaw, 2008; The Economist Intelligence Unit, 2008). With tougher economical

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conditions and the trend in lifelong learning, online education has become an attractive option to the traditional on- campus education with cheaper, more convenience anytime anywhere by anyone even on any device, and is often more specialized than the traditional programs, despite the doubt in terms of prestige as compared to traditional means (Preston, 2011; Chorpothong & Charmonman, 2004). Many domain experts believe that online education has the power to transform the education industry landscape, not just as an evolution, but a revolution in the industry on a global scale (McCullough & Hibel, 2011).

Demographic changes as a result of pressures for continued learning and skills upgrading, as well as new structural approach to teaching and learning require different pedagogical approaches (Osborne & Oberski, 2004). Increasingly, students demand flexible approaches to access education in order to accommodate their family and work commitment (Osborne & Oberski, 2004; Henshaw, 2008). The successful uptake of online distance courses is evident with over 50 percent of US students returning to education after work, while working, and often while starting a family (Hiltz & Turoff, 2005). Student demographics are diverse in terms of age, socio-economic, geographical locations, and so on. The demographic profiles of students also has changed from traditionally 18-24 years old studying full-time to an increasing number of older students studying and working part-time as it is evident that only 16 percent of students in the US are reported to study full-time on campus (Van der Wende, 2002). Moreover, there has been an increase in the number of women attending higher education due to the increased demand for more skilled labor (Carnoy, 2005). It was found that commitment to jobs, home and family are common reasons people take online education as it could give them the convenience and flexibility of a 24/7 platform to pursue their learning goals (McCullough & Hibel, 2011). Online education thus gives them the flexibility and ability to integrate education with the demand of work and family (Hiltz & Turoff, 2005).

Furthermore, the shift in consumer behavior impacts teaching and learning models. The "global culture" has emerged in the network society, along with negative criticisms that it becomes invasive and is a threat to local culture, values, and traditions

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due to heavy reliance on information and communication technology, and capitalism (Vrasida & Zembylas, 2003). It has become common to see the young generation of digital natives who come to class equipped with electronic communication devices, loaded with communication software such as YouTube, Facebook, or LinkedIn. Furthermore, facilities and flexibility that distance education provide in the form of online-learning is now demanded by the traditional group of students called "Instant Education Generation" or "Digital Natives" (Ashraf, 2009). The term "digital natives", according to Prensky (2001) refers to students who are all "native speakers" of the digital language of computers, video games and the Internet. As Ashraf (2009) pointed out, students' behavior has changed to become increasingly digitally literate and techno-savvy as they have grown up with new digital media in the Internet age. Technological advancement has obviously driven the change in the way information is created, accessed, vested, and disseminated, made possible by technological innovations. This enforces self-adaptation, redefinition of cultures and mission, and the transformation of the institutions' educational model to compete for traditional and non-traditional students from this borderless world (Henshaw, 2008; The Economist Intelligence Unit, 2008; Phillips, 2010).

2.1.3 Obstacles for Adoption and Growth of Online Education

An important obstacle is the credentials and acceptance of degrees received from online education, and this is among the major concerns for consumers (McCullough & Hibel, 2011). Moreover, employers often rank inter-personal and ability to work in teams higher in their recruitment scores, compared to functional skills. Since online education has been perceived as limited in terms of social interactions, candidates receiving degree via online education might be disadvantaged in the recruitment scores under this circumstance. Nevertheless, this challenge may be overcome by new developments in computing technology such as virtual reality and social network technologies (Gunasekaran et al., 2002; Henshaw, 2008). In terms of credentials among employers, a

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shift in perception can be seen gradually occurring over time (McCullough & Hibel, 2011).

Other than the above concern, cultural differences can increasingly become a critical issue since globalization will bring teachers and students from all parts of the world-together (Bray, 2004). For example, Bray (2004) suggested that Asian students may prefer more interaction with classmates and are more suited to hybrid class. This view is in line with the review on online learning in India by Bhattacharya and Sharma (2007) who argued that universities will not rely solely on virtual campuses, but rather the physical campus will remain along with an extended virtual campus environment, especially in the Indian context. In addition, Bray (2004) also suggested that Asian students may prefer teachers to be in charge of their learning experience since more direction and support may be necessary for them to be oriented to the online learning practices. Interestingly, flexible time and places may be less appealing to Asian students according to his opinion (Bray, 2004). Nonetheless, as Bray (2004) suggested, even with full faculty support and cutting edge technology being deployed, if the online education does not fit with student's cultures, acceptance and adoption of online distance education might be less successful or slow to take off.

On the supply side, the institutional culture can also impede the adoption. The adoption of innovation in educational technology appeared to be slower than many other industries due to the conservative institutional cultures as well as other technical challenges such as technologically-competent resources and infrastructure (McPherson & Nune, 2006). As a result, these conditions can cause a slower than expected adoption of online education despite the visible growth potential (The Economist Intelligence Unit, 2008). Moreover, there are also concerns in terms of negative technological disruption such as student plagiarism, cheating, distraction, ethics, and legal issues (The Economist Intelligence Unit, 2008). However, despite these concerns, it can be commonly seen that many reputable universities are providing course content online or delivering a mixture of both online and traditional classroom courses to experiment new ways of doing things (Osborne & Oberski, 2004).

Another factor impacting the slow pace of online education adoption is also related to the country's ICT infrastructure readiness and government policy. For example, Iceland's government has issued a clear policy that all citizens should have means to exploit IT through distance learning with 80 percent of the population already having access to the Internet (Osborne & Oberski, 2004). Such a policy makes Iceland progress further than other European countries in various aspects of distance education (Osborne & Oberski, 2004). On the other hand, in a developing country where infrastructure for implementation of such policy is not ready, adoption of online education might take a different form. Tiene (2002) highlighted issues of the digital divide in education including high costs of ICT with limited funding, readiness of infrastructure especially in remote areas where there is no access to Internet or with access but low bandwidth with high costs, lack of technical support and expertise when facing technical difficulties interrupting the learning process and negative experiences with technology. In addition to this, educational institutes often end up with hardware acquisition with less focus on software and knowledge transfer as well as maintenance and support resources necessary for on-going operations. Nonetheless, ICT is still perceived as a solution to leapfrog and lessen the digital divide since setting up new physical campus to accommodate demand sufficiently is still considered expensive as compared to setting up virtual universities (Tiene, 2002). Therefore, it is suggested that careful assessment with pilot implementation and selective applications that suit the conditions would allow familiarity and smooth process for leapfrogging (Tiene, 2002). Furthermore, cooperation between countries' public and private sectors are encouraged in order to share the costs and reduce time to develop and implement up-to-date courses, thus accelerating globalization process (Kwok et al., 1999; Tiene, 2002). In terms of issues related to content quality, Kwok et al. (1999) suggested that academic expertise and technical supports are also necessary to facilitate the production of contents. On top of these, English has been mentioned as another obstacle for non-English speaking countries (Kwok et al., 1999). To increase the chance for successful adoption of online education, understanding of students' characteristics in each country will contribute to a more constructive and effective education system for them since each country has its own economic and social background (Kwok et al., 1999; Bray, 2004).

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2.1.4 Discussion on Challenges and Future of Online Education Adoption

The rate of online education diffusion, however, may be accelerated by the competition and demand for education from the global market. Henshaw (2008) presents his view on the future of higher education with technology adoption patterns through the year 2035. He stated that the shift in demographic and global economies will enforce technology adoption in higher education, which will then transform the teaching and learning models where proximity to campus is no longer a necessary condition. In terms of industry wise competition, the new virtual educational service providers have greater advantages as they are more agile and can quickly invest in new programs to accommodate the changes in demands of the job market to offer courses that are best in the interest of students (McCullough & Hibel, 2011). The level of competition has grown even further when large multinational firms such as Microsoft and Disney have entered the market with their own corporate universities. In addition to that, another important niche market which has been captured by ICT multinational firms such as Cisco, Microsoft, Oracle, is the offering of professional certificates, which guarantee credentials and recognition by employers internationally (Van der Wende, 2002, Tiene, 2002; Vrasidas & Zembylas, 2003). Collaborations with these types of firms are additional strategies addressing the competition which have been employed widely (Henshaw, 2008).

Despite the hype in online education, technologies have not radically changed the basic concepts of distance learning or university education in terms of the underlying societal structure of education involving providers, consumers, and regulatory agencies (Hiltz & Turoff, 2005). The critical process is the new phenomenon of "blended" or "hybrid" courses, which are delivered with learning experiences available in face-to-face format, which are also available and equally effective in the digital form of online learning. This means the focus is on the end result of blending face-to-face and online learning into one entity (Hiltz & Turoff, 2005). In sum, despite the unstoppable growth potential, scholars such as Ashraf (2009), and Bhattacharya and Sharma (2007), still believe that traditional face-to-face learning will not diminish. Most students will still

need and require face-to-face contact, and prefer to continue coming to their institutions, needing the physical and social environment to further their growth and development, while flexibility is also required (Ashraf, 2009; Bhattacharya & Sharma, 2007). Therefore, as many organizations are moving toward becoming "click-and-mortar" with blended learning environments, the critical success factor is to get the right mix as suggested by Bhattacharya and Sharma (2007).

How technological innovation will shape online education adoption among consumers is still questionable. While distance online education programs continue to grow in number with improved quality, most people still perceive online courses as a supplement to face-to-face classes. Nearly two-thirds of respondents stated that traditional degrees carry greater credibility than those earned online (Economist Intelligence, 2008). Additionally, despite the outstanding benefits a virtual campus can offer, maintaining quality standards have been a major concern in virtual campus learning (McCullough & Hibel, 2011). There is, however, some sign of a perception shift as evidenced by the growth statistics with elite institutions such as John Hopkins and Stanford also offering highly regarded online courses (Economist Intelligence, 2008; McCullough & Hibel, 2011). Greater challenges lie ahead with the upcoming web 3.0 generation, where semantic web or web of meaning, use artificial intelligence software to comb the web and find information for individuals. The role of educational institutes, as well as the teaching and learning approaches will definitely be challenged (Ashraf, 2009).

2.1.5 The Development of Educational Innovations and Adoption in Thailand

Education is perceived as one way to develop the human capital of the country, thus increasing its economic progress and competitiveness. With increasing access to network and higher quality bandwidth at lower costs, Thailand possesses an infrastructure ready for online education. The number of Internet Broadband subscribers in Thailand in the year 2010 was 2.4 million (www.ntc.or.th). Additionally, the number of mobile phone subscribers was at 68.5 million in 2010 (www.ntc.or.th). With respect to the development

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in terms of educational innovation in Thailand, initiatives to promote the use of ICT in education started with the establishment of the Act of Parliament on Education 1999 (revised 2002). The first educational law that emphasized the importance and support of ICT for education aimed to promote the use of ICT in education in order to expand access and improve the quality of education for the Thai population. An information network for education entitled "National Education Network" has been set up to promote the use of educational network for the country's education and research effectiveness. The National Education Network integrating MOE Net (primary and secondary schools network), Vocational Network (VED Net), and University Network (UniNet) are the main networks connecting education institutes at all levels including higher education, vocational education, and basic education. Thailand Cyber University (TCU) was established to promote high quality online distance education. According to the Thailand Cyber University (TCU)'s study conducted during 2008-2009 on the readiness of e-Learning in Thai educational institutes, with data collected from 91 institutes of public (72) and private (19) Universities, it was found that 94 percent of the universities use eLearning systems and 38.4 percent of them had been using the system for 3-5 years. However, only 20 percent used the high quality online courses, 52.24 percent of the respondents use the courseware as supplementary, while 39.5 percent used them as complementary, and a mere 8.21 percent used them as a comprehensive replacement (www.thaicyberu.go.th). From the report by TCU, it was found that eLearning is not new since about 95 percent of respondents have been using eLearning in their institutes (www.thaicyberu.go.th). However, there is no formal statistical report on which courses or degrees are provided in the form of online service delivery.

According to the online source for e-education called "digitallearning.com", Assumption University with its establishment of the College of Internet Distance Education on April 25, 2002 spearheaded the visionary initiative for Thailand to be the seat for eLearning in Asia, by offering complete eLearning degree programs (Digital Learning, 2006). The government of Thailand legalized eLearning degree programs in 2005 (Digital Learning, 2006). With respect to online education as of the year 2011, Assumption University appears to be at the forefront in providing a number of truly

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online courses with accredited degrees at post-graduate level with English as the medium of instruction. There are approximately 900 students who have enrolled in online degree programs provided by the College of Internet Distance Education, Assumption University (personal communication, College of Internet Distance Education, May 25, 2012). Additionally, Ramkhamhang University and Rangsit University also provide courses and post-graduate degrees online, but with Thai as the language of instruction (www.ru.ac.th; www.rsu.ac.th).

In conclusion, online education in Thailand is considered a new form of educational service that Thailand's institutes have not yet adopted or provided to their students, except for the few universities mentioned above. In other words, the development of online education is still at a very early stage in Thailand. However, it is believed that the challenges brought by globalization and the competition coming from the developed countries with capability to capture immediate opportunities caused by increasing domestic demand, would enhance the adaptation or adoption of technology in education.

2.2   Definition and Features of the Independent Variable

Since online education is considered an innovation in the education industry, the study adopts the integrated model of Diffusion of Innovation (DOI) using Perceived Characteristics of Innovating (PCI), the Self-Directed Learning attributes from distance education, and the Decomposed Theory of Planned Behavior (DTPB) to examine factors influencing consumers' technological innovation adoption with respect to online education. Empirical evidence suggests that attitudes towards innovation attributes can affect the consumers' decision (Taylor & Todd, 1995). Therefore, DOI attributes have been included as antecedents to attitudinal beliefs towards online education, and subsequently influence the behavioral intention towards adopting online education. In consumers' decision making, factors that contribute to final decision are not limited to cognitive evaluation based on the attributes of the products and services, but also other

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factors including social factors such as reference groups and other constraints such as time, money, and other resources available to them. Based on this integrated model, factors include social influence, technology and resources constraints, as well as personal attributes including self efficacy and self-directed learning, have been investigated as to whether and how they can influence behavioral intention towards online education within the scope of this study. The section below describes definitions and features of the independent variables included in the model.

2.2.1 Attitude

Attitude is defined by Fishbein and Ajzen (1975) as an individual's positive or negative feelings (evaluative affect) about performing the target behavior. It is an individual's beliefs about the consequences of performing the behavior (behavioral beliefs), weighted by his or her evaluation of those consequences (outcome evaluations) as per the Theory of Reasoned Action or TRA model by Ajzen and Fishbein (1980). Therefore, the TRA presents an information processing perspective of attitude formation or structure, asserting that external stimuli influence attitudes only indirectly through changes in an individual's belief structure (Davis, Bagozzi, & Warshaw, 1989). Research models that aim to explain consumer behavior usually assume that a person's action is initiated with the processing of information, followed by an evaluation of the information and the development of an attitude, and then the formation of a volition or intention to act prior to actual performance of the behavior (Bagozzi, 1982). According to Bagozzi (1982), this organization of the mental events and feelings are referred to as "expectancy-value" model designed to represent how people actually integrate multiple pieces of information to arrive at an overall judgment. Expectancy-value judgment then creates the affect or attitude, intention, followed by the behavior sequentially (Bagozzi, 1982). Therefore, the theories imply that an individual will intend to perform a certain behavior when he or she evaluates it positively (Ajzen & Fishbein, 1980). Similarly, if an individual evaluates certain behavior negatively, he or she will not intend to perform such behavior (Ajzen & Fishbein, 1980). In this study, it implies the degree to which an

individual favors online education. The potential student will evaluate the online education and the consequence of studying online. He or she will then form a favorable or unfavorable attitude toward online education, which will then lead to the behavioral intention on whether he or she will intend to further his or her education online.

TRA is a base theory for TPB and DTPB. As TRA is considered a general model to explain any human behavior (Ajzen & Fishbein, 1980; Davis et al., 1989), for each new context, researchers therefore identify the beliefs that are salient for subjects regarding the behavior being investigated (Davis et al., 1989; Karahanna, Straub, & Chervany, 1999). By referring to the innovation-decision process, an individual acquires information of an innovation and initiates the information processing (expectancy-value judgment), forming a favorable or unfavorable attitude toward the innovation, and then makes the decision to adopt or reject it, and eventually either uses that particular innovation continually or discontinues using it (Rogers, 2003). Despite the fact that there are five perceived characteristics of innovation as suggested by Rogers's Diffusion of Innovation Theory (Rogers, 2003) or seven as suggested by Moore and Benbasat (1995), three have been commonly found to be most influential in the decision to adopt an innovation in general (Tornatzky & Klien, 1982 cited in Taylor & Todd, 1995), in computer information technology (Moore & Benbasat, 1991; Taylor & Todd, 1995), and particularly in the educational sector (Jebeile & Reeve, 2003; Lu, Liu, & Liao, 2005; Ajjan & Hartshorne, 2008; Jebeile & Abeysekera, 2010; Rath & Sekhar, 2010). These most influential attributes include: perceived relative advantage, perceived complexity, and perceived compatibility. However, to validate the previous findings, this study adopted all five attitudinal components (behavioral beliefs): perceived relative advantage, perceived simplicity, perceived compatibility, perceived trailability, and perceived observability. A discussion on this is provided in the next section.

Perceived Relative Advantage refers to the degree to which an innovation (online education) is perceived as better than the idea it supersedes (Rogers, 2003). It reflects the consumers' perceptions about the innovation's attributes as being superior or more valuable to them as compared to the existing alternatives (Flight, D'Souza & Allaway,

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2011). Advantages can be both tangible and intangible. In other words, it can be economic or non-economic advantages (Rogers, 2003; Flght et al., 2011). Economic advantages include initial costs as well as cost savings or efficiency obtained after operating or using the innovation (Flight et al., 2011). According to Moore and Benbasat (2001) and Vishwanath and Goldhaber (2003), the concept of "Perceived Relative Advantage (PRA)" is similar to Technology Acceptance Model's construct of "Perceived Usefulness (PU)" which is defined as the degree to which a person believes that using the system will enhance his/her performance. The term "perceived usefulness" is also used by Taylor and Todd (1995) in the original DTPB model. By referring to Moore and Benbasat (1991), the term "perceived relative advantage" has intuitive appeal and recognition across a variety of disciplines, thus the term "perceived relative advantage" is retained in this study to reflect innovation's attributes based on the diffusion of innovation theory. Therefore, perceived relative advantage refers to potential students' perception of online education as a better choice than other forms of education.

Perceived Simplicity (PS), an inverse of perceived complexity, refers to the degree to which an innovation (online education) is perceived as easy (not difficult) to understand and use (Rogers, 1995; 2003). According to Rogers (2003), perceived complexity is defined as the degree to which an innovation is perceived as difficult to understand and use. Therefore, the perceived simplicity in this study refers to the degree to which an innovation is perceived as easy to understand and use (Dearing, 2007). The term is coined by James W. Dearing (2007) to make it less confusing when developing a conceptual model with positive relation between the perceived simplicity (rather than negative relation) and the variable "attitudes". It reflects whether a person perceives an innovation to be easy (not difficult) to understand and use (Rogers, 2003). The term "perceived complexity" in Rogers' DOI is similar to the term "perceived ease of use" in *Davis' TAM (Moore & Benbasat, 1991; Vishwanath & Goldhaber, 2003). As applied to* this study, the term "perceived simplicity" represents the inverse of "perceived complexity" adopted due to its ease of understanding as well as maintaining Rogers' DOI term that represents the characteristics of an innovation for the purpose of this study.

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The third attitudinal component is the "perceived compatibility", which is defined as the degree to which an innovation (online education) is perceived as being consistent with existing values, past experiences, and needs of potential adopters (Rogers, 2003). The more incompatible an innovation, the more uncertainty or risks it projects to potential adopters, thus slowing down the rate of adoption as a consequence (Rogers, 2003; Hirunyawipada & Paswan, 2006). Innovations can be compatible or incompatible with socio-cultural values and beliefs, previously adopted ideas, and adopter's felt needs (Rogers, 2003). Flight et al. (2011) described compatibility in terms of how well the innovation fits into the potential adopter's personal life and social structure. The innovation is considered personally compatible if it fits with existing habits, routines, and lifestyle without requirements for people to adapt or change much of their existing way of life (Flight et al., 2011). Furthermore, an innovation is considered socially compatible if it is congruent with the adopter's social expectation or reference groups and allows the person to be part of the group or the community (Flight et al., 2011). Therefore, the more compatible the innovation (online education) is, the greater is the likelihood of adoption.

Perceived trialability is the degree to which an innovation may be experimented with on limited basis (Rogers, 2003, p. 258). It refers to the opportunity that the adopting units have to use and try the particular innovation over a certain period of time. New ideas or objects that are divisible, allowing targeted adopters to use part of it without destroying the capabilities of what is not used are generally adopted more rapidly than innovations that are not divisible (Holak & Lehmann, 1990; Rogers, 2003). Rogers (2003, p.258) stated that with personal trying out an innovation, an individual will give meaning to an innovation and to find out how it works under his or her own conditions. This process is a part of information gathering in the innovation-decision making process. With personal trial, uncertainty can be reduced. An innovation may actually be changed during or after its trial to suit individual conditions and therefore improve the success rate of the adoption. Rogers (2003) then posited that the trialability of an innovation, as perceived by the members of a social system, is positively related to the rate of adoption. If an innovation can be designed so as to be tried more easily, it will have a more rapid rate of adoption.

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Perceived observability is the degree to which the results of an innovation are visible to others (Rogers, 2003, p. 258). It refers to how visible are the results after an innovation is used by previous adopters (Flight et al., 2011). Consumers make decisions based on information gathering through communication channels (interpersonal and external). Some innovations can be observed and communicated to other people easily, whereas others are difficult to observe or to describe to others. Rogers (2003) stated that innovations can be described in aspects of hardware and software. While hardware aspect consists of the tool that embodies the technology in the form of a material or physical object, the software aspect consists of the information base for the tool. The software component of a technological innovation is not so apparent to observation. Therefore, innovations in which the software aspect is the dominant component possess less observability, and usually have a relatively slower rate of adoption. As such, Rogers (2003, p. 259) posited that the observability of an innovation, as perceived by members of a social system, is positively related to its rate of adoption. Flight et al. (2011) pointed out that the observability is a useful and powerful mechanism to communicate new ideas or new products and services to targeted adopters. Positive information and knowledge about new products and services obtained from observing others using the innovations can reduce risks and increase potential adopters' confidence to use such products and services (Hirunyawipada & Paswan, 2006; Flight et al., 2011).

2.2.2 Subjective Norms (Social Influences)

Subjective Norm is defined as an individual's perceptions of whether the people, who are important to him or her, think he or she should or should not perform the behavior in question (Fishbein & Ajzen, 1975). It is determined by his or her normative beliefs, which is the perceived expectation of the referent individuals or groups together with his or her motivation to comply with such expectations (Fishbein & Ajzen, 1975; Karahanna et al., 1999). The following describes how subjective norms or normative beliefs relate to individual's decision or behavior.

According to Fisher and Price (1992), normative beliefs also refer to the likelihood as well as importance of the social consequences of undertaking the target behavior, reflecting the extent to which the individuals are motivated by the expectations of another person or group of people. Referring to the Diffusion of Innovation theory (DOI)'s innovation-decision process, socially compatible innovation will lead to more rapid rate of adoption (Rogers, 2003; Flight et al., 2011). Therefore, social influences play an important role in the decision making process. Based on social perspective, norms are considered codes of conduct that either prescribe or proscribe behaviors that members of a group can enact (Rimal & Real, 2003, p. 185). Social norms are considered customary rules, governing behavior of individuals in specific groups and societies by specifying what is acceptable and what is not (Standford Encyclopedia of Philosophy (2011). Thus, by complying or acting contrary to the expectations of others, individuals anticipate socially mediated rewards or punishment in the form of visual or verbal indications, approval or disapproval, or more tangible consequences such as gaining admission into or being fired from the group (Fisher & Price, 1992). As such, normative beliefs, sometimes refer to as "social influence" or "social "pressures" exerted through messages and signals, can motivate or demotivate the individual to do what he or she perceives a referent group or individuals want him or her to do because it is instrumental in achieving a social objective or social compliance (Ajzen, 1991; Fisher & Price, 1992; Venkatesh & Davis, 2000; Venkatesh & Brown, 2001). The following section describes the definition of reference groups.

Reference groups' influence has been well researched and is an important topic in the study of consumer behavior (Irwin, 2004). Shibutani (1962) described the concept of reference group as sources of values selected by an individual for the guidance of his/her behavior especially when a choice has to be made, thus it constitutes the form of social control. Based on this definition, he argued that all kinds of units might become a reference group including a single person, groups of people – a social class, a profession, an ethnic group, or a community (Shibutani, 1962). Irwin (2004) classified reference groups into three criteria: membership (member or non-member and degree of commitment), attraction (dissociative, aspiration), and type of contact (primary groups,

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secondary groups). Referring to Granovetter (1985), he argued that most behavior is closely embedded in a network of personal relations, and therefore, the social context must be taken into account in the theory of norms. In this study of online education adoption, in which potential adopters reference groups by type contact i.e. the primary group being examined include peers, family and loved ones, employer or superiors, and the community (social system's influence). These groups are considered interpersonal influences (Bhattacherjee, 2000). Another reference group being examined is external sources or external influence as in the term used in this study, which include mass media reports, expert opinions, and other non-personal information obtained by a potential adopter in making a rationally accepted decision (Bhattacherjee, 2000).

To further explain behavior of an individual within a social system, related theories including self-categorization theory is then discussed. According to Turner (1987), self-concept or self-perception is a system of cognitive self-schemata that filter and process information and is a representation of the social situation that guides the choice of appropriate behavior, having two components: personal identity and social identity. Social identity refers to self-descriptions or individual's self-concept derived from his/her knowledge of his/her membership of a social group together with the value and emotional significance attached to that membership (Tajfel, 1981; Turner, 1987). On the other hand, personal identification refers to self-descriptions such as individual character traits, abilities, and taste (Turner, 1987). In a social group, perceived similarity between group members, cohesiveness, the tendency to cooperate to achieve common goals, shared attitudes and beliefs, and conformity to group norms characterize group behavior (Shibutani, 1962; Turner, 1987). Since social identity is built around group characteristics and behavioral norms, any perceived lack of conformity to group norms is seen as social risks, which might lead to penalty, alienation, or exclusion from the group (Turner, 1987; Fisher & Price, 1992). This explains why social group can influence an individual's behavior. In relation to innovation-decision making process, the norm of a social system is one of prior conditions that affect decision-making (Rogers, 2003). Therefore, it is argued that social norms can influence both behavioral intention and the behavior of an individual. This study aims to add value by extending primary or

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interpersonal reference groups (as dimension or decomposed version of subjective norms) such as peers, family and loved ones, employers or superiors as well as group norms namely "community influence" to examine whether the cultural context of Thai community norms can influence the Thai student's decision to adopt studying via distance online education. This is also to incorporate and explore the effect of social systems and communication as per DOI's theory outlining four core components of innovation diffusion (Rogers, 2003).

Since "community influence" is added as new dimension under subjective norms, a description of the construct is provided. Several researchers have developed theories around "community" in terms of the boundaries, social networks and social norms (Smith, 2001). Referring to the definition by Etzioni and Etzioni (1999), a community has two central attributes: 1) affect-laden relationships of the members, and 2) commitment to a set of shared values, meanings, and a shared historical identity (cited in Jang, Olfman, Ko, Koh, & Kim, 2008). According to Muniz and O'Guinn (2001), three core components of a community are: 1) intrinsic connection such that members feel different from others outside of the community, 2) the presence and shared rituals and traditions that perpetuate the community's history, culture, and consciousness, and 3) a sense of moral responsibility, duty, or obligation to the community as a whole and its individual members (cited in Jang et al., 2008). Additionally, Gusfield (1967) differentiates community into two types: 1) the traditional territorial or geographical community such as neighborhood, town, region, and 2) a relational community concerned with human relationships such as hobby clubs, religious groups, fan clubs, and other social clubs (cited in Jang et al., 2008). From these definitions, Jang et al. (2008) explained community characteristics using three major criteria: 1) locality, i.e. community based on a certain region that differentiates it from another community, 2) social interaction which refers to relationship building among community members, and 3) bond which refers to feelings of belonging and comfort that the community gives to its members.

According to socialization theory by Parsons (1951; cited in the Stanford Encyclopedia of Philosophy, 2011), order and stability are essentially social phenomena

brought about by a common value system, and that common values of a society are embodied in norms that, when conformed to, can guarantee the orderly functioning and reproduction of the social system. According to Shibutani (1962), culture designates the perspective that is shared by the people in a particular group as it is observed that people with the same cultural background engage in similar patterns of activity. Since norms can be considered as code of conduct shared by a given community, and embody a common value system, people may make their decision based on their preference, but what they prefer in turn confirms to social expectations or acceptable codes of conducts (Shibutani, 1962; the Stanford Encyclopedia of Philosophy, 2011). In this context, the community as a social system that an individual belongs to, is considered a form of reference group that the researcher believes has a key role in the decision making of its members.

For the purpose of this study, community is limited to geography or physical boundary such as a neighborhood or region in the Thai cultural context, characterized by shared cultural values, social norms, interaction and bonding or intrinsic connection among members in the society (Shibutani, 1962; Jang et al., 2008; the Stanford Encyclopedia of Philosophy, 2011). Community influence therefore, refers to the social pressures or codes of conduct from the community that influences an individual's decision to adopt or not to adopt online education.

2.2.3 Perceived Behavioral Control

Perceived Behavioral Control (PBC) is defined as the individual's perception on how easy or difficult it is to perform the particular behavior, reflecting the degree to which he/she feels that such behavior is under his or her volitional control (Ajzen, 1991). In other words, it refers to how confident an individual is to study online based on internal and external factors that may be facilitating or constraining him/her to successfully study online such as emotions, skills, resources available, and situational or environmental conditions. Ajzen (1991) added perceived behavioral control construct as the third component of TRA and then named the model "Theory of Planned Behavior" or

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TPB, based on the idea that behavioral achievement depends jointly on motivation (intention) and ability (behavioral control). The control beliefs or perceived behavioral control deal with the presence or absence of requisite resources and opportunities (Ajzen, 1991). They may be based partially on past experience with the behavior, but usually are influenced by second-hand information and experiences shared by friends or personal network, as well as other factors that increase or decrease the perceived difficulty of performing the target behavior, or in other words, the increased likelihood of success as perceived by the individuals (Ajzen, 1991). To better understand the background of the construct "perceived behavioral control", Ajzen (1991) referred to Atkinson's (1964) theory of achievement motivation's "expectancy of success" construct, referring to the perceived probability of succeeding in a given task (p. 183). Another important construct that is most compatible with perceived behavioral control is the concept of Bandura's (1977, 1982) perceived self-efficacy (Ajzen (1991). Based on these constructs, PBC was then derived to explain decision criteria that an individual takes into account of available resources and perception of his/her own capability, the chance of success in performing the task is evaluated and decision is then made based on these internal and external factors. By decomposing the TPB model, perceived behavioral control is comprised of three control beliefs components i.e. self-efficacy, technology facilitating conditions, and resources facilitating conditions. This study employs the decomposed version of TPB with these three constructs being examined as determinants of behavioral intention, mediated by the perceived behavioral control.

Self-efficacy is defined as an individual's confidence in his/her capabilities to perform certain behavior (Taylor & Todd, 1995). Bandura (1997, p. 3) has defined self-efficacy as "the beliefs in one's capabilities to organize and execute the courses of action required to produce given attainments". In other words, self-efficacy is not specifically because of the person's skills, but rather the person's belief or judgment about his or her skills (Haddoune, 2009; Zulkosky, 2009). It is also context-specific, focusing rather on the person's own assets and limitations, and evaluation of his or her own competence to succeed in a specific domain or activity (Haddoune, 2009; Zulkosky, 2009). Most importantly, it is not a trait, but it can be generated, developed, and shaped through times

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and experiences, therefore it is subject to change and enhancement with active use of a number of cognitive, affective, and self-regulative skills (Haddoune, 2009; Zulkosky, 2009). Based on the definition, belief precedes the actual performance, which then determines the outcome of the action.

According to Zulkosky (2009), and Bandura (1977), expectations of personal efficacy are derived from four key sources of information. These are: 1) performance accomplishments where people's self-efficacy increases as they are successful at tasks and vice versa; 2) vicarious experience where people observe others especially with the same abilities doing a task leading to feelings of confidence that they can complete the same task with favorable outcomes; 3) verbal persuasion where people receiving favorable feedback convinces them that they are capable of accomplishing the task successfully; and 4) physiological cues where people interpret the bodily signs such as anxiety and tensions that may affect the outcome of the task. Self-efficacy then can influences people's feelings, thoughts, behavior, and their self-motivation (Zulkosky, 2009).

The second set of dimensions is technology and resources facilitating conditions. Facilitating conditions is defined as the degree to which an individual perceives he/she has technology and other necessary resources available to facilitate the performance of certain behavior (Taylor & Todd, 1995). Ajzen (1991) suggested that resources and opportunities available to a person, must to some extent, dictate the likelihood of behavioral achievement as in concepts of "facilitating factors" (Triandis, 1977), "the context of opportunity" (Sarver, 1983), "resources" (Liska, 1984) and "action control" (Kuhl, 1985). In the context of online education adoption intention, requisite resources in terms of technology include personal computer, high-speed Internet access, and other resources such as time and money which are necessary to facilitate online learning performance.

2.2.4 Self-Directed Learning

In Higher Education (HE), the importance of student's ability for self-managed or self-directed learning is well recognized as a significant factor determining their performance and success especially with respect to preparing them for lifelong learning (Ottewell, 2002; O'Doherty, 2006). As such, both K-12 and Higher Education have had direction towards developing students to be self-reliant and independent in their learning (Ottewell, 2002; O'Doherty, 2006; Chee, Divaharan, Tan, & Mun, 2011). The description of what is "self-directed learning" is provided below.

Self-directed learning (SDL) has been referred to by different authors using different terms include independent learning, autonomous learning, independent study, self-instruction, self-managed learning, and self-management of learning (Ottewill, 2002; O'Doherty, 2006). The term "self-directed learning", though indicating self-reliance, does not mean that an individual must learn in isolation without support or need of tutors, but it requires individual learners to relate to new information, concept, process and people within the social context of the educational environment (Allan, Cook, & Lewis, 1996; Biggs, 2003). The notion was developed in the field of adult education (O'Doherty, 2006; Chee, Divaharan, Tan, & Mun, 2011). Knowles (1975, p. 8) proposed the term to describe a process in which individuals take the initiative, with or without the help of others, in diagnosing their learning needs, formulating learning goals, identifying human and material resources for learning, choosing, and implementing appropriate learning strategies, and evaluating learning outcomes. Self-directed learning (SDL) includes dimensions of self-management, self-monitoring, and motivation (Garrison, 1997). Therefore, SDL is adopted in this study to describe individual's attributes with capabilities to perform autonomous learning activities, self-initiation, self-reliance, and independent process of learning, interacting with various kinds of supporters such as teachers, tutors, mentors, resources, and peers (O'Doherty, 2006).

Abdullah (2001, p. 1) stated that self-directed learners are "responsible owners and managers of their own learning process". SDL integrates self-management

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(management of the context, including social setting, resources, and actions) with self-monitoring (the process whereby learners monitor, evaluate, and regulate their cognitive learning strategies). When learners take ownership of learning, they will take personal responsibility in learning by setting goals and accepting the consequences of their thoughts and actions, as well as personal autonomy and control over their one's own decision (Brockett & Hiemstra, 1991; Candy, 1991); Since learners have a sense of ownership in learning, they are then motivated to learn. Garrison (1997) described the difference between entering motivation and task motivation. Entering motivation refers to how much the learner is attracted and committed to the learning goal, affected by various factors e.g. whether the learning goals will meet the learners' needs, whether they perceive the goals as achievable, and how they perceive their own self-efficacy in relation to the goals. Providing opportunities and control for learners to set their learning goals can enhance entering motivation. While entering motivation affects a learner's choice of learning goals, task motivation affects the learner's sustaining effort toward the learning goal. It is affected by extrinsic rewards and more importantly, the intrinsic motivation to work on a task. Thus, it is recommended to provide opportunities for learner's control in managing and monitoring their learning, and helps develop their capacity in this aspect since learner's motivation is jointly shaped by personal attributes and external contextual factors surrounding the learners (Chee, Divaharan, Tan, & Mun, 2011). Fang, Chang, Lin, Tsai, Lee, Wang and Li (2008) refer to this concept of "ownership of learning" as the self-guided study and one in which a person is mainly responsible for one's own study. By referring to Knowles' definition of self-directed learning, the authors suggested that "self-guidance" or "ownership of learning" is important in the web-based self-learning environment.

According to Northwestern Regional Educational Laboratory (2004), there are many traits/characteristic of a self directed learner including student motivation, meta-cognition, self-efficacy, self-regulation, locus of control, and goal orientation. With respect to goal orientation, it refers to the individual's ability to make plans and set goals with high level of commitment without giving up to obstacles in order to achieve the goals (Caraway, Tucker, Reinke, and Hall, 2003). Self-efficacy refers to an individual's

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perception of his/her capabilities to organize and execute courses of action required in attaining the designated types of performances and it is task specific (Bandura, 1986). "Locus of control" refers to the tendency students have to ascribe achievements and failures to either internal factors that they can control (effort, ability, motivation), or external factors that are beyond control (chance, luck, others' actions) (Rotter, 1996). A self-directed learner would have a higher internal locus of control than an external one. With regards to Metacognition, it refers to the ability of the student to analyze, reflect on, and understand her own cognitive and learning processes. Students, who can use metacognition effectively, can identify appropriate learning strategies in the right context. Students who are aware of their own cognitive strengths and weaknesses are more likely to be able to adjust and compensate for them. Finally, "Self-regulation" refers to the ability of the learner to control interest, attitude, and effort toward a task or a goal. The key to self-regulation is the ability of the learner to understand the requirements of the task or goal, and then to monitor and adjust his/her effort without reminders, deadlines, or cues from others such as teachers, peers, or parents. Song and Hill (2007) summarize the definitions of SDL by key researchers as follows:

Candy (1991, p.23 in Song & Hill, 2007) concluded that 'self-direction' encompasses four dimensions: 1) as a personal attributes or personal autonomy, describing the willingness and capacity to conduct one's own education (self-management); 2) as a mode of organizing instruction in formal settings (learner-control); 3) as the individual, non-institutional pursuit of learning opportunities in the 'natural societal setting (autodidaxy); and 4) learner's self-direction, which might be different in different context.

Brokett and Hiemstra (1991, p.24), presented the Personal Responsibility Orientation Model (PRO) by viewing SDL in two orientations i.e. process and goal. Firstly, SDL is viewed as a process in which a learner assumes primary responsibility for planning, implementing, and evaluating the learning process. Secondly, SDL is viewed as a goal, which focuses on a learner's desire or preference for assuming responsibility for learning.

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Garrison's (1997) proposed three dimensional models by including perspective of SDL as personal attributes as well as learning process. He proposed that SDL is accomplished by three dimensions interacting with each other: self-management, self-monitoring, and motivation. He further explained that self-management involves learners taking control of the learning context to reach their learning objectives. Furthermore, learner-control does not mean independence, but rather collaboration with other people within the context.

Based on Candy (1991) and Garrison (1997), "self-management" refers to the aspect of behavioral task control relating to management activities, characterized by management of external tasks and resources. With respect to "self-monitoring", it refers to internal process of thinking, reflection, and making improvement on the learning process. The key dimensions of SDL are monitoring (reflection) and managing (action) the learning process. Monitoring is the assessment of feedback information, while managing has to do with taking control of learning tasks and activities. Initiating interest and maintaining effort are essential elements in SDL and effective learning. The conceptualization and practice of self-directed and regulated learning have focused on issues of control, both externally and internally (Garrison, 1997).

Since online learning environment differs from traditional classroom setting as it gives more control of the instruction to the learners, SDL is therefore a critical factor in distance online education context since learners are physically and socially separated from the instructor as well as other learners (Song & Hill, 2007). In a study conducted by Shapley (2000), the results indicated that students have to have a high level of SDL to be successful in an online learning environment. Song and Hill (2007) suggested that online learning context influence the amount of control that is given to (or expected of) learners, as well as impacting a learner's perception of his or her level of self-direction. In conclusion, learners need to take control in planning their own learning pace, monitoring their learning comprehension, and making judgment on various aspects of their learning process. They need to be aware of and actively explore various learning resources, develop strategies to effectively use the resources and overcome the challenges faced in

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online learning environment, while also become self-motivated to overcome the procrastination challenge with self-initiative or proactive approach to learning.

In this study, the self-directed learning or SDL is defined in terms of personal attributes by referring to the definition provided by Garrison (1997), which refers to learners' motivation for and capability of taking responsibility or ownership for their learning. SDL includes dimensions of self-management, self-monitoring, and motivation (Garrison, 1997). Therefore, SDL is used to describe an individual's attributes with capabilities to perform autonomous learning activities, self-initiation, self-reliance, and independent process of learning, interacting with various kinds of supporters such as teachers, tutors, mentors, resources, and peers (O'Doherty, 2006).

2.3   Theories Related to the Independent Variables

This section reviews the theories related to the independent variables included in this study on online education adoption. There are several research models on technological innovation adoption commonly employed by researchers including the Diffusion of Innovation theory (DOI), Theory of Reasoned Action (TRA), Technology Acceptance Model (TAM), Theory of Planned Behavior (TPB), and the Decomposed Theory of Planned Behavior (DTPB). Each theory has been chosen based on specific context and applicability as they all come with advantages and disadvantages. Researchers suggest the integration of these models based on the context, purpose of the study, and trade-offs between their explanatory power and parsimony (Taylor & Todd, 1995; Lu, Yu, Liu, & Yao, 2003; Park & Chen, 2007). These theories related to the independent variables in this study are discussed in the following sections.

2.3.1 Technology Acceptance Model (TAM)

The Technology Acceptance Model (TAM) was developed based on the Theory of Reasoned Action (TRA) in order to understand a user's acceptance of information systems (Davis et al., 1989). Common critiques found with the TRA is that it was very general, therefore, Davis (1986) introduced an adaptation of TRA namely "Technology Acceptance Model (TAM)" to specifically model user acceptance of IT within organizations (Vishwanath & Goldhaber, 2003; Baron, Patterson & Harris, 2006). TAM deviates from TRA by firstly, excluding the subjective norm as a determinant of usage intention and secondly, provides a direct linkage from perceived usefulness to usage intention (Teo & Pok, 2003). By identifying a small number of fundamental variables that deal with the cognitive and affective determinants of computer acceptance, TAM can provide the basis for tracking the impact of external factors on internal beliefs, attitudes, and intentions (Davis et al., 1989). TAM postulates that two belief constructs i.e. perceived usefulness and perceived ease of use, are primary determinants for computer acceptance behaviors (Vishwanath & Goldhaber, 2003; Teo & Pok, 2003). Figure 2.1 illustrates the technology acceptance model.

Figure 2.1: The Technology Acceptance Model
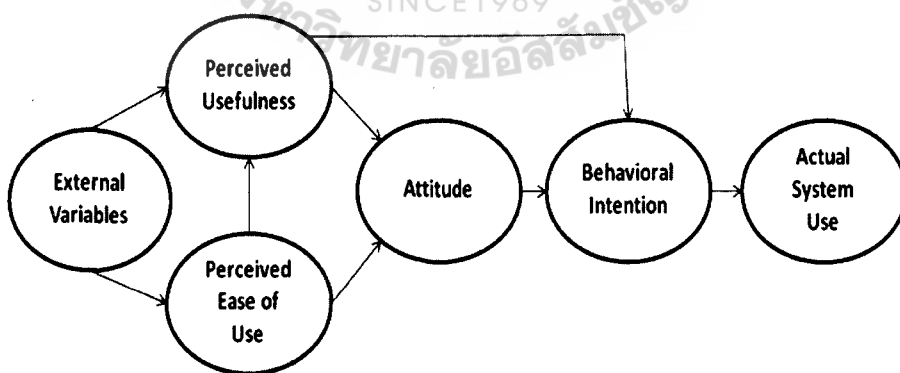
Source: Adapted from Davis, Richard, Bagozzi, and Warshaw (1989), p. 984.

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As illustrated in Figure 2.1, TAM proposes that Perceived Usefulness (PU) and Perceived Ease of Use (PEOU) significantly impact on a user's attitude toward using the system. Behavioral intention to use the system is modeled as a function of attitude and perceived usefulness. Behavioral intention then determines actual usage behavior. TAM excluded TRA's subjective norm as a determinant of behavioral intention because of its uncertain theoretical and psychometric status (Davis et al., 1989). Davis et al. (1989) stated that it is difficult to disentangle direct effects of the subjective norm on behavioral intention (due to Kelman's, 1958 compliance process) and indirect effects via attitude (due to Kelman's, 1958 internalization and identification processes). According to Davis et al. (1989), all other factors not explicitly included in the model are expected to impact intentions and usage through perceived ease of use and perceived usefulness. In addition, perceived ease of use was found to act primarily through perceived usefulness to influence intentions to use (Davis, 1989). In other words, TAM argues that a technology that is useful and easy to use will influence the user's positive attitude and intention towards using the technology, and finally adopting and using the system (Teo & Pok, 2003).

TAM has been a well-recognized theory to explain user behavior with regards to computer and information systems since its inception till date. It offers a parsimonious model for researchers in the information systems area to examine user acceptance or adoption behavior of the computer and technologies across industries, including education. The theoretical model offers practical implications for business to understand and improve acceptance and usage of the information system. However, TAM's characteristics of simplicity, parsimony, and specificity may also pose limitations in applicability of the model in several contexts. As such, the trade-off has to be made between using the model that is parsimonious versus a more complex model that could provide greater insight and depth of understanding in terms of specific factors that have influential effects on users acceptance or adoption of the technology being studied as researchers including Taylor and Todd (1995), Malhotra and Galletta (1999), Baron et al. (2006), have suggested.

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2.3.2 Theory of Reasoned Action (TRA)

The Theory of Reasoned Action or TRA was developed by social psychologists, Ajzen and Fishbein in 1967. This theory suggests that individuals think about his or her decision and the possible outcomes of the action before making any decision to be involved or not involved in a particular behavior (Ajzen & Fishbein, 1980). The model is concerned with the determinants of consciously intended behaviors (Ajzen & Fishbein, 1980). Figure 2.2 illustrates the TRA model.

Figure 2.2: The Model of Theory of Reasoned Action
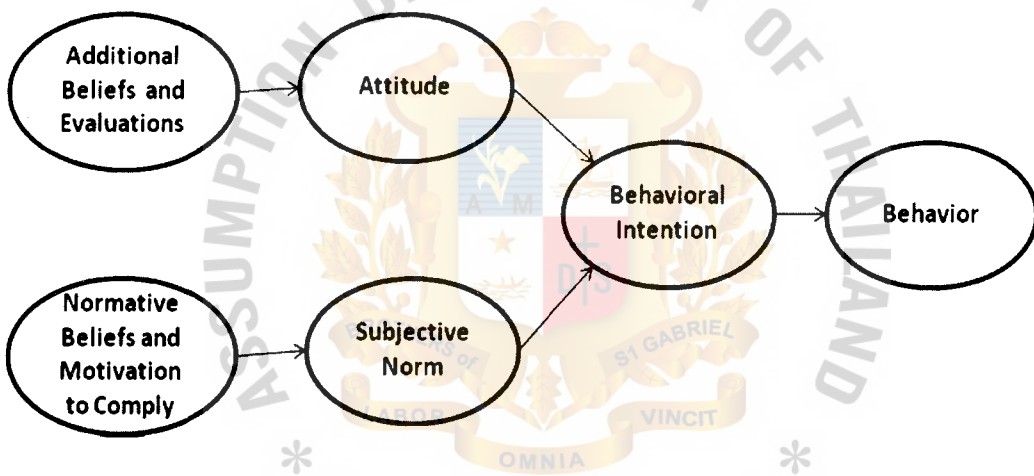
Source: Ajzen and Fishbein (1980)

Based on Figure 2.2, TRA posits that an individual's performance of a particular behavior is determined by his or her behavioral intention to perform the behavior, and the behavioral intention is jointly determined by his or her attitude and the subjective norm concerning that particular behavior. According to TRA, the person's attitude toward the particular behavior is determined by his or her salient beliefs about the consequences of performing the behavior as well as the evaluation of those consequences (Fishbein & Ajzen, 1975). The person's subjective norm is determined by his or her normative beliefs, which is the perceived expectation of the referent individuals or groups together with his or her motivation to comply with such expectations (Fishbein & Ajzen, 1975).

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According to Davis et al. (1989), researchers in information systems have relied on intention models from social psychology such as TRA as a theoretical foundation for research on determinants of user behavior. TRA has been a very successful, well-researched model, to explain behaviors in many domains, but at the same time it is too general as it has been designed to explain virtually any human behavior (Ajzen & Fishbein, 1980; Davis et al., 1989). TRA, however, has become the foundation to explain human behavior and foster the development of theories including the Technology Acceptance Model (TAM) by Davis in 1986 and the Theory of Planned Behavior (TPB) by Ajzen in 1985, as well as the decomposed version of TPB (DTPB) which form the basis for developing the research framework for this study.

2.3.3 Theory of Planned Behavior

The Theory of Planned Behavior (TPB) is another development based on the Theory of Reasoned Action (TRA) designed to deal with behaviors over which people have incomplete volitional control (Ajzen, 1991) by the addition of "Perceived Behavioral Control or PBC" as the third component to the original two constructs TRA's attitude and subjective norm constructs. TPB was developed by Ajzen (1985, 1991) proposing that subjective norm and perceived behavioral control such as skills, opportunities, and resources necessary to use a product or perform an action also influences behavior in addition to the attitude towards the use. Figure 2.3 depicts the relationship in the TPB model.

Figure 2.3: The Theory of Planned Behavior Model
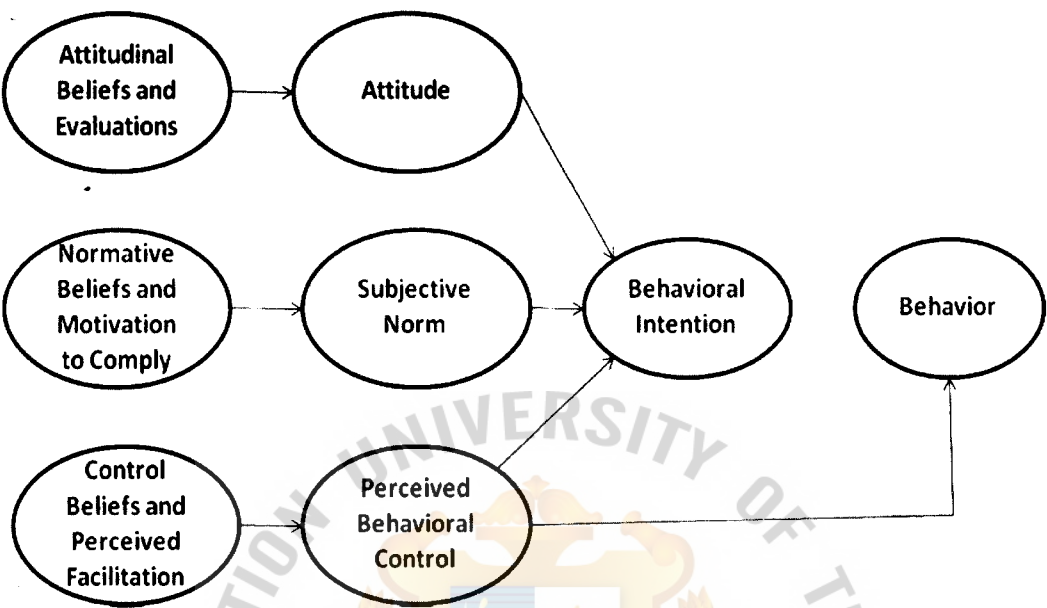
Source: Adapted from Ajzen (1991), p. 182

TPB suggests that human behavior is guided by three kinds of salient beliefs (Ajzen, 1991) including:

- Behavioral beliefs – assumed to influence attitudes toward the behavior,
- Normative beliefs – constituting the underlying determinants of subjective norms, and
- Control beliefs – providing the basis for perceptions of behavioral control.

TPB posits that behavioral intention and perceived behavioral control are direct determinants of actual behavior, and behavioral intention is formed by individual's attitude, subjective norm and perceived behavioral control, which reflects perceptions of internal and external constraints on behavior (Ajzen, 1991). The relative importance of the three components in terms of intention and behavior prediction is notable, and varies across behaviors and situations (Ajzen, 1991). TPB has also been well-recognized and

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adopted as a research model across several domains. As reported in a meta-analytic review of the TPB based on 185 independent studies by Armitage and Conner (2001), TPB accounted for 27 percent and 39 percent of the variance in behavior and intention, respectively. Additionally, the PBC construct alone accounted for significant amounts of variance in intention and behavior, thus providing evidence for contribution of TPB as an enhancement of TRA (Armitage & Conner, 2001).

The disadvantage of TPB as pointed out by Ajzen (1991) and Taylor and Todd (1995) is that the relationship between the belief structures and the determinants of intention i.e. Attitude, Subjective Norms, and Perceived Behavioral Control are not particularly well understood due to two factors; firstly, the belief structures are combined into uni-dimensional constructs and such monolithic belief sets may not be consistently related to attitude, subjective norms, or perceived behavioral control; secondly, the belief sets, especially those relating to attitude, are idiosyncratic to the empirical setting, making it difficult to operationalize the TPB, resulting in problems of inconsistency and generalizability across different settings (Taylor & Todd, 1995). Consequently, Taylor and Todd (1995) addressed these limitations by decomposing the belief structures for the TPB model and proposed DTPB model.

2.3.4 Decomposed Theory of Planned Behavior (DTPB)

The Decomposed Theory of Planned Behavior (DTPB) originated from the Theory of Planned Behavior (TPB) (Taylor & Todd, 1995; Ajzen, 1991). The difference is that the DTPB decomposes main constructs i.e. attitude, subjective norm, and perceived behavioral control into lower level constructs (Taylor & Todd, 1995). Teo and Pok (2003) stated that when compared to TPB, the DTPB draws upon constructs from the innovation diffusion literature, and more completely explores the dimensions of attitude, subjective norm, and perceived behavioral control by decomposing them into specific belief dimensions. Figure 2.4 depicts the decomposed TPB model.

Figure 2.4: Decomposed Theory of Planned Behavior Model
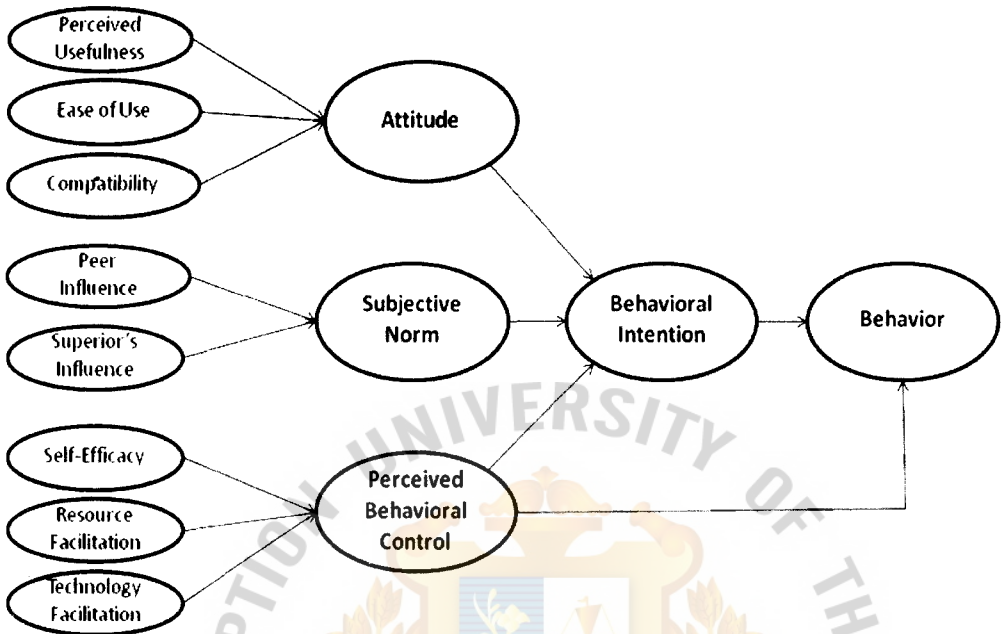
Source: Taylor & Todd (1995), p. 163.

The first component is Attitude, which is decomposed into three dimensions including perceived usefulness, ease of use, and compatibility. Taylor and Todd (1995) integrated the diffusion theory into attitudinal component based on Rogers' innovation attributes, Moore and Benbasat's (2001) perceived characteristics of innovating (PCI), and TAM's PU and PEOU, and then derived these attributes since they have been commonly found to be significantly related to adoption decisions in general and specifically to IT intention and usage.

When compared to the original TPB, DTPB becomes more complex as more constructs have been included. However, by decomposing the belief structures, the explanatory power of the model increases for behavioral intention. Moreover, as Taylor and Todd (1995) have suggested, DTPB has added managerial implications and greater diagnostic value since by specifying beliefs that influence the consumers' decisions to adopt, points of improvement to influence the usage can be targeted clearly. As a result,

implementation and usage of the system among users will have greater success, thus yielding a greater return on investment and business performance of the system. In summary, DTPB has added value to TPB by providing increased explanatory power and a more precise understanding of the antecedents of users' acceptance and behavior (Taylor & Todd, 1995).

2.3.5 Diffusion of Innovation Theory (DOI)

Diffusion of Innovation or "DOI" theory has commonly been used to explain and predict the adoption or rejection of new ideas and practices (Warford, 2005). Changes such as globalization phenomenon, highly efficient means of communications, and the Internet as well as media convergence have made the diffusion research become even more interesting since it has become the basis for development of theories and understanding of social changes (Wejnert, 2002). Furthermore, innovation research is considered one of the most important business research topics as innovation can raise the quality, while lowering the price of products and services, thus improving the lives of consumers (Hauser, Tellis, & Griffin, 2006). Hence, DOI is suitable in the study of online education diffusion since this method of educational delivery is shifting the way learning is being provided and accessed in society and has impacted the structural changes to the overall industry and society as a whole (Virkus & Wood, 2004; Hiltz & Turoff, 2005; Henshaw, 2008).

According to Rogers (2003), "Diffusion of Innovation (DOI)" refers to the spread of new ideas and concepts, information, and practices within a social system, where the spread denotes flow or movement from a source to an adopter, typically via communication and influence. Research in the area of DOI aims to understand the spread of innovations throughout a lifecycle, as well as to understand the influence of word of mouth communications, network externalities, and social signals on consumers in adopting the innovations (Peres et al., 2010). As per the definition by Rogers (2003), diffusion is the process by which 1) an innovation; 2) is communicated through certain

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channels; 3) over time; and 4) among the members of a social system. Sometimes these factors can be grouped into four major categories as 1) adopter-related personality traits; 2) socioeconomic influences; 3) interpersonal channels and mass media use; and 4) perceived attributes of an innovation (Leung & Wei, 1999). Some researchers have classified them into three groups as 1) characteristics of innovation; 2) characteristics of innovators; and 3) characteristics of the environmental context (Wejnert, 2002). These factors together determine whether the specific innovation is adopted or rejected as well as the rate of adoption (Rogers, 2003).

Education has always been a highly regulated industry, according to Wejnert (2002), the decision to adopt new innovation depends largely on the higher authorities which is characterized as "authority" innovation decision. However, due to the disruptive innovation, such as the Internet, along with the process of globalization, the consumers seem to play a major role as decision-makers i.e. adoption of new innovation in education has become "optional" or "collective" innovation decisions (Wejnert, 2002). Education has then gradually transformed into a deregulated industry as a consequence. Consequences of innovations refer to changes that occur to an individual or to a social system as a result of the adoption or rejection of an innovation, which can be considered as part of the attitude towards the particular innovation (Wejnert, 2002). According to Rogers (2003), individuals or a unit's decision to adopt the particular innovation is not an instantaneous act, but rather is a process described as innovation-decision process, occurring over time which comprises a series of actions. Figure 2.1 illustrates Rogers' model of five stages in the innovation-decision process, starting from knowledge stage, persuasion stage, decision stage, implementation stage, and confirmation stage.

Figure 2.5 Rogers' Model of Five Stages in the Innovation-Decision Process
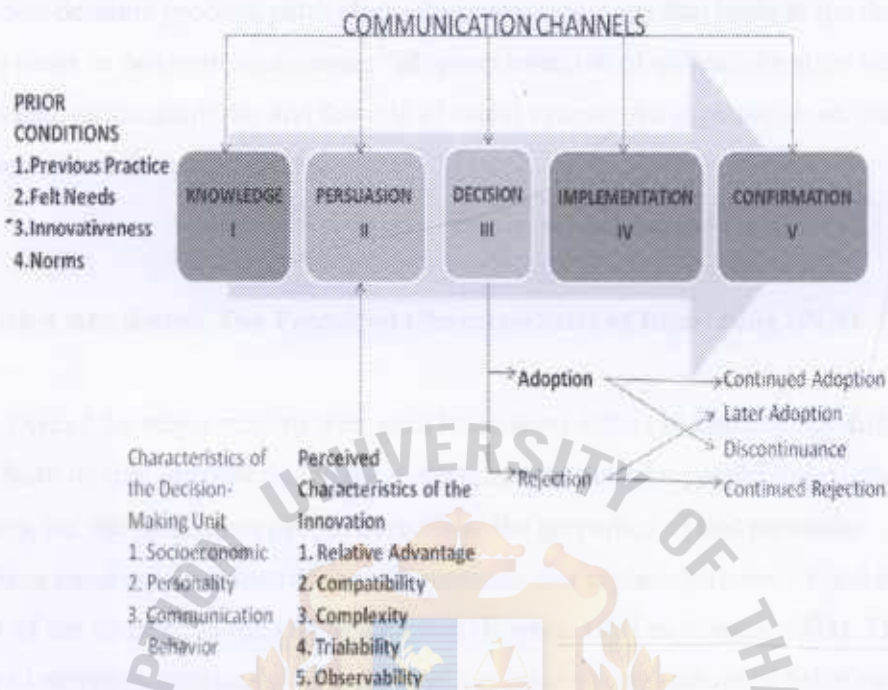
Source: Rogers (2003) p. 170.

Based on Figure 2.5, each stage of the innovation-decision process is described below:

- Knowledge occurs when an individual (or decision-making unit) is exposed to an innovation's existence and gains understanding of how it functions.
- Persuasion occurs when an individual forms a favorable or unfavorable attitude towards the innovation.
- Decision takes place when an individual engages in activities that lead to a choice to adopt or reject the innovation.
- Implementation occurs when an individual puts a new idea into use.
- Confirmation takes place when an individual seeks reinforcement of an innovation-decision already made, but he or she may reverse this previous decision if exposed to conflicting messages about the innovation.

This study focuses on some key variables within the framework of DOI theory's innovation-decision process, particularly the persuasion stage that leads to the decision stage in order to determine consumers' adoption intention of online education which include innovation attributes and the role of social system. An explanation on innovation attributes is included in the next section.

Innovation Attributes: The Perceived Characteristics of Innovating (PCI)

One of the major reasons why each innovation differs in terms of the diffusion period from its first introduction to the widespread adoption by people is the innovation's attributes, i.e. the perception people have about the properties of that particular innovation since perceived attributes of innovation can explain between 49 and 87 percent of the variance in the rate of adoption (Rogers, 1995 in Rogers, 2003). These perceived attributes constitute the individual's subjective perceptions or beliefs about an innovation, and are factors persuading the individual whether to adopt or reject the innovation (Vishwanath & Goldhaber, 2003). As such, the response or reaction to innovation is another key area in diffusion and it has been suggested that marketing researchers can play a major role in the research contribution (Hauser et al., 2006).

There are five attributes of the innovation perceived by individuals that can enhance the adoption decision and explain the diffusion rates (Rogers, 2003).

1) Relative Advantage: the degree to which an innovation is perceived as better than the idea it supersedes. It can be an objective or subjective advantage as long as the individual perceives the innovation as advantageous.

2) Compatibility: the degree to which an innovation is perceived as being consistent with existing values, past experiences, and needs of potential adopters. If an innovation is compatible with existing values and norms of a social system, the more likely and rapid the process of the adoption would be.

3) Complexity: the degree to which an innovation is perceived as difficult to understand and use. New ideas that are simpler to understand are adopted more rapidly than an innovation that requires the adopting unit to acquire new skills and understanding.

4) Trialability: the degree to which an innovation may be experimented with on a limited basis. Trial reduces uncertainty or risks and enables learning by doing to increase familiarity and confidence.

5) Observability: the degree to which the result of an innovation is visible to others. Such visibility stimulates peer discussion and information sharing among members in social systems. The easier it is for individuals to see the results of an innovation, the more likely they are to adopt it.

From the above definition on innovation attributes, it can be summarized that innovations that are perceived by individuals as having greater relative advantage, compatibility, trailability, and observability, as well as less complexity, will be adopted more rapidly than other innovations (Rogers, 2003). Moore and Benbasat (1991) developed an instrument designed to measure perceptions of individuals toward adopting information technology innovation. They argued that mixed and inconclusive results of research in the area of information technology innovation adoption were due to the lack of theoretical foundation as well as inadequate definition and measurement of constructs. The five attributes of innovation by Rogers (1983) then were redefined with additional constructs developed from their study, and were referred to as "Perceived Characteristics of Using Innovation" and later labeled as "Perceived Characteristics of Innovating or PCI" (Moore & Benbasat, 1991). The perceived characteristics of innovating include Voluntariness, Image, Relative Advantage, Compatibility, Ease of Use, Trialability, and Results Demonstrability (Moore & Benbasat, 1991). In this study, some measurement items of characteristics of online education have been adapted from Moore and Benbasat (1991).

The influence of perceived attributes of innovations on the attitudes and behavior of individuals have been empirically studied by several researchers, though relatively less

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than the other antecedent variables such as innovativeness of the adopting units or actors (Vishwanath & Goldhaber, 2003). Understanding the attributes of an innovation is highly important since an individual's belief of these attributes significantly predicts most of the variance in future adoption and use (Rogers, 1995; Vishwanath & Goldhaber, 2003; Warford, 2009). The majority of researchers have found mixed and often inconsistent results in a meta-analysis of the relationship between an innovation's attributes or characteristics of an innovation and its adoption when testing in different contexts (Vishwanath & Goldhaber, 2003). For example, Warford (2009) tested diffusion of innovations in an education model and found that in the innovation which appeared to be negatively associated with adoption, the contrary was borne out. Wungwanichichakorn (2002) studied adoption intention of banks' customers on Internet Banking Service in Thailand and found that the perceived characteristics of Internet Banking i.e. relative advantage, compatibility, complexity, and trialability were significantly related to intention to adopt the Internet Banking Services. Leung (2004) found that only two of the five perceived attributes of the innovation, which were complexity and incompatibility with existing values, were significant predictors of employers' adoption intention in his study on societal, organizational and individual factors in the adoption of telework. In this context, he suggested that relative advantage and observable benefits were not important motivators for employers to adopt telework since environmental protection from the reduced traffic congestion and the overhead cost were less compared to the productivity gained (Leung, 2004).

Results can also vary based on the cultural context. For example, Eriksson, Keren, and Nilsson (2008) extended the applicability of the DOI model to study the adoption intention of Estonian Internet Banking. Independent variables included relative advantage, complexity, perceived risk, and compatibility. The results showed that relative advantage and complexity have the strongest influence on adoption of Internet banking. They argued that there is no consensus as to the relative influence of factors influencing innovation adoption as they vary according to the kind of innovation adopted (Eriksson et al., 2008). Moreover, they suggested that there is a need for modification of the original

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model of diffusion of innovation in order to make it applicable to an emerging economy like Estonia.

Another area of focus in this study is related to the social system. Rogers (1976) stated that it has become common procedure for diffusion scholars to ask a question such as: "From whom in this system did you obtain information that led you to adopt this innovation?" Referring to the innovation-decision process model in Figure 2.1, norms of a social system is one of prior conditions that affect decision-making. Thus this study also examines how norms affect the diffusion of online education. The role of social system in the diffusion of innovation is discussed in the section related to social influences.

2.4 Critical Analysis and Discussion of the Theories Related to the Independent Variable

This section provides critical analysis and discussion of the theories related to independent variables.

2.4.1 The Role of Social Influences and the Diffusion of Innovation

As previously mentioned, a social system is one of the four key factors that influence the diffusion of innovation. Peres et al. (2010) argued that the traditional perception of diffusion as a theory of interpersonal communication should be extended to encompass social interdependence of all kinds. The authors proposed that Innovation Diffusion should be defined (p. 91) as:

> "Innovation Diffusion is the process of the market penetration of new products and services that is driven by social influences, which include all interdependencies among consumers that affect various market players with or without their explicit knowledge"

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The above definition highlights the importance of social influences as drivers for the diffusion of new products and services into society. Enhancements and continued validity of DOI have been urged and proposed by many researchers. For example, Wejnert (2002) proposed that the models of diffusion of innovations should group the variables into 3 major components. These are: 1) characteristics of the innovation - whether it results in private or public consequences, as well as costs or risks and benefits; 2) characteristics of innovators concerning societal entity, familiarity of the innovation, status characteristics, socioeconomics characteristics, position in social networks, and personal qualities; and 3) characteristics of the environmental context that modulate diffusion via structural characteristics of the modern world including geographical settings, societal culture, political conditions, and global uniformity. In addition, MacVaugh and Schiavone (2010) proposed the integration of theoretical explanations for innovation diffusion across the discipline of marketing, innovation, and sociology research. Their study focuses on resistance to technology adoption and is also based on the assumption that users adopt new technology to maximize utility. It was suggested that innovation diffusion is affected by technological, social, and learning conditions, while operating in the contextual domain of the individual, community, or market and industry (MacVaugh & Schiavone, 2010). The disruptive technological innovation and rapidly growing adoption of online communication through social media and network such as Facebook, Twitter, LinkedIn, YouTube etc., creates the "digi-cult" with user-generated content and exchange of information, resulting in a growing borderless social network online over the internet (Flew, Bruns, Collis, Jackson, Luck, O'Donnell, Shelly & Tsai, 2009; Peres et al., 2010). Consequently, the Diffusion of Innovation theory has to be continually validated as society continues to change with no sign of stagnating (Flew et al., 2009; Peres et al., 2010).

According to Rogers (2003), social structure gives regularity and stability to human behavior in a system. It allows people to predict behavior with a certain degree of accuracy and can facilitate or impede the diffusion of innovations by representing a type of information that decreases uncertainty. Young (2000) mentioned that innovation often spreads gradually through social networks as evidenced by such patterns documented in

the adoption of family planning methods, new agricultural practices, and a variety of other innovations. In the first stage, a few innovators adopt, second, people in contact with the innovators adopt, third, people in contact with those people adopt, and so forth until eventually the innovation spreads throughout society (Young, 2000). Young (2000) further argued that a similar process can be used to describe the diffusion of certain norms of behavior. While such behaviors are not actually innovations, the process by which they spread has similar dynamic properties, namely, the propensity to adopt a behavior increases proportionately with the number of reference groups that have adopted it (Young, 2000). Rogers (2003) suggested that individuals are exposed to the innovation through their network of peers, and this exposure has a cumulatively increasing influence on adoption. Therefore, social influence is proposed as a key factor affecting the consumer's decision to adopt a new form of educational service, i.e. online education.

Furthermore, social networking technologies have now facilitated the adoption of innovations as a channel through which innovations are being communicated, while it is also an innovation to be adopted itself. According to Owen and Humphrey (2009), by expanding on Roger's diffusion idea, online communications which occur through social network tools are moving towards interactivities among individuals, thus individuals can broadcast information as the producers or organizations which can be negative or positive, or in other words, informed or misinformed. Owen and Humphrey (2009) further suggested that the infrastructure elements including core/technological, competitive/commercial, political/regulatory, and social are critical factors in the diffusion of online communication having social networking tools as an enabler. Diffusion through traditional media may take years to reach a nation; the same techniques might take only days or even hours to reach the same number of people through new social network channels, even though these forms of social media are still new and the continuance of these media in their current forms and the diffusion of these into common use by an entire society is not guaranteed (Owen & Humphrey, 2009). Therefore, revisiting the role of social influences on the innovation adoption in this paradigm of communication technology sophistication, can be very useful for both business and academia.

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2.4.2 Integrating the Diffusion of Innovation with the Acceptance Model by taking into account Social Influences

A line of research examining ICT adoption from the perspective of innovation diffusion has given more attention to specific settings or contexts as well as external factors (Lu et al., 2003). According to the DOI theory, innovation can be an idea, practice, technique or object that is perceived as new by a unit of adoption (Rogers, 1995). Moreover, the unit of adoption can range from individuals within a social system to groups and organizations, depending on what is that particular innovation. The range of beliefs or perceptions about the innovation varies considerably, making the beliefs idiosyncratic to the innovation and the adopter. To examine the adoption decision making process at the individual level, integration between acceptance model and the diffusion of innovation model are then more suitable and recommended (Vishwanath & Goldhaber, 2003). There are several acceptance models commonly used with some have been briefly discussed earlier. This section provides the basis for which the most suitable acceptance model is chosen for the context of this study on online education adoption.

As stated in a prior section, TAM is the model designed specifically to examine acceptance of technology in the field of Information Systems research. It offers parsimony and simplicity of application, while giving sufficient practical understanding of factors influencing technological acceptance. Integration of DOI and TAM has also been common to investigate the acceptance of new technology. For example, Vishwanath and Goldhaber (2003) examined factors contributing to adoption decisions by synthesizing perspectives from TAM and DOI, thus deriving an integrated model of cellular phone adoption. The model confirms the importance of potential adopters' attitudes, and found significant influence of perceived innovation attributes i.e. relative advantage, observability, and compatibility on the adoption decisions (Vishwanath & Goldhaber, 2003). Based on this study, Vishwanath and Goldhaber (2003) also realized that TAM was designed to understand IT implementation within the organization, and as such the variables in the model were formulated to predict user attitudes and behaviors in an organizational context rather than voluntarily consumer environment. Supportive of

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this criticism, many researchers criticized TAM as limited in its ability to explain the adoption and use of technology, particularly in the consumer context (Baron, Patterson & Harris, 2006). The importance of TAM adaptation to specific contexts is well recognized and usually suggested by researchers (Park & Chen, 2007).

Not taking into account social influence has been a major criticism of TAM since the model excludes the subjective norm variables from TRA and focuses on only two belief constructs since they are meant to be fairly generalizable across systems (Davis et al., 1989; Teo & Pok, 2003). The social factor is increasingly and particularly important in network applications such as collaborative systems, in which technology acceptance and usage are mostly affected by social influence processes (Malhotra & Galletta, 1999). The critique is further supported by the study of Baron et al. (2006) in their qualitative research conducted on individual consumers. The concern raised was that TAM may be inadequate in the context where technology is embedded in a consumer's community of practice since the results of their study provide evidence of subtleties of "social influence" and "perceived behavioral control" that TAM was not able to capture (Baron et al., 2006).

To fill the gap in TAM, adaptation and enhancements or extensions of TAM became popular methods to investigate technology acceptance in Information Systems research. For example, Hsu and Lu (2004) examined why people play online games by applying the extended TAM with social influences and flow experience as belief related constructs to predict users' acceptance of online games. The results revealed that social norms, attitude, and flow experience explain about 80 percent of game playing. In addition, Lu et al. (2003) proposed a technology acceptance model for wireless Internet employing TAM by adding other constructs including social influences, technology complexity, and facilitating conditions. To provide meaningful results on users' responses about specific systems, they suggested that there is a need for adaptation when applying TAM to different contexts by incorporating additional constructs or integration with other technology acceptance models to improve its explanatory utility (Lu et al., 2003).

An additional example is the study by Nysveen, Pedersen and Thorbjornsen (2005) which examined intention to use mobile services in Norway. They argued firstly, that TAM may be too parsimonious, and therefore should be supplemented and extended with additional constructs suitable to apply in the context and objective of the study. Secondly, it is most often used in the work-related organizational based setting, which may not imply direct costs to users. Thirdly, consumers' uses of services are constrained by their available resources as reflected in the construct of perceived behavioral control in the TPB model. Fourthly, explanatory power is limited to approximately 40 percent explained variance of intention to use the system. As such, integrations and enhancement of TAM have been recommended. The results of this study showed that PU, PEOU have indirect effects on intention via attitude as well as direct effect on intention. In addition, normative pressure (subjective norm/social influence) and behavioral control have direct effects on intention to use the services. They then concluded that extension of TAM with normative pressure and perceived behavioral control represents important antecedents of consumers' intentions to use mobile services.

Applicability in a consumer context as well as accounting for social influences are particularly important in selection of the model suitable to be used in examining antecedents of online education adoption intention since this is voluntary decision by individual consumers in the social network paradigm. As pointed out by Baron et al. (2006), given the relative freedom of choice of consumers as compared to organizational employees, TAM should face limitations in terms of ability to explain more than 70 percent of variations, leaving 30 percent unexplained in terms of acceptance and use behavior. They considered TAM based models to be less useful for understanding the technology acceptance behavior where there is a strong community component, social influence, paradoxical and counter-intuitive behavior. Furthermore, this limitation has also been well recognized by the advocates of TAM's and another variation of TAM, i.e. the Unified Theory of Acceptance and Use of Technology or UTAUT (Venkatesh et al., 2003). In addition, importance of social influences in consumers' decision making is further emphasized since the use of technology is not only determined by subjective norms, but also by the needs for relationship with others and social groups (Schau &

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Gily, 2003 as cited in Malhotra & Galletta, 1999). As recent studies by major research firms such as Forrester and Jupiter have shown, users play an increasingly interactive and central role in issues of design, development and marketing of the Information Technology system. These studies have urged that mere acceptance is deemed insufficient in technology adoption in the social computing context and suggest that such models as TRA and TAM are inadequate as they may not fully explain technology adoption in the context of social computing when technology is embedded in a consumer community of practice and where consumers have co-created its value (Baron et al., 2006; Vannoy & Palvia, 2010).

Another acceptance model that has been widely employed especially in social psychology is the Theory of Planned Behavior or TPB. In a meta-analytic review on the efficacy of TPB, Armitage and Conner (2001) pointed out that TPB fills the gaps that TRA has ignored. While TRA can adequately predict behaviors that were relatively straightforward, predicting the behavior that is not under an individual's volitional control might be insufficient. Consequently, perceived behavioral control was included in the TPB to provide information about the potential constraints on action as perceived by the actor, and explains why intentions do not always predict behavior (Armitage & Conner, 2001). Ajzen (1991) argued that the magnitude of effects from perceived behavioral control or PBC to intention is dependent on the type of behavior and the situation. The results of his study support the use of TPB for predicting intention and the behavior. Though TPB is less commonly employed in the Information Systems research, the strengths of TPB have been found suitable in certain contexts and objectives of the study. For example, Venkatesh and Brown (2001) used TPB as a guiding framework to study personal computers adoption in homes based on the rationale that TPB was designed to explain volitional behavior. Moreover, it has been successfully applied in studying technology adoption behavior (Taylor & Todd, 1995; Venkatesh & Brown, 2001).

Another common acceptance model is the enhancement to TPB, namely "Decomposed Theory of Planned Behavior (DTPB)", developed by Taylor and Todd

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(1995). After assessing the three technology adoption models, including TAM, TPB, and the DTPB, Taylor and Todd's (1995) study suggests that TAM is useful in predicting IT usage behavior, but the decomposed TPB (DTPB) provides a more complete understanding of behavior and behavioral intention by accounting for the effects of normative and control beliefs. By decomposing the belief structures, DTPB helps to provide a fuller understanding and guideline for management of IT system implementation process by focusing attention on social influences and control factors that influence IT usage (Taylor & Todd, 1995). Supportive of Taylor and Todd's statement, Chau and Hu (2001) also compared TAM, TPB, and DTPB (cited in Lu et al., 2003). The results showed that both TAM and TPB have limitations in terms of examining individual adoption decision, as they have been initially developed to understand the technology adoption in organizational settings (cited in Lu et al., 2003).

After careful consideration, DTPB is the chosen acceptance model for this study, and the rationale supporting the choice is discussed. The major reason why the DTPB is chosen is because DTPB combines the most applicable features of the three models include TAM, TPB, and DOI despite its criticism for being too complex while only marginal explanatory power is added to explain behavioral intention and use of technology. Supportive of this rationale, researchers such as Fogelgren-Pedersen, Andersen and Jelbo (2003) also adopted the DTPB model as a framework to conduct a qualitative study on acceptance and rejection of Mobile Internet. As recommended by Taylor and Todd (1995), if the central goal is to predict IT usage, it can be argued that TAM is preferable, otherwise DTPB provides a more complete understanding of the determinants of behavioral intention. By allowing the decomposition of each TPB beliefs constructs, researchers can drill down into sub-factors of the core belief constructs, thus proving more insightful understanding of users' acceptance process. Consequently, DTPB is considered a suitable model in this study as compared to other acceptance models due to its combined features of the three models, TAM, TPB, and DOI, to examine factors contributing to adoption intention towards online education.

2.5 Discussion of the Dependent Variable

Behavioral Intention: Adoption Intention

Behavioral Intention (BI) refers to how hard people are willing to try and how much effort they are planning to exert in order to perform a behavior (Ajzen, 1991). It is a measure of strength of an individual's intention to perform a specified behavior (Fishbein & Ajzen, 1975 cited in Davis et al., 1989). BI is influenced by three components, i.e. a person's attitude towards performing the behavior, the perceived social pressures or subjective norm, and the perceived behavioral control as per TPB and DTPB (Ajzen, 1991; Taylor & Todd, 1995).

Acceptance models include TRA, TPB, DTPB, as well as TAM as immediate antecedents to behavior. These theories suggest that the stronger a person's intention to perform a particular behavior, the more successful the performance of such behavior will be. Intention is a function of salient beliefs about the likelihood that performing a particular behavior will lead to a specific outcome. Thus, decisions to act or not act are the result of an assessment of the likelihood of specific outcomes associated with the act along with the subjective value assigned to those outcomes. Based on the results of assessment, if it is positive, then a decision is made to perform the behavior. Similarly, if the assessment result is negative, then a decision is made to reject or not to perform the behavior. That decision is the BI, which is the antecedent to behavior according to TRA, TPB, and DTPB. Specific antecedents to BI in the TRA are subjective norms (what important others want one to do) and attitudes toward the behavior (e.g., one's affective reaction to performance of the behavior). Enhancement of TRA, namely TPB, and DTPB add the perceived behavioral control as an additional determinant of behavioral intention.

Researchers have long been using BI as an indicator for predicting actual behavior. According to Ajzen (1991), it is found by researchers in various fields, that when behaviors pose no serious problems of control, they can be predicted from intentions with considerable accuracy. As the acceptance theories are applied to the field

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of technological innovation adoption and information systems, researchers such as Davis et al. (1989), Malhotra and Gallatta (1999), Taylor and Todd (1995); Venkatesh, Morris, Davis, and Davis (2003) also confirm that BI is significantly correlated with the usage of computer system (the behavior). Therefore, understanding determinants of behavioral intention will also lead to understanding of determinants and likelihood of the person to perform the behavior.

In this study, the behavioral intention implies a person's intention to adopt online education. The research aims to understand determinants of adoption intention towards online education, which is considered a new and innovative idea to obtain access to education online using Internet-based technologies.

2.6   Relationship of the Independent Variables to the Dependent Variable

2.6.1 Attitude and Behavioral Intention

According to Fishbein and Ajzen (1975), attitude refers to a person's general feeling of favorableness and unfavorableness towards some stimulus object. Therefore, a person's attitude toward the object is a function of his evaluation of the object's attributes. Intention was defined as a person's location on a subjective probability dimension involving a relation between himself and some action. Therefore, behavioral intention refers to a person's subjective probability that he or she will perform certain behavior (Fishbein & Ajzen, 1975). Fishbein and Ajzen (1975) argued that there is a strong relation between attitudes and intentions, and posits that the more favorable a person's attitude toward some objects, the more he or she will intend to perform positive behaviors (and the less favorable a person's attitude, the less he or she will intend to perform the behavior).

According to Bagozzi (1982), expectancy-value judgment was found to influence intention both directly and indirectly through affect, while Fishbein and Ajzen (1975)

posits that cognition influences intention only directly through their impact on affect, whereas Triandis (1977) proposes that cognitions and affect are two parallel causes of intention. Bagozzi (1982) found that behavior was influenced directly only by intentions, with cognitive and affective processes operating only through their effects on intention.

.Lu et al. (2003) included system complexity in the proposed TAM model for Wireless Acceptance. They argued that the impact of system characteristics has been widely recognized in system and technology acceptance research by Davis et al. (1989); Davis (1993). Being exposed to a number of technological innovations, consumers are likely to have formed favorable or unfavorable attitude toward those innovations whether or not they have actually experienced using those products. Therefore, attitude such as PU, PEOU, Social Influence, and Facilitating Conditions should affect the intention to use such products positively or negatively. System complexity inhibits the learning and perceived ease of use of the system; affecting adoption intention is widely recognized with supportive evidence in a number of studies, such as Davis et al. (1989). Facilitating conditions such as training and technical support are necessary determinants of technology adoption in organizations. Additionally, policies, regulations, and legal environment are all critical to technology acceptance (Lu et al., 2003).

Perceived Compatibility refers to the degree to which an innovation, in this study it refers to online education, is perceived as being consistent with existing values, past experiences, and needs of potential adopters (Rogers, 1995, 2003). Fogelgren-Pedersen et al. (2003) found from their qualitative study on Mobile Internet acceptance and rejection, that subjective norm was not found to be a significant factor due to early adopter characteristics of respondents.

Park and Chen (2007) investigated human motivations affecting acceptance and adoption of smart phones among medical doctors and nurses, employing the Technology Acceptance Model and Diffusion of Innovation theory by examining whether factors such as innovation attributes and self-efficacy influence the adoption decision for smart phones. The results indicated that behavioral intention to use was largely influenced by

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perceived usefulness and attitude toward using smart phones. In addition, perceived usefulness and perceived ease of use positively determine attitude toward using smart phones. Observability was the only innovation attribute found to significantly influence the attitude towards smart phone usage. Trialability showed weak correlation, while compatibility was not tested due to missing value. Based on the findings, the study concluded that attitude towards using smart phones was the strongest significant predictor of the behavioral intention, followed by perceived usefulness and self-efficacy.

For this particular study, the relationship between attitude and behavioral intention implies that if a student forms favorable attitudes toward online education, he or she will intend to adopt online education.

2.6.2 Subjective Norm and Behavioral Intention

Characteristics of norms was described by Rimal and Real (2003) with four features: 1) norms are thought to exist and any behavior departure from a norm is followed by some punishment; 2) norms are different from laws, in that laws are explicitly codified whereas norms are understood through social interaction.; 3) norms do not exist in the absence of communication among members of the group, 4) norms can be redefined as group-identity based codes of conduct that are understood and disseminated through social interaction. With these characteristics, norms become the basis for social control and a code of conduct for individual behavior to keep societies in order. Extensive evidence from past research has shown that norms are related to behaviors, but how effective is the norm in providing social control and influencing an individual's behavior has varied since an individual can still act independently (Stanford Encyclopedia of Philosophy, 2011). A discussion on how subjective norms or social influences are related to the behavioral intention and behavior, is provided as follows.

Norms influence behavior through a process of socialization and interactions with significant others. People learn and internalize the common values embodied in norms.

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Internalization is conceived as the process by which people develop a psychological need or motive to conform to a set of shared norms. Kelman (1961) posits that social influence operates through three processes: internalization, identification, and compliance (cited in Karahanna et al., 1999). Internalization is the process whereby individuals accept information from expert sources and integrate this information into his or her cognitive system. Identification is an individual' feelings of bonding with likeable sources of information and persists for as long as the likeable sources are salient. The third process is compliance, which occurs when powerful sources have control over an individual in the form of rewards and punishments (Kelman, 1961 cited in Karahanna et al., 1999; Malhotra & Galletta, 1999; Venkatesh & Davis, 2000).Warner and DeFleur (1969) found that main variables affecting behavior is not what an individual personally feels he should do, but rather his belief about what "society" i.e. most other people, his/her reference group etc. says he/she should do.

The linkage between norms and behavior has been widely studied. According to Karahanna et al. (1999), the subjective norm is closely related to the aspect of communication network in DOI and two of the four core components of diffusion of innovation, i.e. communication and the social system (Rogers, 2003). Evidence of the importance of subjective norm or social influence is found in numerous studies. For example, Kraut, Rice, Cool, and Fish (1998) and Nysveen et al.(2005) found that people used a particular system more when more people in general and more people in their workgroup were using it. Referred to as "social norm", Kraut et al. (1998) suggested that social norms focus less on the objective value of an innovation, but more on the communication context and processes through which potential adopters learn about and develop attitudes toward it. These processes include direct persuasion such as bosses or co-workers recommending the adoption, and indirect persuasion such as an individual seeing others adopting an innovation, or speaking of it (Kraut et al. 1998). Results showed that the workgroup was an important source of social norms because interaction within the group was frequent and group members were powerful sources of influence and offered a low-risk environment for trying a new system. Non-compliance to group

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norms created social costs or punishments such as embarrassment, being alienated or even fired from the group (Kraut et al., 1998).

Even though the importance of subjective norms on behavior has been confirmed with supportive empirical evidence, discussions continue on the effectiveness of subjective norms on behavior. The effect of subjective norm on behavioral intention has been mixed, based on empirical evidence in previous studies (Venkatesh & Morris, 2000; Venkatesh & Brown, 2001). Some researchers stated that it is the weakest predictor of intentions and some even removed it from their models (Godin & Kok, 1996 cited in Armitage & Conner, 2001). TAM excluded the construct due to theoretical and measurement problems (Davis et al., 1989; Venkatesh & Morris, 2000). However, the construct was later included in the TAM2 model, which is an extension of TAM by Venkatesh and Davis (2000).In the technology acceptance domain, both peer and superior influences have been shown to be strong determinants of subjective norm as in Mathieson, 1991; Taylor and Todd, 1995b; Venkatesh & Morris, 2000).

In the social computing paradigm, however, it is believed that social influences or subjective norms are factors important in user's decision making. Researchers have started to include subjective norms in their studies on technological acceptance. For example, Hsu and Lu (2004) in examining why people play online games, used the extended TAM with social influence. They found that the social norm was significantly related to the behavioral intention in the networked-based application such as online games (Hsu & Lu, 2004). On the contrary, Lin (2006) conducted a study to understand behavioral intention to participate in virtual communities and the results showed that attitude and perceived behavioral control significantly influenced member behavior intention, while subjective norms did not. However, the study by Armitage and Conner (2001) offers reason for inconsistency for the effect of subjective norms on behavioral intention. The study based on a meta-analytic review of TPB, found that subjective norm-intention correlation was significantly weaker than attitude-intention correlation and perceived behavioral control-intention correlation (Armitage & Conner, 2001). However,

the results also showed a strong relationship between subjective norm and intention when appropriately measured with multiple-item scales (Armitage & Conner, 2001).

As explained earlier, "community influence" is added as another interpersonal reference group in the context of this study, reflecting the social system's norm or the community norms, and its influence on behavior under Thailand's cultural context. Community can be a reference group (Sindhav, 2011). Some studies provide evidence of how the community can affect the behavior of individuals.

DOI theory suggests that social system and communication channels influence the adoption of products by shaping the information to which people are exposed. Thompson and Sinha (2008) argued that brand community can be viewed as both social systems composed of members and communication channels through which information about new products is transmitted. As such, brand communities have the potential to alter members' adoption behavior by selectively exposing them to information about new products offered by competing brands as well as the preferred brand. It was found that higher levels of participation and longer-term membership not only increase the likelihood of adopting new products from the preferred brand, but also decrease the likelihood of adopting new products from the opposing brands. Supportive of this phenomenon, Kramer, 1993 stated that a higher degree of community identification motivates one to fulfill the needs and goals of the community and display cooperative behaviors (cited in Wang et al., 2009). Moreover, Yang (2012) also confirmed that the interactions among forum users build up consumers' commitment to the community. Furthermore, as interactions among community become more frequent, common assumptions and shared understanding develop among community members along with greater social bonding and emotional attachments, which in turn, tend to foster group cohesiveness and conformity (Wang et al., 2009).

According to Hogg and Terry (2000), social identity serves as a social-cognitive schema (norms, values, and beliefs) for group-related behaviors that develops through a process of self-categorization (cited in Wang et al., 2009). Social categorization theories

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imply that people develop group intentions as a result of internalization process, to act or behave in a specific way toward an issue related to the group and thus maintain a positive, self-defining relationship with the group. It was found that social identity and group norms affect community members' group intentions to accept advertising in online communities. The stronger the social identity possessed by online community members, the more likely are they to develop group intentions to accept advertising. Additionally, the stronger the group norm, the more positive the effect is on group intentions. For instance, online communities could employ educational campaigns to instill a sense of belonging among users to enhance social identity perceptions, and could also propagate the benefits of accepting advertising for long term survival of the community (Wang et al., 2009).

de Silva, Ratnadiwakara, and Zainudeen (2010) studied various influences on mobile phone adoption in Bangladesh, Pakistan, India, Sri Lanka, Philippines, and Thailand. The study found evidence of the importance of social influence in mobile phone adoption in two modes: one that exerts pressure on individuals to adopt; and another that helps generate benefits via social networks that are tied in with economic and business networks. The results support previous findings related to mobile phone adoption by Chabassou et al. (2009). These authors assessed the importance of this factor through memberships in any "social network" such as church group and sports clubs, and found that belonging to such networks contributes positively to the probability of mobile adoption in seven out of seventeen countries surveyed in the study (cited in de Silva et al., 2010).

Li and Lai (2008) studied antecedents of behavioral intention toward virtual community participation. They argued that the social nature of the virtual community or VC software requires that social factors such as sense of belonging and social identity are taken into account. Additionally, previous research found that the relationship between social factors and the behavioral intention is stronger in a formal and constrained social situation, or in a social situation with clearer norms such as in work place settings. On the other hand, social factors will have no or even a negative effect on behavioral intention in

an informal, and relaxing social situation. The results showed that all three factors are significant, but with affect having the strongest impact, and social factors having the least.

It is argued that culture, which is characterized by shared beliefs and values, affects behavior in such a way that people from the same culture tend to perceive things in a similar way. Community influence, in this study, refers to the social pressures or codes of conducts from the community that influence an individual's decision to adopt or not to adopt online education. In other words, it is the belief that the community a person belongs to approves or disapproves of adopting online education. The following example demonstrates how cultural values of the community or community influence (in this study) are related to behavior with respect to online education adoption.

Thongprasert (2004; as cited in Bray, 2004) conducted a study on Thai students' attitude towards online courses based on Hofstede's cultural dimensions and found that some cultural traits might be inhibiting online learning adoption. These traits are 1) high power distance – teachers are seen as sources of knowledge and students tend to express their own ideas and are unwilling to share in the discussion, 2) Collectivism – students are reluctant to work independently, which is often the requirement for online distance education, 3) high uncertainty avoidance – both students and teachers tend to see something new and unfamiliar as dangerous and risky which needs to be avoided. Based on this finding, Bray (2004) suggested that educational services exporting countries targeting Thailand and other Asian countries as the market for online education should pay careful attention to the design of course contents and structure that can better match the characteristics of the targeted students.

Another example offers a contrasting result with regards to relationship between cultural traits and behavior. Im, Hong, and Kang (2011) expected from their comparative studies between US and Korea that social influences should be greater in an Asian culture such as Korea, but found surprising results, in that, there was no significant difference in the impact of social influence between US and Korea.

According to TRA, TPB, and DTPB, subjective norm or social influence has a direct effect on behavioral intention.

2.6.3 Perceived Behavioral Control and Behavioral Intention

TPB theorized that the presence of constraints can inhibit both the intent to perform the behavior as well as the behavior itself. On the contrary, the presence of facilitating resources and technologies can enable both the intent and the actual behavior (Ajzen, 1991). Based on the assumption that motivation and ability interact in their effects on behavioral achievement, factors that influence intention and behavior are facilitating factors such as resources, time, money, skills, technology, government policy, environment, and so on. TPB posits that the stronger the intention to perform the behavior, the more likely the performance of such behavior should be (Ajzen, 1991). This implies that an individual will be motivated to perform a particular behavior provided that he or she perceive the likelihood of success based on his or her ability and evaluation of resources available to him or her to perform such behavior.

PBC refers to people's perception of the ease or difficulty of performing the particular behavior. It differs from the concept of "locus of control" in the way that it varies across situations and actions, while locus of control in general remains stable across situations (Ajzen, 1991). It can be closely compared to the theory of achievement motivation by Atkinson (1964), which combines multiplicatively the situational expectancy of success and the situation-specific or incentive value of success (Ajzen, 1991). As such, Ajzen (1991) suggested that the concept of perceived behavioral control is most compatible with Bandura's (1982) concept of perceived self-efficacy. Self-efficacy is defined as judgments of how well the person can execute courses of action required to deal with prospective situations (Bandura, 1982 cited in Ajzen, 1991). Accordingly, Ajzen (1991) argued that PBC and self-efficacy constructs are interchangeable, but several authors such as Terry (1993) suggested that the two constructs are not entirely synonymous (Armitage & Conner, 2001). Additionally,

Bandura (1982, 1992) has argued that control and self-efficacy are different concepts i.e. self-efficacy reflects internal control factors, whereas PBC reflects more general external factors (Armitage & Conner, 2001). By referring to Armitage & Conner (2001), this study includes self-efficacy as one dimension under PBC.

Recent worldwide debates on educational issues related to enhancement of academic achievement have focused on development and promotion of students' learning habits that would be more suitable in the globalized and technological world (Haddoune, 2009). One way to achieve this is to foster sophisticated self-efficacious learners to prepare them to be strategic, self-reflective, and enduring to meet any challenges in learning as well as living their life (Haddoune, 2009). Self-efficacy has emerged as a highly effective predictor of students' motivation and learning for over two decades (Zimmerman, 2000).

Self-efficacy has been found to influence key indices of academic motivation as choices of activities, level of effort, persistence, and emotional reactions (Zimmerman, 2000). It has been found that self-efficacious students participate more readily, work harder, persist longer, and have fewer adverse emotional reactions when they encounter difficulties than those who are low in self-efficacy (Bandura, 1997 cited in Zimmerman, 2000). Supportive of this notion, Cameron and Kirkman (2010) suggested that universities need to engage first year international students in a discussion about self-efficacy and facilitate them to acquire necessary academic, social, and cultural competencies to be able to cope well with culture shock.

According to Triandis (1980), behavior cannot occur if objective conditions in the environment prevent it, or if the facilitating conditions make the behavior difficult. Therefore, policies, regulations, and legal environment are all conditions critical to technology acceptance (Lu et al., 2003). Ajzen (1991) argued that the more resources and opportunities individuals believe they possess, and the fewer obstacles or impediments they anticipate, the greater should be their perceived control over the behavior. Therefore, technology facilitating conditions and resources facilitating conditions are included as

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antecedents of perceived behavioral control. In this study, it can imply how confident a person is to study online based on internal and external factors such as emotions, skills, resources available, and situational or environmental conditions. An individual will be more confident to study online provided that he or she has confidence in his/her capabilities (self-efficacy), the necessary facilitating conditions including technological resources such as high-speed Internet and computing resources, as well as other resources such as time and money.

Armitage and Conner (2001) found from their meta-analytic review of TPB that PBC adds on average 6 percent to the prediction of intention, over and above attitude and subjective norm. Thus, they concluded that PBC appears to influence behavior directly and indirectly through intention, independent of TRA variables and therefore represents a useful addition to the TRA.

In this study, the relationship between perceived behavioral control and behavioral intention implies that if the target student believes he or she has more control over studying online, he or she will be more likely to adopt online education.

2.6.4 Self-Directed Learning and Behavioral Intention

Smith and Sadler-Smith (2003) argued that the learner characteristics of readiness is likely to be a crucial factor in determining levels of motivation and performance in learning from online sources. Research consistently identifies learner self-management and self-directedness as important in the readiness for online learning.

The notion of readiness of students for online learning is developed in the context of the Australian vocational education and training sector by Warner et al. (1998), by discussing readiness for online learning as requiring three pre-requisites: learners' preference for online delivery of learning over face-to-face delivery, learners' confidence and competence in information and communication technologies for learning, and the

ability to engage in autonomous learning. Oppenheim (1992, p.105) defined 'readiness' as part of attitude: "most people agree that an attitude is a state of readiness, a tendency to act or react in a certain manner when confronted with certain stimuli". Greener explained that 'willing and able' imply ability through skills, knowledge, and competence plus attitude and motivation focused on the task. Gibbons and Wentworth (2001) linked the notion of readiness to motivated orientation to learning found in online learners, particularly non-traditional students. Greener suggested that ICT skills and self-direction for learning (defined as a liking for learning and independence in study) will be important in readiness for online learning. Furthermore, Greener also believed that the readiness had more in common with the idea of students' choice around whether or not to take an online elective (Greener, 2003).

Smith (2005) assessed the learning preferences and readiness for online learning. The results identified that self-management of learning or self-directed learning is one of the key factors associated with flexible delivery and resource-based learning, in addition to the comfort with e-learning. Several researchers, such as Wang and Newlin (2000), Valenta, Therriault, Dieter and Mrtek (2001), and Warner, Christie and Choy (1998) found from their studies that independent learning factors such as ability for self-directed learning, intellectual inquisitiveness, and internal locus of control, are possible predictors of success with technology-mediated distance education (Smith, 2005). Other researchers in the field of distance learning also confirmed that independent self-direction style of learning is necessary for learners to effectively and successfully engage in distance education, including Kember (1995); Evans and Smith (1999); Smith (2000); and Evans (2000). As such, self-directed learning is believed to be a beneficial and necessary pre-requisite characteristic of learners in an online learning environment (McVey, 2000; Hartley & Bendixen, 2001; Smith, 2005).

Greener (2008) investigated student conceptions of "blended" or "hybrid" learning, based on their experience of a Higher Education Masters level module at a British university, using a qualitative method. The students' conceptions were related to the stage of study and an analysis of motivations for learning in this context. Lumsden

(1999) suggested that student motivation may be intrinsic or extrinsic and it comprises the various situational reasons why students choose whether or not to engage in academic tasks. Entwistle (1987 in Greener, 2008) distinguished types of student's motivation into: 1) Competence motivation – a search for successful learning experiences; 2) Extrinsic motivation – a search for qualifications or good grades; 3) Intrinsic motivation – a search for subject knowledge and understanding; 4) Achievement motivation – a search for improved self esteem through achievement. The interview results identified the need for comfort and confidence in learning, and the need for everyone's personal commitment to support the group's learning. The blended mode gave students the freedom to make time and quality decisions about learning, about how much to do, enjoyment, self-discipline and adaptation to personal learning style. A clear awareness for the need of self-directed learning was found. Students expressed need for something to make people participate more, such as force or compulsion to make the effort sustained by stimulation and interest through method and content or a strong commitment to finding their own way to meaningful understanding.

Cultural factors are also influential such as attitudes toward education, individualism versus collectivism, and the role of the teacher (Lumsden, 1999). According to Fischer and Sugimoto (2006), self-directed learning can be characterized as "less structured, self-paced, activities orientation and learner's self motivation towards his or her own goal with choice of topic, time, and place. Learning becomes an integral part of life — driven by a desire and need to understand something, or to get something done instead of merely solving a problem given in a classroom setting. Successful self-directed learning is driven by each individual who actively externalizes his/her own ideas and contribute to peers, who uses feedback for reflection and furthers the learning process. However, culture is also a key factor for successful self-directed learning. Fischer and Sugimoto (2006) stated that in Eastern cultures, especially the Japanese culture, collaborative learning has yet not been successful in many Japanese schools since Japanese learners tend to leave the judgment or authority of the group to the leader or powerful person. Additionally teachers are perceived as superior to students in Eastern cultures such as Japan and China, therefore students leave the teaching to teachers and

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teachers are to be respected, listened, and followed rather than have collaborative or exchange of ideas to contribute to the learning (Fischer & Sugimoto, 2006).

Robertson (2007) conducted a survey to seek evidence that support assumptions about learners in vocational education towards online learning. Despite the use of technology for non-educational purpose, this does not guarantee the transferability of the use in education. The results of survey did not find solid evidence to support the readiness and preference for online learning among VET students.

Wang, Wu and Wang (2009) conducted a study to explore the factors affecting users' acceptance of m-learning based on the unified theory of acceptance and use of technology (UTAUT), with enhancement of two additional constructs to the model: perceived playfulness and self-management of learning. Data collected from 330 respondents in Taiwan were tested using the structural equation modeling approach. The results indicated that performance expectancy, effort expectancy, social influence, perceived playfulness, and self-management of learning were all significant determinants of behavioral intention to use m-learning. The authors also found that age differences moderate the effects of effort expectancy and social influence on m-learning use intention, and that gender differences moderate the effects of social influence and self-management of learning on m-learning use intention. It is worth noting that the two newly proposed constructs, perceived playfulness and self-management of learning, were significant for all respondents ($g = 0.21$, $p < 0.01$ and $g = 0.20$, $p < 0.01$, respectively). Thus, this study has provided evidence that self-management of learning or self-directed learning positively affects the behavioral intention to use m-learning. The results imply that m-learning systems should enable users to choose what they want to learn, control their learning progress, and record their learning progress and performance. Additionally, an individual with highly autonomous learning ability will be more likely to use m-learning than will an individual with a lower autonomous learning ability. This result establishes the predictive validity of the self-management of learning instrument proposed by Smith et al (2003) in predicting the behavioral intention to use m-learning. For m-learning system developers, they can design m-learning systems with functions of

time management, learning content hierarchy control and learning progress control to attract those who have highly autonomous learning abilities. On the other hand, pedagogical policy makers could program corresponding curriculums that can inspire and boost learners' capability of self-management of learning. Educators should diligently deliver these curriculums to cultivate students' habit of continuous self-learning and lifelong-learning, which will in turn increase the number of users of m-learning systems in the near future.

In non-traditional classroom environment, capabilities and willingness to take control, self-management and self-direction of one's own learning, are important in the distant learning context (Liu, Han, & Li, 2010).The authors further argued that in m-learning situation, students need to also take control of their learning since they are also socially and physically separated from their peers and instructors. Additionally, empirical evidence found in studies by Long (1991) and Hanna et al. (2000) confirmed that self-directed learning is a significant factor for predicting learners' academic success in a traditional classroom as well as online learning contexts. Liu, Han and Li (2010), therefore proposed that self-management of learning or self-directed learning would lead to learners' willingness to adopt m-learning.

Brahmasrene and Lee (2012) examined the intent to continue using online learning by including constructs of online learning readiness, social ability, and perceived usefulness. Eight hundred and seventy two samples of students studying online business classes from two universities in the United States and South Korea were selected. Data were analyzed using structural equation modeling and sample t-statistics. The results showed that perceived social ability, online learning readiness, and perceived usefulness are significant factors predicting intention to continue using online learning in both countries. Most interestingly, the results showed significant group differences in online learning readiness and perceived usefulness due to cultural influences. Though perceptions of online learning may differ in different cultures, students from both Korea and US still perceived online learning positively with intention to continue using online learning.

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In online education, there are opportunities and challenges related to self-directed learning. Song and Hill (2007) summarize key challenges include: 1) ease and convenient access to resources at anytime, anywhere and as frequently as possible provide opportunities for learners to reflect deeply on topics, discuss with peers and instructors, as well as access information on the Internet. However, reliability and validity of information are major challenges that require self-directed learning ability to filter related and necessary information effectively in a timely manner; 2) written communication is the major means of communication as opposed to verbal in a classroom context. With lack of facial and body expression, misinterpretation or misunderstanding can occur during communication, thus requiring communication strategies to be developed for online education. Moreover, responses may not be timely since peers may not feel obligated to respond as soon as required. Furthermore, responses from instructors may also be delayed; 3) procrastination is easy in online education, thus requiring self-motivation to learn online. In conclusion, it is arguable that learners who are ready to manage the above challenges, or in other words acquire attributes of SDL, would be more likely to adopt online education.

2.7   Previous Studies, Related Research, and Findings

Jebeile and Reeve (2003) studied teacher's adoption of web technology for educational delivery namely "web-based eLearning system" in a secondary college in Sydney, Australia. A total of 75 teachers participated in the survey and all questionnaires were completed and useable, satisfying the sample size requirements of the study. The data collected then was analyzed using Multiple Regression. The results suggested that teachers' perceptions regarding web technology attributes including relative advantage, compatibility, visibility, ease of use, results demonstrability, and trialability should be considered by school administrators in order to increase the rate of adoption of e-Learning. Image attributes did not emerge as significant in the context being studied. The authors pointed out the importance of adoption among users of eLearning, i.e., that the lack of adoption will impede the progress in terms of an educational institution's role in

preparing knowledge workers for the knowledge economy, despite increased spending on ICT in the educational sector. Additionally, they suggested that extra workload to handle eLearning while also attending traditional face to face learning became a hurdle for teachers, thus constraining the adoption rate among teachers.

Ndubisi (2004) examined factors influencing eLearning adoption intention in the Malaysian education system based on the structure of DTPB constructs. The studied system was Blackboard, a web-based Learning Management System. The target population consists of students of one of the public universities in Malaysia who had experience in both traditional classroom learning and online learning system for at least one semester. A total of 300 respondents participated in the survey. The purposive non-probability sampling method was used for sample selection. The collected data was analyzed using the Hierarchical Multiple Regression model to predict the relationships between the constructs. It was found that perceived usefulness, perceived ease of use, and the security of the system positively affected the attitude toward the system; attitude in turn, positively affected the adoption intention toward the system. Furthermore, it was found that attitude and perceived behavioral control were significantly related to the behavioral intention, while the subjective norm was not. The author explained that the reason might be because the respondents are volunteers for the trial, therefore, subjective norm was not a likely factor. Overall results showed that attitude directly influenced behavioral intention to adopt eLearning. The course leader's influence was positively associated with subjective norm which also mediated the relationship between course leader's influence and adoption intention. Finally, the perceived behavioral control also had an important influence on eLearning adoption intention, and it also mediates the relationship between self-efficacy, computer experience, training, access to technological facilities and the adoption intention of eLearning system. The findings provide guidelines for system designers, marketers, as well as universities to improve students' participation in online learning.

Suanpang and Petocz (2004) explored students' experiences in learning business statistics through a pilot online course designed as a pioneering project at Suan Dusit

Rajabhat University (SDRU), Thailand. Based on the Community of Inquiry as theoretical framework, the research model assumed that within the community, learning occurs through interaction of three components: cognitive presence, social presence, and teaching presence. Cognitive presence refers to the extent to which participants are able to construct meaning through sustained communication. Teaching presence refers to designing and managing learning sequences, providing subject expertise and facilitating active learning. Social presence refers to the ability of learners to project themselves socially and emotionally in a community of inquiry. There were 269 participants out of 1000 students enrolled in the business statistics course. Data collection process covered 16 weeks using qualitative methods including interviews, students' diaries, messages from the discussion board, and end-of-semester evaluation. It was found that the majority ofthe students used the online mode for reading course materials, doing exercises, searching for information, taking quizzes, and communicating with other students as well as teachers. The online course could support students to learn more effectively and enhanced their attitudes toward the subject of business statistics. The results showed that online students were able to communicate more effectively with a higher level of interaction than the traditional group of students. In addition, online learning environment also provided more opportunities for students to share with others their thoughts, interpretation, and reaction to the ideas and topic presented. Teachers in online course acted more as facilitators, providing feedback, guidance in learning and providing encouragement, while teachers in traditional class played a traditional authoritarian role. However, there were also problems and concerns detected during the pilot. Appropriate structures were required to prevent a sense of isolation and lack of social interaction by including occasional face-to-face meetings to develop a learning community and social contact among students. Technical problems and Internet speed were possible obstacles. Students' skill in English language is necessary to access global information. The authors concluded that eLearning could become a powerful method for extending education in developing countries such as Thailand and other countries in Southeast Asia. This exploratory research study can provide some guidelines to further encourage students' adoption of online learning.

Crossman (2005) explored the relationship between work and learning since the growth of enrollment in Thailand's open universities had been increasing, indicating the demand for flexible learning and growing acceptance of foreign education qualifications through distance programs. Tang (1999 as cited in Crossman, 2005) also argued that Asian transnational distance students tend to seek out programs that can be applied to their employment contexts. Crossman (2005) then conducted a qualitative study concerning the experiences of nine Thai transnational distance learners enrolled in doctoral programs in Australian universities, while working in higher educational contexts in Thailand. The findings revealed that the workplace is an important influence on the quality of learning experience, including finance, time, technology and other resources. Technological resources, including speed of Internet access, personal computer resources, and technical supports were some obstacles and discouraging factors for learning in an online distance environment.

According to Burn and Thongprasert (2005), the widespread adoption of information communication technology in educational sector and the globalized vision for educational delivery has driven traditional universities to change from traditional classroom to long distance delivery models to serve the accelerating demand for mass education. Thailand, in 2004, was still in its early stage of developing virtual education delivery or online education. Burn and Thongprasert (2005) examined the critical success factors for implementing virtual education delivery in Thailand using both qualitative and quantitative methods. They proposed that five factors, including resources, computer literacy, perceived value of computer-based information, characteristics of students' culture, and information culture, would significantly influence the perception of Thai virtual education delivery. A total of 240 samples were drawn from 4 Rajabhat universities, of which 167 responses were valid. The data was then analyzed using Multiple Regression. The findings indicated that students' perception can be improved by enhancing information culture with supportive material content online, email discussions, supportive university contexts and perceived value of computer-based information. In addition to the perception, it was also found that resources, computer literacy, perceived value of computer-based information, organizational culture, and information culture

were significant influences on the success of Thai virtual education delivery. The authors concluded that for educational institutes to be successful in implementing virtual education delivery, they should: 1) improve technologies and provide technical support; 2) increase IT competency and skills of students' and instructors; and 4) enhance the members' cooperation and commitment.

Marchewka, Liu, and Kostiwa (2007) conducted an empirical study to understand student perceptions using course management software - Blackboard. The research framework was based on the User Acceptance and Use of Technology (UTAUT) model. Constructs including performance expectancy, effort expectancy, attitude toward using technology, social influence, facilitating conditions, self-efficacy, and anxiety were tested to examine the relationships with behavioral intention. Using online survey for data collection, 132 students from a Midwestern University in the United States, where the use of Blackboard system is strongly encouraged, participated in the study. Based on the correlation analysis, it was found that the data did not support a significant relationship between performance expectancy and behavioral intention, which is in contrast to major research findings. However, significant relationships were found between Effort Expectancy and Behavioral Intention, as well as between Social Influence and Behavioral Intention. Overall results did not find strong support for the UTAUT model. The authors suggested further research to validate the fit of UTAUT model since this study is limited to small sample size, and the model fit may differ in larger organizational settings.

Keller, Hrastinski, and Carlsson (2007) examined students' acceptance of eLearning environments between education in Sweden and Lithuania. The research framework was developed by integrations of Diffusion of Innovation theory (DOI) and User Acceptance and Use of Technology (UTAUT). The survey study was conducted at two university departments offering post graduate education in public health in Sweden and Lithuania. In the Swedish research setting, ClassFronter was used as an e-learning environment to deliver education online. The questionnaire was distributed and thirty-two students respondents, of which 29 were women and 3 were men. Students' ages ranged from 28 to 58 years with a mean age of 49 years. The Lithuanian research setting used

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WebCT as an e-learning environment to deliver education online. The questionnaire was translated by a Lithuanian IS academic and distributed in three master degree courses. Thirty-five students answered the questionnaire, of which 22 respondents were women, and 13 were men. Students' ages ranged from 25 to 56, with a mean age of 41 years. Measures of means and standard distributions were computed for each core construct to compare the responses from the two student populations. A bivariate correlation analysis using Pearson correlation coefficient was conducted to explore relationships between technology acceptance core constructs, and to assess relationships between core constructs and individual students' background factors. The authors found that the overall results varied between the two cultures, suggesting that cultures may influence the adoption intention. They also found confidence in the use of computers impacted the acceptance positively in the Swedish University, while previous knowledge of computers positively influenced the acceptance in the Lithuanian university. Interestingly, Swedish students experienced a higher degree in terms of facilitating conditions, but Lithuanian students displayed a higher degree of eLearning acceptance.

Siragusa and Dixon (2009) conducted a qualitative and quantitative study to determine students' attitudes towards ICT-based learning interactions. This study was the second study after the test of applicability of Theory of Planned Behavior was performed in the first pilot study. Methodology and research instruments were refined and used in this second study. A total of 21 undergraduate students were invited to complete the questionnaires refined after the first study. Students were then asked to complete 20 minutes ICT interaction activity. The qualitative data was then collected by completing another questionnaire as well as describing their reactions to the ICT interaction. The qualitative results found that students felt some anxiety in the initial stage since they neither had knowledge nor experience of the session, but more confidence was gained as the activity progressed. The results of quantitative data of the pilot study showed that three quarters of participants indicated the intention to engage in ICT-based learning interactions. The factors influencing the intention were positive attitude about the system, opinions of the people who are important to them, and a sense of control. The findings are in line with the technology adoption models i.e. Theory of Planned Behavior

and the Decomposed Theory of Planned Behavior proposing that behavioral intention is a function of attitude, subjective norm, and perceived behavioral control.

Rath and Sekhar (2010) assessed students and faculty's response to e-Learning adoption by examining their perceptions on various attributes of high technology equipment used for educational delivery in the twin cities of Hyderabad and Secunderabud. The study was conducted using samples of 20 faculty members in different disciplines and 75 students from the participating institute completed the questionnaire. Using the Multiple Regression Model to test the hypotheses, the results showed that attributes of the innovation are perceived differently by students as compared to faculty members. In terms of lecture and presentation preparation using ICT, the results revealed that relative advantage, compatibility, visibility, image and trialability were found as significant predictors, except for ease of use and results demonstrability by faculty members. For the students' perceptions, only relative advantage was found to be a significant predictor. The authors suggested the different results may be due to the reason that students use the ICT equipment less than faculty members for class preparation. In terms of the lecture and presentation delivery, and the faculty members' perception towards using the ICT tools, the results revealed that all are positively significant as predictors, while relative advantage, visibility, and results demonstrability were found to be insignificant as predictors. The research by Rath and Sekhar (2010) provides some implications for e-Learning diffusion. The adoption and usage of new ICT tools for students and faculty members are different due to the nature of tasks and roles, and therefore requires different strategies and motivation. Since this study focused on students rather than faculty members, the research implies that influential factors for students to adopt the ICT tool in their study are compatibility, image, ease of use, results demonstrability, and trialability.

Jebeile and Abeysekera (2010) argued that the information revolution has forced developed economies into an era that demands effective utilization of ICT in education to prepare knowledge workers for the knowledge economy. As a result, educational institutions must reassess their methods of practices, adapting and improving teaching

and learning for the changing needs of global, digital, and networked economy. The use of ICT in teaching and learning can enhance student learning outcomes and stimulate their motivation and also facilitate student-centered approach. DOI was applied to determine whether the students would be willing to adopt the ICT innovation in the future to supplement traditional teaching methods. By focusing on students' perceptions relating to the attributes of WEBLEARN as an innovation in their learning environment, the results showed that DOI was successful in predicting the students' intention to use WEBLEARN for learning purposes. A sample of 485 students responded to a questionnaire adapted from Moore and Benbasat (1991) with 4 variables relevant to web use in teaching and learning, i.e. relative advantage, compatibility, ease of use, and results demonstrability. Using Multiple Regression, the overall results demonstrated that relative advantage, compatibility, ease of use, and results demonstrability, were all important in explaining students' intention to extend their use of WEBLEARN for learning purposes if the module was extended to other topics in their program of study. Based on results, the authors found that students who used WEBLEARN formed favorable perceptions regarding its relative advantage over other learning resources such as the prescribed text exercises, as an effective platform to learn. Students attributed the compatibility of the resource in the context of the topic and also compatible with how they like to learn and learning style. Students also commented favorably on ease of use in learning independently. Results demonstrability was perceived positively by students as they clearly cited the benefits gained from using WEBLEARN. The results are consistent with Pugalee and Robinson (1998) and Leidner and Jarvenpaa (1995) who suggested that web-based interaction and learning environment create greater student control over their own pace and content of learning, and the way students like to learn.

Lee, Hsieh, and Hsu (2011) argued that existing antecedents of acceptance intention in TAM do not sufficiently reflect e-learning system acceptance by users in an organization. Therefore, researchers propose to integrate DOI characteristics of innovation into TAM as determinants of perceived usefulness, perceived ease of use, and behavioral intention. They have added DOI attributes to TAM to evaluate employees' intention to use e-Learning systems. By combining DOI and TAM, the researchers

proposed an extended technology acceptance model to investigate factors affecting business employees' behavioral intention to use the e-learning system. The model was tested with data collected from a sample of 552 employees using e-learning system in Taiwan. Structural Equation Modeling was used for data analysis. The results showed that DOI's five attributes of innovation significantly influenced employees' behavioral intention to use the e-learning system. The effect of compatibility, complexity, relative advantage, and trialability to the perceived usefulness are significant. The effects of compatibility, complexity, relative advantage, and trialability on perceived ease of use are also significant. Therefore, the results confirmed previous findings that there exists a strong relationship among the five characteristics of innovation and the behavioral intention.

Bhatiasevi (2011) proposed that more research on eLearning adoption in Thailand is required as there have been few empirical studies on the subject and very little is known in the field of international eLearning. Therefore, the author conducted an empirical study to examine factors affecting students' acceptance of eLearning system based on extended technology acceptance model (TAM). The proposed factors included computer self-efficacy, system functionality, and teaching materials which can influence behavioral intention through perceived usefulness and perceived ease of use. The samples were 207 undergraduate students in Thailand. Structural Equation Modeling was used for data analysis. The results indicated that computer self-efficacy, system functionality, and teaching materials had positive effects on perceived ease of use. Perceived ease of use then positively affected the perceived usefulness, which in turn, affected intention to use eLearning. From the results, it can be concluded that if students are confident in using computers and if system functionality is easy, they will find eLearning to be useful, thus increasing their intention to use the system.

CHAPTER III

RESEARCH FRAMEWORK

This chapter begins with an overview and discussion of theoretical frameworks used as foundation to build the conceptual framework for the study of factors contributing to online education adoption. The second section comprises a discussion on the proposed conceptual framework followed by the research hypotheses posited in the study and the operationalization of the independent and dependent variables.

3.1   Theoretical Framework

This study adopted the well-known Diffusion of Innovation theory (DOI) originally developed by Everette M. Rogers, with the integration of one of the major acceptance models, i.e. the Decomposed Theory of Planned Behavior (DTPB) with modifications to suit the context and purpose of the study. Many researchers have recommended the integration of DOI and acceptance theories, which were based on determinants of behavioral intention to predict usage behavior to study new technology adoption (Lu et al., 2003). Vishwanath and Goldhaber (2003) also supported the rationale that the DOI theory is broad since it includes as "an innovation", an idea, practice, technique or object that is perceived as new by a unit of adoption, while the unit of adoption ranges from individuals within a social system to groups and organizations. On the other hand, beliefs or perceptions about the innovation varies according to what the particular innovation is, which makes the beliefs idiosyncratic to the innovation and the adopting unit; thus integrating DOI and acceptance theories in the research model is considered to be useful (Vishwanath & Goldhaber, 2003). The researcher, therefore, adopts and adapts the integrated framework of DOI and Acceptance theories as the base

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model for this study of online education adoption. Furthermore, many researchers including McVey (2000), Smith et al. (2003), Song & Hill (2007) and Liu & Han (2010) suggested that individual's characteristics of readiness for online learning are related to the preferences and performance in online education. However, there is still a lack of empirical evidence on its effect on intention to adopt online education (Liu & Han, 2010). The researcher, thus, proposes that integrating individual's characteristics of self-directed learning in the research framework to determine its relationship towards the behavioral intention to adopt online education would add to the knowledge base in the field of online education as a sub-set of distance learning. The following section discusses the theoretical bases to derive the conceptual model for this study.

3.1.1 The Decomposed Theory of Planned Behavior (DTPB) to explain Adoption Intention

As described in Chapter 2, several acceptance theories are employed to study the consumers' behavioral response toward the technology and innovations, and integration with the diffusion of innovation theory has been common and often recommended. To serve the purpose of this study, the Decomposed Theory of Planned Behavior, as an acceptance model, developed by Taylor and Todd (1995) was selected with integration to the Diffusion of Innovation theory by Rogers (1986), based on the rationale as discussed in the following section.

Taylor and Todd (1995) compared three acceptance models to assess which one would be the best to provide understanding of usage of information technology. Such models included Technology Acceptance Model (TAM), Theory of Planned Behavior (TPB), and the Decomposed Theory of Planned Behavior (DTPB). In addition, another line of research to examine adoption intention has been integrated into acceptance models to be tested in this study, which is the Diffusion of Innovation perspective, by incorporating the perceived characteristics of innovation as determinants of attitude in the decomposed version of TPB. The results showed that both TPB and DTPB outperformed

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TAM in explanatory power for behavioral intention (Taylor & Todd, 1995). TAM, however, was considered a more parsimonious model, noted for its simplicity, which has been applied in many researches especially in the field of ICT acceptance and usage (Taylor & Todd, 1995). Additionally, when comparing between the TPB and the DTPB models, DTPB can perform better in explaining behavioral intention, though it is more complex when compared to TPB. However, the most important findings from the study of Taylor and Todd (1995) is that by decomposing the belief structures, the DTPB model provides better diagnostic value than the original TPB by identifying specific beliefs affecting the intention to use the system and as a result, provides better insight and understanding of the factors affecting the behavioral intention and more detailed practical implications.

The TAM, TPB, and DTPB models share a common basis in terms of origination i.e. they have been developed by drawing upon Fishbein and Ajzen's (1975) Theory of Reasoned Action or TRA (see Chapter 2). The TRA model posits that an individual's behavior is a function of both the individual's attitude toward a specific behavior and the social influences as well as norms surrounding that behavior (Jebeile & Reeve, 2003; Jebeile & Abeysekera, 2010). The TRA forms the backbone of attitude and behavioral relationships and has been widely adopted by researchers. It postulates that beliefs influence attitude and social norms, which in turn, shape behavioral intention which is considered an immediate antecedent of the behavior (Ajzen & Fishbein, 1980). However, since the model has been criticized by several researchers as being too general (Davis et al., 1989; Ong, Poong, & Ng, 2008) and may not be applicable in some contexts, some enhancements and variations have been developed to fill the gap including the Technology Acceptance Model or TAM (Davis, 1989), Theory of Planned Behavior or TPB (Ajzen, 1985), and the Decomposed Theory of Planned Behavior or DTPB (Taylor & Todd, 1995).

TAM was developed to study information technology acceptance in organizational settings by Davis in 1986 (Davis, 1989). Using TRA as a theoretical base, TAM argues that the effects of external variables such as system characteristics, process

and training on intention to use the system are mediated by the two key belief constructs i.e. Perceived Usefulness (PU) and Perceived Ease of Use (PEOU). It specifies the causal linkages between the PU and the PEOU that determine users' behavioral intention and actual usage of the information system. TAM has become well-accepted and is well-validated empirically as a robust, powerful, and parsimonious model for predicting user acceptance in the field of computer and information technology (Venkatesh & Davis, 2000).

Despite the obvious advantages mentioned, criticisms have been found in TAM in several aspects important to this study. Firstly, it excludes subjective norms from the model and does not account for social influence, which is key aspect in the social and network computing paradigm (Malhotra & Galletta, 1999; Venkatesh & Davis, 2000; Baron, Patterson & Harris, 2006; Vannoy & Palvia, 2010). Secondly, it is criticized as being developed originally to determine acceptance in organizational settings, and many researchers found it unsuitable when applying to the study of adoption behavior in individual non-mandatory consumer environments (Lu et al., 2003; Baron, Patterson & Harris, 2006).

TPB was developed as an extended version of the TRA to address the limitations of TRA in dealing with behavior over which people have incomplete volitional control (Ajzen, 1991). Intentions are assumed to capture the motivational factors that influence behavior, reflecting how hard people are willing to try or how much effort they are willing to exert in order to perform the behavior (Ajzen, 1991). By adding the construct namely "Perceived Behavioral Control or PBC" as the third component as a determinant of behavioral intention in addition to the "Attitudes" and "Subjective Norms" in the original TRA model, the enhanced model was called "Theory of Planned Behavior or TPB". PBC refers to people's perception of the ease or difficulty to perform the targeted behavior, which depends on abilities, resources and opportunities available to them. The TPB model implies that if people see greater chances of succeeding in the tasks, the stronger their intention will be to perform the tasks. Therefore, TPB postulates that people's intention to perform the particular behavior will depend on Attitude, Subjective

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Norm and Perceived Behavioral Control, which reflects perceptions of internal and external constraints on behavior (Ajzen, 1991).

The disadvantage of TPB as pointed out by Ajzen (1991) and Taylor and Todd (1995) is that the relationship between the belief structures and the determinants of intention i.e. Attitude, Subjective Norms, and Perceived Behavioral Control are not particularly well understood due to two factors. Firstly, the belief structures are combined into unidimensional constructs and such monolithic belief sets may not be consistently related to Attitude, Subjective Norms, or Perceived Behavioral Control. Secondly, the belief sets, especially those related to attitude, are idiosyncratic to the empirical setting, making it difficult to operationalize the TPB, resulting in problems of inconsistency and generalizability across different settings (Taylor & Todd, 1995). Consequently, Taylor and Todd (1995) addressed these limitations by decomposing the belief structures for the TPB model and proposed the DTPB model.

Consistent with TRA, DOI by Rogers suggests that five attributes or characteristics of innovations influence an individual's attitude towards his/her innovation adoption decision process (Jebeile & Reeve, 2003; Jebeile & Abeysekera, 2010; Rath & Sekhar, 2010). Although there are many characteristics of innovations, similar research in web-based educational services, as evidenced in studies by Jebeile & Reeve (2003); Lu et al., (2005); Ajjan & Hartshorne (2008); Jebeile & Abeysekera (2010); and Rath & Sekhar (2010), found three characteristics most influential among the five, which are, relative advantage, complexity, and compatibility. However, in order to fully validate the previous findings when applied to the context of this study, the perceived characteristics being included are relative advantage, perceived simplicity (reverse form of complexity), and perceived compatibility.

As discussed in Chapter 2, the DTPB does not only allow for in-depth understanding of the antecedents, but also allows for determining specific factors that impact the adoption intention of the new technology by decomposing variables into dimensions (Ajjan & Hartshorned, 2008; Taylor & Todd, 1995). In addition, the DTPB

also adds value by proving higher explanatory power than the TPB as demonstrated in the study by Taylor & Todd (1995). The social influences construct or subjective norms construct, which is found to be a significant factor influencing the adoption in the age of networked applications and social computing (Vannoy & Palvia, 2010) is also included in the DTPB model. Moreover, online education adoption behavior as being the context of this study is voluntary in nature, DTPB includes the perceived behavioral control construct to address this perspective, positing that people are motivated in performing certain behaviors if they perceive that they have a greater chance of success, which depends upon their self-efficacy, resources and technology facilitating conditions (Ajzen, 1991; Taylor & Todd, 1995).

The main purpose of this study is to gain fuller understanding of factors associated with the consumers' behavioral intention and the diffusion of online education by taking into account the importance of social influences and the belief structures. Hence, the DTPB, with integration of DOI's perceived characteristics of innovations, serves the purpose and is considered an appropriate model to examine the adoption intention of online education. Figure 3.1 depicts the DTPB model with some description and rationale based on past literature.

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Figure 3.1: The Decomposed Theory of Planned Behavior
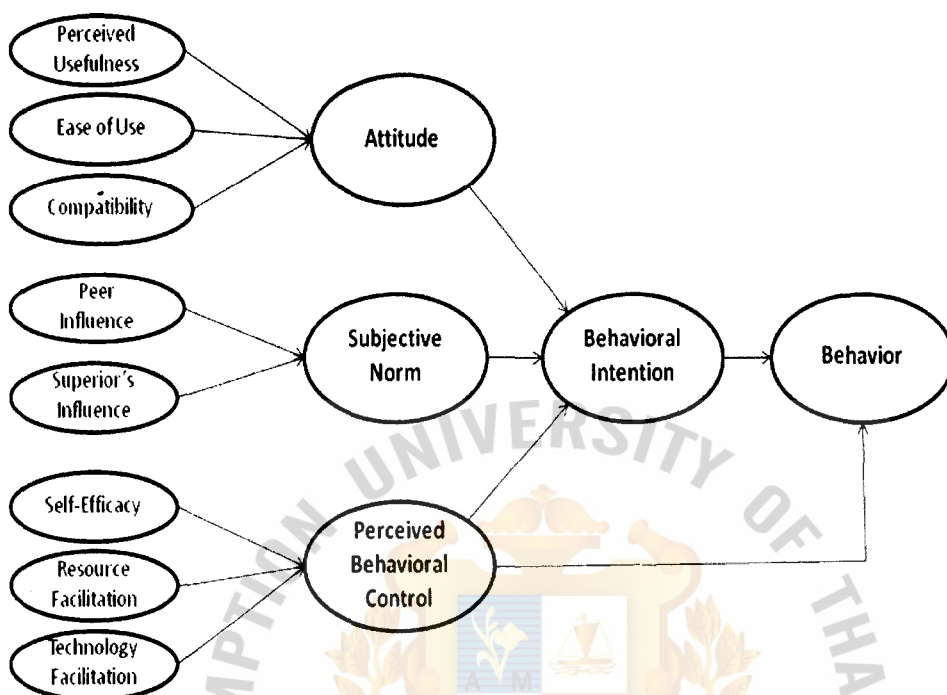
Source: Taylor & Todd (1995)

Decomposing Attitudinal Belief Structures

Taylor and Todd (1995) suggested that a set of attitudinal belief dimensions can be derived from the perceived characteristics of innovation developed by Rogers (1983) and have been adopted and used in studying computer technology adoption. Although among the five perceived characteristics of innovation, three of which including relative advantage, complexity, and compatibility have been found to be consistently related to adoption decisions in general (Tornatzky & Klein, 1982) and also to information technology usage in particular (Moore & Benbasat, 1991). With respect to the field of education, some researchers included only these three innovation's attributes and some included all. Results have been mixed. For example, Lu, Liu, Liao (2005) examined factors influencing the adoption of e-Learning websites by including all perceived

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characteristics of innovation based on Moore and Benbasat (1991). They found that only perceived relative advantage and compatibility were significant predictors for intention to use the websites. Another example is, Jebeile and Abeysekera (2010) who included four DOI variables: relative advantage, compatibility, ease of use (complexity as in Rogers' DOI, 2003), and results demonstrability (observability as in Rogers' DOI, 2003). The results showed significant relationship between all four variables and intention to use WEBLEARN e-Learning system in future (Jebeile & Abeysekera, 2010). With these mixed results, it is crucial to investigate and validate the role of perceived characteristics of innovation by including all the five DOI's attributes. Therefore, attitudinal beliefs toward online education are decomposed into five DOI's attributes which include: perceived relative advantage, perceived simplicity, perceived compatibility, perceived trialability, and perceived observability.

Decomposing Normative Belief Structure

According to Taylor and Todd (1995), decomposition of normative belief structures into relevant referent groups as suggested by several researchers might be related to the possible divergence of opinion among the referent groups. As such, a monolithic normative structure may not show influence on subjective norm or behavioral intention because the effects of the referent groups may cancel each other out. Therefore, decomposing normative belief structure into individual related referent groups is suggested (Taylor & Todd, 1995). In this study, the normative belief structures are decomposed into two main groups i.e. interpersonal influences (peer, family and loved ones, employer/superiors, and community), and external influences (mass media) as the second referent group.

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Decomposing Control Belief Structure

Following the discussion on the perceived behavioral control construct by Ajzen (1985; 1991) comprised of internal factor of individual's "self-efficacy" (Bandura, 1977) and external resource constraints namely "facilitating conditions" (Triandis, 1979), Taylor and Todd (1995) decomposed the perceived behavioral control construct in relation to information technology acceptance and usage into three sub-constructs, which are self-efficacy, resource facilitation, and technology facilitation. The model postulates that the higher level of self-efficacy will lead to higher level of behavioral intention and usage. Additionally, resources constraints may encourage or discourage intention to adopt and usage of the system (Taylor & Todd, 1995). Facilitating conditions of the information technology system can be divided into two dimensions; resources such as time and money, and technology such as availability and compatibility of the system. In this study, the control beliefs are then decomposed into self-efficacy, technology facilitation, and resource facilitation.

3.2   The Conceptual Framework

Following the DTPB model with integration of DOI theory to examine factors contributing to the adoption intention towards online education, the conceptual framework for this research is derived as shown below in figure 3.2.

Figure 3.2: The Conceptual Framework of this Study
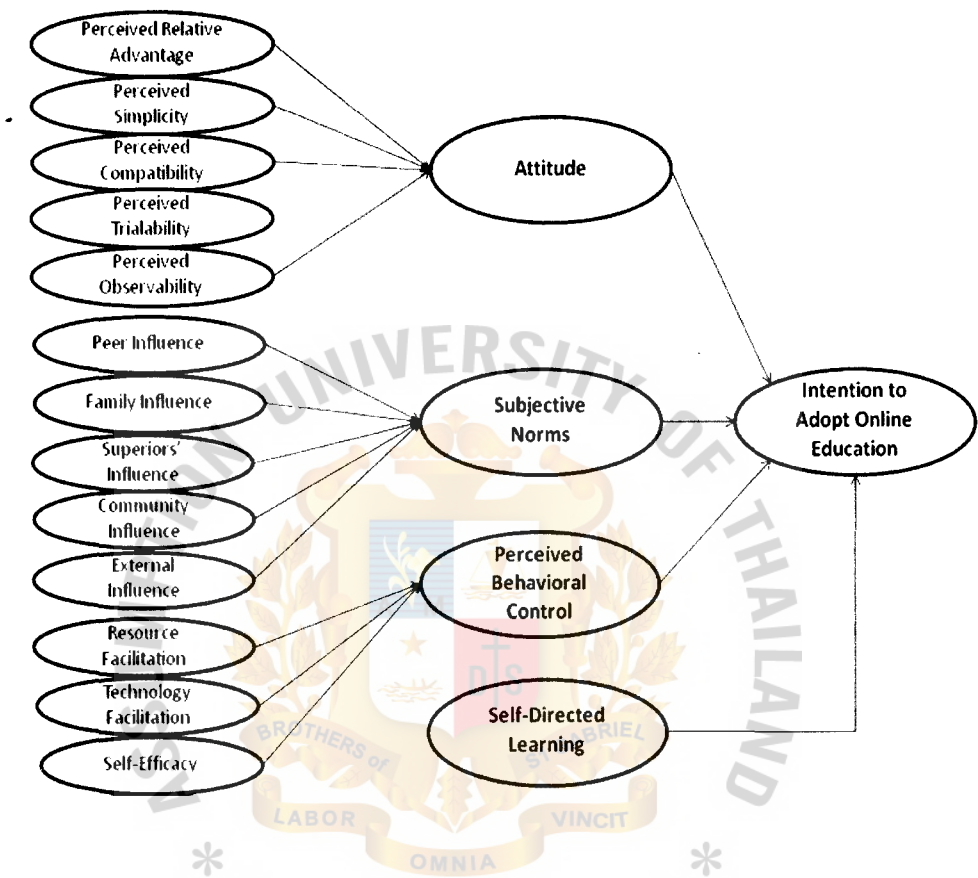
This study adopted the Decomposed Theory of Planned Behavior from Taylor and Todd (1995) (shown in Figure 3.1) as the conceptual framework (Figure 3.2) to understand factors associated with consumers' decision to adopt online education. Originating from the Theory of Planned Behavior (TPB), the model postulates that behavioral intention is an antecedent of behavior and that behavioral intention is a function of attitude, subjective norm, and perceived behavioral control. By decomposing the attitudinal, normative and control beliefs structures, we can uncover specific factors associated with the adoption intention towards online education. Based on the DTPB model, the conceptual framework of this research proposed that attitude, subjective norm, and perceived behavioral control are related factors towards the behavioral intention to

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adopt online education. Additionally, the self-directed learning attribute is also related to the behavioral intention to adopt online education.

As discussed earlier, attitude is composed of five perceived characteristics including perceived relative advantage, perceived simplicity (reverse form of complexity), perceived compatibility, perceived trailability, and perceived observability. The conceptual model of this study proposes that if people perceive that online education is relatively more advantageous, simple to understand and use, compatible with their learning habits and lifestyle, can be tested and trialed, and the consequence of action can be observed, they will form positive attitude towards studying online, which will then lead to intention to adopt online education. In other words, perceived characteristics of innovation, i.e. perceived relative advantage, perceived simplicity, and perceived compatibility can indirectly affect the intention to adopt online education through attitude towards using online education.

According to Ajzen and Fishbein (1980), attitude is defined as an individual's beliefs about the consequences of performing the behavior (behavioral beliefs), weighted by his or her evaluation of those consequences (outcome evaluations). An individual will intend to perform a certain behavior when he or she evaluates it positively. Similarly, if an individual evaluates certain behavior negatively, he or she will not intend to perform such behavior (Ajzen & Fishbein, 1980). Several studies in the field of educational technology acceptance such as e-learning system have examined the linkage between attitude and behavioral intention including Ndubisi (2004), Abdel-Wahab (2008), and Siragusa & Dixon (2009). These studies confirmed positive relationship between attitude towards e-learning systems and the behavioral intention to adopt the system (Ndubisi, 2004; Abdel-Wahab, 2008; and Siragusa & Dixon, 2009). In this study, it implies that an individual's attitude toward online education will be related to intention to adopt online education. If an individual's beliefs about the consequences of studying online, weighted by his or her evaluation of the consequences of taking online education are positive, he/she will be more likely to adopt online education. In other words, attitude toward

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online education is an antecedent to adoption intention of online education. The following hypothesis is therefore derived:

H_a1: Attitude towards online education is positively related to intention to adopt online education.

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Perceived Relative Advantage refers to the degree to which an innovation is perceived as better than the idea it supersedes (Rogers, 2003). It reflects the consumer perceptions about the innovation's attributes to be superior or more valuable as compared to the existing alternatives (Flight, D'Souza & Allaway, 2011). The construct of "perceived relative advantage" has been referred to as "perceived usefulness" as in the TAM by Davis (1989) by some researchers (Moore & Benbasat, 1991). In this study, online education is treated as an innovation and the term "perceived relative advantage" is maintained due to its intuitive appeal and its recognition across a variety of disciplines (Moore & Benbasat, 1991). Advantages can be both tangible and intangible. In other words, it can offer economic or non-economic advantages (Rogers, 2003). Economic advantages include initial costs as well as cost savings or efficiency obtained after operating or using the innovation (Flight et al., 2011). Despite the criticisms about credentials of online education from both academicians and practitioners, especially among employers with respect to quality standards and accreditation issues (Tiene, 2002; Virkus & Wood, 2004; Tierney & Findlay, 2009; ICDE, 2009), online education offers several advantages both economic and non-economic that has created a surge in growth worldwide (Henshaw; 2008; The Economist Intelligence Unit, 2008). Common relative advantages include lower costs of traveling expense, flexibility of time and places, 24 hours 7 days accessibility, ability to review course contents anytime, advancing student-centered learning, encouraging communication and interactivity among students and instructors, and supporting lifelong learning (Gunasekaran et al., 2002; Tiene, 2002; Bray, 2004; Osborne & Oberski, 2004; Hilts & Turoff, 2005; Bhattacharya & Sharma, 2007; Economist Intelligence, 2008; Henshaw, 2008). Several research studies in the educational industry such as Jebeile and Reeve (2003), Lu, Liu, and Liao (2005), Janardhanam, Sinha, and Babu (2011) suggested and confirmed that perceived relative

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advantage and attitude towards educational technology are positively related, which would then lead to behavioral intention to use the technology. This implies that if an individual perceives online education to be more advantageous, he or she will be likely to form positive attitude towards it, and in turn, will be more likely to adopt online education. Therefore, the following hypothesis is proposed:

$H_a1.1$: Perceived relative advantage is positively related to attitude towards online education adoption.

Perceived Simplicity is a reversed form of "complexity". Perceived complexity refers to the degree to which an innovation is perceived as difficult to understand or use. Therefore, perceived simplicity reflects whether an individual perceives an innovation to be easy (not difficult) to understand and use (Rogers, 2003). The term "perceived complexity" in Rogers' DOI is similar to the term "perceived ease of use" in Davis' TAM (Moore & Benbasat, 1991). By referring to Dearing (2007), the term "perceived simplicity", which is a reverse form of "perceived complexity" is adopted due to its ease of understanding as well as maintaining Rogers' DOI term that represents the characteristics of online education as an innovation for the purpose of this study. In the innovation-decision making process, the potential adopters evaluate subjectively whether an innovation presents any risk due to complexity, which will lead to difficulties or failure to satisfy their needs and wants (Flight et al., 2011). In educational technology acceptance context, researchers such as Jebeile and Reeve (2003), Lu, Liu, and Liao (2005), Abdel-Wahab (2008),and Janardhanam, Sinha, and Babu (2011) confirmed that perceived ease of use or simplicity and attitude are positively related, which then lead to the behavioral intention to use the education technology. Therefore, an innovation which is perceived to be difficult to understand and use, requires efforts to learn and understand, would lead to negative evaluation and negative attitude formed in the potential adopter's decision process. Similarly, if an innovation is perceived to be easy to understand and use, there is a likelihood that positive evaluation and positive attitudes would be formed in the potential adopter's mind.

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In this study, online education is highly dependent on ICT tools and therefore, it implies that technical attributes of online education may require prior familiarity with web-based technology or an effort to learn. These might consequently become obstacles to the adoption as it requires some technical knowledge and capabilities (Henshaw, 2008; Parsons, 2010). The following hypothesis is therefore proposed:

$H_a1.2$: *Perceived simplicity is positively related to attitude towards online education adoption.*

Perceived Compatibility refers to the degree to which an innovation is perceived as being consistent with existing values, past experiences, and needs of potential adopters (Rogers, 2003). Flight et al. (2011) described compatibility in terms of how well the innovation fits into the potential adopter's personal life and social structure. The innovation is considered personally compatible if it fits with existing habit, routines, and lifestyle without requiring a person to change much of his/her existing way of life (Flight et al., 2011). Such innovation is considered socially compatible if it is congruent with the adopter's social expectation or reference groups and allows the person to be part of the group or the community (Flight et al., 2011). In the context of online education, it allows flexibility of time and place for people to obtain access to education anytime and anywhere. Therefore, they do not need to change their normal routines such as jobs or family commitment. However, additional workload may require extra efforts and commitment of time as well as efforts in learning online may present some challenges in self-management or self-direction. In addition to the personal compatibility issue, social issue such as expectations from workplace in terms of time management between job and study can create pressure for the potential adopter. For example, the study conducted by Crossman (2005) revealed that the workplace is an important influence on the quality of learning experience. Furthermore, degrees received via online education are perceived to be inferior to traditional degrees in general especially when there are comparisons of educational qualifications among employers, implying that online education might be socially incompatible (Osborne & Oberski, 2004; Ashraf, 2009). According to Taylor and Todd (1995), perceived compatibility is positively related to intention to adopt an

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innovation through attitude as a mediator. In the educational technology acceptance context, previous research by Jebeile and Reeve (2003), Lu, Liu, and Liao (2005), Janardhanam, Sinha, and Babu (2011) suggested and confirmed that perceived compatibility and attitude are positively related, which then lead to the behavioral intention to use the education technology. The following hypothesis is therefore derived:

$H_a1.3$: Perceived compatibility is positively related to attitude towards online education adoption.

Perceived trialability is the degree to which an innovation may be experimented with on a limited basis (Rogers, 2003, p. 258). Personal trial of an innovation will allow the person to give meaning to the particular innovation, experience and adapt to one's own conditions to reduce any uncertainty or risk which might occur when adopting the innovation (Rogers, 2003). In other words, it is part of information gathering or knowledge stage of an innovation to support decision- making. As suggested by Holak and Lehman (1990) as well as Rogers (2003), new ideas or objects that are divisible, allowing targeted adopters to use part of it without destroying the capabilities of what is not used are generally adopted more rapidly than innovations that are not divisible. Additionally, an innovation may actually be changed during or after its trial to suit individual conditions, improvements to the product can be made, thereby increasing the success rate of the adoption. Rogers (2003) then posited that the trialability of an innovation, as perceived by the members of a social system, is positively related to the rate of adoption. If an innovation can be designed so as to be tried more easily, it will have a more rapid rate of adoption. According to Rogers (2003), innovations can be in the form of hardware and software. In the context of online education, it is considered software which may be difficult to offer for trail. However, there are some researchers who previously examined the relationship between attitudinal belief construct as "trialability" such as Jebeile and Reeve (2003). These authors demonstrated that there was a positive relationship between trialability and attitude, which then positively affected the behavioral intention to use e-learning innovation. The researcher thus proposes the following hypothesis:

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$H_a1.4$: Perceived trialability is positively related to attitude towards online education adoption.

Perceived observability is the degree to which the results of an innovation are visible to others (Rogers, 2003, p. 258). It refers to how visible are the results after an innovation is used by previous adopters (Flight et al., 2011). Since consumers make decisions based on information gathering through communication channels (interpersonal and external), some innovations can be observed and communicated to other people easily, whereas others are difficult to observe or to describe to others. As per Roger's (2003) explanation of hardware and software aspects of innovation, hardware aspect in the form of a material or physical object is easier to observe, while the software aspect is more abstract and difficult to observe. Innovations in which the software aspect is the dominant component are less observable and usually have a relatively slower rate of adoption. Therefore, Rogers (2003, p. 259) posited that the observability of an innovation, as perceived by members of a social system, is positively related to its rate of adoption. Positive information and knowledge about new products and services obtained from observing others using the innovations can reduce risks and increase potential adopters' confidence to use such products and services, thus making the observability attribute a powerful mechanism to communicate new ideas or new products and services to targeted adopters (Flight et al., 2011). It can then be said that there is a positive relationship between perceived observability and attitude, which will then lead to behavioral intention. In education technology acceptance research, Jebeile and Reeve (2003) suggested that results demonstrability and visibility (observability in Roger's DOI, 2003) should be considered to increase rate of e-learning system adoption among users. Lu, Liu, and Liao (2005) also suggested that results demonstrability is significant predictor for intention to use e-learning websites. The researcher then proposes the following hypothesis:

$H_a1.5$: Perceived observability is positively related to attitude towards online education adoption.

The second set of variables is subjective norms involving the referent groups or social influences in the decision making process. The DTPB model posits that opinions of relevant people can influence the decision of an individual to perform certain behavior. Subjective norms were found to be more important in early stage or prior to the adoption of innovation when no or limited experience from which to develop the attitude exists toward that particular innovation (Taylor & Todd, 1995; Bhatterjee, 2000; Matti & Jani, 2010).In education research, Ndubisi (2004) included subjective norms in the model based on DTPB to study factors influencing e-learning adoption, a referent, i.e. course leader was found to be associated significantly with subjective norms, though subjective norms were not found to be associated significantly with the behavioral intention. Siragusa and Dixon (2009) also tested the applicability of the TPB model to examine students' attitudes towards ICT-based learning interactions due to the belief that social pressure can influence the students' behavior. The pilot study suggested that TPB model is applicable for the study, or in other words, social influence should be included in the model. Jong and Wang (2009) also found from their study on student acceptance of web-based learning system that social influence can significantly predict behavioral intention. In Thailand, Jairak, Praneetpolgrang, and Mekhabunchakij (2009) in their study on mobile learning adoption intention among students in higher education, also found that social factor had a positive significant relationship with behavioral intention to use mobile learning. In similar vein, Bhrommalee (2012) argued that social influence played a significant role in influencing students' decision to adopt e-learning in Thailand. The author explained further that Thai students are likely to use the system if respectable and influential people around them also use the system. Importance of subjective norms on the behavioral decision has been widely agreed by researchers in both IS and education research, though empirical results have been mixed in terms of its effectiveness of its influence on behavior (Kraut et al., 1998; Hsu & Lu, 2004; Nysveen et al., 2005; Lin, 2006). Therefore, the validation and testing the role of subjective norms on the adoption intention towards online education are required and will be beneficial. The following hypothesis is therefore derived:

H_a2: *Subjective norms are positively related to intention towards online education adoption.*

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As applicable to this context and included in the model, relevant people include peers, family and loved ones, employer or superiors, and the community that the decision maker belongs to. The conceptual model of this study proposes that students' decision on whether to adopt online education can be associated with referent groups in their social circle including peers, family, superiors (such as teachers and employer), and the community that they belong to. Each of these referent groups may differ in their views toward online education which subsequently relates to the intention of the consumer to adopt online education. In the current study on online education adoption, the researcher posits that referent groups are divided into two main groups, i.e. interpersonal influences and external influences. Subjective norms are the norms developed from interpersonal and external influences (Pedersen & Nysveen, 2007).

Interpersonal influence refers to word-of-mouth influence by friends, colleagues, family members, superiors, and prior adopters of such innovation (Bhattacherjee, 2000, p. 413). An individual's subjective norm depends on reference groups. Furthermore, individual tends to communicate first within his or her own social network, thus family members, friends, peers, and supervisor are among closest referents. Many empirical findings have also supported that these reference groups influence the subjective norms (Karahanna et al., 1999; Matti & Jani, 2010; Lin, 2007). Bhattacherjee (2000) demonstrated that both interpersonal and external influences were significant predictors of subjective norms, which in turn was an important predictor of intention to use electronic brokerage services. Additionally, other research confirms that people seek information from significant others in their social network (interpersonal influence) to reduce uncertainty especially in dealing with new situation or uncertain consequences of action (Gracia, Arino, & Blanco, 2012). The authors found that interpersonal influence positively affects the subjective norms in their study on e-government adoption in Spain. Lin (2007) also found both interpersonal and external influences to positively affect the subjective norms, however, it did not lead to behavioral intention. In education, Shen, Laffy, Lin, and Huang (2006) defined social influence as the pressure which students feel towards using the innovation from instructors, other students, or significant others related in the learning context. As such, students feel the pressure to comply with other's

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expectation, conform and identify with others. These are potentially key elements in determining educational activity, including usage of online learning systems (cited in Mazman, Usluel, & Cevek, 2009). Mazman et al. (2009) concluded based on their study on social influence in the adoption process and usage of innovation among teachers, that significant others can influence an individual's decision. However, peers and superiors are among the most powerful predictors of social influence, especially in online collaborative learning environments.

Community influences refers to the social pressures or code of conduct from the community (group's influence) that influence an individual's behavioral decision on whether or not to adopt the innovation. According to Shibutani (1962) and Pentina, Prybutok, and Zhang, (2008), community, as a source of values selected by an individual for guidance of his/her behavior, can be considered a reference group. Community is characterized by shared cultural values, locality, social interaction and norms, and bonding or intrinsic connection among members in a society (Shibutani, 1962; Smith, 2001; Jang et al., 2008; Stanford Encyclopedia of Philosophy, 2011). Based on these characteristics, an individual might make his or her own decision, yet with or without his knowledge, is likely to conform to the group that he or she is affiliated with to be accepted or to avoid any social risks (Shibutani, 1962; Fisher & Price, 1992). Moreover, Granovetter's (1985) argument is that most behavior is closely embedded in a network of personal relations, and the theory of norms needs to take social context into consideration. The argument is aligned with DOI's theory that diffusion process occurs via communication among members in a social system. Empirical evidence on the impact of cultural value on individual's adoption of an innovation has been found in numerous studies (Kalliny & Hausman, 2007). As in the example of water-boiling practice in Peru reported by Wellin (1955 in Rogers, 2003), the introduction of water-boiling practice failed to diffuse in the community due to the belief that hot water is for people with illness. The study suggested that detailed knowledge of social and cultural factors of the community is vital for successful implementation of the new practice since they constitute the system in which the individuals are linked to form a meaningful structure (Dubois, 1972). Since culture is shared among members in the community (Durmaz,

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Celik, & Oruc, 2011), community interaction facilitates the diffusion of innovation as in the study by Ghane, Samah, Ahmad, and Idris (2011) on the adoption of Integrated Pest Management (IPM) practices by paddy farmers in Iran. The results showed that social influence was positively and directly related to the adoption of IPM practices (Ghane et al., 2011). Many researchers, including Subramanian and Subramanian (1995) and Jung and Kau (2004), argued based on Hostede's (1980) cultural dimensions, that individualism-collectivism cultures differ in terms of normative influence on individual's behavior, whereby stronger influence of normative referents is expected in truly collectivist cultures. Supportive of this argument, Pavlou and Chai (2002) found that social norm was strongly related to e-commerce transaction intention in the Chinese collectivist culture, whereas insignificant relationship was found in the US individualistic society. With respect to the cultural context of Thailand as well as in education sector, Burn and Thongprasert (2005) found from their study on implementation of Virtual Education Delivery (VED) that the collectivist culture of Thai students is reflected in their preference for group activity, which facilitates online learning. On the other hand, this is also a major inhibitor since students were unlikely to pursue individual learning style, raise questions or discuss novel ideas. Socially compatible innovation tends to diffuse more rapidly in the society especially when the risks of adoption out-weighs the benefits of adopting such innovation (Kalliny & Hausman, 2007). In the globalized economy, how culture influences consumer behavior will be crucial (Luna & Gupta, 2001; Keller, 2009). Furthermore, the most important cultural factors affecting international business include language, religion, education, consumer value judgment is manifested by the creation of reference groups, and social organization that generate different social classes (Constantinescu, Goldbach, & Gavrila, 2009, p. 1023). Therefore, the study includes community influence to reflect cultural norms and evaluate Thai students' behavioral intention to adopt online education.

External influence refers to mass media reports, expert opinions, and other non-personal information considered by adopters in rationalizing their decision (Bhattacherjee, 2000, p. 413). The impact of social information on an individual's behavior can be described by three mechanisms: 1) internalization – accept information

from expert sources, 2) identification – results from the need to be viewed as similar to a desired referent, and 3) compliance or the effect of reward or punishment. Secondary sources of information such as mass media can influence the behavior especially in early adopters (Rogers, 2003). Bhattacherjee (2000) demonstrated that both interpersonal and external influences were significant predictors of subjective norms, which in turn was an important predictor of intention to use electronic brokerage services. The study by Matti and Jani (2010) also confirmed that secondary source of information (mass media) positively affect subjective norms, and consequently affect the continuous use of social network system. Online education is a form of electronic commerce in education (Dodor & Rana, 2009), therefore, research findings in various domains demonstrating relationship between external influences and subjective norms, which in turn relates to behavioral intention, provide strong justification for further investigation of the relationships in online educational settings.

Since different referent groups may differ in their opinion towards adoption of online education, researchers such as Bagozzi (2007), suggested clarification of the individual value, social and cultural influences. Individuals face dilemma to choose to comply with referents that they are most attracted to (Tajfel, 1981; Turner, 1987). For example, Kwon and Onwuegbuzie (2005, p. 1527) subdivided normative beliefs into two dimensions: individuals and collectivities. Normative beliefs-individuals refer to the likelihood that important referents approve or disapprove adopting online education, whereas normative beliefs-collectivities refer to the likelihood that important social group referents approve or disapprove of adopting online education. Kwon and Onwuegbuzie (2005) tested the relationship between two normative beliefs and subjective norms. They found that normative beliefs-collectivities to be insignificantly related to subjective norms, while normative beliefs-individuals were found to be significantly related to the subjective norms. Similarly, Pavlou and Chai's (2002) decomposed subjective norms into societal norm and social influence. They defined societal norm as group norms based on Hofstede's (2001) collectivism-individualism cultural dimension. On the other hand, they defined the social influence to reflect high and low power distance cultural dimension, referring to the extent that people accept a hierarchical system with unequal power

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distribution in the society (Pavlou & Chai, 2002). In addition to this, Taylor and Todd's DTPB suggest the decomposing of the subjective norms construct in order to clearly identify influential effect of each referent, as well as preventing the effect of cancelling out each other's affects if combined together. Kainian and Harun (2010) also deconstructed the subjective norms to student, peer, and superiors' influences in their study of acceptance of Web 2.0 tools in higher education. The following hypotheses are therefore proposed:

$H_a2.1$: Peer influence is positively related to subjective norms.

$H_a2.2$: Family influence is positively related to subjective norms.

$H_a2.3$: Superiors' influence is positively related to subjective norms.

$H_a2.4$: Community influence is positively related to subjective norms.

$H_a2.5$: External influence is positively related to subjective norms.

The third set of variables in the model is perceived behavioral control decomposed into three dimensions including self-efficacy, resource facilitation, and technology facilitation. The conceptual model of this study proposes that if people perceive themselves as having the ability to accomplish the study using online education system, possess the necessary resources such as time, money, and technology to facilitate their learning using online educational system, they would be motivated to study online as they see more chances of success. Positive motivation will then lead to intention to adopt online education. In other words, self-efficacy, resources and technology facilitations can affect the individual's intention to adopt online education through the mediating effect of perceived behavioral control. Taylor and Todd's (1995) study demonstrated that self-efficacy and resource facilitating conditions were significantly related to the perceived behavioral control and were significantly related to behavioral intention to use computer resource centers by students. However, the technology facilitating conditions were not found to have significant relationship with the perceived behavioral control. There was however significant relationship between perceived behavioral control and the behavioral intention to use the computer resource center

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(Taylor & Todd, 1995). Consistent findings were shown in the study of determinants of students' Internet usage for academic purposes in Malysia by Bidin, Shasudin, Sharif, and Hashim (2009) in that perceived behavioral control significantly influenced the behavioral intention. In Thailand's higher education, Jairak, Praneetpolgrang, and Mekhabunchakij (2009) studied factors affecting the usage intention of mobile learning, and the results showed that facilitating conditions have a significant positive relationship with behavioral intention to use mobile learning. Bhrommalee (2012) also conducted the study to determine factors influencing Thai students' decision towards e-learning adoption, and the results showed that one of the key factors was facilitating conditions. The author concluded that students are likely to adopt e-learning when there exist organizational and technical infrastructure readiness with support and assistance provided for them when needed. Jong and Wang (2009) also found from their study on student acceptance of web-based learning system that facilitating conditions and self-efficacy can significantly predict behavioral intention. From the study of factors influencing e-learning adoption intention, Ndubisi (2004) found self-efficacy to have minor significant relationship with perceived behavioral control, but there was significant association between perceived behavioral control and the behavioral intention. Supportive to this, El-Gayar and Moran (2006) also found self-efficacy to significantly influence college students' acceptance of tablet PCs. Availability of resources to use e-learning was found to significantly influence the students' intention to adopt e-learning in Egypt (abdel-Wahab, 2008). Based on these findings, the following hypotheses are therefore proposed:

H$_a$3: Perceived behavioral control is positively related to intention towards online learning adoption.

H$_a$3.1: Self-efficacy is positively related to perceived behavioral control.

H$_a$3.2: Resource facilitation is positively related to perceived behavioral control.

H$_a$3.3: Technology facilitation is positively related to perceived behavioral control.

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The "self-directed learning" construct is added as independent variable with linkage directly to behavioral intention. According to Smith et al. (2003), self-directed learning or self-management of learning is defined as the extent to which an individual feels he or she is self-disciplined and can engage in autonomous learning. Smith and Sadler-Smith (2003) suggested that SDL is a crucial factor determining the level of motivation and the performance of students in an online learning environment. The need for self-direction or self-management of learning is an important trait in learners identified throughout the distance education and resource-based flexible learning literature (Evans, 2000; Smith et al, 2003; Warner et al, 1998). Since online education is considered a kind of distance education, it is expected that a person's level of self-directed learning attributes will have a positive relationship with his or her behavioral intention to adopt online education (Smith et al., 2003). Evidence was found as in the study by Smith (2005) on the learning preferences and readiness for online learning. The results identified that self-directed learning is a key factor associated with flexible delivery and resource-based learning (Smith, 2005). Consistent results were found in the study by Wang et al (2009) on factors affecting mobile learning adoption. The results indicated that self-directed learning positively affects the behavioral intention to adopt mobile learning. According to Fischer and Sugimoto (2006), cultural dimensions may be related to the self-directed learning capability. In the Eastern collectivist and high power-distance culture such as Japan and China, students tend to leave the authority of the group to powerful persons and expect the classroom to be led by a respected teacher. As such, it is valuable to validate in the collectivist culture of Thailand, whether self-directed learning will be related to intention to adopt online education. Self-directed learning reflects the state of readiness in terms of internal motivation, the strengths or weaknesses of motivation that can deter or motivate the intention to perform the behavior, which is adopting online education in this study (Greener, 2003; Dodor & Rana, 2009). Based on this, the higher and positive self-directed learning would lead to a positive behavioral intention to adopt online education. The following hypothesis is therefore proposed:

H_a4: *Self-Directed Learning is positively related to intention towards online education adoption.*

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3.3 Research Hypotheses

Table 3.1 provides a list of hypotheses proposed in this study.

No.	Hypothesis Statements
1	**Attitude towards online education is positively related to intention towards online education adoption.**
1.1	Perceived relative advantage is positively related to attitude towards online education adoption.
1.2	Perceived simplicity is positively related to attitude towards online education adoption.
1.3	Perceived compatibility is positively related to attitude towards online education adoption.
1.4	Perceived trialability is positively related to attitude towards online education adoption.
1.5	Perceived observability is positively related to attitude towards online education adoption.
2	**Subjective norms are positively related to intention towards online education adoption.**
2.1	Peer influence is positively related to subjective norms.
2.2	Family influence is positively related to subjective norms.
2.3	Superiors' influence is positively related to subjective norms.
2.4	Community influence is positively related to subjective norms.
2.5	External influences are positively related to subjective norms.
3	**Perceived behavioral control is positively related to intention towards online education adoption.**
3.1	Self-efficacy is positively related to perceived behavioral control.
3.2	Resource facilitation is positively related to perceived behavioral control.
3.3	Technology Facilitation is positively related to perceived behavioral control.
4	**Self-directed learning is positively related to intention towards online education adoption.**

3.4 Operationalization of the Independent and Dependent Variables

The study adopted the Decomposed Theory of Planned Behavior of Taylor and Todd (1995) as a baseline theory to determine factors contributing to online education adoption. The following is a list of constructs included in the model.

Table 3.2: Operational Definition of Variables

Constructs and Variables	Conceptual Definition	Operational Definition	Level of Measurement
Attitude towards Online Education (ATT)	An individual's beliefs about the consequences of performing the behavior (behavioral beliefs), weighted by his or her evaluation of those consequences (outcome evaluations).	• Wise idea • Good idea • Pleasant • Degree of favorableness	Interval
Perceived Relative Advantage	The degree to which an innovation is perceived as better than the idea it supersedes.	• Benefits • Advantageous • Greater control over time • Increase in knowledge and career potentials without sacrificing other commitments	Interval
Perceived Simplicity	The degree to which an innovation is perceived as easy (not difficult) to understand and use.	• Learn to use resources and facilities • Studying in	Interval

		• online education environment	
		• Ease of understanding	
		• Studying in online education mode.	
Perceived Compatibility	The degree to which an innovation is perceived as being consistent with existing values, past experiences, and needs of potential adopters.	• Compatibility with work • Compatibility with current situation • Compatibility with the preferred style of studying • Compatibility with lifestyle	Interval
Subjective Norm (SN)	The beliefs that individuals important to him/her, who might be a person's parents, spouse, peers, teachers, superiors, employer, community he/she lives in, and other reference groups, approve or disapprove of performing the behavior.	• Approval from people who are influential • Approval from people who are important • Degree of compliance to the referent groups	Interval
Peer Influence	An individual will intend to perform certain behavior when he/she	• Approval from friends • Approval from	Interval

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	perceives that his/her peers think he or she should.	• co-workers • Degree of compliance with approvals from friends and co-workers.	
Family's Influence	An individual will intend to perform certain behavior when he/she perceives that his/her family and loved ones think he or she should.	• Approval from family • Approval from loved ones • Degree of compliance with approvals of family and loved ones	Interval
Superiors' Influence	An individual will intend to perform certain behavior when he/she perceives that others who are significantly influential to him or her (as for example teachers, superiors, employer etc.) think he or she should.	• Approval from employers and/or superiors • Degree of compliance with approvals from employers and/or superiors	Interval
Community's Influence	An individual will intend to perform certain behavior when he/she perceives that his/her community thinks he or she should.	• Approval from the community • Degree of compliance with community's approval	Interval

External Influence	An individual will intend to perform certain behavior when he/she accepts the information from secondary sources including mass media reports, expert opinions, and other non-personal information to rationalize his/her decision (Bhattacherjee, 2000)	• Approval from the media, expert opinions, or external trusted sources. • Degree of compliance with mass media.	Interval
Perceived Behavioral Control (PBC)	The individual's perception on how easy or difficult it is to perform the behavior (studying via online education) i.e. how confident he or she is to study online based on internal and external factors such as emotions, skills, resources available, and situational or environmental conditions.	• Degree of perceived control • Degree of confidence in capability • Degree of confidence in knowledge and ability	Interval
Self-Efficacy	An individual's confidence in his/her capabilities to perform certain behavior.	• Degree of comfort • Degree of confidence in ability to accomplish task	Interval

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		• Degree of confidence in managing tasks	
Resource Facilitation	Degree to which an individual perceives he/she has the necessary resources available including time and money.	• Compatibility with existing resources • Affordability	Interval
Technology Facilitation	Degree to which an individual perceives he/she has the necessary technological resources available.	• Accessibility • Compatibility with existing hardware and software education.	Interval
Self-Directed Learning (SDL)	The extent to which an individual feels he or she is self-disciplined and can engage in autonomous learning.	• Time management • Possess self-directed learning • Possess self-discipline • Independence • Goal-orientation	Interval
Intention to Adopt Online Education	The respondents' stage in the innovation-decision process whether he/she has an intention to adopt an innovation.	• Degree of decision to pursue post-graduate study via online education.	Interval

CHAPTER IV

RESEARCH METHODOLOGY

The purpose of this chapter is to describe the research design, methodology, procedure include target population, sample size and sampling procedure, questionnaire development and measurements, pretest procedure and result, data collection plan and statistical treatments used to perform the data analysis.

4.1 Research Design

This is a descriptive research, which applies the self-administered survey method to collect primary data from respondents. The participants or unit of analysis in this research are potential adopters of post-graduate level online education i.e. people currently pursuing bachelor degree or who have completed a bachelor degree. The sample of online education potential adopters is collected and statistical analysis methods are used to test the proposed hypotheses. As a result of these procedures, results and findings from sample of the research can then be generalized to the whole population of online education potential adopters.

For the purpose of the research, which is to examine adoption intention of an educational innovation, in this case online education, the researcher has extended the "Decomposed Theory of Planned Behavior" or DTPB by Taylor and Todd (1995), incorporating the Perceived Characteristics of Innovating (PCI) by Moore and Benbasat (2001), derived from the Diffusion of Innovation (DOI) theory by Rogers (2003). Additionally, Self-Directed Learning, a learner's key attributes in distance education research, has also been included to investigate its affect on intention to adopt online

education. These have been employed as baseline models to develop the conceptual framework in order to determine the possible factors which are related to consumer's adoption intention towards online education.

Questionnaires have been adapted from the past literature and translated into Thai. A pretest has been conducted to ensure the reliability of questionnaires before the actual launch of survey to respondents.

4.2   Population and Sample

4.2.1 Target Population

Target population is defined as the collection of elements or objects that possess the information sought by the researcher and about which inferences are to be made (Maholtra, 2007). The target population for the purpose of studying online education adoption intention is Thai people in Thailand, both male and female, who are currently pursuing undergraduate degrees in their final semester before graduation, as well as those who have completed undergraduate degree, and may have opportunities to pursue post-graduate degrees in the future. The screening process is done by providing a screening question in section one of the questionnaires during data collection. Respondents who fit the criteria of the target population were asked to proceed with the rest of questionnaire, or else they were thanked for their cooperation and asked to stop responding.

4.2.2 Sampling Procedure

In this research, the *Non-Probability Sampling Technique* is employed to allow flexibility and speed to obtain target respondents in a more timely and economical manner. According to Malhotra (2007), non-probability sampling is likely to provide purposive samples which rely on personal judgment rather than the equal chance for

sample elements to be selected. Therefore, the researcher employed the convenience sampling method for data collection. In this case, the population is composed of people who have chances to pursue post-graduate level education, i.e. those people who are currently studying at the undergraduate level in their final semester before graduation as well as those who have completed undergraduate degrees. Self-administered questionnaires were distributed to respondents in Bangkok, Thailand. The nature of online education would require high-speed access to the Internet, therefore it is expected that broadband connection from home is a necessary infrastructure. As such, adopters are likely to be those who have access to Broadband Internet. According to the Nation, (www.nationmultimedia.com, November 28), a local Thai newspaper online, reported that Thailand's number of broadband subscribers were at 4.2 million, with 1.5 million subscribing to TrueOnline. Furthermore, the majority of subscribers are in Bangkok, as for example, out of total 1.5 million subscribers with TrueOnline, only 300,000 were in other provinces (www.nationmultimedia.com, ww.telegeography.com). Therefore, Bangkok was chosen as the venue for conducting the research. The approximate time frame for data collection was two weeks.

The samples were approached by researcher's assistants face-to-face on locations. Questionnaires were distributed to organizations and universities around Changwattana area based on convenience sampling technique. The questionnaires were distributed at one private university and one public Open University in the area indicated above. These two institutions do offer any online courses. All respondents did not have prior experiences to online education.

4.2.3 Sample Size

The total number of population enrolled in the higher educational institutions in Thailand as reported by the Office of the Higher Education Commission, Thailand was approximately 2.03 million students in the year 2008 (http://inter.mua.go.th). Thailand's total population was approximately 65 million people and 7.5 percent obtained bachelor

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degrees as reported, in the year 2009, which means that approximately 4.9 million people obtained bachelor degrees (http://www.nso.go.th). Even though there are some statistics reported on the number of students who obtained bachelor degrees, the actual number of population for the study is still unknown since the intention to adopt an online education can be of interest to anyone. Therefore, the researcher applied the formula to calculate the required sample size, in order to ensure that the results from the sample can be generalized to the population.

For populations that are large i.e. greater than 100,000, Yamane (1967) recommended sample size of 400 at confidence level of 95 percent would be sufficient to ensure that the results can be generalized to the population of the study. (University of Florida, http://edis.ifas.ufl.edu/pd006).

4.3   Questionnaires Development (Measurements)

The research framework has been developed based on theoretical framework incorporating theories which include the "Decomposed Theory of Planned Behavior" or DTPB by Taylor and Todd (1995) and Diffusion of Innovation (DOI) theory by Rogers (1995), incorporating the Perceived Characteristics of Innovating (PCI) derived from the DOI by Moore and Benbasat (2001) to determine the possible factors which are associated with consumer's adoption intention towards online education. Therefore, measurement items of the constructs used in this study have been developed and tested empirically by various researchers. The measurement items have been tested for reliability and validity over the past years by researchers in many fields, for example, in information systems as well as the education sector. The researcher, therefore, adapted measures to be used in this study. Translation from the original language (English) into the local language (Thai) is necessary to ensure understanding and correct interpretation of the questions by respondents. The forward and back-translation processes have been employed. Beaton, Bombadier, Guillemin and Ferraz (2000) argued that if measures are to be used across cultures, the items must be well-translated linguistically and adapted

culturally to maintain the content validity of the instrument at a conceptual level across different cultures. Forward translation is the procedure whereby a bilingual translator translates the instrument from the original language (source) to the target language. Backward translation is the procedure where the translated instrument is translated back to the original language to assure validity, and it is done without letting the translator see the original instrument (Beaton et al., 2000). Therefore, forward translation from English to Thai was performed by two translators. The two translated versions were then compared and synthesized to resolve any discrepancies to achieve consensus. Back-translation from Thai to English was then performed by another two translators. All of the translators had no prior knowledge of the concept of the study in order to avoid information bias (Beaton et al, 2000). Additionally, the measurement items are refined after the pretest results to ensure reliability and validity.

The way in which the measurement of each construct has been derived is described in the following section.

4.3.1 Attitude

The items used to measure attitude are adopted from Taylor and Todd (1995), which are originally developed from TPB and TRA. The items have been tested for reliability in prior research since the development of TRA by Fishbein and Ajzen in 1975. Taylor and Todd (1995) also tested for reliability of these items and reported a Cronbach's Alpha of 0.85. Adopting these items to be used in this study, the reliability statistics of internal consistency measurement has been performed. The result of Cronbach's Alpha of items measuring attitude is 0.856, which is therefore considered reliable.

Based on integration of DTPB and DOI theories, attitudinal belief toward online education is decomposed into three perceived characteristics of innovation including perceived relative advantage, perceived simplicity (reverse form of perceived

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complexity), and perceived compatibility. This study adopted measurement items of perceived relative advantage and perceived compatibility constructs from Perceived Characteristics of Innovating (PCI) by Moore and Benbasat (2001), which was developed based on Rogers' DOI (1983). According to Ong et al. (2008) as well as Janardhanam and Sinha (2011), PCI was designed to measure the perception users have about the innovation rather than measuring the primary attributes as in Rogers' DOI (1983). Researchers studying technological innovation adoption in the education sector, such as Jebeile and Reeve (2003) and Rath and Sekhar (2010), and Rogers (1995) suggested Moore and Benbasat's instrument as a valuable tool for future research in the technological innovations. Moreover, by using consistent innovation attributes across various settings, Rogers (1995) suggested that it will make a significant contribution to DOI research (Jebeile & Reeve, 2003; Rath & Sekhar, 2010). Many prior researches in the area of educational innovation diffusion adapted the PCI by Moore and Benbasat (2001) as research instrument in their study including Jebeile and Abeysekera, (2010), Janardhanam and Sinha (2011), Gose (2008), and Rath and Sekhar (2010). This study also adopted items measuring the 4 constructs, i.e. the perceived relative advantage, the perceived compatibility, perceived trialability, and perceived observability. Cronbach's Alpha results from the reliability test for internal consistency is 0.818 compared to the original Moore and Benbasat (2001) of 0.90 for the perceived relative advantage, while Cronbach's Alpha for perceived compatibility is 0.830 as compared to the original 0.86 by Moore and Benbasat (2001). In addition, Cronbach's Alpha results from the reliability test for internal consistency is 0.676 for the perceived trialability, while Cronbach's Alpha for perceived observability is 0.769 as compared to the original 0.827 and 0.857 by Lee et al. (2011).The reliability for internal consistency is adequate as per the minimum acceptable level of 0.6 (Malhotra, 2007).

Another attitudinal sub-construct is perceived simplicity, which is a reverse form of perceived complexity in the original DOI study. Dearing (2007) introduced the inverse of "perceived complexity" i.e. perceived simplicity for ease of operationalization of the construct in order to reduce confusion on the part of respondents by making the wording positive and consistent with other perceived characteristics of innovation, except for

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"perceived complexity". This study thus adopted the term "perceived simplicity" from Dearing (2007) as well as adapted the questionnaire items from Moore and Benbasat (2001) and tested the reliability. From the results of reliability statistics for internal consistency, the Cronbach's Alpha is 0.870 as compared to the original 0.84 in Moore and Benbasat (2001). The questionnaire items are hence proven reliable.

4.3.2 Subjective Norms

Subjective norms are measured by adopting questionnaire items from Taylor and Todd (1995). Based on TRA, behavioral intention is determined by two factors including subjective norms in addition to attitude towards the target behavior. Subjective norms are excluded from TAM due to its weakness in terms of exact definition and measurements (Davis, 1989). In this study, the subjective norms or social influences are employed as an important construct. The items measuring subjective norms are adopted from Taylor and Todd (1995) for which they obtained a reliability of 0.88, while this study shows a Cronbach's Alpha of 0.683. Therefore, the items are proven reliable for the study as per the minimum acceptable Cronbach's Alpha level of 0.6 (Malhotra, 2007).

Subjective norms are decomposed into four sub-variables including peer influence, family influence, superiors' influence, community influence, and external influences. All, except community influence, have been adopted by researchers in previous studies, therefore items are well validated and reliable. Based on Taylor and Todd (1995) and Teo and Pok (2003), the test of reliability for internal consistency yielded Cronbach's Alpha of 0.92 for peer influence, 0.88 for significant others' influence, and 0.80 for superiors' influence. By adapting measurement items from Taylor and Todd (1995) and Teo and Pok (2003), the results of reliability for internal consistency yielded Cronbach's Alpha results of 0.911 for peer influence, 0.878 for family influence, and 0.925 for superiors' influence.

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In this study, given that community influence is a newly developed sub-construct under subjective norms, measurement items are adapted from items measuring peer influence. The result of the test for reliability yielded Cronbach's Alpha of 0.836 which is exceeding the suggested minimum score of Cronbach's Alpha as referred to by Malhotra (2007). Therefore, the measurement items of community influence are proven reliable and valid for this study.

Measurement items for external influences are adapted from Pedersen and Nysveen (2007) and Bhattacherjee (2000). The results of reliability for internal consistency yielded Cronbach's Alpha result of 0.844 as compared to the original 0.63 by Pedersen and Nysveen (2007).

4.3.3 Perceived Behavioral Control

Adapted from Taylor and Todd (1995), the perceived behavioral control was originally developed by Ajzen and included in the TPB model with intention to account for behavior over which people have incomplete volitional control. The "perceived behavioral control" construct is added to the original TRA model. The TPB has been widely used to study human behavior, and measurements have been well-validated and tested for reliability. This study adopted the PBC measurement items from Taylor and Todd (1995). The Cronbach's Alpha obtained from the reliability testing for internal consistency is 0.819 as compared to the original Cronbach's Alpha of 0.7 in Taylor and Todd (1995). Therefore, all items are considered sufficiently reliable to measure the PBC construct.

Based on DTPB, perceived behavioral control construct is decomposed into self-efficacy, technology facilitating condition, and resource facilitating condition. These sub-constructs have also been tested for validity and reliability in previous research. The Cronbach's Alpha obtained from this study is 0.873 for self-efficacy as compared to 0.85 reported in Taylor and Todd (1995), 0.783 for technology facilitating condition as

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compared to 0.78 in Taylor and Todd (1995), and 0.862 for resources facilitating condition as compared to 0.50 in Taylor and Todd (1995). All questionnaire items measuring variable and sub-variables included in this study are proven reliable as per results of the internal consistency test.

4.3.4 Self-Directed Learning

The measurement items for self-directed learning were adapted from Smith (2005). They were originally developed by McVey (2000) in his "Readiness for Online Learning" questionnaire. Smith (2005) conducted a factor analysis of the questionnaire items by McVey and the results yielded two main constructs including "self-management of learning" as in Smith et al. (2003) which can be interpreted as self-directed learning (Smith, 2005), and "comfort with e-learning" as in Smith et al. (2003). Therefore, the items loaded onto "self-management of learning" are adapted to measure self-directed learning in this study. After reliability testing, the result of Cronbach's Alpha is 0.868 as compared to the original 0.79 by Smith (2005). Therefore, the items are proven reliable for the study.

Table 4.1 presented the Cronbach's Alpha value as obtained in the original studies.

Table 4.1 Cronbach's Alphas of the Original Questionnaires

Variables	Sources	Original Cronbach's Alpha
Attitude	Taylor &Todd (1995)	0.85
Perceived Relative Advantage	Moore & Benbasat (2001)	0.90
Perceived Simplicity	Moore & Benbasat (2001), Dearing (2007)	0.84
Perceived Compatibility	Moore & Benbasat (2001)	0.86
Perceived Trialbility	Moore & Benbasat (2001), Lee, Hsieh, & Hsu (2011)	.827
Perceived Observability	Moore & Benbasat (2001) , Lee, Hsieh, & Hsu (2011)	.857
Subjective Norms	Taylor and Todd (1995)	0.88
Peer Influence	Taylor and Todd (1995)	0.92
Family Influence (Significant Others' as in Teo & Pok, 2003)	Teo & Pok (2003)	0.88
Superiors' Influence	Taylor & Todd (1995)	0.80
Community Influence	Adapted from Taylor & Todd (1995)	N/A
External Influences	Perdersen & Nysveen (2007) Bhattacherjee (2000).	0.63
Perceived Behavioral Control	Taylor &Todd (1995)	0.7
Self-Efficacy	Taylor & Todd (1995)	0.85
Technology Facilitation	Taylor & Todd (1995)	0.78
Resources Facilitation	Taylor &Todd (1995)	0.50
Self-Directed Learning	Smith (2005)	0.79

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4.4.5 Structure of the Questionnaires

The questionnaire consisted of three parts as follows (see Appendix A for questionnaire items and constructs):

· Part 1: Screening Question

The first part of questionnaire aimed to screen the qualified target respondents. The target population for this research is male and female who are currently pursuing undergraduate degrees as well as those who have completed their undergraduate degrees. The screening question is used to ensure that respondents possess the characteristics of the target population.

Part 2: Factors associated with the consumer's adoption intention towards online education

This part of questionnaire comprises attitude measurement questions developed by adapting from previous researchers. The questionnaire uses the 5 level Likert scale for which respondents choose the level of agreement with each statement in the questionnaire from 1 (strongly disagree) to 5 (strongly agree) that would best match their opinion. Table 4.2 shows the sources from which the measurement items are derived.

Likert scale has been used in the questionnaire for attitude measurement in this research. Likert scales were originally developed to measure psychological attitudes in a scientific way by Rensis Likert, a sociologist at the University of Michigan from 1946 to 1970 (Uebersax, 2006). Therefore, it is suitable for measuring the attitude towards online education adoption. The five-level Likert scale is applied due to its reliability as suggested by Lissitz and Green (1975) in that reliability starts to level off after 5 points (cited in http://www.getfeedback.net/kb/Choosing-the-optimium-feedback-scale). The respondent has to choose the agreement level which is represented by the point value

ranging from 1 to 5 as 1 = Strongly Disagree (SD), 2 = Disagree (D), 3 = Neutral (N), 4 = Agree (A), and 5 = Strongly agree (SA).

Part 3: Respondent's Demographic Characteristics

-In this part, each respondent is asked to report their demographic profile which consists of gender, age, family income, occupation, marital status, and children. The questionnaire in this part employed fixed alternative questions, and dichotomous questions. The objective of this part is to present the descriptive findings which might be beneficial for explaining the implication of the research results and also offer suggestions for future research.

4.4   Pretest

The purpose of the pretest is to ensure of the quality of research instrument, in this study it refers to the questionnaire. Pretest is conducted to test the validity and reliability of the instrument. The pretest results ensure that all types of questions are correct in terms of their structure and language, the questionnaire errors are uncovered and fixed, and that it acts as an effective tool to collect the required data from target respondents (Malhotra, 2007). The following section describes procedure and results of the pretest.

4.4.1 Pretesting Procedure

Pretest was conducted by distributing questionnaires to 50 respondents in a private organization as well as university students in Bangkok. Hunt, Sparkman and Wilcox (1982) suggested that for the pretest, a sample of 12 people is satisfactory, a sample of 20 is recommended, and a sample of 50 is adequate. In this study, the 50 questionnaires distributed were considered adequate.

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A letter requesting permission was submitted to authorized persons in the private company and the university to approve the distribution of questionnaires and data collection. The researcher and research assistants also observed and requested comments from respondents on how questionnaires may be improved or whether questions were clear and well understood by respondents. Names were not required in order to ensure privacy and anonymity. Of the 50 questionnaires distributed for pretest, all of them were returned and valid due to direct collection by the researcher and her assistants.

After the questionnaire was completed, the researcher probed to see whether the respondents filled out all the questions, whether the respondents interpreted the meaning of each question correctly and whether the respondents had problems with any questions such as ambiguous, confusing or unfamiliar wordings. The data collected from the pretest were edited and adjusted in terms of wording, sequencing and structuring to prevent communication error and bias between the researcher and the respondents.

4.4.2 Pretest Results & Discussion

The pretest data was then measured for reliability using Cronbach's alpha. Maholtra (2007) stated that for the Social Science field, if the Cronbach's alpha is equal to or greater than 0.6, it ensures that the instrument is reliable. Measurement items were then adjusted in order to improve the reliability of the scales. Table 4.3 describes the results of pretest.

Table 4.2 Summary of Reliability Statistics (Pretest, N=50)

Variables	Original Number of Items	Number of Items Retained	Cronbach's Alpha
Attitude	4	4	.856
Perceived Relative Advantage	4	4	.818
Perceived Simplicity	4	4	.870
Perceived Compatibility	4	4	.830
Perceived Observability	3	3	.769
Perceived Trialability	3	3	.676
Subjective Norms	3	3	.683
Peer Influence	4	4	.911
Family Influence	3	3	.878
Superiors' Influence	2	2	.925
Community Influence	2	2	.836
External Influence	2	2	.844
Perceived Behavioral Control	3	3	.819
Self-Efficacy	6	6	.873
Technology Facilitation	4	4	.783
Resource Facilitation	4	4	.862
Self-Directed Learning	7	7	.868
Adoption Intention	4	4	.904

Table 4.2 summarizes the result of Cronbach's alpha. All variables have reliability scores ranging from .676 to .925 representing reliability of the instrument (Maholtra, 2007).

In summary, the measurement items can be said to be reliable and valid for the research purpose. The Thai and English versions of the questionnaire as well as pretest statistical results are shown in appendices.

4.5   Data Collection and Time Frame

Primary data were collected using self-administered questionnaires distributed to organizations and universities around Changwattana area in Bangkok, where there are state enterprises as well as some major universities located due to convenience. The questionnaires were distributed at one private university and one public Open University

in the area. These two universities do not offer any online courses. All respondents did not have prior experiences to online education. A minimum of 400 samples needed to be collected to ensure that the results can be generalized to the population, according to Yamane (1967). The data collection process took approximately two weeks.

4.6   Data Analysis

The completed questionnaires were collected and the data coded into statistical analysis tool using SPSS version 16.0 to perform statistical analysis as follows:

1. Descriptive Statistics using

    1.1 Frequency distribution

    1.2 Percentage

    1.3 Mean and Standard Deviation

This type of statistical analysis was applied to report the demographic information of the respondents and their perceptions toward the constructs.

2. Structural Equation Modeling (SEM) Analysis

This type of statistical analysis was applied for hypotheses testing to identify which factors are associated with the adoption intention towards online education based on the research model. Structural Equation Modeling or SEM is deemed appropriate to test the research questions for the study since this statistical technique is considered the most efficient technique for a series of separate multiple regression equations estimated simultaneously (Hair, Black, Babin, Anderson, & Tatham, 2006). Since the structural model is a path model, it allows the researcher to distinguish which independent variable predicts the dependent variable (Hair et al., 2006). Similar research in innovation diffusion studies has also employed SEM given that the studies are multivariate in context, with multiple variables involved. Other advantages that SEM offers are that it is able to represent latent concepts in the analysis of dependent relationships as well as improving statistical estimation by accounting for measurement error in the estimation process (Ho, 2006). Table 4.3 summarizes the statistical treatments to be used for testing each hypothesis statement.

Table 4.3: Statistical Treatment of the Data

No	Hypothesis Statements	Stat.
1	**H$_a$1: Attitude is positively related intention towards online learning adoption.**	**SEM**
1.1	H$_a$1.1: Perceived relative advantage is relatively related to attitude towards online education adoption.	SEM
1.2	H$_a$1.2: Perceived simplicity is positively related to attitude towards online education adoption.	SEM
1.3	H$_a$1.3: Perceived compatibility is positively related to attitude towards online education adoption.	SEM
1.4	H$_a$1.4: Perceived trialbility is positively related to attitude towards online education adoption.	SEM
1.5	H$_a$1.5: Perceived observability is positively related to attitude towards online education adoption.	SEM
2	**H$_a$2: Subjective norms are positively related to intention towards online learning adoption.**	**SEM**
2.1	H$_a$2.1: Peer influence is positively related to subjective norms.	SEM
2.2	H$_a$2.2: Family influence is positively related to subjective norms.	SEM
2.3	H$_a$2.3: Superiors' influence is positively related to subjective norms.	SEM
2.4	H$_a$2.4: Community influence is positively related to subjective norms.	SEM
2.5	H$_a$2.5: External influences are positively related to subjective norms.	SEM
3	**H$_a$3: Perceived behavioral control is positively related to intention towards online learning adoption.**	**SEM**
3.1	H$_a$3.1: Self-efficacy is positively related to perceived behavioral control.	SEM
3.2	H$_a$3.2: Resource facilitation is positively related to perceived behavioral control.	SEM
3.3	H$_a$3.3: Technology facilitation is positively related to perceived behavioral control.	SEM
4	**H$_a$4: Self-Directed Learning is positively related to intention towards online learning adoption.**	**SEM**

CHAPTER V

DATA ANALYSIS AND RESULTS

This chapter presents the data and results of the hypotheses test results based on the research framework. A total of 600 self-administered questionnaires were distributed using convenience sampling technique. Of these, 542 responses were obtained and valid, which accounted for a 90.33 percent response rate. Therefore, a total of 542 questionnaires were used for this data analysis.

The questionnaire was developed to examine factors related to the target students' intention to adopt online education. Based on data obtained from the survey, data analysis was carried out using Structural Equation Modeling or SEM. The data analysis and results presentation was carried out in four major stages including descriptive statistics analysis, exploratory factor analysis, confirmatory factor analysis, and hypotheses testing. These four stages of the analysis are presented and elaborated in sequential order as follows:

1. Descriptive Statistical Analysis
2. Exploratory Analysis
3. Confirmatory Analysis
4. Hypotheses Testing

5.1 Descriptive Statistical Analysis

Table 5.1 presents the descriptive statistics on demographic information of the 542 respondents.

Table 5.1: Demographics Information

Demographic Profile		Descriptive Statistics		
		Frequency	Percentage	Cumulative Percentage
Educational Status				
	Currently Studying	213	39.3	39.3
	Completed a Bachelor Degree	329	60.7	100
Gender				
	Female	247	45.6	45.6
	Male	295	54.4	100
Age				
	18-30 years	314	57.9	57.9
	31-40 years	159	29.3	87.3
	41-50 years	65	12.0	99.3
	More than 50 years	4	0.7	100
Family Income				
	Less than 10,000 baht	28	5.2	5.2
	10,000 - 20,000 Baht	95	17.5	22.7
	20,001 - 30,000 baht	79	14.6	37.3
	30,001 - 40,000 Baht	141	26.0	63.3
	40,001 – 50,000 baht	100	18.5	81.7
	Above 50,000 baht	99	18.3	100
Occupation				
	Student	174	32.1	32.1
	Government officer	169	31.2	63.3

	Private Sector's Employee	115	21.2	84.5
	State Enterprise's Employee	63	11.6	96.1
	Business Owner	17	3.1	99.3
	Freelance	4	0.7	100
Work Experiences (Number of Years)				
	None	199	36.7	36.7
	Less than 1 year	66	12.2	48.9
	1-5 years	92	17.0	65.9
	More than 5 years	187	34.1	100
Marital Status				
	Single	368	67.9	67.9
	Married	169	31.2	99.1
	Divorced	5	0.9	100
Any Child?				
	None	418	77.1	77.1
	Yes	124	22.9	100
Number of Children				
	None	418	77.1	77.1
	1	84	15.5	92.6
	2	36	6.6	99.3
	3	4	0.7	100

From table 5.1, among 542 respondents, the majority of respondents, which is 329 respondents (60.7 percent) have completed a Bachelor's degree, whereas the remaining 213 (39.3 percent) of them are currently pursuing a Bachelor degree in their final semester.

In terms of gender, the majority of respondents were male (295 respondents or 54.4 percent), while 247 respondents (45.6 percent) were female.

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With respect to age range, more than half of the respondents (314 respondents or 57.9 percent) were in the age range of 18-30 years old. The second largest group of respondents was in the age range between 31-40 years old, comprising 159 respondents or 29.3 percent. The age range between 41-50 years old comprised 12 percent or 65 respondents. The least number of respondents was in the age group of over 50 years old, which comprised of 4 respondents, or 0.7 percent.

In terms of family income, the majority group comprised of 141 respondents or 26 percent had family income ranging from 30,001 to 40,000 Baht per month. The second largest group was the group with family income ranging from 40,001 to 50,000 Baht per month comprised of 100 respondents or 18.5 percent. The third largest group with almost similar number of respondents to the second largest group had family income over 50,000 Baht per month, comprised of 99 respondents or 18.3 percent. In addition, there were 95 respondents (17.5 percent) who had family income ranging from 10,000-20,000 Baht per month. Finally, 79 of the respondents (14.6 percent) had family income ranging from 20,001-30,000 Baht per month.

For occupation, there were 174 students or 32.1 percent while 169 or 31.2 percent of respondents were government employees. Private employees comprised of 21.2 percent or 115 respondents. A total of 63 respondents or 11.6 percent worked for state enterprises. There were 17 respondents or 3.1 percent who had their own businesses. Freelance comprised of 0.7 percent or 4 respondents.

With regards to work experiences, the range was from having no experience at all to greater than five years experience. Respondents reported having no work experience at all comprised of 199 people or 36.7 percent, while 185 people or 34.1 percent had greater than five years experiences in working. Less than one year experience comprised of 66 respondents or 12.2 percent. 17 percent or 92 people reported having work experiences from 1 to 5 years.

In terms of marital status, there were 368 respondents who reported being single, while 169 people were married, and 5 out of 542 reported being divorced. Furthermore, 418 respondents or 77.1 percent of them reported having no children, while the rest of 124 people or 22.9 percent reported having children. From the group of 124 respondents, 84 of them reported having 1 child, 36 reported having 2 children, and 3 of them reported having 3 children.

Table 5.2: Mean and Standard Deviation Values of Variables

Attitude toward Online Education (4 items)

Items	Mean	Standard Deviation
1. For me, studying online education is a wise idea.	3.86	.982
2. For me, studying online education is a good idea.	3.82	.978
3. For me, studying online education would be pleasant.	3.91	.943
4. I like the idea of studying via online education.	3.84	.985

Perceived Relative Advantage (4 items)

Items	Mean	Standard Deviation
5. I think online education is relatively more beneficial to me as compared to the traditional on-campus education.	3.75	1.021
6. Overall, I think taking online education will be advantage to me.	3.64	1.003
7. Taking online education will give greater control over my time.	3.79	.933
8. Taking online education enables me to increase my knowledge and career potentials without sacrificing other commitments.	3.68	.924

Perceived Simplicity (Non-Complexity, Ease of Use)(4 items)

Items	Mean	Standard Deviation
9. I believe that learning to use resources/facilities provided by online education over the Internet will be a simple task for me.	3.79	.948
10. I believe that studying in an online education model environment will be simple for me.	3.78	.974
11. I believe that studying online will be understandable and easy to follow for me.	3.69	1.036
12. Overall, I believe that it is simple for me to study in an online education.	3.74	.942

Perceived Compatibility (4 items)

Items	Mean	Standard Deviation
13. Taking online education is compatible with all aspects of my work.	3.74	.956
14. Taking online education is completely compatible with my current situation.	3.69	.928
15. Taking online education fits well with the way I like to study.	3.68	.961
16. Taking online education fits well with my lifestyle.	3.73	1.037

Perceived Observability (5 items)

Items	Mean	Standard Deviation
17. I have seen people successfully completing their post-graduate degree online.	3.61	1.146
18. In my society, I can see people studying at home with online education.	3.57	1.119
19. Online education is not commonly seen in my society.	3.65	1.019
20. It is easy for me to observe people studying for post-graduate degree online.	3.54	1.061
21. Online education is common outside of my society.	3.64	1.032

Perceived Trialability (4 items)

Items	Mean	Standard Deviation
22. I have had an opportunity to try various online education systems.	3.67	1.074
23. I know where I can go to satisfactorily try out various uses on online education.	3.61	1.015
24. Online education should be available to me to adequately test run various tools and applications.	3.78	.962
25. Before deciding whether to enroll in any online education programs, I should be able to properly try them out.	3.80	.969
26. I should be permitted to use online education system on a trial basis long enough to see what it is like.	3.81	.939

Subjective Norms (3 items)

Items	Mean	Standard Deviation
27. People who influence my behavior would think that I should study online education.	3.69	.953
28. People who are important to me would think that I should study online education.	3.79	.955
29. It is important that people who are important to me agree that I take online education.	3.75	.985

Peer Influence (4 items)

Items	Mean	Standard Deviation
30. I will enroll for online education if my friends think it is good.	3.67	1.068
31. I will enroll for online education if my co-workers think it is good.	3.65	1.055
32. Generally speaking, I would want to do what my friends think I should do.	3.66	1.708
33. Generally speaking, I would want to do what my co-workers think I should do.	3.59	1.078

Family/Loved Ones Influence (3 items)

Items	Mean	Standard Deviation
34. I will enroll for online education if my family thinks it is good.	3.65	1.003
35. I will enroll for online education if my spouse/loved ones think it is good.	3.63	.987
36. Generally speaking, I would want to do what my family and loved ones think I should do.	3.78	1.000

Employer/Superiors' Influence (2 items)

Items	Mean	Standard Deviation
37. I will enroll for online education if my employer or my superior thinks it is good.	3.74	1.041
38. Generally speaking, I would want to do what my employer or my superior think I should do.	3.80	1.022

Community Influence (2 items)

Items	Mean	Standard Deviation
39. I will enroll for online education if it is acceptable in my community.	3.70	1.034
40. Generally speaking, I would want to do what is well accepted in my community.	3.64	1.017

External Influence (2 items)

Items	Mean	Standard Deviation
41. Media with full support, articles, news suggesting online education as a good idea can convince me to take online education.	3.68	1.051
42. Generally speaking, I would want to do what media consistently recommends me to do.	3.68	1.030

Perceived Behavioral Control (3 items)

Items	Mean	Standard Deviation

43. Studying online is entirely within my control.	3.80	.984
44. I am capable of studying online.	3.83	.929
45. I have resources, knowledge, and ability to study online.	3.88	.902

Self-Efficacy (6 items)

Items	Mean	Standard Deviation
46. I would feel comfortable studying online on my own.	3.84	.944
47. For me, feeling comfortable studying online on my own is important.	3.82	.940
48. If I wanted to, I could easily find my own way to use online educational tools on my own.	3.75	.960
49. For me, being able to easily find way to use online educational tools on my own is important.	3.75	.981
50. I am confident that I can manage my study online on my own by following reference manuals or guidelines by online education service institutes.	3.69	.948
51. For me, whether or not I am confident to manage my study online on my own is important.	3.67	.972

Facilitating Conditions: Technology (5 items)

Items	Mean	Standard Deviation
52. The Internet connection that I have can facilitate access to online education system with sufficiently satisfactory speed.	3.66	1.052
53. For me, online education system must be accessible with sufficiently satisfactory speed of my existing Internet connection.	3.80	.966
54. Online education hardware and software requirements are compatible with my existing computer systems.	3.77	.936
55. For me, it is important that hardware and software required for online education are compatible with my existing computer systems.	3.82	.901
56. For me, it is important that software tools necessary for online education are made available for students.	3.85	.867

Facilitating Conditions: Resources (4 items)

Items	Mean	Standard Deviation
57. Online education service is compatible with the resources that I have.	3.83	.893
58. Online education and resources are affordable to me.	3.81	.939

59. For me, being able to afford the price of online education and resources is important.	3.85	.943
60. For me, it is important that technical support resources and staff are available to me when I need them.	3.85	.941

Self-Directed Learning (7 items)

Items	Mean	Standard Deviation
61. I am willing to dedicate 8-10 hours per week for my studies.	3.71	1.004
62. When it comes to learning and studying, I am a self-directed person.	3.79	.945
63. I believe looking back on what I have learned in a course will help me to remember it better.	3.84	.926
64. In my studies, I am self-disciplined and find it easy to set aside reading and homework time.	3.78	.936
65. I am able to manage my study time effectively and easily complete assignments on time.	3.78	.893
66. As a student, I enjoy working independently.	3.90	.905
67. In my studies, I set goals and have a high degree of initiative.	3.91	.967

Adoption Intention (4 items)

Items	Mean	Standard Deviation
68. I want to be among the first ones to study for a post-graduate degree with online education.	3.69	1.063
69. I intend to be among the first ones to study post-graduate degree with online education.	3.67	1.036
70. I prefer to study post-graduate degree with online education instead of the traditional ones.	3.64	1.092
71. Overall, I intend to pursue post-graduate degree with online education.	3.59	1.169

Table 5.2 illustrates the mean values and the standard deviation values of responses to each questionnaire items. Mean value indicates the average score of the responses, while the standard deviation indicates how spread the responses are from the central tendency or the mean value (William, 2006).

Attitude towards online education has mean values range from 3.82 to 3.91, and standard deviation values range from 0.943 to 0.985. Perceived relative advantage has mean values range from 3.64 to 3.79 and standard deviation values range from 0.924 to

1.021. Perceived simplicity has mean values range from 3.69 to 3.79 and the standard deviation values range from 0.942 to 1.036. Perceived compatibility has mean values range from 3.68 to 3.74 and standard deviation values range from 0.928 to 1.037. Perceived observability has mean values range from 3.54 to 3.65 and standard deviation values range from 3.54 to 3.65 and standard deviation values range from 1.032 to 1.146. Perceived trialability has mean values range from 3.61 to 3.80 and standard deviation values range from 0.962 to 1.074.

Subjective norms have mean values range from 3.69 to 3.79 and standard deviation values range from 0.953 to 0.985. Peer influence has mean values range from 3.59 to 3.67 and standard deviation values range from 1.055 to 1.708. Family influence has mean values range from 3.63 to 3.78 and standard deviation values range from 0.987 to 1.003. Mean values for superiors' influence are 3.74 and 3.80 with standard deviation values of 1.041 and 1.022. Mean values for community influence are 3.70 and 3.64 with standard deviation values range from 1.034 and 1.017. External influence has mean values of 3.68 and 3.68 with standard deviation values of 1.051 and 1.030.

Perceived behavioral control has mean values range from 3.80 to 3.88 and standard deviation values range from 0.902 and 0.984. Self-efficacy has mean values range from 3.67 to 3.84 and standard deviation values range from 0.940 to 0.981. Mean values for technology facilitations range from 3.66 to 3.85 and standard deviation values range from 0.867 to 1.052. Mean values for resource facilitations range from 3.81 to 3.85 and standard deviation values range from 0.893 to 0.943.

Self-directed learning has mean values range from 3.71 to 3.91 and standard deviation values range from 0.893 to 1.004. And finally, the mean values for adoption intention range from 3.59 to 3.69 and standard deviation values range from 1.036 to 1.169.

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The above mean and standard deviation values therefore present the centrally tendency of the scores based on responses obtained, as well as the spread of the data from the central tendency.

5.2 ⸱Exploratory Factor Analysis

According to Hair et al. (2006), the primary purpose of factor analysis is to define the underlying structure among the variables in the analysis. In other words, it is a technique used for construct validation, assessing the degree to which an instrument measures the concept that it is designed to measure. Many methods of validation rely on the analysis of inter-item or inter-scale correlations (Brahmasrene & Lee, 2012). By defining the set of variables that are highly correlated, these set of variables then are assumed to represent dimensions within data (Hair et al., 2006). Since, factor analysis technique is based on the assumption that all variables are correlated in some degree, items explaining similar dimensions should then appear to be highly correlated, and those items measuring different dimensions should yield low correlations (Ho, 2006).

The following section presents factor loading under the extraction of Principal Component Analysis determining construct validity of each construct including all four main independent variables and their dimensions. Table 5.3 presents factor loading of attitude towards online education and its dimensions which include perceived relative advantage, perceived simplicity, perceived compatibility, perceived observability, and perceived trialability. Table 5.4 presents factor loading of subjective norms and dimensions which include peer influence, family influence, superiors' influence, community influence, and external influences. Then, table 5.5 presents perceived behavioral control and dimensions which include self-efficacy, resource facilitations, and technology facilitations. Finally, table 5.6 presents factor loading of self-directed learning construct.

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Table 5.3: Factor Loading of Attitudinal Belief Constructs

Items	Attitude toward Adoption Intention	Perceived Relative Advantage	Perceived Simplicity	Perceived Compatibility	Perceived Observability	Perceived Trailability
ATT1	.866					
ATT2	.790					
ATT3	.764					
ATT4	.871					
PRA1		.738				
PRA2		.828				
PRA3		.768				
PRA4		.665				
PS2			.728			
PS3			.889			
PS4			.772			
PC1				.589		
PC2				.770		
PC3				.812		
PC4				.760		
PO1					.798	
PO2					.828	
PO3					.780	
PT1						.772
PT2						.869
PT3						.622

As presented in table 5.3, the results showed that all four items measuring the construct "attitude towards online education" are loaded onto one component with correlation coefficients ranging from 0.764 to 0.871, indicating that these items measure

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the same construct i.e. "attitude towards online education" as is intended. Thus, the measurement item for the construct "attitude towards online education" is considered valid for this study.

With regards to each dimension of attitudinal belief construct, the factor loading result of the construct "perceived relative advantage" shows that all measurement items are highly correlated and loaded onto one component with correlation coefficients ranging from 0.665 to 0.828. It can then be concluded that measurement items for this construct is valid for the study.

The "perceived simplicity" construct contained four items originally. Due to cross-loading, item PS1 was deleted, therefore, there are 3 items which remained to measure this construct. As described earlier, items measuring the same construct should be highly correlated with each other and clustered onto the same component. However, PS1 was loaded onto component 1 with coefficient value -0.024, while loaded onto component 2 with coefficient value of 0.905. This result indicates that PS1 measures different dimension of the construct or does not measure the same concept as the other items PS2, PS3, and PS4. Cronbach's Alpha was improved from 0.636 with 4 items to 0.716 with the remaining three items (PS2, PS3, and PS4). In sum, the three measurements items which include PS2, PS3, and PS4 are proven valid to measure the construct "perceived simplicity" with correlation coefficients of 0.728, 0.889, and 0.772.

The results of factor loading for the construct "perceived compatibility" show that four measurement items are loaded onto one component with correlation coefficient ranging from 0.589 to 0.812. Therefore, measurement items are proven valid to measure the construct "perceived compatibility" for this study.

The results of factor loading for the construct "perceived observability" shows that all three measurement items are loaded onto one component with high correlation coefficients ranging from 0.780 to 0.828. Therefore, measurement items are proven valid to measure the construct "perceived compatibility" for this study.

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The results of factor loading for the construct "perceived trialability shows that all three measurement items are loaded onto one component with correlation coefficient value ranging from 0.622 to 0.869. It can then be concluded that measurement items for this construct is valid for the study. Next, table 5.4 presents factor loading for subjective norms and their dimensions.

Table 5.4: Factor loading of Normative Belief Constructs

Item	Subjective Norms (SN)	Peer Influence (PI)	Family Influence (FI)	Superiors' Influence (SI)	Community Influence (CI)	External Influence (EI)
SN1	.780					
SN2	.893					
SN3	.776					
PI1		.773				
PI2		.823				
PI3		.708				
PI4		.757				
FI1			.782			
FI2			.866			
FI3			.811			
SI1				.940		
SI2				.955		
SI3				.850		
CI1					.933	
CI2					.963	
CI3					.855	
EI1						.959
EI2						.960
EI3						.801

Subjective norm is one of the main independent variables in this study. As presented in table 5.4, there are 3 measurement items and all of them are loaded onto one component with correlation coefficient values ranging from 0.776 to 0.893. Hence, the measurement items are considered valid for this study.

- The results of factor loading for the construct "peer influence" show that all four items are loaded onto one component with correlation coefficient values ranging from 0.708 to 0.823, indicating that all items are highly correlated. Therefore, these measurements items are proven valid to measure the construct "peer influence" in this study.

Regarding the construct "family influence", all three items are loaded onto one component as a result of factor loading analysis, with correlation coefficient values ranging from 0.782 to 0.866. The measurement items are therefore proven valid to measure the construct "family influence" as intended.

The results of factor loading for the construct "superiors' influence" show that all measurement items are highly correlated and loaded onto one component with correlation coefficients ranging from 0.850 to 0.955. Therefore, these measurement items are proven valid to measure the construct "superiors' influence" as intended for this study

With regards to the measurement items to measure the construct "community influence", the results of factor analysis show that all measurement items are highly correlated and loaded onto one component with correlation coefficients ranging from 0.855 to 0.963. These measurement items, therefore, are proven valid to measure the construct "community influence" in this study.

The results of factor loading for the construct "external influence" show that all measurement items are highly correlated and loaded onto one component with correlation coefficients ranging from 0.801 to 0.960. Therefore, these measurement items are proven valid to measure the construct "external influence" as intended for this study.

Table 5.5: Factor Loading of Control Belief Constructs

Items	Perceived Behavioral Control (PBC)	Self-Efficacy (SE)	Technology Facilitations (FCT)	Resource Facilitations (FCR)
PBC1	.759			
PBC2	.859			
PBC3	.745			
SE3		.728		
SE4		.830		
SE5		.801		
SE6		.727		
FCT2			.572	
FCT3			.798	
FCT4			.840	
FCT5			.672	
FCR1				.626
FCR2				.781
FCR3				.827
FCR4				.668

Table 5.5 presents factor loading for the construct "perceived behavioral control" construct and its dimensions. With regards to the factor loading results of the construct "perceived behavioral control", all three measurement items are loaded onto one component with correlation coefficient value ranging from 0.745 to 0.859. Therefore, these measurement items for the construct "perceived behavioral control" are proven valid for this study.

Regarding the "self-efficacy" construct, there were six items originally. Due to cross-loading, item SE1 and SE2 were deleted, and therefore, four items remained to measure this construct. As stated earlier, items measuring the same construct should be

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highly correlated with each other and clustered onto the same component. However, SE1 and SE2 showed low loading on component 1 with coefficient value 0.121 and 0.129, while they loaded highly on component 2 with coefficient value of 0.799 and 0.883. In addition, SE3, SE4, SE5, and SE6 loaded highly on component 1 with coefficient value 0.529, 0.768, 0.836, and 0.773, respectively. This result indicates that SE1 and SE2 measure different dimensions of the construct or may not measure the same concept as the other items SE3, SE4, SE5, and SE6. Therefore, items SE1 and SE2 were deleted. After deletion of these two components, SE3, SE4, SE5, and SE6 are loaded onto the same component 1 with coefficient values 0.728, 0.830, 0.801, and 0.727, respectively. In sum, the four measurements items include SE3, SE4, SE5, and SE6 are proven valid and reliable to measure the construct "self-efficacy" in this study.

For the construct "technology facilitations", there were five items used to measure the construct originally. Due to cross-loading of FCT 1, which loaded with low and negative coefficient value of 0.004 onto component 1, while loaded highly onto component 2 with coefficient value of 0,785. After deleting FCT1, the rest of items (FCT2, FCT3, FCT4, and FCT5) showed high loading onto the same component 1. Therefore, it can be concluded that these three measurement items are proven valid and reliable to measure the construct "technology facilitations" in this study.

As the table 5.5 shows, the factor loading for the construct "resource facilitations" present all four items loaded highly onto the same component with coefficient ranging from 0.626 to 0.827. Conclusively, these four items are proven valid to measure the construct "resource facilitations" in this study.

Table 5.6: Factor Loading of Self-Directed Learning

Self-Directed Learning (SDL)		
Measurement Items	**Corrected item-total correlation**	**Cronbach's Alpha**
SDL3	.618	0.796
· SDL4	.745	
SDL5	.813	
SDL6	.799	
SDL7	.737	

Table 5.6 presents factor loading for "self-directed learning" construct. Originally, there were 7 items. Due to cross-loading, item SDL1 and SDL2 were deleted, thus resulting in 5 items remaining to measure this construct.

As described earlier, items measuring the same construct should be highly correlated with each other and clustered onto the same component. However, SDL1 and SDL2 were loaded onto component 1 with coefficient value 0.172 and 0.074, respectively, while loaded highly onto component 2 with coefficient value 0.074 and 0.852. This result indicates that SDL1 and SDL2 measure different dimensions of the construct or do not measure the same concept as the other items SDL3, SDL4, SDL5, SDL6 and SDL7.

In sum, the five measurements items include SDL3, SDL4, SDL5, SDL6 and SDL7 are proven valid to measure the construct "self-directed learning" with correlation coefficients ranging from 0618 to 0.813.

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Table 5.7: Factor Loading of Adoption Intention

Adoption Intention (AI)		
Measurement Items	**Corrected item-total correlation**	**Cronbach's Alpha**
AI1	.845	0.877
AI2	.896	
AI3	.879	
AI4	.805	

As presented in table 5.7, the results show that all four items are loaded onto one component with correlation coefficients ranging from 0.805 to 0.896, indicating that these items measure the same construct i.e. "adoption intention" as is intended. In sum, the measurement items for the construct "adoption intention" are considered valid for this study.

With regards to the reliability of the measurement items as a result of factor analysis, Santos (1999) suggested that reliability comes to the forefront when variables developed from summated scales are used as predictor components in objective models since summated scales are an assembly of interrelated items designed to measure underlying constructs. Highly reliable measures would provide stable and reliable responses over a repeated administration of the test. Cronbach's alpha is an index of reliability associated with the variation accounted for by the true score of the "underlying construct." Alpha coefficient ranges in value from 0 to 1 and may be used to describe the reliability of factors extracted from dichotomous and/or multi-point formatted questionnaires or scales. The higher the score, the more reliable the generated scale is (Santos, 1999).

The table 5.8 presents the Cronbach's Alpha reliability analysis of these measurement items for each construct and their dimensions.

Table 5.8: Cronbach's Alpha of Variables towards Intention to Adopt Online Education

Variables	Cronbach's alpha value
Attitude towards Online Education	0.854
Perceived Relative Advantage	0.742
Perceived Simplicity	0.716
Perceived Compatibility	0.715
Perceived Observability	0.721
Perceived Trailability	0.629
Subjective Norms	0.749
Peer Influence	0.735
Family Influence	0.756
Superior Influence	0.902
Community Influence	0.906
External Influence	0.893
Perceived Behavioral Control	0.693
Self-Efficacy	0.774
Technology Facilitations	0.693
Resource Facilitations	0.703
Self-Directed Learning	0.796
Adoption Intention	0.877

Table 5.8 present the results of reliability test using the Cronbach's alpha as index. The results show that the Cronbach's alpha for all measurement items as a result of factor analysis range from 0.629 to 0.906. Based on Maholtra's (2007) statement that in the Social Science field, if the Cronbach's alpha is equal to or greater than 0.6, it ensures that the instrument is reliable. Therefore, it can be concluded that all of these measurement items are proven reliable for this study.

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In conclusion, all measurement items are proven reliable to measure the constructs they are designed to for this study. Further analysis of data is then carried out based on the results of the exploratory analysis described above.

Since SEM contains two parts: measurement model and the structural equation model, the following section provides explanation on the results of these two parts as obtained in the data for this study.

5.3   Confirmatory Factor Analyses

Confirmatory Factor Analysis (CFA) using AMOS 21 was conducted to test the measurement model. CFA provides a test for reliability of the observed variables employed to measure the latent variables (Ho, 2006). According to Ho (2006), a number of goodness-of-fit measures are available to assess the overall fit of the hypothesized model, and they can be classified into three types:

1) Absolute fit measures determine the degree to which the proposed model predicts or fits the observed covariance matrix. The commonly used measures of absolute fit include Chi-square statistics, Goodness-of-Fit Index (GFI), and Root Mean Square Error of Approximation (RMSEA).

2) Incremental fit measures the comparison of the proposed model to some baseline model or independence model, which is assumed to be poorly fit with data. In other words, these measures show the improvement made by a proposed model over the independence model. These measures of incremental fit include Tucker-Lewis Index (TLI), Normed Fit Index (NFI), Relative Fit Index (RFI), Incremental Fit Index (IFI), and Comparative Fit Index (CFI).

3) Parsimonious fit measures are used to compare models on the basis of some criteria that take into account the parsimony (number of parameters to be estimated) as

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well as the fit of the models. These measures include Parsimonious Normed Fit Index (PNFI) and Akaike Information Criterion (AIC). Goodness-of-fit statistics results are listed in table 5.20.

Table 5.9: Fit Statistics of the Measurement and Structural Equation Models

Goodness-of-Fit Measures	Recommended Value	Measurement Model	Structural Equation Model
CMIN/DF	≤ 3.00	2.611	2.460
RMSEA	< 0.1	0.055	0.052
TLI	> 0.9	0.813	0.830
NFI	> 0.9	0.765	0.773
RFI	> 0.9	0.729	0.744
IFI	> 0.9	0.841	0.852
CFI	> 0.9	0.838	0.850
PNFI	0.6 - 0.9	0.664	0.685

In the relative/normed chi-square (CMIN/DF) when applied to SEM, insignificant differences between the actual and the predicted matrices is expected, thus the smaller the chi-square value, the better fit of the model (Ho, 2006). Though there is no consensus on an acceptable ratio for the chi-square statistics, the recommended value ranges from the lowest 2.0 (Tabachnick & Fidell, 2007 in Hooper, Coughlan, & Mullen, 2008) and the highest 5.0 (Wheaton et al., 1977 in Hooper, Coughlan, & Mullen, 2008). In this study, the chi-square statistics (CMIN/DF) for the measurement model is 2. 611 and yielded 2.460 value for the structural equation model. Therefore, both measurement model and the structural equation model are considered an acceptable fit model based on the relative/normed chi-square statistics (CMIN/DF).

The root mean square error of approximation (RMSEA) tells how well the model, with unknown but optimally chosen parameter estimates, would fit the population covariance matrix (Byrne, 1998 in Hooper, Coughlan, & Mullen, 2008). It takes into

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account the error of approximation in the population (Ho, 2006, p. 285). Value ranges from 0.05 – 0.08 deemed acceptable fit (Ho, 2006). RMSEA values for measurement model and structural equation model are 0.055 and 0.052, respectively. Therefore, both measurement model and the structural equation model in this study are considered acceptable fit based on the RMSEA values.

The fit statistics for incremental fit indices include TLI, NFI, RFI, IFI, and CFI for both measurement model and the structural equation model yielded value ranging from 0.729 to 0.852. Based on Ho (2006), the value range from 0 (indicating the model is no better than the null model) to 1 (indicating a perfect fit model). In this study, it is therefore considered an acceptable fit model.

The fit statistics for parsimonious normed fit indices (PNFI) for both measurement model and the structural equation model yielded value of 0.664 and 0.685. The recommended PNFI value ranging from 0.6 to 0.9 indicates an acceptable fit model. Therefore, the overall fit indices obtained in this study indicate that both measurement model and the structural equation models show acceptable fit.

The next section then describes the hypotheses test results.

5.4   Hypotheses Testing

This section describes the hypotheses test results. Figure 5.1 shows the path analysis of the structural equation model.

_____ Significant Path

-------------- Non-Significant Path
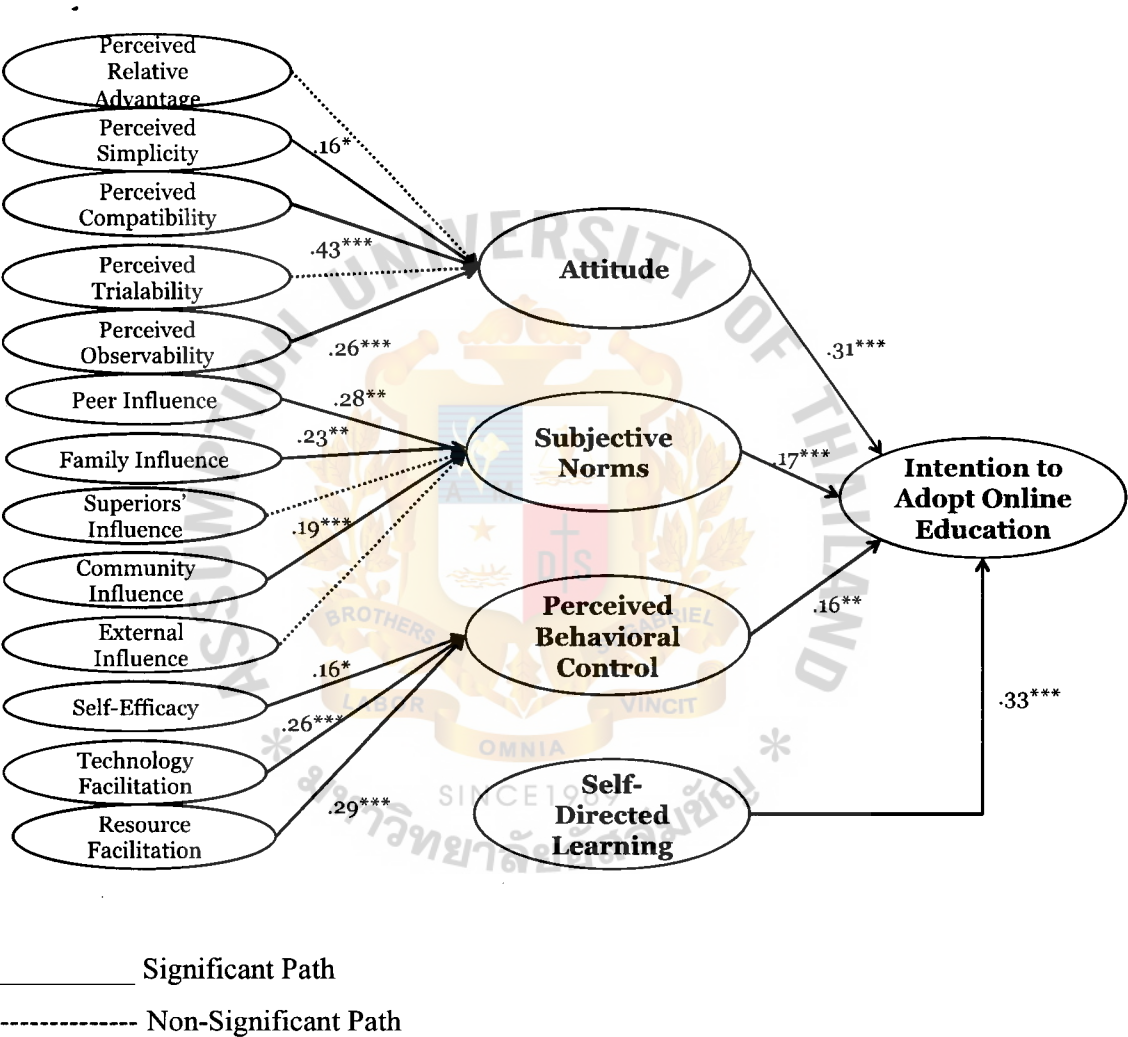
Figure 5.1: Path Analysis of the Structural Equation Model

***p < 0.001, coefficient is statistically significant at 0.001 confidence level

**p < 0.01, coefficient is statistically significant at 0.01 confidence level

*p < 0.05, coefficient is statistically significant at 0.05 confidence level

The path model in figure 5.1 shows direct and indirect statistical relationships between each independent and dependent variable. Explanation of the path model will be presented by main variables with their sub-variables.

Firstly, the attitudinal belief construct with its sub-variable. Among the five attitudinal belief variables, three are statistically significantly and positively related to the attitude towards online education, including perceived simplicity ($\beta = 0.16$, $p < 0.05$), perceived compatibility ($\beta = 0.43$, $p < 0.001$), and perceived observability ($\beta = 0.26$, $p < 0.001$). In contrast, perceived relative advantage and perceived trialability were not found to have any statistically significant relationship with attitude towards online education. However, the relationship between attitude towards online education and adoption intention are also strongly and positively statistically significant with predictive power of 31 percent ($\beta = 0.31$, $p < 0.001$). All sub-variables under attitude towards online education can explain 73 percent total variance in attitude towards online education, while leaving 27 percent residual or unexplained variance.

The second group of independent variables is subjective norms or social influences. This is divided into two main referent groups, which include interpersonal influences (peer, superiors/employer, family/love ones, and community influences) and external influences. These referent groups are decomposed into sub-variables under subjective norms. The results shown in the path model indicate that three out of four interpersonal influences are statistically significantly and positively related to the subjective norms, including peer ($\beta = 0.28$, $p < 0.01$), family ($\beta = 0.23$, $p < 0.01$), and community ($\beta = 0.19$, $p < 0.001$) influences. On the other hand, superiors/employer was not found to be statistically significantly related to the subjective norms. Moreover, the external influences did not show any statistically significant relationship with subjective norms. Furthermore, the relationship between subjective norms and adoption intention towards online education were found to be statistically strongly and positively significant at $p < 0.001$ level with predictive power of 17 percent ($\beta = 0.17$, $p < 0.001$). All of sub-variables under subjective norms can explain 78 percent variance with residual value of 0.22 or 22 percent variance unexplained.

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With respect to the third group of independent variables, all of the three sub-variables under the control beliefs construct (perceived behavioral control) were statistically significantly and positively related to perceived behavioral control, and the perceived behavioral control then was statistically significantly related to the adoption intention towards online education. The path model has shown that direct linkage between self-efficacy and perceived behavioral control were statistically significant at $p < 0.05$) with predictive power of 16 percent ($\beta = 0.16$, $p < 0.05$). With respect to the direct linkage between resource facilitations and technology facilitations, the relationships were found to be strong and positively significant. The results showed that resource facilitations can explain approximately 29 percent variance ($\beta = 0.29$, $p < 0.001$), while the technology facilitations can explain approximately 26 percent variance ($\beta = 0.26$, $p < 0.001$) for the perceived behavioral control. Consequently, the perceived behavioral control were found to be statistically significantly and positively related to the adoption intention towards online education with ability to explain approximately 16 percent at $p < 0.01$ confidence level ($\beta = 0.16$, $p < 0.01$). All of the sub-variables under perceived behavioral control together can explain 74 percent of the variance in perceived behavioral control, while leaving the remaining 26 percent of the variance unexplained.

Lastly, the fourth main variable included in the study is self-directed learning. The path results showed a direct strong and significant positive relationship between self-directed learning and adoption intention towards online education ($\beta = 0.33$, $p < 0.001$).

Total direct effects between the four main independent variables include attitude towards online education, subjective norms, perceived behavioral control, and self-directed learning can explain 65 percent of the variance in adoption intention towards online education, leaving 35 percent of the variance unexplained. Hypotheses test results are then summarized and explained in more detail in tables 5.21.

Table 5.10: Structural Relationship between Attitudinal Beliefs and Adoption Intention

Hypothesis	Path Relationship			Standardized Regression Coefficient	Critical Ratio (C.R.)	P-Value
H1: Attitude is positively related to intention towards online education adoption.	Attitude	+ →	Adoption Intention	0.315	6.241	***
H1.1: Perceived relative advantage is positively related to attitude towards online education adoption.	PRA	+ →	Attitude	-0.073	-0.997	0.319
H1.2: Perceived simplicity is positively related to attitude towards online education adoption.	PS	+ →	Attitude	0.156	2.437	0.015 *
H1.3: Perceived compatibility is positively related to attitude towards online education adoption.	PC	+ →	Attitude	0.427	5.089	***
H1.4: Perceived trialability is positively related to attitude towards online education adoption.	PT	+ →	Attitude	0.102	1.647	0.100
H1.5: Perceived observability is positively related to attitude towards online education adoption.	PO	+ →	Attitude	0.264	3.736	***

***$p < 0.001$, **$p < 0.01$, *$p < 0.05$

Table 5.10 shows the hypothesis test results for the structural relationship between the first group of variables i.e. "attitude towards online education" and adoption intention towards online education.

Firstly, hypothesis 1 proposed that attitude is positively related to intention towards online education adoption. The results showed that there is a significant support for the hypothesis with $\beta = 0.315$, C.R. = 6.241, $p < 0.001$. Therefore, hypothesis 1 is supported. It was found that there is significant positive relationship between attitude towards online education and intention to adopt online education.

Secondly, hypothesis 1.1 proposed that perceived relative advantage is positively related to attitude towards online education adoption. The results showed non-significant support for this hypothesis with statistical result of $\beta = -0.073$, C.R. -0.997, $p > 0.05$ confidence level, indicating that there is no significant relationship between perceived relative advantage and attitude towards online education.

Thirdly, hypothesis 1.2 proposed that perceived simplicity is positively related to attitude towards online education adoption. As table 5.21 shows, hypothesis 1.2 is supported as the statistics yielded $\beta = 0.156$, C.R. = 2.437, $p < 0.05$. Therefore, the results confirm that there is significant positive relationship between perceived simplicity and attitude towards online education adoption.

Fourthly, hypothesis 1.3 proposed that perceived compatibility is positively related to attitude towards online education adoption. The results showed that there is significant positive relationship between these two constructs with statistical values of $\beta = 0.427$, C.R. = 5.089 at $p < 0.001$ confidence level. Therefore, hypothesis 1.3 is supported.

Fifthly, hypothesis 1.4 proposed that perceived trialability is positively related to attitude towards online education adoption. The results showed non-significant relationship between these two constructs as per statistical values of $\beta = 0.102$, C.R. =

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1.647, p > 0.05, indicating that there is no significant relationship between perceived trailability and attitude towards online education.

Finally, hypothesis 1.5 proposed that perceived observability is positively related to attitude towards online education adoption. The results showed significant positive relationship between these two constructs with statistical value of $\beta = 0.264$, C.R. = 3.736 at $p < 0.001$. Therefore, hypothesis 1.5 is supported.

In summary, among the first set of hypotheses related to relationship between attitudinal beliefs and the intention towards online education adoption, four hypotheses are supported including H1, H1.2, H1.3, and H1.5. On the other hand, the results show non-significant support for H1.1 and H1.4. In other words, perceived simplicity is positively related to attitude towards online education. Additionally, perceived compatibility is also significantly and positively related to attitude towards online education. Moreover, the relationship between perceived observability and attitude towards online education was also found to be significant. In turn, attitude towards online education was subsequently found to have positive relationship with intention to adopt online education. However, the results found no significant relationship between the other two sub-variables, perceived relative advantage and perceived trialability and attitude towards online education.

Next, the summary of hypothesis 2 and sub-hypotheses which include normative beliefs and their relationship with adoption intention towards online education are presented in detail in table 5.11.

Table 5.11: Structural Relationship between Normative Beliefs and Adoption Intention towards Online Education

Hypothesis	Path Relationship			Standardized Regression Coefficient	Critical Ratio (C.R.)	P-Value
H2: Subjective norms are positively related to intention towards online education adoption.	SN	+ →	AI	0.173	3.474	***
H2.1: Peer influence is positively related to subjective norms.	PI	+ →	SN	0.283	3.141	0.002**
H2.2: Family influence is positively related to subjective norms.	FI	+ →	SN	0.227	2.801	0.005**
H2.3: Superiors' influence is positively related to subjective norms.	SI	+ →	SN	0.028	0.449	0.653 (NS)
H2.4: Community influence is positively related to subjective norms.	CI	+ →	SN	0.190	3.451	***
H2.5: External influences are positively related to subjective norms.	EI	+ →	SN	0.074	1.395	0.163 (NS)

***p < 0.001, **p < 0.01, *p < 0.05

From table 5.11, the study hypothesizes that normative beliefs are positively related to adoption intention towards online education. Decomposing normative beliefs

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into each referent group, provides clarification on whose opinions can significantly influence the decision of potential adopters. The results for hypothesis 2 showed significant support that the main variable i.e. subjective norms are positively related to intention towards online education adoption with β = 0.173, C.R. = 3.474 at p < 0.001.

- Secondly, hypothesis 2.1 proposed that peer influence is positively related to subjective norms. The results found significant support for the hypothesis 2.1 with statistical value of β = 0.283, C.R. = 3.141 at p < 0.01. Therefore, there is a significant positive relationship between peer influence and subjective norms.

Thirdly, hypothesis 2.2 proposed that family influence is positively related to subjective norms. The results showed that there is significant positive relationship between these two constructs with statistical value of β = 0.227, C.R. = 2.801 at p < 0.01 confidence level. Therefore, hypothesis 2.2 is supported.

Fourthly, hypothesis 2.3 proposed that superiors' influence is positively related to subjective norms. The results found no significant support for the relationship between superiors' influence and subjective norms with statistical value of β = 0.028, C.R. = 0.449 at p > 0.05 confidence level. Therefore, hypothesis 2.3 is not supported.

Fifthly, hypothesis 2.4 proposed that community influence is positively related to subjective norms. The results showed β = 0.190, C.R. = 3.451 at p < 0.001 confidence level. Therefore, hypothesis 2.4 is supported. There is a positive relationship between community influence and subjective norms.

Finally, hypothesis 2.5 proposed that external influences are positively related to subjective norms. The results did not show significant relationship between these two constructs with statistical results of β = 0.074, C.R. = 1.395 at p > 0.05 confidence level. Therefore, hypothesis 2.5 is not supported.

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Next, the results of structural relationship between control beliefs and adoption intention towards online education are presented in table 5.23.

Table 5.12: Structural Relationship between Control Beliefs and Adoption Intention towards Online Education

Hypothesis	Path Relationship			Standardized Regression Coefficient	Critical Ratio (C.R.)	P-Value
H3: Perceived behavioral control is positively related to intention towards online education adoption.	PBC	+ →	Adoption Intention	0.157	3.073	0.002**
H3.1: Self-efficacy is positively related to perceived behavioral control.	SE	+ →	PBC	0.162	2.281	0.023*
H3.2: Resource facilitation is positively related to perceived behavioral control.	FCR	+ →	PBC	0.290	3.357	***
H3.3: Technology facilitation is positively related to perceived behavioral control.	FCT	+ →	PBC	0.260	3.633	***

***$p < 0.001$, **$p < 0.01$, *$p < 0.5$

According to table 5.12, the study hypothesizes that control beliefs are positively related to adoption intention towards online education. Control beliefs are decomposed into three sub-variables including self-efficacy, resource facilitation and technology facilitation. The results for hypothesis 3 showed significant support that the main

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variable, perceived behavioral control, is positively related to intention towards online education adoption with $\beta = 0.157$, C.R. $= 3.073$ at $p < 0.01$. Therefore, hypothesis 3 is supported.

Hypothesis 3.1 proposed that self-efficacy is positively related to perceived behavioral control. The results indicate that hypothesis 3.1 is supported with statistical value of β 0.162, C.R. $= 2.281$ at $p < 0.05$ confidence level. Therefore, the findings indicate that there is significant and positive relationship between perceived behavioral control.

Hypothesis 3.2 proposed that resource facilitation is positively related to perceived behavioral control. The statistical results showed $\beta = 0.290$, C.R. $= 3.357$ at $p < 0.001$ confidence level. Therefore, findings indicate that there is significant positive relationship between resource facilitation and perceived behavioral control, thus hypothesis 3.2 is supported.

Finally, hypothesis 3.3 proposed that technology facilitation is positively related to perceived behavioral control. The statistical results showed $\beta = 0.260$, C.R. $= 3.633$ at $p < 0.001$ confidence level. Therefore, findings indicate that there is significant positive relationship between technology facilitation and perceived behavioral control, thus hypothesis 3.3 is supported.

In summary, all hypotheses relationship between perceived behavioral control and intention towards online education adoption are significantly supported. The findings indicate that self-efficacy, resource facilitation, and technology facilitation are significantly and positively related to the perceived behavioral control, and consequently the perceived behavioral control is positively related to the intention towards online education adoption.

Next, the results of hypothesis test of the structural relationship between self-directed learning and adoption intention towards online education is presented in table 5.13.

Table 5.13: Structural Relationship between Self-Directed Learning and Adoption Intention towards Online Education

Hypothesis	Path Relationship			Standardized Regression Coefficient	Critical Ratio (C.R.)	P-Value
H4: Self-directed learning is positively related to intention towards online education adoption.	SDL	+	Adoption Intention	0.326	6.019	***

***p < 0.001

Table 5.13 presents the structural relationship between self-directed learning and adoption intention towards online education (hypothesis 4). Hypothesis 4 proposed that self-directed learning is positively related to intention towards online education adoption. As the table illustrates, the hypothesis 4 is supported with β = 0.326, C.R. = 6.019, p < 0.001. Therefore, there is significant positive relationship between self-directed learning and adoption intention towards online education.

Results Summary

This chapter presents the data analysis and results, both descriptive data and quantitative data based on 542 valid responses to the questionnaires survey. Exploratory Factor Analysis (EFA) was conducted to validate the constructs, assessing the degree to which an instrument measures the concept that it is designed to measure. Cronbach's

Alpha showed that the items are reliable with the overall results of greater than minimum threshold of 6.0. Then, Confirmatory Factor Analysis (CFA) was conducted to validate the model fit. The Goodness-of-Fit indices showed that both measurement model and the structural equation model evidenced acceptable fit. The data showed that all the four main variables (attitude, subjective norms, perceived behavioral control, and self-directed learning) are related positively to the adoption intention towards online education. However, sub-variables under each of the main variables showed mixed relationships.

Under the attitudinal belief constructs, three out of five sub-variables (perceived simplicity, perceived compatibility, and perceived observability) were found to have significant positive relationship with attitude towards online education, while perceived relative advantage and perceived trialability were found to have non-significant relationship with attitude towards online education.

For the normative belief constructs, the results showed peer influence, family influence, and community influence to be positively related to the subjective norms, while superior's influence and external influence were found to be not significantly related to the subjective norms.

With regards to the control belief constructs, all of the three sub-variables (self-efficacy, resource facilitations, and technology facilitations) were found to be significantly and positively related to the perceived behavioral control with varying degree of significance.

CHAPTER VI

SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

This chapter integrates the findings on the factors contributing to adoption intention towards online education in Thailand based on the structural paths of the research model. A discussion of the findings is also provided in order to address the research questions and hypotheses. Based on this discussion, conclusions have been drawn, along with the recommendations. The chapter then concludes with implications for both academics and practitioners, as well as limitations and suggestions for future research. The following is an outline of topics to be discussed:

6.1 Summary of Findings
6.2 Discussion and Conclusions
6.3 Implications and Recommendations
6.4 Suggestions for Further Research

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6.1 Summary of Findings

This section presents the summary of findings based on problems and hypotheses posed in this study. The research framework involves four major variables, three of which have been decomposed into specific dimensions based on the decomposed version of Theory of Planned Behavior (DTPB). DTPB allows for the identification of which specific factor is related to the behavioral decision, thus providing better implications and diagnostic value.

Based on the statistical analysis and the results explained in Chapter 5, findings can be summarized and as such, research questions can be answered as follows:

RQ1: Which factors are significantly related to the adoption intention of online education?

All four main independent variables including attitude towards online education (ATT), subjective norms (SN), perceived behavioral control (PBC), and self-directed learning (SDL) are significantly and positively related to adoption intention towards online education (AI). Among the four main independent variables, self-directed learning was found to be the strongest predictor to explain adoption intention ($\beta = 0.33$, $p < 0.001$), followed by attitude towards online education ($\beta = 0.31$, $p < 0.001$), subjective norms ($\beta = 0.17$, $p < 0.001$) and lastly, the perceived behavioral control ($\beta = 0.16$, $p < 0.05$). All four factors together can explain adoption intention towards online education at 65 percent of variance, leaving 35 percent unexplained. Therefore, the answer to research question 1 is that all factors, included in the study, have been found to be statistically significant related to the adoption intention towards online education in a positive direction, which is interpreted that when one variable increases, the other also increases in the same direction.

RQ2: Which factors are significantly related to the attitude and the adoption intention of online education?

The first set of independent variables comprise the attitudinal beliefs, which is decomposed into five perceived characteristics of innovation to determine which specific attribute of online education is significantly related to attitude towards online education, and in turn is related to the adoption intention towards online education. These perceived characteristics of innovation (PCI) include perceived relative advantage (PRA), perceived simplicity (PS), perceived compatibility (PC), perceived trialability (PT), and perceived observability (PO). These sub variables were indicated in hypotheses 1.1 to 1.5. The path results showed that three out of the five PCIs are significantly and positively related to the attitude towards online education. These variables include perceived simplicity (β = 0.16, p <0.05), perceived compatibility (β = 0.43, p < 0.001), and perceived observability (β = 0.26, p < 0.001). Non-significance path were found on perceived relative advantage and perceived trialability. However, the path relationship between attitude towards online education and adoption intention have been found to be strongly and positively significant (β = 0.31, p < 0.001). All dimensions under attitude towards online education can explain 73 percent total variance in attitude towards online education.

Therefore, the null hypotheses of H1, H1.2, H1.3, and H1.5 are rejected, while the null hypotheses of H1.1 and H1.4 are failed to reject. In other words, the statistical results answer the research question number 2 by showing that three out of five attributes, including perceived simplicity (PS), perceived compatibility (PC), perceived observability (PO) have been found to have significant and positive relationship with attitude towards online education, and subsequently are related to the adoption intention.

RQ3: Which factors are significantly related to the subjective norms and the adoption intention of online education?

The second set of independent variables is subjective norms, which have been decomposed into two groups of social influences, i.e. interpersonal and external influences. For interpersonal influences, it is decomposed into peer influence (PI), family influence (FI), superiors' influence (SI), and community influence (CI). It must be noted that external influences (EI) represent the influences from mass media and other non-interpersonal contacts such as expert opinions and aspiration referents outside of an individual's personal network. There is one main hypothesis and 5 sub-hypotheses involved. The path results showed that three out of four interpersonal influences are significantly and positively related to the subjective norms, which include peer ($\beta = 0.28$, $p < 0.01$), family ($\beta = 0.23$, $p < 0.01$), and community ($\beta = 0.19$, $p < 0.001$) influences. The results showed non-significance path from superiors/employer influence to subjective norms. Similarly, the path from external influences to subjective norms was also non-significant. However, the path indicating relationship between subjective norms and adoption intention towards online education were found to be strong and positively significant ($\beta = 0.17$, $p < 0.001$).

Therefore, the null hypotheses of H2, H2.1, H2.2, and H2.4 are rejected, while the null hypotheses of H2.4 and H2.5 failed to reject. The statistical results provide he the answer to research question 3, i.e. factors which are significantly related to subjective norm and the adoption intention towards online education are peer influence, family influence, and community influence, while superiors' influence and external influences are not significantly related.

RQ4: Which factors are significantly related to the perceived behavioral control and the adoption intention of online education?

The third set of independent variables is perceived behavioral control (PBC), which has been decomposed into three dimensions including self-efficacy (SE), resource facilitations (FCR), and technology facilitations (FCT). The results showed that all three dimensions are positively and significantly related to perceived behavioral control, though the strength of relationships varies. Consequently, perceived behavioral control is positively and significantly related to the adoption intention. Self-efficacy is positively related to the perceived behavioral control at $\beta = 0.16$, at $p < 0.05$, thus H3.1 is supported. External factors including resources and technologies were also found to be significant with positive relationships toward perceived behavioral control. The resource facilitations were found to be positively related to perceived behavioral control at $\beta = 0.29$ at $p < 0.001$ significance level, thus H3.2 is supported. Furthermore, technology facilitations were found to be positively related to perceived behavioral control at $\beta = 0.26$, $p < 0.001$ significance level, indicating that H3.3 is supported. The main variable, perceived behavioral control, was then found to be positively related to the adoption intention towards online education with statistical analysis results of $\beta = 0.16$, at $p < 0.01$ significance level, indicating that H3 is supported. Therefore, all three dimensions, including self-efficacy, resource facilitations, and technology facilitations were found to be statistically significant related to perceived behavioral control, and the adoption intention towards online education. Other than that, among the three dimensions, resource facilitations was the strongest predictor of the perceived behavioral control, followed by the technology facilitations and self-efficacy. The results thus provide answer to research question 4.

RQ5: Is self-directed learning attribute related to the adoption intention of online education?

The final major variable hypothesized to be positively related to the adoption intention towards online education is self-directed learning (SDL). The statistical results demonstrated that self-directed learning is statistically positive related to adoption intention towards online education with $\beta = 0.33$, at $p < 0.001$ significance, indicating that H4 is supported. Based on this finding, the answer to research question 5 is then provided.

Conclusively, the statistical analysis results have demonstrated that the four main variables include attitude towards online education (ATT), the subjective norms (SN), the perceived behavioral control (PBC), and self-directed learning (SDL) showed significant and positive relationships with adoption intention towards online education. Total direct effects between the four main independent variables, including attitude towards online education, subjective norms, perceived behavioral control, and self-directed learning can explain 65 percent of the variance in adoption intention towards online education, leaving 35 percent of the variance unexplained.

The findings from this study indicate that the more positive the attitude towards online education, the more positive the opinions of significant others, the better the control people have in terms of internal belief about one's own capabilities and external factors, as well as the better self-directed learning capability, the more likely is an individual to adopt online education. By decomposing each of the major variables, except SDL, into dimensions, it is possible to provide specific answer to the research questions by identifying which specific factor is related to the adoption intention toward online education.

In terms of attitudinal beliefs, the study integrates the innovation's characteristics of online education as sub-factors. Three dimensions including perceived simplicity, perceived compatibility, and perceived observability, were found to be significantly

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related with the attitude towards online education, and subsequently adoption intention. In other words, the more simple and more compatible personally and socially online education is, the more likely that the potential adopters will form positive attitude towards online education, and the more likely they will have intention to adopt online education.

Additionally, the findings also indicate that social influences are positively related to the behavioral intention to adopt online education. Specifically, interpersonal influences include peers, family, loved ones, and the community influence have shown positive relationship with subjective norms, consequently subjective norms were found to be positively related to adoption intention towards online education. In contrast, superiors' influence (or employer) and external influence (mass media) were not found to have significant relationship with subjective norms and adoption intention towards online education. This indicates that Thais give higher importance to opinions from close interpersonal networks include family and loved ones, peers, and the community that they belong to rather than more distant contacts as employer or superiors, mass media or others such as expert opinions.

Furthermore, the findings also indicate that Thai students also take into consideration their level of their capabilities to study online, the resources such as money and time, as well as the technology available or accessible to them that can facilitate their studying online. The more confidence they have about their capabilities to study online, and the more ready they are in terms of resources and technology necessary to facilitate online education, the more likely they are to adopt online education. Last but not least, the fourth major variable is self-directed learning attribute, which was found to have significant positive relationship with adoption intention towards online education. This indicates that the more self-directed learning that a Thai student has, the more likely is he or she to adopt online education.

6.2 Discussion and Conclusions

The model explains 65 percent of the variance in adoption intention towards online education, with all four major variables found to have significant positive relationships with the intention to adopt online education. Therefore, the results imply that potential Thai students for online education will make decision by taking into account all factors including the attributes of online education, social influences, controllability, and also personal attributes of self-direction. These factors, however, vary in terms of strength of influence. Thai students who are likely to pursue online education tend to have self-directed learning as the key attribute, followed by the attitudes on how they perceive online education's attributes, the influence of their reference individuals or groups, and then the least important factor influencing their decisions is how they perceive online education as being under their control for successful performance. This is an interesting finding since self-directed learning attribute, which is a key attribute required for successful performance in the traditional distance education is also applicable to online education. This is in line with the argument by Liu, Han, & Li (2010) that self-directed learning would lead to the willingness to adopt m-learning as well as other online learning since students need to be self-directed and take control of their learning to be successful in the distance education environment such as mobile or Internet-based online education where students and instructor are normally geographically separated.

The results obtained from the statistical analysis of attitudinal belief components have shown that the perceived relative advantage was not significantly related to the attitude, which is contradicting to the findings by other researchers in related fields, including Moore and Benbasat (1991), Talor and Todd (1995), Jebeile and Reeve (2003), Lu, Liu, and Liao (2005), Ajjan and Hartshorne (2008), and Rath and Sekha (2010). This might be explained by referring to the argument by Pedersen and Nysveen (2007) that service properties or attributes may determine the perceived usefulness or perceived relative advantage of the service, particularly online education. Without prior experiences or exposure to online education, comparison between the properties or advantages

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between off-line and online education might be difficult. Another interesting finding is that the perceived observability, which was not suggested as an influential attribute, was found to be a significant factor related to the attitude and then the behavioral intention in this study. This implies that Thai students want to see references support their decision-making. The result might be related to Thai culture and the concept of "face" as referred to by-Lee and Green (1991) or "image" according to Moore and Benbasat (1995). Thai people want to maintain social status; therefore, seeing others engaging in an action before can reduce the social risk and protect them from losing face (Hirunyawipada and Paswan, 2006; Flight et al., 2011).

The other two attributes suggested by these previous researchers, as common attributes influencing attitude towards an innovation and the adoption intention which are perceived simplicity and perceived compatibility, were found to be significantly related to the attitude towards online education and then the adoption intention. Therefore, the results are consistent with the previous researchers. This implies that the potential Thai adopters' cognitive evaluation of online education does not take into account the relative advantage of this method of learning, nor considers trailability as important in decision making. However, if online education is compatible with their personal and social lifestyles, is simple to learn and use, and if significant others are studying online, they are more likely to form positive attitude and subsequently intend to adopt online education.

To further explain the findings, the results reflect the explanation on "perceived risks" by several researchers such as Rogers (2003); Hirunyawipada and Paswan (2006); and Flight et al. (2011) that newness is perceived as uncertainty personally and socially, therefore incompatibility, difficulty, and unobservability will increase risk and slow down the rate of innovation adoption. However, as Holak and Lehmann (1990) as well as Rogers (2003) also suggested, trialability can reduce the perceived risks and uncertainty, but the results of this study showed no significant relationship between perceived trialability and attitude towards online education. Based on Rogers' (2003) discussion on technological innovation such as online education, which is a new form of educational delivery using information and communication technology as a main medium for

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delivery, technology has two components including hardware and software. Hardware aspect of the technology consists of physical tools or objects, while the software aspect consists of information base or non-physical tools or objects. Technology can also be almost entirely composed of information as for example, political philosophy and religious idea. Rogers (2003) further argued that technology almost always has mixture of hardware and software, depending on which aspect is dominant. Online education is a form of service, for which it is information base, thus presenting difficulty for trial or experimentation. Trial can cost time and effort for both providers and target adopters. Specifically for target adopters, it can cost time and effort before one can understand and judge whether it is suitable or matches with one's needs. On top of that, trial is also an uncommon practice for formal education in Thailand, and thus the trailability attribute might be overlooked by the Thai potential adopters of online education. Therefore, the perceived trailability might not be related to the intention to adopt online education by the target students.

Furthermore, the results showed that subjective norms are significantly related to the adoption intention towards online education. This confirms the role of normative belief or social influences posited in this study. Several researchers in related fields, including Diffusion Of Innovation (DOI), Information System (IS), as well as education research, argued that social factors should be taken into account when studying technological adoption, particularly in the current social network computing paradigm (Gounaris & Koris, 2008; Vannoy & Palvia, 2010). In addition, the results also confirm the proposed enhancement to the DOI definition that diffusion of new products and services are driven by social influences and all players are interdependent and are affected without their explicit knowledge (Peres et al., 2010). The results are congruent with the findings from the case study conducted in a Thai university on Thai students' attitudes toward e-learning by Bhrommalee (2012). In this study, it was found that Thai students would intend to use e-learning if they are convinced that respectable and influential people around them want them to use the system (Bhrommalee, 2012). Thai people have a strong sense of collectivism, according to Hofstede (2001) as a consequence of their living in extended families. The dependency between a person and

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in-groups is then stronger as compared to out-groups. As Burn and Thongprasert (2005) suggested, Thais tend to hold views and opinions respecting the group and rely on the spirit and moral support from in-groups in their decisions. With respect to cultural traits defined by Hofstede (2001), Thai people are also characterized as high in uncertainty avoidance, i.e. they feel threatened by ambiguous situations and try to avoid challenging experiences. Thais seek certainty in their relationships and are normally reluctant to be the cause of discomfort to others. Therefore, each individual Thai would try to restrain his/her own interest or desire in situations where there is the potential for discomfort or conflict, and where there is a need to maintain a pleasant relationship (Holmes & Tangtongtavy, 1995). These cultural traits explain how subjective norms or social influences are significantly related to the Thai students' decision on adopting online education.

On deeper examination of dimensions after decomposing the normative beliefs, the findings indicated that external influences include mass media or expert opinions, did not show significant relationship with subjective norms, while interpersonal influences have been found to be more influential. However, among the interpersonal reference group or individuals (peers, family and loved ones, superiors' or employer, and the community), only the superiors' influence was found to be insignificantly related to the subjective norms. Unlike many previous researches in related fields especially in organizational setting, superiors' influence was found to be an influential factor. For example, Thanasankit and Corbit (2000) suggested that it is typical to see Thai subordinates accepting their superiors' decisions and carrying out work unquestioningly. However, online education is considered an individual decision-making, which is a voluntary consumer environment, where an individual is free to make his/her own choice. Therefore, this voluntary nature of online study may explain the results found from this study that superiors have no significant influence in the Thai students' decision to adopt online education. This confirms the argument by researchers of technology acceptance models such as Baron et al. (2006) that it is necessary to include social factors into the technology acceptance study, especially in a consumer-based environment. In addition, the results may be attributable to the fact that almost 40 percent of the samples are

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currently studying, therefore employer or superiors' influence may not yet be accountable for their decision. The findings indicate that employer's perception of online education as inferior or less credential might not affect the decision for online education by potential Thai adopters.

- Most importantly, community influence which is the new dimension added to the DTPB model was found to be statistically significant related to the subjective norms, and consequently is related to decision to adopt online education. The findings may also be explained in terms of cultural aspect of the diffusion of innovation process since culture consists of value system of a particular society (Dubois, 1972). As the author suggested, the influence of culture upon the individual decision to adopt or reject an innovation can be expressed firstly in terms of value and status, and secondly in terms of norms and role. Furthermore, each individual has a different degree of conformity to group's norms. Since members of the community share common understandings or societal norms, and cultural beliefs determine practice or acceptable behavior in the community (Dubois, 1972), cultural values and norms underlying the system impact the success as well as the rate of innovation diffusion in the community. The failure to introduce boiled water program in the rural village of Peru due to the cultural belief that hot food is for ill people, is a good example (Dubois, 1972). As such, consequences of innovation acceptance may generate a cultural change. Therefore innovation contributes to the development of a cultural system rather than is affected by it (Dubois, 1972). Compatibility of innovation's attributes to the cultural norms will therefore, increase the rate of adoption and reduce resistance (Dubois, 1972; Rogers, 2003).

As Dubois (1972) suggested cultural influence on an individual's decision can also be expressed in terms of values and status. This can also be described by referring to Moore and Benbasat's (1995) concept of "image". Findings from this study are in line with what was found in the cross-cultural study conducted by Lee and Green (1991) based on Fishbein's behavioral intentions model to compare between samples from the United States and Korea. The authors found that people's decision in collectivist cultures tend to be highly influenced by the referent group that they interact with, such as family,

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neighbors, friends, coworkers, and even people in the overall society. On top of this, they are also highly concerned with "face" i.e. how other people perceive them in order to maintain their status and acceptance in the society. Failing to do so can threaten their social position or standing in the society, thus Koreans are highly motivated to save their face, which reflects in compliance to societal norms. The findings from this study demonstrated that Korean gives more important to subjective norms as compared to the Americans who give greater importance to their own attitude toward a product. Interestingly similar to this study, both Koreans and Americans identified friends and family as the first two most important influencers. Lee and Green (1991) found substantial differences between the two cultures with greater importance for personal attitude in decision making in the Western culture, and greater effect of social influences in decision making for people in Collectivist cultures. The findings of this study have provided evidence that social influence plays important role in diffusion of innovative online education in Thai society.

Both self-efficacy and facilitating conditions are important determinants of perceived behavioral control, and in turn, perceived behavioral control is an important determinant of intention to adopt online education. As discussed in an earlier chapter, there has been increasing availability and advancement in network computing technology such as broadband Internet, multimedia technology such as video, web 2.0, and social network technologies which facilitate innovative ways of teaching and learning (Ajjan & Harthshorne, 2008; Asharaf, 2009; Minocha, 2009). The Meaningful Broadband Report 2.0 Broadband Thailand 2015 by Smith (2010) reported that if there are no changes to the current broadband policy, 17 percent of households and 37 percent of Thailand's national population would receive broadband by 2015, either fixed and wireless. There were approximately 2.74 million broadband subscribers in Thailand as of the second quarter year 2010 (National Telecommunication Commission, 2010). Smith (2010, p.30) also agued that broadband is a communication medium for shaping human behavior, the impact of which is destined to rise exponentially over time. Popularity and familiarity can increase students' confidence in using the technologies such as those used for online learning (Osborne & Oberski, 2004; Tierney & Findlay, 2008; Henshaw, 2008; Walsh,

2009). Previous empirical studies on learning have evidenced that an individual with high self-efficacy would perform better since self-efficacious students would have high level of effort in learning, are more persistent, and have lower adverse emotional reactions when they encounter difficulties (Bandura, 1997; Zimmerman, 2000; Cameron & Kirkman, 2010). With respect to Thailand's educational context, Bhatiasevi (2011) found that computer self-efficacy had significant effect on students' perceived ease of use, but was not significantly related to their intention to use the system. The author argued that this is due to usability and interface design of the system that needs to be improved since the study found that students perceive e-learning system to be useful and are willing to learn to use it. This study found significant relationship between self-efficacy and perceived behavioral control, which indirectly affects the behavioral intention to adopt online education. The findings indicate that students' confidence in studying online education is related to the perceived control over their successful performance in studying online, and subsequently related to the intention to adopt online education.

With respect to the facilitating conditions, both resources and technologies, the findings from this study showed that the two factors have significant positive relationship with perceived behavioral control. Therefore, the results are in line with the findings from the original DTPB model by Taylor and Todd (1995). This implies that if an individual perceives the target behavior to be under his or her control, it will increase the confidence in successfully performing the task, and is therefore likely to have positive intention to performing that specific task. As in the context of Thailand, Bhrommalee (2012) also found facilitating conditions to be a strong predictor of students' behavioral intention to adopt e-learning system in his case study of a Thai university. He suggested, based on the finding of this study, that students would agree to use e-learning system if both organizational and technical infrastructures in the university are ready to support and assist them in using the system (Bhrommalee, 2012). An earlier study conducted by Jairak, Praneetpong, & Mekhabunchakij (2009) on acceptance of mobile learning for higher education students in Thailand, also found supportive evidence that facilitating conditions had significant effects on the behavioral intention to adopt mobile learning. However, there is no study conducted in Thailand related to e-learning or online learning

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that demonstrates or validates the relationship between the facilitating conditions and perceived behavioral control, as demonstrated in this study. Further research in the Thai context may replicate the model to validate this relationship and the results found from this study.

- Self-Directed Learning, a newly added construct to the traditional DTPB model, was found to be a significant factor in predicting the intention to adopt online education as compared to other main constructs in this study. This is consistent with the study by Wang, Wu, and Wang (2009) on m-learning adoption that self-directed learning plays a critical role in acceptance of mobile learning. The findings imply that people with high autonomous learning abilities, regardless of the medium of access (i.e., desktop personal computers or mobility devices), will be more likely to adopt online education. This result also confirms the validity of self-directed learning or self-management of learning proposed by Smith et al. (2003) to predict behavioral intention towards online distance education. Since 63.3 percent of the respondents are employed and 42 percent are above 31 years old, the results may be due to the pressure for self-development and the need for lifelong learning to advance their careers and increase their own competitive advantage in the job market.

6.3   Implications and Recommendations

Practitioners

For Policy Makers - Findings on consumers' perception specific to online education adoption worldwide, as well as Thailand in particular, due to its newness (Bhatiasevi, 2011; Teo, Wong, Thammetar, & Chattiwat, 2011) should facilitate stakeholders' decision to get rid of the limitations and disadvantages in areas including information and communication technology (ICT), human resources, and promote supportive governmental and institutional policies for competitiveness of the national education industry. This can be further explained by referring to academicians and

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practitioners' point of views on the critical success factors in online education diffusion, which are discussed in this report. For example, McPherson & Nune (2006); and Economist Intelligence Unit (2008) recommended that institutional culture can impede the slower adoption of online education. Both academic and technical expertise resources are required for successful implementation of distance online education (Kwok et al., 1999; Bray, 2004). Many researchers recommended that in addition to resources such as time and money, technological resources including speed of Internet access, personal computer resources, and technical supports were recommended as obstacles and discouraging factors for learning in an online distance environment (Tiene, 2002; Crossman, 2005; Burn & Thongprasert, 2005; McPherson & Nune, 2006). Tiene (2002) and Osborne & Oberski (2004) agreed that clear governmental policies with regards to the use of information and communication technology for education and readiness of technological infrastructure are key success factors. The findings from this study support the previous literatures in area of innovation adoption in educational sector. The findings suggest that policy makers should issue clear policies when implementing online education for their country or institutions with regards to provisioning resources and technological readiness since they can influence decision of target students for online education.

For Service Providers, Institutions, and International Marketers - Growing demand for education in Asia has attracted worldwide educational institutes, especially those in developed economies where domestic demand has been declining. Internationalization of education is an increasing trend. The findings from this study give valuable implication to international marketers of educational services, suggesting that social factors are important in collectivist cultures such as Thailand. Therefore, international marketer should take into account of these factors when designing marketing mix programs targeting students in collectivist cultures such as Thailand. For example, Bray (2004) suggested that Asian students may prefer more interaction with classmates and more accustomed with instructor-led learning experience, and as such, independent learning environment such as online education may not be attractive choice for them. Bhattacharya and Sharma's (2007) stated that hybrid environment might be

more suitable as compared to purely online in India. Therefore, the business model of educational institution may be designed with the right combination of independent learning and social interaction among peers and instructors. As Tiene (2002) also suggested that developing countries should take careful consideration when implementing online education in each country. The service provider should take into account the local culture in addition to readiness of infrastructure when designing the online educational service. Acceptance among interpersonal networks or groups will be essential for adoption of any product and service rather than personal cognitive evaluation of the product or services. The marketing programs should therefore be designed to incorporate social factors influencing prospective students of online education. The marketers can leverage the use of interpersonal network more than public media since the findings indicate that it is more powerful channel of communication. In line with these findings, Rogers (2003, p.341) suggested that individuals tend to be linked to others who are close to them in physical distance and who are homophilous in social characteristics since it takes them the least effort but most rewarding. As part of decision process, information can be effectively and efficiently transmitted to personal network more than the public opinion or mass media. The marketing communication programs, as for examples, can be designed to leverage the word-of-mouth communication strategy, engage the target students' personal network including peers, family and lover ones, and the community in the marketing activities or programs and promotion. The marketing programs can then become more effective for institution or educational service providers.

For Technology Providers/Designers – The study identifies specific factors related to the decisions of potential adopters of online education. Therefore, technology providers can design online education systems with functions and features that incorporate simplicity for usage, compatibility of the existing lifestyle without too many changes to the students' routines. This implication is in line with many researchers in education sector such as Jebeile and Reeve (2003) and Ndubishi (2004) also suggest that technology designers should design the system so that it is easy to use to create positive experience and reduce workload or effort in learning to use the system. In addition, since social factors also influence the decision of target students, the online education system

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should be designed to incorporate social interaction functions and features such as messaging, discussion board, and other communication and collaborative to facilitate in the classroom interaction online. Relative advantage as compared to traditional classroom learning including the ease and convenient access to educational materials, tools and facilities that allow effective learning without the need to change much of their existing habits can motivate them to intend to adopt online education (Rath & Sekha, 2010). In addition, this will result in students' increased self-confidence to use the system and facilitate and encourage autonomous learning in the online educational environment (Siragusa & Dixon, 2009).

Theoretical Contribution

Firstly, the study successfully validated that the DTPB model is suitable and applicable to examine factors related to adoption decision of online education in the context of Asian countries, specifically Thailand. The decomposed TPB model allows examination into specific dimensions of attitudinal beliefs based on cognitive evaluation of innovation's attributes of online education in addition to normative beliefs or social influences, as well as the control beliefs. Most importantly, the new dimension added specifically for this study, i.e. community influence was found to have significant relationship with the subjective norms and subsequently was related to the adoption intention towards online education. Other than this unique contribution to the DTPB model, the "self-directed learning" construct was adapted from distance education field of research into this study. The result showed that self-directed learning is also related to the adoption intention of online education in Thailand. The model developed therefore was proved to be useful in predicting the behavioral intention towards innovative online education adoption. Decomposing beliefs structures into dimensions allow specificity of factors related to target students' decision whether they intend to adopt online education. Other than that extending DTPB to include self-directed learning, which is influential factor in the field of distance education, provides the integrated model to study online education as subset of distance education. Therefore, the research contributes

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academically by providing the research framework of extended DTPB which is applicable and suitable to examine factors related to the decision to adopt online education in the context of Thailand and the field of distance learning research. Moreover, the research also adds to the body of knowledge in the area of e-learning research in the context of Thailand which has been found to be scarce. Therefore, the study contributes to the field of consumer behavioral research specifically in the context of educational innovation research.

Furthermore, many other studies focused on acceptance after implementation, but this study focuses on perception prior to implementation of the system, i.e. respondents had no prior online learning experience. In addition, online education is voluntary in nature and is an individual consumers' decision rather than one stemming from the organizational environment. As such, DTPB is deemed appropriate for use as an alternative model to TAM especially in the current social network computing paradigm, which can fill the gaps afore mentioned. Even the original DTPB by Taylor and Todd (1995) was tested in environment after implementation and in more of compulsory environment. This study therefore is contributing to the field of technology acceptance in educational research.

6.4   Limitations and Suggestions for Further Research

Even though the developed framework seems promising in providing an explanation of adoption intention towards online education, the research can still be extended in several ways.

1. The data is cross-sectional i.e. collected at a single point in time. Results may differ if data is collected in different times. Therefore, longitudinal data may provide patterns of adopters' behavior over time. This is congruent with what has been suggested by Rogers (2003) that continued validity and enhancement of the diffusion theory is recommended due to the continued changes in

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consumer behaviors and the social environment. Further research, carried out in different points in time, can also yield different results, thus validating the findings from this study.

2. The scope of the study is limited to respondents in Bangkok area only. The results therefore may not be generalized to the whole of Thailand. Further research may be conducted by collecting data from other provincial areas other than Bangkok to assess and compare the results. As earlier mentioned with regards to continued validation of diffusion theory, the results may differ when testing in different social environment contexts.

3. Factors selected and included in this study may not cover all factors that could be related to adoption intention towards online education. Future research may be extended to cover other factors including reputation of the institutions and cultural traits, which have not been included in this study, but are believed to influence the behavioral decision as discussed based on findings. Cross-national validation of the study is recommended for researchers interested in consumer behavior theory by comparing between different countries' cultural traits.

4. The DTPB allows for flexibility to include dimensions into each major variable in the original model. Since community influence, which is a new addition in this study, is geographically bound, future research may validate the findings by extending the definition of this particular variable to include non-physical community such as sports & other leisure clubs, virtual community, brand community, religious communities, and other social activity communities. Moreover, the study has proven that social factors play a more important role in potential adopter's decision to adopt online education than cognitive evaluation of the innovation's attributes. Social media has also become common media for communication, therefore future research may

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consider examining the role of social media as a possible factor influencing potential adopter's decision on whether to adopt online education.

5. The study incorporates innovation's attributes as sub-factors under the attitudinal belief construct. Since Rogers (2003) identified adopter's characteristics as one of the key factors affecting the rate of innovation diffusion into the society, further research may be extended to include an individual's characteristics other than self-efficacy and self-directed learning such as opinion leadership and innovativeness as determinants of the online education adoption decision.

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APPENDICES

Factors Influencing Adoption Intention of Online Education
To Pursue Post-Graduate Degree

This questionnaire is designed to gather information for a dissertation as a partial fulfillment of the requirement for the degree of Doctor of Philosophy in Business Administration (Ph.D.BA). Please choose your answers according to facts and your true opinions. All collected data will be used for academic purpose only. Thank you for your kind cooperation.

Part 1: Screening Question

Please indicate your current education

(   ) I am studying in the final semester, Bachelor Degree level (please, continue to the next part of the questionnaire)

(   ) I have completed a Bachelor Degree (please, continue to the next part of the questionnaire)

(   ) No More than Secondary School or Equivalence (please, do not go further on the questionnaire)

Thank you very much for your valuable time and co-operation.

Part 2: Your opinions towards statements

Please, indicate your level of agreement with each statement about factors influencing adoption intention towards online education to pursue post-graduate study by putting (√) mark on the box that best matches your answers.

1 = Strongly Disagree (SD), 2 = Disagree (D), 3= Neutral (N),4 = Agree (A), 5 = Strongly Agree (SA)

No.	Attitude Towards Online Education	1	2	3	4	5
1	For me, studying online education is a wise idea.					
2	For me, studying online education is a good idea.					
3	For me, studying online education would be pleasant.					
4	I like the idea of studying via online education.					
	Perceived Relative Advantage	1	2	3	4	5
5	I think online education is relatively more beneficial to me as compared to the traditional on-campus education.					
6	Overall, I think taking online education will be advantageous to me.					
7	Taking online education will give greater control over my time.					

8	Taking online education enables me to increase my knowledge and career potentials without sacrificing other commitments.					
	Perceived Simplicity **(Non-Complexity, Ease of Use)**	**1**	**2**	**3**	**4**	**5**
9	I believe that learning to use resources/facilities provided by online education over the Internet will be a simple task for me.					
10	I believe that studying in an online education model environment will be simple for me.					
11	I believe that studying online will be understandable and easy to follow for me.					
12	Overall, I believe that it is simple for me to study in an online education mode.					
	Perceived Compatibility	**1**	**2**	**3**	**4**	**5**
13	Taking online education is compatible with all aspects of my work.					
14	Taking online education is completely compatible with my current situation.					
15	Taking online education fits well with the way I like to study.					
16	Taking online education fits well into my lifestyle.					
	Perceived Observability	**1**	**2**	**3**	**4**	**5**
17	I have seen people successfully completing their post-graduate degree online.					
18	In my society, I can see people studying at home with online education.					
19	Online education is not commonly seen in my society.					
20	It is easy for me to observe people studying for post-graduate degree online.					
21	Online education is common outside of my society.					
	Perceived Trialability	**1**	**2**	**3**	**4**	**5**
22	I've had an opportunity to try various online education systems.					
23	I know where I can go to satisfactorily try out various uses of online education.					
24	Online education should be available to me to adequately test run various tools and applications.					
25	Before deciding whether to enroll in any online education programs, I should be able to properly try them out.					
26	I should be permitted to use online education system on a trial basis long enough to see what it is like.					
	Subjective Norms	**1**	**2**	**3**	**4**	**5**
27	People who influence my behavior would think that I should study online education.					
28	People who are important to me would think that I should study online education.					
29	It is important that people who are important to me agree that I take online education.					
	Peer Influence	**1**	**2**	**3**	**4**	**5**
30	I will enroll for online education if my friends think it is good.					
31	I will enroll for online education if my co-workers think it is good.					
32	Generally speaking, I would want to do what my friends think I should do.					
33	Generally speaking, I would want to do what my co-workers think I should do.					
	Family/Loved Ones Influence	**1**	**2**	**3**	**4**	**5**
34	I will enroll for online education if my family thinks it is good.					

35	I will enroll for online education if my spouse/loved ones think it is good.					
36	Generally speaking, I would want to do what my family and loved ones think I should do.					
	Employer/Superiors' Influence	1	2	3	4	5
37	I will enroll for online education if my employer or my superior thinks it is good.					
38	Generally speaking, I would want to do what my employer or my superior think I should do.					
	Community Influence	1	2	3	4	5
39	I will enroll for online education if it is acceptable in my community.					
40	Generally speaking, I would want to do what is well accepted in my community.					
	External Influence	1	2	3	4	5
41	Media with full support, articles, news suggesting online education as a good idea can convince me to take online education.					
42	Generally speaking, I would want to do what media consistently recommends me to do.					
	Perceived Behavioral Controls	1	2	3	4	5
43	Studying online is entirely within my control.					
44	I am capable of studying online.					
45	I have resources, knowledge and ability to study online.					
	Self-Efficacy					
46	I would feel comfortable studying online on my own.					
47	For me, feeling comfortable studying online on my own is important					
48	If I wanted to, I could easily find my own way to use online educational tools on my own.					
49	For me, being able to easily find way to use online educational tools on my own is important.					
50	I am confident that I can manage my study online on my own by following reference manuals or guidelines provided by online education service institutes.					
51	For me, whether or not I am confident to manage my study online on my own is important.					
	Facilitating Conditions: Technology	1	2	3	4	5
52	The Internet connection that I have can facilitate access to online education system with sufficiently satisfactory speed.					
53	For me, online education system must be accessible with sufficiently satisfactory speed of my existing Internet connection.					
54	Online education hardware and software requirements are compatible with my existing computer systems.					
55	For me, it is important that hardware and software required for online education are compatible with my existing computer systems.					
56	For me, it is important that software tools necessary for online education are made available for students.					
	Facilitating Conditions: Resources	1	2	3	4	5
57	Online education service is compatible with the resources that I have.					
58	Online education and resources are affordable to me.					
59	For me, being able to afford the price of online education and resources is important.					

60	For me, it is important that technical support resources and staff are available to me when I need them.					
	Self-Directed Learning	**1**	**2**	**3**	**4**	**5**
61	I am willing to dedicate 8-10 hours per week for my studies.					
62	When it comes to learning and studying, I am a self-directed person.					
63	I believe looking back on what I have learned in a course will help me to remember it better.					
64	In my studies, I am self-disciplined and find it easy to set aside reading and homework time.					
65	I am able to manage my study time effectively and easily complete assignments on time.					
66	As a student, I enjoy working independently.					
67	In my studies, I set goals and have a high degree of initiative.					

No.	**Adoption Intention**	**1**	**2**	**3**	**4**	**5**
68	I want to be among the first ones to study for a post-graduate degree with online education.					
69	I intend to be among the first ones to study post-graduate degree with online education.					
70	I prefer to study post-graduate degree with online education instead of the traditional ones.					
71	Overall, I intend to pursue post-graduate degree with online education.					

Part 3: Demographic Information

72. Gender

(   ) Female   (   ) Male

73. Age

(   ) 18-30 years   (   ) 31-40 years

(   ) 41-50 years   (   ) More than 50 years

74. Family Income (Baht per month)

(   ) Less than 10,000 baht   (   ) 10,000 - 20,000 Baht

(   ) 20,001 - 30,000 baht   (   ) 30,001 - 40,000 Baht

(   ) 40,001 – 50,000 baht   (   ) Above 50,000 baht

75. Occupation

(   ) Student   (   ) Government officer

(   ) Private Sector's Employee   (   ) State Enterprise's Employee

(   ) Business Owner   (   ) Freelance

(   ) Others, please specify……………………………………………

76. Work Experiences (Number of Years)

(   ) None   (   ) Less than 1 year

(   ) 1-5 years   (   ) More than 5 years

77. Marital Status

(   ) Single   (   ) Married   (   ) Divorced

78. Number of Children to Take Care

(   ) None   (   ) Yes, _____

Thank you very much for your valuable time and kind co-operation

แบบสอบถาม

ปัจจัยที่ส่งผลต่อการตัดสินใจเรียนต่อในระดับสูงกว่าปริญญาตรีในรูปแบบการศึกษาออนไลน์
(Adoption Intention towards Online Education to Pursue Post-Graduate Degree)

แบบสอบถามนี้เป็นส่วนหนึ่งของงานวิจัย หลักสูตรดุษฎีบัณฑิตการ จัดการ สาขาการตลาด มหาวิทยาลัยอัสสัมชัญ
．กรุณาเลือกคำตอบที่เหมาะสมมากที่สุดตามความคิดของท่านจากคำถามที่กำหนดให้
ข้อมูลที่ได้เพื่อใช้สำหรับการศึกษาเท่านั้น ขอขอบพระคุณเป็นอย่างสูงสำหรับความร่วมมือของท่าน

ส่วนที่ 1: คำถามคัดกรอง

กรุณาระบุระดับการศึกษาของท่าน

( ) กำลังศึกษาอยู่ชั้นปริญญาตรี เทอมสุดท้าย　　　　(กรุณาตอบแบบสอบถามต่อในส่วนถัดไป)

( ) จบการศึกษาชั้นปริญญาตรีแล้ว　　　　　　　　(กรุณาตอบแบบสอบถามต่อในส่วนถัดไป)

( ) ระดับมัธยม, เทียบเท่ามัธยม หรือ ต่ำกว่า　　　　(ขออนุญาตจบการสอบถามแต่เพียงเท่านี้)

ขอขอบพระคุณอย่างสูงที่ท่านเสียสละเวลาร่วมทำแบบสอบถามในครั้งนี้

ส่วนที่ 2: ปัจจัยที่ส่งผลต่อการตัดสินใจเรียนต่อในระดับสูงกว่าปริญญาตรีในรูปแบบการศึกษาออนไลน์

กรุณาพิจารณาประโยคด้านล่างต่อไปนี้ แล้วระบุระดับความเห็นด้วยของท่าน เกี่ยวกับปัจจัยที่มีผลต่อการตัดสินใจเรียนต่อใน ระดับสูงกว่าปริญญาตรีในรูปแบบการศึกษาออนไลน์ โดยทำเครื่องหมาย (✓) ในช่องที่ตรงกับความคิดของท่านมากที่สุด

ระดับ 1: ไม่เห็นด้วยอย่างยิ่ง
ระดับ 2: ไม่เห็นด้วย
ระดับ 3: รู้สึกเฉยๆ
ระดับ 4: เห็นด้วย
ระดับ 5: เห็นด้วยอย่างยิ่ง

ข้อ	ทัศนคติที่มีต่อการศึกษาออนไลน์	1	2	3	4	5
1	ฉันคิดว่ารูปแบบการเรียนแบบออนไลน์เป็นแนวความคิดที่ฉลาด					
2	ฉันคิดว่ารูปแบบการเรียนแบบออนไลน์เป็นแนวความคิดที่ดี					
3	ฉันคิดว่ารูปแบบการเรียนแบบออนไลน์เป็นความคิดที่น่าสนุก					
4	ฉันชอบแนวความคิดของการเรียนแบบออนไลน์					
	ทัศนคติด้านข้อได้เปรียบของการศึกษาออนไลน์	**1**	**2**	**3**	**4**	**5**
5	ฉันคิดว่าการเรียนแบบออนไลน์มีประโยชน์ต่อฉันมากกว่าการศึกษาในรูปแบบปกติ					
6	โดยรวมแล้วฉันคิดว่าการเรียนแบบออนไลน์เป็นข้อได้เปรียบสำหรับฉัน					
7	การเรียนแบบออนไลน์ทำให้ฉันสามารถบริหารจัดการเวลาของตัวเองได้ดี					
8	การเรียนแบบออนไลน์ทำให้ฉันเพิ่มพูนความรู้และมีความก้าวหน้าในหน้าที่ การงานโดยไม่บกพร่องในหน้าที่อื่นๆ					
	ทัศนคติด้านความเรียบง่ายไม่ซับซ้อนของการศึกษาออนไลน์	**1**	**2**	**3**	**4**	**5**
9	ฉันเชื่อว่าการเรียนรู้ที่จะใช้ทรัพยากรและเครื่องมือสำหรับการเรียนออนไลน์ ผ่านทางอินเทอร์เน็ตนั้นง่าย					
10	ฉันเชื่อว่าการเรียนออนไลน์จะเป็นเรื่องง่ายสำหรับฉัน					
11	ฉันเชื่อว่าการเรียนออนไลน์นั้นเข้าใจได้ง่าย					
12	โดยรวมแล้ว ฉันเชื่อว่าการเรียนออนไลน์เป็นเรื่องง่าย					
	ทัศนคติด้านความสอดคล้องเข้ากันได้ในเรื่องต่างๆกับการศึกษาออนไลน์	**1**	**2**	**3**	**4**	**5**
13	การเรียนแบบออนไลน์สอดรับกับการทำงานในทุกแง่มุมของฉัน					
14	การเรียนแบบออนไลน์สอดคล้องกับสถานการณ์ปัจจุบันของฉันเป็นอย่างดี					
15	การเรียนแบบออนไลน์เป็นรูปแบบการเรียนที่ฉันชอบ					
16	การเรียนแบบออนไลน์เหมาะกับแนวทางการดำเนินชีวิตของฉันเป็นอย่างดี					
	ทัศนคติด้านการมองเห็นแบบอย่างที่เป็นรูปธรรมของการศึกษา ออนไลน์	**1**	**2**	**3**	**4**	**5**
17	ฉันเห็นคนอื่นๆประสบความสำเร็จในการศึกษาระดับบัณฑิตศึกษาแบบออนไลน์มาแล้ว					
18	ในสังคมของฉัน ฉันเห็นคนที่เรียนต่อโดยการเรียนที่บ้าน ผ่านการศึกษาแบบออนไลน์					
19	การศึกษาแบบออนไลน์ ไม่ใช่เรื่องที่พบเห็นทั่วไปในสังคมของฉัน					
20	ฉันสังเกตเห็นได้ง่ายว่ามีคนที่ศึกษาต่อในระดับบัณฑิตศึกษาแบบออนไลน์					
21	ฉันเห็นว่าการศึกษาต่อแบบออนไลน์เป็นเรื่องที่ทำกันทั่วไปในสังคมอื่น					
	ทัศนคติด้านความสามารถในการทดลองเรียนได้ของการศึกษา ออนไลน์	**1**	**2**	**3**	**4**	**5**
22	ฉันมีโอกาสมากมายในการทดลองเรียนระบบการศึกษาต่อแบบออนไลน์					
23	ฉันรู้ว่าจะทดลองเรียนระบบการศึกษาแบบออนไลน์ได้ที่ไหนจนกว่าจะเป็นที่พอใจ					
24	การศึกษาแบบออนไลน์ควรจะมีโปรแกรมให้ทดลองเรียนเพื่อเป็นการทดสอบการใช้งานอุปกรณ์การเรียนและแอพพลิเคชั่นต่างๆได้อย่างเพียงพอ					
25	ก่อนที่จะตัดสินใจลงทะเบียนศึกษาแบบออนไลน์ ฉันน่าจะมีโอกาสได้ทดลอง เรียนก่อน					
26	ฉันควรได้รับอนุญาตให้ทดลองใช้ระบบการศึกษาแบบออนไลน์เป็นเวลานานนานพอที่จะรู้ว่ามันเป็นอย่างไร					

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ข้อ	บรรทัดฐานทางสังคม	1	2	3	4	5
27	คนที่มีอิทธิพลต่อการกระทำของฉันน่าจะสนับสนุนให้ฉันเรียนแบบออนไลน์					
28	คนที่มีความสำคัญกับฉันน่าจะสนับสนุนให้ฉันเรียนแบบออนไลน์					
29	สำหรับฉันแล้ว การที่คนที่มีความสำคัญกับฉันเห็นด้วยกับการศึกษาแบบออนไลน์นั้น เป็นสิ่งสำคัญ					
	อิทธิพลจากเพื่อน	1	2	3	4	5
30	ฉันจะเรียนแบบออนไลน์ถ้าเพื่อนของฉันเห็นว่าเป็นสิ่งที่ดี					
31	ฉันจะเรียนแบบออนไลน์ถ้าเพื่อนร่วมงานของฉันเห็นว่าเป็นสิ่งที่ดี					
32	โดยทั่วไปแล้ว ฉันต้องการที่จะทำในสิ่งที่เพื่อนของฉันเห็นว่าดี					
33	โดยทั่วไปแล้ว ฉันต้องการที่จะทำในสิ่งที่เพื่อนร่วมงานของฉันเห็นว่าดี					
	อิทธิพลจากครอบครัวและคนที่รัก	1	2	3	4	5
34	ฉันจะเรียนแบบออนไลน์ถ้าครอบครัวของฉันเห็นว่าเป็นสิ่งที่ดี					
35	ฉันจะเรียนแบบออนไลน์ถ้าคู่สมรสหรือคนรักของฉันเห็นว่าเป็นสิ่งที่ดี					
36	โดยทั่วไปแล้ว ฉันต้องการที่จะทำในสิ่งที่ครอบครัวและคนที่ฉันรักเห็นว่าดี					
	อิทธิพลจากนายจ้าง/เจ้านาย	1	2	3	4	5
37	ฉันจะเรียนแบบออนไลน์ถ้านายจ้างหรือเจ้านาย ของฉันเห็นว่าเป็นสิ่งที่ดี					
38	โดยทั่วไปแล้ว ฉันต้องการที่จะทำในสิ่งที่นายจ้างหรือเจ้านายเห็นว่าดี					
	อิทธิพลจากชุมชน	1	2	3	4	5
39	ฉันจะเรียนแบบออนไลน์ถ้ามันเป็นที่ยอมรับในชุมชนของฉัน					
40	โดยทั่วไปแล้ว ฉันต้องการที่จะทำในสิ่งที่ได้รับการยอมรับจากชุมชนของฉัน					
	อิทธิพลจากสื่อ					
41	หากสื่อต่างๆมีการให้ข้อมูลข่าวสาร ในแง่ที่ดีเกี่ยวกับการศึกษาแบบออนไลน์ ก็จะสามารถโน้มน้าวให้ฉันอยากจะเรียนแบบออนไลน์ได้					
42	โดยทั่วไปแล้ว ฉันมักจะทำตามในสิ่งที่สื่อมีการแนะนำอย่างต่อเนื่อง					
	ทัศนคติด้านอำนาจการควบคุมของตนที่มีเหนือพฤติกรรม	1	2	3	4	5
43	การเรียนแบบออนไลน์อยู่ในการควบคุมของฉันทั้งหมด					
44	ฉันมีศักยภาพพอที่จะเรียนแบบออนไลน์					
45	ฉันมีความรู้และความสามารถที่จะเรียนแบบออนไลน์					
	ความมั่นใจในตนเอง	1	2	3	4	5
46	ฉันรู้สึกสบายๆในการที่จะเรียนแบบออนไลน์ด้วยตัวฉันเอง					
47	สำหรับฉัน ความรู้สึกสบายๆกับการเรียนแบบออนไลน์ด้วยตัวฉันเอง เป็นสิ่งสำคัญ					
48	ฉันเชื่อมั่นว่าฉันสามารถที่จะหาวิธีการใช้โปรแกรมการเรียนออนไลน์ด้วยตัวเองได้อย่างง่ายดาย					
49	สำหรับฉัน การที่ฉันสามารถหาทางใช้โปรแกรมการเรียนออนไลน์ด้วยตัวเองได้อย่างง่ายดาย เป็นสิ่งสำคัญ					
50	ฉันมั่นใจว่าฉันสามารถบริหารจัดการการเรียนแบบออนไลน์ด้วยตนเองได้ โดยการอ้างอิงคู่มือการเรียนที่ทางสถาบันมีให้					

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51	สำหรับฉัน ความรู้สึกมั่นใจหรือไม่มั่นใจที่จะบริหารจัดการการเรียนแบบออนไลน์ได้ เป็นสิ่งสำคัญ					
	สภาวะที่เอื้ออำนวย: ด้านเทคโนโลยี	**1**	**2**	**3**	**4**	**5**
52	ด้วยความเร็วของอินเทอร์เน็ตเทคโนโลยีที่ฉันมี ฉันสามารถที่จะเรียนออนไลน์ได้อย่างเป็นที่น่าพอใจ					
53	ฉันคิดว่า การเข้าถึงระบบการเรียนออนไลน์ โดยผ่านความเร็วอินเตอร์เน็ทที่น่าพอใจ เป็นสิ่งสำคัญ					
54	อุปกรณ์เครื่องมือที่จำเป็นในการเรียนออนไลน์นั้น สามารถใช้ร่วมกันได้กับอุปกรณ์เทคโนโลยีที่ฉันมีอยู่แล้ว					
55	สำหรับฉัน การที่อุปกรณ์เครื่องมือที่จำเป็นในการเรียนออนไลน์ สามารถใช้ร่วมกันได้กับอุปกรณ์เทคโนโลยีที่ฉันมีอยู่แล้วเป็นสิ่งสำคัญ					
56	ฉันคิดว่าการมีซอฟท์แวร์และเทคโนโลยีที่จำเป็นสำหรับการเรียนแบบออนไลน์ให้นักศึกษาเพื่อใช้งานได้สะดวกเป็นสิ่งที่สำคัญ					
	สภาวะที่เอื้ออำนวย: ด้านทรัพยากร	**1**	**2**	**3**	**4**	**5**
57	การเรียนแบบออนไลน์สอดคล้องกับทรัพยากรต่างๆ เช่น เวลาและการเงินที่ฉันมีอยู่					
58	ฉันสามารถรับผิดชอบค่าใช้จ่ายในการเรียนแบบออนไลน์และทรัพยากรที่จำเป็นต่างๆ ได้					
59	การที่สามารถจ่ายค่าเล่าเรียนแบบออนไลน์และทรัพยากรที่จำเป็นต่างๆใน ราคาที่เหมาะสมเป็นสิ่งสำคัญ					
60	การศึกษาแบบออนไลน์ควรมีบุคลากรที่คอยให้ความช่วยเหลือทางเทคนิค เมื่อต้องการ เป็นสิ่งสำคัญ					
	ความพร้อมในการเรียนด้วยการพึ่งพาตนเอง	**1**	**2**	**3**	**4**	**5**
61	ฉันยินดีที่จะจัดสรรเวลา 8-10 ชั่วโมงต่อสัปดาห์เพื่อการเรียนโดยเฉพาะ					
62	เมื่อเป็นเรื่องการเรียนรู้และการศึกษา ฉันเป็นคนที่สามารถกำกับแนวทางการเรียนของตัวเองได้					
63	ฉันเชื่อว่าการได้กลับไปย้อนดูว่าตัวเอง ได้เรียนอะไรมาบ้างในบทเรียน จะช่วยให้ฉันสามารถจดจำสิ่งที่เรียนได้ดีขึ้น					
64	ในเรื่องการเรียน ฉันเป็นคนมีวินัย และให้เวลาสำหรับอ่านหนังสือและทำการบ้านเสมอ					
65	ฉันสามารถบริหารจัดการเวลาเพื่อการเรียน ได้อย่างมีประสิทธิภาพ และ สามารถทำงานที่ได้รับมอบหมายเสร็จทันตามกำหนดได้					
66	ในการเป็นนักศึกษา ฉันสนุกกับการทำงานด้วยตัวเองอย่างเป็นอิสระ					
67	ในการเรียน ฉันตั้งเป้าหมายของตัวเอง และ มีความมุ่งมั่นสูงในการทำสิ่งนั้นๆให้สำเร็จ					
	แนวโน้มในการเลือกการศึกษาต่อออนไลน์	**1**	**2**	**3**	**4**	**5**
68	ฉันต้องการจะเป็นคนแรกๆที่เรียนต่อในระดับสูงกว่าปริญญาตรีแบบออนไลน์					
69	ฉันตั้งใจจะเป็นคนแรกๆที่เรียนต่อในระดับสูงกว่าปริญญาตรีแบบออนไลน์					
70	ฉันชอบที่จะเรียนต่อในระดับสูงกว่าปริญญาตรีแบบออนไลน์มากกว่าที่จะ เรียนในมหาวิทยาลัยแบบในชั้นเรียน					
71	โดยรวมแล้ว ฉันมีแนวโน้มที่จะเลือกศึกษาต่อแบบออนไลน์					

4

ส่วนที่ 3: ประวัติส่วนบุคคล

72. เพศ

( ) หญิง   ( ) ชาย

73. อายุ

( ) 18-30 ปี   ( ) 31-40 ปี

( ) 41-50 ปี   ( ) มากกว่า 50 ปี

74. รายได้ทั้งครอบครัวเฉลี่ยต่อเดือน

( ) น้อยกว่า 10,000 บาท   ( ) 10,000 - 20,000 บาท

( ) 20,001- 30,000 บาท   ( ) 30,001 - 40,000 บาท

( ) 40,001 - 50,000 บาท   ( ) มากกว่า 50,000 บาท

75. อาชีพ

( ) นักเรียน/นักศึกษา   ( ) รับราชการ

( ) พนักงานเอกชน   ( ) รัฐวิสาหกิจ

( ) เจ้าของกิจการ   ( ) รับจ้างทั่วไป

( ) อื่น ๆ โปรดระบุ ....

76. ประสบการณ์การทำงาน (จำนวนปี)

( ) ไม่มี   ( ) น้อยกว่า 1 ปี

( ) 1 – 5 ปี   ( ) มากกว่า 5 ปี

77. สถานภาพสมรส

( ) โสด   ( ) สมรส   ( ) หย่าร้าง

78. จำนวนบุตรที่ต้องเลี้ยงดู

( ) ไม่มี   ( ) มี โปรดระบุ_____ คน

<u>ขอขอบพระคุณเป็นอย่างยิ่งที่ท่านให้ความร่วมมือและเสียสละเวลาอันมีค่าในการตอบแบบสอบถามนี้</u>

Form signed by Proofreader of the Dissertation

I, Frank. J. Jones, have proofread this dissertation entitled: **Modeling Adoption Intention of Online Education in Thailand Using Extended Decomposed Theory of Planned Behavior (DTPB) with Self-Directed Learning** and hereby certify that the verbiage, spelling and format is commensurate with the quality of internationally acceptable writing standards for a PhD in Business Administration.

Signed

(Frank James Jones)

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Date: 8 April, 2013