

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

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Abstract

This study aimed to explore the determinants of online education adoption based upon the extended Decomposed Theory of Planned Behavior with self-directed learning attributes. 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. 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. 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 as well as technological facilitations, 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.

Keywords: Online Education, Thailand, Distance Learning, DTPB, Innovation, Adoption, Self-Directed Learning

บทคัดย่อ

งานวิจัยนี้จัดทำขึ้นด้วยจุดประสงค์ในการค้นหาปัจจัยที่มีผลกระทบต่อการยอมรับการศึกษาแบบออนไลน์ โดยการปรับใช้ทฤษฎี Decomposed Theory of Planned Behavior ร่วมกับคุณสมบัติส่วนบุคคลในการเรียนรู้แบบนำตนเอง ใช้วิธีวิจัยเชิงปริมาณโดยการเก็บตัวอย่างจากกลุ่มตัวอย่างทั้งหมด 542 คนในประเทศไทย ข้อมูลที่ได้ถูกนำไปประมวลผลเชิงสถิติแบบสมการโครงสร้าง (Structural Equation Modeling) ผลการวิจัยพบว่าตัวแปรหลักทั้งสี่ตัวมีผลกระทบต่อการตั้งใจเลือกศึกษาต่อแบบออนไลน์ อย่างไรก็ตามตัวแปรย่อยหรือมิติย่อยของตัวแปรหลักบางมิติมีผลกระทบในขณะที่บางมิติไม่มีผลกระทบที่เป็นนัยสำคัญดังต่อไปนี้ คุณสมบัติที่เหนือกว่าและความสามารถในการทดลองใช้ของการศึกษาออนไลน์ไม่มีผลกระทบต่อทัศนคติของนักศึกษากลุ่มเป้าหมาย ในขณะที่มีการให้ความสำคัญกับความง่ายในการใช้งาน การเข้ากันได้กับรูปแบบการใช้ชีวิตแบบเดิม และการที่ได้เห็นผู้อื่นศึกษาแบบออนไลน์มาก่อนจะทำให้เกิดทัศนคติเชิงบวกต่อการศึกษาออนไลน์อย่างมีนัยสำคัญ นอกเหนือจากนี้ พบว่ากลุ่มอ้างอิงระหว่างบุคคลที่มีความสัมพันธ์ใกล้ชิดกันจะมีอิทธิพลทางสังคมซึ่งส่งผลกระทบต่อการตั้งใจเลือกศึกษาแบบออนไลน์ ในขณะที่สื่อมวลชนและกลุ่มอ้างอิงที่ไกลตัวอย่างผู้มีชื่อเสียงและดาราไม่พบว่ามีผลกระทบที่เป็นนัยสำคัญใด ๆ คือ กลุ่มเพื่อน ครอบครัวและคนรัก รวมถึงคนในชุมชนที่อาศัยอยู่แถวหน้างานหรือเจ้านาย ทั้งนี้ผลวิจัยยังพบว่าปัจจัยที่เป็นความสามารถในการควบคุมความสำเร็จของการศึกษา อันได้แก่ ความมั่นใจในตัวเอง อุปกรณ์การเรียนเชิงเทคโนโลยีและปัจจัยทางการเงินเวลาและอื่น ๆ ก็มีผล

กระทบต่อการตัดสินใจอย่างมีนัยสำคัญ และที่สำคัญ ผลวิจัยแสดงให้เห็นว่าคุณสมบัติส่วนตัวในการเรียนรู้แบบนำตนเอง มีผลกระทบโดยตรงต่อความตั้งใจที่จะเลือกศึกษาแบบออนไลน์ ซึ่งงานวิจัยและผลการวิจัยนี้เป็นประโยชน์ทั้งในภาคการศึกษาเชิงทฤษฎีและภาคปฏิบัติในเชิงธุรกิจ

คำสำคัญ: การศึกษาแบบออนไลน์, ประเทศไทย, การเรียนทางไกล, ทฤษฎีจำแนกพฤติกรรมตามแผน (DTPB), นวัตกรรม, การยอมรับ, การเรียนรู้แบบนำตนเอง

INTRODUCTION

Driven by key factors including globalization, technological innovation, student demographic shift with increasing number of non-traditional students, and the growth in demand for education due to the need for lifelong learning, skill upgrades and re-skilling, “online education” has transformed from a niche to become the main educational delivery method offering strategic competitive advantages to many educational services providers (Economist Intelligence, 2008; Henshaw, 2008). The changes that occur in higher education are considered as a paradigm shift when courses are provided anytime anywhere with year round operations as a result of technological innovation (Heydenrych, 2002; Virkus & Metsar, 2004; Virkus & Wood, 2004).

With increasing access to network and higher quality bandwidth at lower costs, Thailand possesses an infrastructure ready for online education (www.ntc.or.th). Thailand is still at the very early stage in terms of online education development, however to attract international students, while also retaining the Thai students in the country, distance or online education was mentioned as one of the competitive strategies (Khaopa, 2011). There are 150 higher educational institutions in Thailand, nonetheless only few of them have started to provide formal online courses.

Furthermore, there has been a lack of empirical studies in this area particularly in the context of Thailand (Bhatiasevi, 2011; Teo, Wong, Thammetar, & Chattiwat, 2011). In addition, there is necessity to find a research model suitable for understanding technological innovation adoption or acceptance that take into account of social influences in the social computing paradigm (Baron, Patterson & Harris, 2006; Vannoy & Palvia, 2010). In addition, online education is considered a subset of distance education (Gunasekaran et al., 2002), therefore a framework that is suitable for

understanding online distance online education will be a beneficial add-on to the knowledge in distance education research (Liu & Han, 2010). Consequently, this study aims to fill these gaps, thus providing both practical implications as well as theoretical contributions.

LITERATURE REVIEW

Online education is defined as the delivery or access to learning experience over the Internet, using all kinds of Internet-based tools from legitimate educational institutions with formal accredited degrees in higher education (Bhattacharye & Sharma, 2007; Gunasekaran et al., 2002; www.onlineeducation.org).

Online education is considered an innovation in the education industry in Thailand since adoption rate is not yet known. Empirical evidence suggests that attitudes towards innovation attributes can affect the consumers’ decision (Taylor & Todd, 1995). 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 a innovation-decision process, occurring over time which comprises a series of actions starting from obtaining knowledge about an innovation, being persuaded by the perceived characteristics of an innovation, making decision whether to adopt or reject, implementing or using an innovation, and confirming the decision after use.

The perceived characteristics of an innovation is highly important since an individual’s belief of these characteristics or attributes significantly predicts most of the variance in future adoption and use (Rogers, 2003; Vishwanath & Goldhaber, 2003; Warford, 2009). Furthermore, the innovation-decision process which identifies that norm of a social system is one of prior conditions that affect decision-making. In addition, the characteristics of decision-making unit are also influential

factors in the innovation-decision process. 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. Furthermore, the propensity to adopt a behavior increases proportionately with the number of reference groups that have adopted it (Young, 2000). Rogers (2003) also 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 and personal characteristics of the target adopters are proposed as additional key factors affecting the consumer's decision to adopt a new form of educational service, i.e. online education.

To study innovation adoption at individual decision-making level, researchers including Vishwanath and Goldhaber (2003) recommend integration of DOI and acceptance models. This study adopts DTPB, an acceptance model that integrates DOI theory's innovation attributes in the model developed by Taylor and Todd (1995). The model posits that behavioral intention is determined by three main belief constructs including attitudinal beliefs, normative beliefs, and control beliefs. By decomposing these beliefs into specific dimensions, in-depth understanding of the antecedents can be obtained, along with ability to determine specific factors that impact the adoption intention of the new technology (Ajjan & Hartshorned, 2008; Taylor & Todd, 1995). In addition, the DTPB adds value by proving higher explanatory power than the TPB as demonstrated in the study by Taylor & Todd (1995). The social influence or subjective norms construct that TAM excludes, while suggested 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).

In consumers' decision making, factors that contribute to final decision are not limited to cognitive evaluation based on the attributes or characteristics of the products and services, but also include factors such as reference groups and constraints such as time, money, and other resources available to them. Furthermore, many researchers including McVey (2000), Smith et al. (2003), Song and Hill (2007) and Liu and 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 subset of distance learning. Based on the rationale discussed, a conceptual framework is then derived and proposed for this study.

THE CONCEPTUAL FRAMEWORK AND HYPOTHESES

Based on DTPB by Taylor and Todd (1995), decomposing the attitudinal, normative and control beliefs structures into various belief dimensions, specific factors associated with the adoption intention towards online education can be uncovered. Thus, specific to this study, these three belief structures are decomposed into dimensions as below. The original DTPB model is also extended to include self-directed learning, from the field of distance education, according to the rationale described previously (Figure 1).

Attitudinal Beliefs

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). Advantages can be economic or non-economic (Rogers, 2003). Despite the criticisms about credentials of online edu-

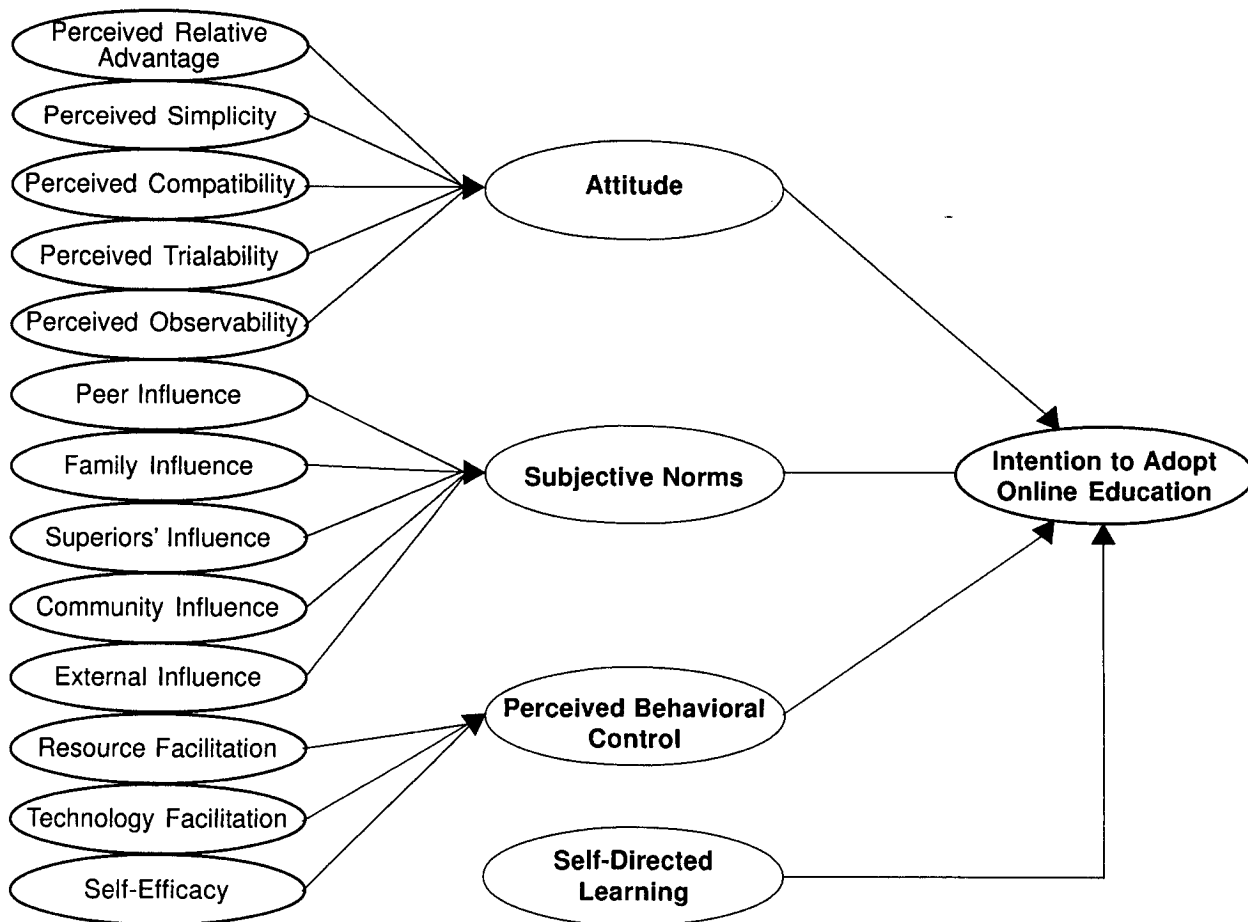


Figure 1: Conceptual Framework for the Study

cation, 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; Bray, 2004; 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 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 a positive attitude towards it, and in turn, will be more likely to adopt online education. Therefore, the following hypothesis is proposed:

Ha1.1: Perceived relative advantage is positively related to attitude towards online education adoption.

Perceived simplicity reflects whether an individual perceives an innovation to be easy (not difficult) to understand and use (Rogers, 2003). 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 technol-

ogy. 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 (Henshaw, 2008; Parsons, 2010). The following hypothesis is therefore proposed:

Ha1.2: 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 that 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 (Crossman, 2005). 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). In the educational technology acceptance context, previous research by Jebeile and Reeve (2003), Lu, Liu, and Liao (2005), Janardhanam, Sinha, and Babu (2011) confirmed that perceived compatibility and attitude are positively related, which then lead to the behavioral intention to use the education technology. The fol-

lowing hypothesis is therefore derived:

Ha1.3: 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 and 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 trial. 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:

Ha1.4: Perceived trialability is positively related to attitude towards online education adoption.

Perceived observability refers to how visible the results are after an innovation is used (Rogers, 2003, 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. 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). 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 a significant predictor for intention to use e-learning websites. The researcher then proposes the following hypothesis:

Ha1.5: Perceived observability is positively related to attitude towards online education adoption.

Normative Belief Constructs

The DTPB model posits that opinions of relevant people can influence the decision of an individual to perform certain behavior. Norms are a prior condition affecting an individual's decision in innovation-decision making process (Rogers, 2003). In Thailand, Jairak, Praneetpolgrang and Mekhabunchakij (2009) also found that social factor had a positive significant relationship with behavioral intention to use mobile learning. In similar vein, Bhrommalee (2012) argued 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 the effectiveness of its influence on behavior (Kraut et al., 1998; Hsu & Lu, 2004; Nysveen et al., 2005; Lin, 2006).

As applicable to this context and included in the model, relevant people include peers, family

and loved ones, employers or superiors, the community that the decision maker belongs to, and the external reference. Many empirical findings have supported that these reference groups influence the subjective norms (Karahanna et al., 1999; Matti & Jani, 2010; Lin, 2007). However, different referent groups may differ in their opinion towards adoption of online education, and individuals face dilemma in choosing to comply with referents that they are most attracted to (Tajfel, 1981; Turner, 1987). Based on this rationale, 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. The following hypotheses are therefore derived:

Ha2: Subjective norms are positively related to intention towards online education adoption.

Ha2.1: Peer influence is positively related to subjective norms.

Ha2.2: Family influence is positively related to subjective norms.

Ha2.3: Superiors' influence is positively related to subjective norms.

Ha2.4: Community influence is positively related to subjective norms.

Ha2.5: External influence is positively related to subjective norms.

Control Belief Constructs

Positive motivation will then lead to intention to adopt online education. 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. 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 a 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. Based on these findings, the following hypotheses are therefore proposed:

Ha3: Perceived behavioral control is positively related to intention towards online learning adoption.

Ha3.1: Self-efficacy is positively related to perceived behavioral control.

Ha3.2: Resource facilitation is positively related to perceived behavioral control.

Ha3.3: Technology facilitation is positively related to perceived behavioral control.

Self-Directed Learning

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. 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. Consistent results were found in the study by Wang et al (2009) 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 propel the intention to perform the behavior, which is adopting online education in this study (Greener, 2003; Smith et al., 2003; Dodor & Rana, 2009). The following hypothesis is therefore proposed:

Ha4: Self-Directed Learning is positively related to intention towards online education adoption.

RESEARCH METHODOLOGY

The study employed quantitative research method with self-administered questionnaires to collect primary data from respondents. The target population 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 degrees, with the opportunities to pursue post-graduate degrees in the future.

Using a convenience sampling method for data collection, self-administered questionnaires were distributed to respondents in organizations and universities around Changwattana area in Bangkok, Thailand in June, 2012. The area is a center for public organizations and there is one private university and one public Open University located these.

Measurement items adapted for this study have been developed and tested empirically by various researchers in the past. The forward and back-translation (English-Thai) processes have been employed in order to maintain the content validity of the instrument at a conceptual level across different cultures (Beaton, Bombadier, Guillemin & Ferraz, 2000). Additionally, the measurement items are refined after the pretest results to ensure reliability. In sum, all variables have reliability scores ranging from .676 to .925 representing reliability of the instrument (Maholtra, 2007).

Table 1 illustrates the sources from which the questionnaires has been adapted and the pretest results using Cronbach’s Alpha.

DATA ANALYSIS AND RESULTS

A total of 600 self-administered questionnaires were distributed in Bangkok, Thailand using convenience sampling technique. Of these, 542 re-

Table 1: Measurement Items and Pretest Results (Cronbach's Alpha)

Variables	Adapted From	# of Items (Original)	# of Items (Retained) Alpha	Pretest Cronbach's
Attitude	Taylor & Todd (1995)	4	4	.856
Perceived Relative Advantage	Moore & Benbasat (2001)	4	4	.818
Perceived Simplicity	Moore & Benbasat (2001), Dearing (2007)	4	4	.870
Perceived Compatibility	Moore & Benbasat (2001)	4	4	.830
Perceived Observability	Moore & Benbasat (2001), Lee, Hsieh, & Hsu (2011)	13	3	.769
Perceived Trialability	Moore & Benbasat (2001), Lee, Hsieh, & Hsu (2011)	3	3	.676
Subjective Norms	Taylor and Todd (1995)	3	3	.683
Peer Influence	Taylor and Todd (1995)	4	4	.911
Family Influence	Teo & Pok (2003)	3	3	.878
Superiors' Influence	Taylor & Todd (1995)	2	2	.925
Community Influence	Adapted from Taylor & Todd (1995)	2	2	.836
External Influence	Perdersen & Nysveen (2007) Bhattacharjee (2000).	2	2	.844
Perceived Behavioral Control	Taylor & Todd (1995)	3	3	.819
Self-Efficacy	Taylor & Todd (1995)	6	6	.873
Technology Facilitation	Taylor & Todd (1995)	4	4	.783
Resource Facilitation	Taylor & Todd (1995)	4	4	.862
Self-Directed Learning	Smith (2005)	7	7	.868

sponses were obtained and valid, which accounted for a 90.33 percent response rate.

Demographics Profile of the Respondents

Among 542 respondents, 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. 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 age range between 41-50 years old comprised 12 percent and 0.7 percent was in the age group of over 50 years old. In terms of family income, the majority group comprised of 141 respondents (26%) who had family income ranging from 30,001 to 40,000 Baht per month.

Confirmatory Factor Analysis

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 based on the relative/normed chi-square statistics (CMIN/DF). 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 statistics for incremental fit indices include TLI, NFI, 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 (Table 2)

Table 2: Fit Statistics of the Measurement and Structural Equation Models

Goodness-of-Fit Measures	Recommended Value	Measurement Model	Structural Equation
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
IFI	> 0.9	0.841	0.852
CFI	> 0.9	0.838	0.850

Hypotheses Testing

Path analysis results are illustrated in figure 2 below. The first group measures attitude its sub-variables 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 significant with predictive power of 31 percent ($\beta = 0.31, p < 0.001$). 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/loved 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 significant relationship with subjective norms. Furthermore, the relationship between subjective norms and adoption intention towards online education were found to be statistically significant at $p < 0.001$ level with predictive power of 17 percent ($\beta = 0.17, p < 0.001$). All of sub-variables under subjective

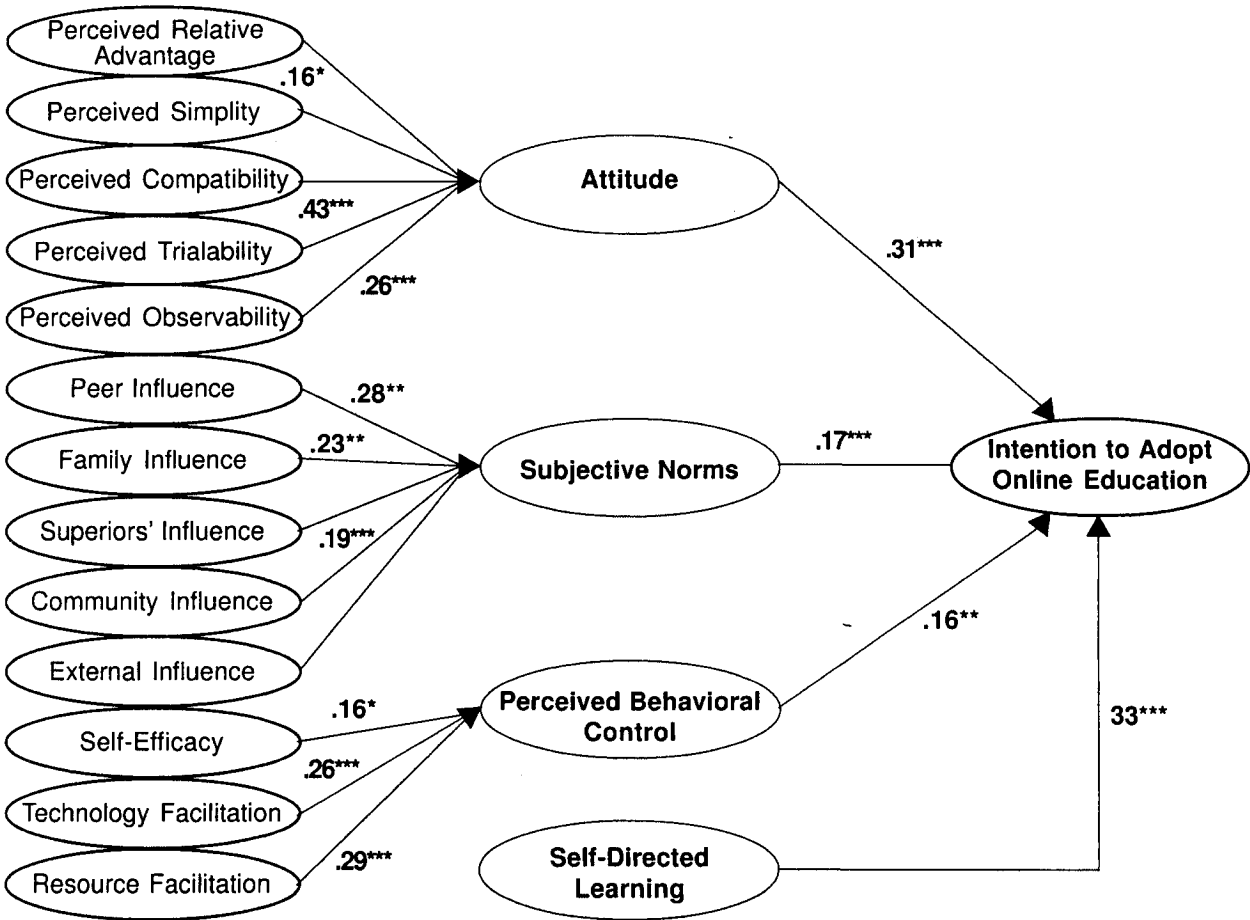


Figure 2: Path Analysis of the Structural Equation Model

*** $p < 0.001$, 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

norms can explain 78 percent variance with residual value of 0.22 or 22 percent variance unexplained. 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 ($\beta = 0.16$, $p < 0.05$). 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 ($\beta = 0.16$, $p < 0.01$). Lastly, the fourth main variable included in the study is self-directed learning. The path results showed a strong and significant positive relationship between self-directed learning and adoption intention towards online education ($\beta = 0.33$, $p < 0.001$).

DISCUSSION, CONCLUSION AND IMPLICATIONS

The results imply that potential Thai students for online education will make decision by taking into account all main factors included in this study with variations in terms of strength of influence.

With regards to attitudinal belief components, the results indicate that Thai students will be likely to adopt online education if they perceive it to be simple, compatible, as well as if they see their references studying online. This might be attributable to difficulty in comparing between online and offline education due to little availability or exposure to online education in Thailand, thus perceived relative advantage and trailability may be ignored. The perceived observability, which was not suggested as an influential attribute, was found to be significant in this study. This implies that Thai students want to have references who support their deci-

sion-making. The result might be related to Thai culture and the concept of “face” (Lee & Green, 1991) or “image” (Moore & 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 & Paswan, 2006; Flight et al., 2011).

Furthermore, subjective norms were found significantly related to the adoption intention towards online education. The results are congruent with the findings from the case study by Bhrommalee (2012), which 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. Thai people have a strong sense of collectivism, according to Hofstede (2001), the dependency between a person and in-groups is therefore stronger as compared to out-groups. Additionally, 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. Thai people are also characterized as high in uncertainty avoidance, i.e. they feel threatened by ambiguous situations and try to avoid challenging experiences (Hofstede, 2001). 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.

Lifelong learning and skills upgrading has driven full-time employed people to take distance online education (Osborned & Oberski, 2004). However, credentials of online education and employers' perception as inferior to classroom on-campus education have been issues related to the adoption (Chorpothong & Charmonman, 2004; Preston, 2011). Thanasankit and Corbit (2000) suggested that it is typical to see Thai subordinates accepting their superiors' decisions and carrying out work unquestioningly. This study, however demonstrated that superiors' influence was not found to be an influential factor, which may be attributable to the voluntary nature of students' decision making (Baron, Patterson & Harris, 2006). In addition, the results may be attributable to the

fact that almost 40 percent of the samples are currently studying, and 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 was found to be significantly 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). 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 could influence community's member decision making, thus impacting the success as well as the rate of innovation diffusion in the community.

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, Bhatiasavi (2011) found that computer self-efficacy had a significant effect on students' perceived ease of use, but was not significantly related to their intention to use the system. This study found significant relationship between self-efficacy and perceived behavioral control, which indirectly affects the behavioral intention to adopt online education. With respect to the facilitating conditions, both resources and technologies, results showed 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). Congruent with the findings, 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. Therefore, 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 (Jairak et al., 2009; Bhrommalee,

2012).

Liu, Han, and Li (2010) confirmed that self-directed learning would lead to the willingness to adopt m-learning as well as other online learning. Wang, Wu, and Wang (2009) found evidence 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 will be more likely to adopt online education. This results also confirm the validity of self-directed learning proposed by Smith et al (2003) to predict behavioral intention towards online distance education.

Implications

Findings on consumers' perception specific to online education adoption worldwide, as well as Thailand in particular, due to its newness, (Bhatiasavi, 2011; Teo, Wong, Thammetar, & Chattiwat, 2011) should facilitate stakeholders to formulate strategies to improve the country's competitiveness in the education industry. 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. For international marketers, the business model and services of educational institutions may be designed by taking into account local culture with the right combination of independent learning and social interaction among peers and instructors. Acceptance among interpersonal networks or groups will be more essential than personal cognitive evaluation of the services and external references. Therefore, marketing communication programs, can be designed to leverage the word-of-mouth communication strategy, engage the target students' personal network including peers, family and loved ones, and the community in the marketing activities or programs and promotion. 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, ease of use to create positive experience and reduce workload or effort in learning to use the system.

LIMITATIONS AND SUGGESTIONS FOR FURTHER RESEARCH

The scope of the study is limited to respondents in Bangkok only; the results therefore may not be generalized to the whole of Thailand. Future research may be extended to cover other factors including reputation of the university and cultural traits, which have not been included in this study, but are believed to influence the behavioral decision 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. In addition, since community influence, 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 and other leisure clubs, virtual community, and other social communities.

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