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The integration of information technology in higher education: a study of faculty's attitude towards IT adoption in the teaching process

Integración de la tecnología de la información en la educación superior: un estudio de la actitud del profesorado hacia la adopción de TI en el proceso de enseñanza

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Abstract

It is a reality that advancement of Information Technology revolutionized the business practices and strategies of entire industries. The field of higher education is not an exception to this phenomenon. Colleges and universities around the world are investing considerable amount of money to create Information Technology resources that meet their student's and faculty's instructional needs. While universities encourage their faculties to adopt the new technologies for their preparation and delivery of classes, various other factors influence the integration or resistance of acceptance of these technologies. Age, highest education earned, teaching experience, computer competency, prior computer experience, availability of technology, Institutional support etc. are examples of these factors. Based

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on the theoretical support of Roger's Diffusion Theory, a conceptual model is developed to identify the critical success factors that influence the adoption of Information Technology among faculties of tertiary educational institutions. The model is empirically tested among the faculty members of leading universities in Asian region. 261 full time lecturers participated in this study and the results show that factors such as computer self-efficacy, relative advantage, compatibility and prior computer experience are significantly influencing their perceived ease of use and attitude towards using educational technologies.

Keywords: Computer self- efficacy; Computer anxiety; Higher education; Information technology

Resumen

Es una realidad que el avance de la Tecnología de la Información revolucionó las prácticas y estrategias de negocios de industrias enteras. El campo de la educación superior no es una excepción a este fenómeno. Los colegios de estudios superiores y las universidades de todo el mundo están invirtiendo una considerable cantidad de dinero para crear recursos de Tecnología de la Información que cumplan con las necesidades educativas de sus alumnos y profesorado. Si bien las universidades estimulan a sus cuerpos de profesores a adoptar las nuevas tecnologías para su preparación e impartición de clases, diversos otros factores influyen en la integración o resistencia a la aceptación de estas tecnologías. Son ejemplos de estos factores la edad, el grado más alto de educación obtenido, la experiencia en la enseñanza, competencia en computación, experiencia previa en computación, disponibilidad de tecnología, apoyo institucional, etcétera. Con base en el soporte teórico de la Teoría de Difusión de Roger, se desarrolla un modelo conceptual para identificar los factores críticos de éxito que influyen en la adopción de la Tecnología de la Información entre los profesorados de instituciones educativas terciarias. El modelo se somete a pruebas empíricas entre los miembros del profesorado de universidades líderes en la región de Asia. Participaron en este estudio 261 docentes de tiempo completo y los resultados muestran que factores tales como autoeficacia en computación, ventaja relativa, compatibilidad y experiencia previa en computación influyen de manera importante en la facilidad percibida de uso y actitud hacia el empleo de tecnologías educativas.

Palabras clave: Autoeficacia en computación; Ansiedad computacional; Educación superior; Tecnología de la información

Introduction

We have witnessed a tremendous growth in the Information and communication Technologies (ICT) during the last two decades (Albirini, 2006) especially in the field of education. This has posed many challenges to both faculties and institutions. Institutions have spent and even spending considerable amounts of money to create Information Technology Infrastructure and online learning opportunities. In return, faculties are expected to achieve technological competence and implement better forms of teaching practices which improve the student learning experiences. In universities, faculties can prepare the students for a digital world by allowing them to do their projects and other works involving the use of Information Technology resources. These kind of activities help the students to change the role from a passive receiver of content to an active participant and a partner of learning process (Roblyer, 2006).

Applications of Information Technologies in the education sector is also referred as educational technologies (Mangin, 2011). In this paper, Information Technology in education refers to computers and other information and communication technologies that when applied to the teaching process, can significantly change the traditional education. Examples of these information technologies in education include computer technologies used to generate course materials such as word processing, presentation programs, database programs, electronic mails, websites, blogs, social networking sites etc. Information systems used to manage various courses such as Course Management systems or Learning Management systems are another example of tertiary level educational technology. Information Technologies can be used by faculties for lesson planning, electronic research purposes, for recording and presenting classes online etc. (Mangin, 2011; Roblyer, 2006).

Governments in most developing countries especially in Asian region initiated many national programs to introduce computers into educational institutes (Albirini, 2006). Supplying free tablets to school students in Thailand is a recent example. With the help of governments, educational institutions made substantial financial investments in the field of IT so that the recent educational technologies can be accessible for the next generation. In return, faculties are expected to be prepared and motivated in teaching in technology rich environments. The ultimate aim is to use the Information and Communication Technologies to improve the quality of education and teaching and learning process. Considering the critical role educators play in return of these substantial investments, more detailed researches are necessary to fully examine the factors influencing the faculty's adoption of information technologies.

The level of integration of information technologies by faculties into their teaching methods may be influenced by a number of factors. More information is necessary to determine the critical factors influencing a faculty's decision to adopt technologies into their courses. There are no studies to date, that research about the faculty's intention to use education technologies in Thailand. Also it is little known about the level of integration of information technologies in Thailand higher education. Therefore this study aimed to address such issues by trying to identify the critical factors that influence Thailand university faculty's intention to use educational technologies in their class room and courses. More specifically the study investigate the following research question:

1. What is the perception of University faculties in Asian region towards integrating Information Technologies into education?
2. What are the significant factors influencing University lecturers to adopt IT in the teaching process?
3. What is the relative significance of each of these factors in influencing the educational technology adoption?

Review of literature and Proposed hypotheses

Information Technology in Education

Information Technology in education is defined as a combination of the processes and tools involved in addressing the educational needs and problems by using computers and other related electronic resources and technologies (Ball & Levy, 2008; Roblyer, 2006). Applications of information technology in education is commonly referred as educational technologies (Bernard & Abrami, 2004; Kingsley, 2007). Some of the examples of IT in education includes wireless connectivity, using online learning Management systems, internet technologies, merged technologies, high speed communication infrastructures, emerging technologies for visual presentation, accessing course materials through internet resources and artificial intelligence (Ball & Levy, 2008).

We can classify the educational technologies (Ball & Levy, 2008; Roblyer, 2006) into three main categories: 1) Instructional, 2) Productivity, 3) Administrative. Today most of the academics are utilizing the applications of Information Technologies for their teaching purposes such as tutorials, researching, simulations and other forms of instructions. Faculties' usage of Online Learning systems are also quite common (Woods, Baker, & Hopper, 2004). Bernard & Abrami (2004) suggested that recent usage of educational technologies increased use of collabo-

rative learning among faculties and students which promotes the constructivist approaches in education.

While applications of information technology brings a lot of benefits to the academic world, it also possess a few challenges. Schmidt, (2002, p.6) suggested that "effectively replacing the traditional class rooms is one of the greatest challenges in placing the course on the internet". Educational practices using information technologies should bring overall teaching and learning to a higher level quality of online learning should be equal or higher than the quality of education in the traditional classrooms (Ball & Levy, 2008; Schmidt, 2002). Butler & Sellbom, (2002) in their research works identified the major challenges to adopting technology for teaching and learning. Butler & Sellbom, (2002) pointed out that unreliability, poor faculty proficiency in technology, resistance to use new technologies, lack of institutional support are the major challenges for integration and use of information technology in educational environments.

The Technology Acceptance Model

The Technology Acceptance Model (TAM) proposed by Fred D. Davis (1989) states that the individual's beliefs about usefulness and ease of use are the major determinants of adoption and use of Information Systems in any organizations (Lu, Yu, Liu, & Yao, 2003). This popular theory in Technology adoption area rooted from another well-known theory in Human Psychology, The Theory of Reasoned Action (Ajzen & Fishbein, 1980; Ajzen, 1991, 2005; Fishbein & Ajzen, 1975). TRA proposed that individual's beliefs will influence their attitudes which in turn influence their intention and then generate the behaviour. Considering the determinants of IT adoption as proposed by Davis (1989), perceived usefulness refers to the extent to which a person believes that using an Information system would enhance his or her work performance. Another important determinant of IS adoption is the perceived ease of use. Perceived ease of use refers to the extent to which an individual believes that using an information system us hassle free and free of mental effort (Lu et al., 2003).

Throughout the years TAM has been tested, validated and extended by various researchers (Benamati & Rajkumar, 2008; Lee, 2009; Liu, Chen, Sun, Wible, & Kuo, 2010; Yousafzai, Foxall, & Pallister, 2007) due to its power to predict the usage and adoption of Information Systems. For this research, TAM is selected as the base of the conceptual model, not only due to its popularity but also it has been used in various management education research (Arbaugh, 2000; Gibson, Harris, Carolina, Colaric, & Leo, 2008). Gibson et al. (2008, p.356) suggested universi-

ty faculties represent an unusual population- "individuals who are highly educated, expected to having considerable autonomy, and most commonly working in a highly politicized environment". Therefore studying about their intention to use Information Technology for teaching and learning based on TAM represents a unique contribution to the Technology and higher education domain.

Computer Self-Efficacy

Computer self-efficacy refers to individual's judgment about their ability to use computers in various situations (Compeau & Higgins, 1995; Thatcher & Perrewé, 2012). Computer self-efficacy has often been regarded as an important construct in technology adoption studies (Awwal, 2011; Chien, 2012; Holden, 2011). Agarwal & Karahanna, (2000) opined that individual's beliefs about an Information system have a significant influence on their usage behaviour. Researchers study about computer self-efficacy generally agree that there is a positive relationship exist between computer self-efficacy and IT adoption. In a study conducted among 978 business management students, Fagan & Neill (2004) found that computer self-efficacy is positively related to computer usage. Agarwal & Karahanna, (2000) suggested that although the results of their research supported the positive relationship between computer self-efficacy and use of technology, further research is necessary to support the relationships especially with a wide variety of educational technologies. Therefore it is important to understand the faculty's computer self -efficacy while measuring their intention to adopt computers for teaching and learning process. Thus the following hypothesis is proposed.

H1: Faculty's computer self-efficacy positively influence their perceived ease of use of educational technologies.

Computer Anxiety

Computer anxiety refers to the fears about the implications of computer usage such as loosing data or making any serious mistakes (Thatcher & Perrewé, 2012). Computer anxiety was defined by Ball & Levy, (2008, p.434) as "the fear or apprehension felt by individuals when they used computers, or when they considered the possibility of computer utilization". Similar to computer self-efficacy, computer anxiety also plays a significant role in the adoption of information systems (Venkatesh et al., 2003). In a study conducted among 116 electronic spreadsheet users, Hackbarth et al. (2003) proved that individuals with high computer anxiety perceive computer based applications are less easy to use. In another study

conducted among 45 executive MBA students in China, (van Raaij & Schepers, 2008) it is found that computer anxiety is negatively influencing perceived ease of use of e-learning systems. Thatcher and Perrewé (2012) found in their study that computer self-efficacy and computer anxiety are having negative association with each other. Previous literature related to computer anxiety shows that computer self-efficacy negatively influences an individual's computer anxiety (Fagan et al., 2003; He & Freeman, 2010) Based on the above literature support, this study tests the following hypothesis.

H2: Faculty's computer self -efficacy negatively influence their computer anxiety.

H3: Higher the faculty's computer anxiety lesser will be perceived ease of use of IT applications.

Computer Experience

Computer experience can be defined as an individual's exposure to using computers and the skills and abilities he/she gains through using computers (Ball & Levy, 2008; Thompson et al., 2006). Prior experience in using computers is a significant influence of whether and to what extent a faculty will use information technology for teaching purpose (Summers & Vlosky, 2001; Wozney et al., 2006). We have adequate evidence that computer experience plays an important role in technology acceptance (Ball & Levy, 2008; Taylor & Todd, 1995; Thompson et al., 2006). While introducing the Unified Theory of Acceptance and Use of Technology (UTAUT) Venkatesh et al. (2003) found that computer experience is a key moderator of other key variables in the model. In an empirical study about the influence of prior computer experience on IS usage, Taylor & Todd (1995) found that previous computer experience significantly influence determinants of intention to use IS such as perceived ease of use, perceived usefulness and attitude. The study was conducted among 430 experienced and 356 inexperienced potential users of a student Information System. Thus the following hypothesis is proposed in this regard.

H4: Prior computer experience significantly influence faculty's perceived ease of use of an information technology.

Relative Advantage

Relative advantage refers to the "degree to which an innovation is being perceived as better than its precursor" (Moore & Benbasat, 1991; Rogers, 1995). In an academic context, Bennett & Bennett (2003) defined relative advantage as "the

degree to which lecturers perceive a new technology as superior to its substitutes" (Hsbollah & Idris, 2009). Relative advantage has its root from the Diffusion Theory (Rogers, 1995). This construct has been extensively used in the Information Technology adoption studies by many names such as perceived usefulness (Davis, 1989), relative advantage (Venkatesh et al., 2003), extrinsic motivation (Davis et al., 1992). Venkatesh et al. (2003) found that relative advantage is one of the strongest predictors of intention to use of an information technology. The same relationship were proved by many previous studies (Mehrtens, Cragg, & Mills, 2001; Poon & Swatman, 1999; Premkumar & Robert, 1999) in various contexts. This study presume that relative advantage is positively correlated with perceived ease of use of an Information Technology. That means, the lecturers who believe that using Information Technology applications will enhance their teaching and learning activities are more likely to perceive those technologies easy to use. Therefore, this study propose to test the following hypothesis.
H5: Relative advantage will positively influence the faculty's perceived ease of use of educational technology.

Compatibility

Compatibility is one of the constructs proposed by Rogers in the Diffusion Theory (Rogers, 1995). Compatibility refers to the degree to which a potential adopter perceive an innovation is consistent with his or her socio cultural values, beliefs, needs and his or her past experiences(Moore & Benbasat, 1991). According to Rogers, an individual will more likely to adopt an innovation if it is consistent with his beliefs, values and customs. Many previous studies in the field of IS adoption identified that compatibility is an important antecedent of attitude towards using a system (Gumussoy et al., 2007; Taylor & Todd, 1995b). In a study conducted among 278 banking customers, Karahanna et al. (2006) found that compatibility with existing work practises and compatibility with prior work experience are positively correlated with perceived ease of use of a customer relationship management system. Therefore this study propose the following:
H6: Compatibility positively influence the faculty's perceived ease of using Information Technology for teaching and learning process.

Perceived Ease of Use

Perceived ease of use is one of the most popular constructs in the IS adoption studies ever since its introduction in the Technology Acceptance Model (Davis, 1985;1989). Davis et al. (1989) defined perceived ease of use as the "the degree

to which a person believes that using a system will be free from efforts". Researchers have used this variable to predict the intention to use various technologies such as e-commerce (Eri et al., 2011; Pavlou, 2003), e-learning (Chiu et al., 2007), computing satisfaction (Doll & Torkzadeh, 2011), internet banking (Nasri, 2011) etc. For this study, we can consider perceived ease of use as the degree to which an educational technology is perceived as easy to understand and use. Review of previous literature (Benamati & Rajkumar, 2008; Lee, 2009; Liu et al., 2010; Yousafzai et al., 2007) provide adequate evidence to support the significant influence of perceived ease of use on attitude towards using a technology as proposed by Davis (1985;1989). Therefore this study propose the following hypothesis to test. H7: Perceived ease of use positively influence faculty's attitude towards using educational technologies.

Attitude

Attitude is defined as "a disposition to respond favourably or unfavourably to an object, person, institution, or event" (Ajzen, 2005, p.3) in the Theory of Planned Behaviour. Well known behavioural models such as Theory of Reasoned Actions (Fishbein & Ajzen, 1975), Theory of Planned Behaviour (Ajzen, 1991), Technology Acceptance Model (Davis, 1989) etc., identified effect of attitude on an individual's behaviour. Behavioural theories pointed out that it is the positive attitude of the individuals' leads to his behavioural actions. Even though we have many instructional technologies that can enhance higher education, "those will not be used by faculty members unless they possess the skills, knowledge and attitudes necessary to infuse it into the curriculum" (Baylor & Ritchie, 2002). Albirini (2006) pointed that successful implementation of information technologies in education depends on the attitude of the educators who finally decide how they are used in the teaching process.

According to the Diffusion of Innovations Theory (Rogers, 1995), it is found that people's attitude towards a technology is one of the key elements to its adoption. The Technology Acceptance Model (Davis, 1989) also conveyed the same message of having a positive attitude towards a technology before his/her acceptance of the technology. Based on a study conducted among the 36 MBA students, (Sun et al., 2008) it is found that attitude towards computers positively influence their intention to use computers for online learning methods. Piccoli et al. (2001) commented that if the teachers and students are having more positive attitude towards using computers for teaching and learning, they will be more satisfied and effective users of e-learning technologies.

Based on the theoretical foundations of Technology Acceptance Model and Diffusion Theory and review of various literature related to the field of technology adoption mentioned above, a conceptual framework is developed for this study. Figure 1 represents the Research model of this study.

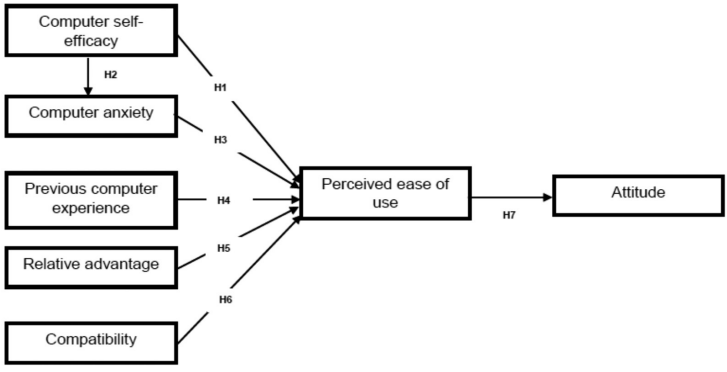

Fig. 1
Research model

Methodology

This study used both paper based and web based questionnaire for collecting information from the respondents. The population for this study consisted of full time faculty members of leading universities of Asian region such as India, Thailand, Vietnam, Indonesia etc. Due to the limited period for data collection and the difficulties to contact professors of various universities, snow ball sampling method have been employed. Researcher initially selected 60 full time faculty members of a doctorate granting educational institution in Thailand, where the researcher is working and completed the paper based survey from them. Later, each of those respondents were requested to provide the e-mail addresses of at least 3 faculties they are corresponding with and later emailed the link of the online version of the questionnaire to nearly 200 full time lecturers of various educational institutions. The study also utilized the opportunities of social networking sites such as Facebook and LinkedIn. Online questionnaire was posted in these social networks and many responses were received through these channels. 261 responses received till 22nd April 2014 were used for this study. All the items for this survey are carefully selected from the available literature in this field. The number of items for each variable and its source are given in the Table 1. All the items used 5 point-Likert scale for measuring the responses.

Table 1.
Measurement items and source.

Constructs	No. of Items	Source
Computer Self efficacy (CSE_{1-6})	6	(Shiverdecker, 2002; Thatcher & Perrewé, 2012)
Computer Anxiety (ANX_{7-12})	6	(Ball & Levy, 2008; Thatcher & Perrewé, 2012)
Prior Computer experience(EXP_{13-18})	6	(Albirini, 2006; Ball & Levy, 2008)
Relative Advantage(RA_{21-27})	7	(Moore, 1991)
Compatibility ($CMBTLY_{28-31}$)	4	(Moore, 1991)
Perceived ease of use (EOU_{33-36})	4	(Gibson et al., 2008; Moore, 1991)
Attitude towards Computer usage (ATT_{37-41})	5	(Albirini, 2006)

Main findings

Descriptive statistics

Table 2 reports the demographic data of the sample. Results show that respondents were relatively middle aged and having Master's degree as the highest academic qualification. Most of the respondents were having more than 10 years but less than 15 years of teaching experience. Lecturing methods are found to be the most frequently employed teaching method among respondents.

Table 2.
Descriptive statistics.

Variable	Frequency	Percent
Gender		
Male	187	71.65
Female	74	28.35
Age		
Less than 30 years old	24	9.2
Between 30 and 50 years old	211	80.84
More than 50 years old	26	9.96
Education		
Master's degree	185	70.88
PhD	76	29.12
Experience		
1-5 years	75	28.74
More than 5 years but less than or equal to 10 years	60	22.99
More than 10 years but less than or equal to 15 years	76	29.12
More than 15 years but less than or equal to 20 years	24	9.2
More than 20 years	26	9.96
Computer training		
Yes	224	85.82
No	37	14.18

Variable	Frequency	Percent
Teaching method		
Active discussion	63	24.14
Collaborative activities	63	24.14
Hands on Learning	13	4.98
Lecturing	110	42.15
Computer assisted instruction	12	4.6

The results of an Independent samples T-test showed that Males perceived computer applications easier than females (t value = 2.46, p=0.01). Results from a one way Anova shows that a significant difference in various age groups and perceived ease of use. While comparing the various age groups, respondents who were aged 30-50 years perceived computer usage easier than professors of other age groups. The study compared the proficiency of respondents in using computers for their teaching purposes. Table 3 summarizes the results. Results show that majority of lecturers participated in the study are proficient in using Microsoft Office products such as Excel, Word, PowerPoint etc. However their familiarity and proficiency in using internet is found to be relatively low.

Table 3.
Faculty proficiency in IT.

Faculty proficiency in Information Technology	Mean (1-5)	Std. Deviation
Sending and receiving Emails	4.08	.946
Using Internet and various websites	4.17	.955
Operate a word processing program (e.g. Word)	4.25	.986
Operate a spreadsheet program (e.g. Excel)	4.34	.806
Operate a database program (e.g. Access)	3.95	1.400
Operate a presentation program (e.g. PowerPoint)	4.21	.7 58

Exploratory Factor Analysis was performed with the SPSS program to determine the strength of the relationship between each of the independent variables and its observed measures. The factor analysis was conducted using principal component method with verimax rotation. A minimum Eigen value of 1 is used as cut off value for extraction. Any items with factor loadings less than 0.5 were removed. Refer Table 4 for the final EFA results.

Table 4.
EFA Results.

Items	Factor Loadings				
	1	2	3	4	5
CSE_1	.883				
CSE_2	.875				
CSE_3	.854				
CSE_4	.766				
EXP_13		.932			
EXP_14		.906			
EXP_15		.887			
ANX_7			.855		
ANX_9			.837		
ANX_8			.812		
ANX_10			.726		
CMBTLY_29				.869	
CMBTLY_30				.777	
EOU_36				.632	
EOU_33				.599	
EOU_34				.554	
RA_27					.878
RA_25					.871
RA_26					.836

Scale Validation

Reliability calculations of the multi items scales showed very favorable results. Cronbach's alpha values were calculate for each of the constructs. All alpha values were more than 0.8 indicate high internal consistency among the items of various constructs. Results of the reliability analysis is shown in Table 5.

Table 5.
Reliability results.

Construct	Cronbach's alpha
Computer Self efficacy	0.83
Computer Anxiety	0.85
Prior Computer experience	0.91
Relative Advantage	0.98
Compatibility	0.86
Ease of Use	0.80
Attitude towards Computer usage	0.89

Measurement Model

A measurement model is developed to test whether the measurement variables reflect the unobserved variables in a reliable manner. Confirmatory Factor Analysis is conducted using AMOS version 20 to check the fitness of the measurement model, adequacy of the factor loadings, and explained variances of the measurement model. Various results of the confirmatory factor analysis is given below (Refer Table 6). The Cronbach's alpha value (Table 4) for all the items were more 0.7; the squared correlation cut off point as well as Average Variance Extracted (Table 6) for all the items were more than 0.6 (Al-Maghrabi & Dennis, 2011; Hair et al., 2010) confirmed adequate convergent and discriminant validity.

Table 6.
Confirmatory Factor Analysis Results.

Constructs/ Indicators	S. Factor Loadings	S.E.	C.R.	P	AVE	Squared Multiple correlations
Computer						
Self-efficacy					0.772	
CSE_1	0.893	1.121	21.015			0.798
CSE_2	0.864	0.924	20.467	***		0.746
CSE_3	0.885	0.963	20.99	***		0.783
CSE_4	0.872	1		***		0.761
Computer experience					0.903	
EXP_13	0.931	0.946	29.906			0.867
EXP_14	0.975	1.001	36.227	***		0.952
EXP_15	0.944	1		***		0.89
Relative advantage					0.9	
RA_25	0.974	0.018	57.713	***		0.949
RA_26	0.878	0.029	31.216	***		0.771
RA_27	0.993	1				0.987
Anxiety					0.6	
ANX_7	0.746	1.253	12.962			0.557
ANX_8	0.619	0.887	10.304			0.384
ANX_9	0.926	1.223	16.764			0.858
ANX_10	0.78	1				0.608
Compatibility					0.76	
CMBTLY_29	0.835	1				0.697
CMBTLY_30	0.908	1.329	15.749	***		0.825
Attitude					0.742	
ATT_40	0.847	1.08	17.271	***		0.717
ATT_41	0.906	1.118	19.61	***		0.821
ATT_43	0.84	1				0.705

Constructs/ Indicators	S. Factor Loadings	S.E.	C.R.	P	AVE	Squared Multiple correlations
ATT_44	0.852	1.069	17.457	***		0.726
Ease of Use					0.71	
EOU_33	0.826	1.128	15.82	***		0.682
EOU_34	0.862	1.246	16.823	***		0.743
EOU_36	0.841	1				0.707

Several fit indices were used to check the Goodness of fit of the research model. The ratio of Chi square/degrees of freedom (CMIN/DF) is 2.957 which is less than the allowed limit of 5 (Hair et al., 2010). Results of the CFA shows that the values of fit indices such as CFI, RFI, NFI, IFI, TLI were all greater than benchmark value of 0.9. Therefore we can conclude that the measurement model is adequate fit.

The Structural equation model (Path Analysis)

This study attempted to identify the significant antecedents of perceived ease of use and attitude towards using educational technologies in teaching and learning process of university lecturers. The structural model presented in Figure 2 was tested using AMOS 20 software. The results of the hypotheses tests are summarized in Table 7. The results show that compatibility and computer self-efficacy, previous computer experience are the significantly influencing faculty's perception towards ease of use of information technologies. The study also investigated the relationship between computer anxiety and computer self-efficacy. According to the findings, we can conclude computer self-efficacy negatively influence ones anxiety. Also it is found that computer anxiety is not a significant predictor of perceived ease of use.

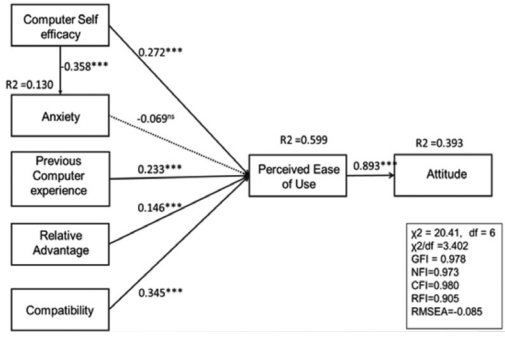

Figure 2.
SEM Results.
Note: *** significant at p<0.001; ns-not significant at p<0.05 level; dotted line indicates no Significant relationship

Table 7.
Hypotheses testing results.

Paths	Standardized regression weights (B)	SE	CR	P	Hypotheses findings
ANX <--- CSE	-0.358	0.053	-6.179	***	Supported
EOU <---EXP	0.233	0.028	5.582	***	Supported
EOU <---CMBTLY	0.345	0.054	7.996	***	Supported
EOU <---CSE	0.272	0.038	6.282	***	Supported
EOU <---RA	0.146	0.041	3.169	0.002	Supported
EOU <---ANX	-0.069	0.038	-1.778	0.075	Not Supported
ATT <---EOU	0.893	0.059	14.305	***	Supported

Discussion about results and implications

The main objective of this study is to identify the significant factors influencing the information technology adoption among faculty members. The advancement of the information technologies help faculties to develop their skills and gain more knowledge that are essential for the teaching process. Nowadays, many tertiary level faculty members put substantial effort to incorporate recent technologies and creativities for teaching and learning processes. However these changes in the faculty's attitude towards using information technologies for educational purposes are easily visible in the western countries compared to Asia. These differences in attitude among individuals are influenced by factors such as age, gender, computer self-efficacy, previous computer experiences, perception towards relative advantage, compatibility etc.

Primary objective of this study (RQ_1) is to identify the perception of faculties in Asian region towards integration of information technologies in their teaching and learning processes. The study revealed that male lecturers are having more positive attitude toward integrating IT into teaching and learning process. Considering the age group of respondents, instructors who were less than 50 years old had significantly different perception than older professors. Results from the current study pointed out the importance of prior computer experiences among teachers. Most of the instructors responded to this survey (85.2%) claimed to receive some sort of computer trainings before. Previous literatures (Albirini, 2006; Pelgrum, 2001) pointed out that lack of computer experience is a main obstacle to teacher's acceptance and adoption of information technologies mainly in developing countries. The results of our research support and extend this finding.

The study also revealed the major factors ($RQ_{2\ and}\ RQ_3$) influencing the attitude towards faculties IT adoption process. The results from the study show that compatibility, computer self- efficacy and prior computer experience are the strongest

antecedents of attitude towards IT integration in teaching and learning process. Compatibility and relative advantages are the constructs of Diffusion of Innovation Theory (Rogers, 1995). According to Rogers (1995), an individual will adopt an innovation when it is consistent with his or her beliefs and customs. Internet has become the part and parcel of our daily lives. According to the recent statistics, more than 360 million internet users are in this world ("Internet World Statistics," 2012) which is nearly 34% of the world population. After the evolution of online social networking sites, beliefs and attitudes towards internet usage changed dramatically. Compatibility is also a factor very much appealing to young generations. It is not entirely wrong if it is said that the younger generations are growing over the web.

The study proved that relative advantage positively influence an individual's attitude toward IT usage. The result is similar or consistent with many of the previous studies. Relative advantage is one of the variables IS researchers all over the world have extensively examined. According to the results obtained, we can suggest that those lecturers who believe that using Information Technology applications will enhance their teaching and learning activities are more likely to perceive those technologies easy to use and may develop a positive attitude towards using those technologies.

This study expected a negative relationship between computer anxiety and perceived ease of use.

However results show that there is no significant relationship exists between these two variables. This may be due to the characteristics of the respondents. Most of the respondents were highly experienced in using computers and received various sorts of trainings on computer applications. Hence their computer anxiety levels might be very low. Venkatesh et al. (2003) proved that computer anxiety has no significant effect on user's intention to use computers since its effect is captured by effort expectancy. However further studies including more number of respondents with diverse educational backgrounds are required in order to generalize this finding.

This research contribute to existing literature related to IT adoption in many ways. The conceptual model developed in this study is based on two well-known behavioural theories; Diffusion of Innovations and the Technology Acceptance Model. Our findings support the relationships proposed by these theories. Though IS adoption is a popular topic among IS academics, there are very few studies conducted among Asian faculty member's perception and attitude towards IT integration in teaching and learning process. This research fills that gap.

In an educational institution, management should give priority to psychological,

cultural and social elements associated with technology. When faculty members have hands on experience in recent educational technologies through workshops and training sessions, and are living in an environment with positive situational support, they are likely to have higher levels of self-efficacy.

During the data collection stage, researcher has been informed about the reasons for the poor reception of a learning management system implemented by the university. One of the main concerns raised by the faculties were the lack of university employees specialized in IT skills to support the faculties for their various needs. Poor communication between the technical staff members and the concerned lecturers were also reported. Universities should employ adequate staff members who are specialized in IT which will enhance the faculty feelings of competence in the use of educational technologies.

Limitations

This study is aimed to understand the factors influencing the adoption and use of information technologies among the faculty members of tertiary level educational institutions. The results of this study should be interpreted in the light of its limitations.

This research work investigated various factors such as computer self-efficacy, relative advantage, computer anxiety, compatibility, previous computer experience and studied its effect on perceived ease of use and attitude toward IT usage. These factors accounted for the 60% of variance of perceived ease of use. However in the academic field there might be many other factors influence a teacher's attitude toward technology integration and the teaching processes. Some of these factors are respondent's age, tenure and promotion policies of the management, teaching disciplines, work load and time constraints etc. Further studies in these fields could shed more light into these areas.

Conclusion

The findings of the study provide key information to the management of educational institutions to improve the rate of return of their IT investments. Steps should be taken to improve the computer self- efficacy of the faculty members. Results show that compatibility and experience are the key determinants of whether or to what extent teachers used computer technologies for instructional needs. Adequate professional trainings on various computer applications will increase the computer self-efficacy of the faculty members. The more an individual is fa-

miliar with information technology, the more likely he will use it for her jobs. Universities should provide adequate workshops allow to their faculty members as it allows them to experience the usefulness of information technologies in the teaching process. Educational technologies and tools are improving day by day and hence the faculties are need to update their IT skills over time. Hence, the management should recognize the importance of providing long term professional development programs.

Appendix

Items used for measuring the various constructs:

Prior computer experience
Please indicate your level of experience with the following technologies from "None" to "Extensive"
Sending and receiving emails
Using internet and various websites
Operate a word processing program (eg. Microsoft Word)
Operate a spreadsheet program (eg. Microsoft Excel)
Operate a database program (eg. Microsoft Access)
Operate a presentation program (eg. Microsoft Power point)
Please indicate your level of agreements for the following statements from Strongly disagree to strongly agree
Computer Self Efficacy
I can effectively use computers as instructional tool
I can effectively manage my classroom when students are using computers
I can extend my instructional options by using computers and internet
I can learn to use computers for my teaching and learning process
I cannot effectively engage students in learning activities that incorporate computers
I could complete my teaching and learning process using computers if someone could show me how to do it first
Computer Anxiety
I feel apprehensive about using computers
It scares me to think that I could cause the computer to destroy a large amount of information by hitting the wrong key
I hesitate to use computers for fear of making mistakes that I can't correct
Computers and Internet technologies are somewhat intimidating to me.
Using computers and related technologies to teach makes me feel uncomfortable
The challenge of learning about computers related Information Technologies are exciting
Relative Advantage
Using information Technology enables me to accomplish my tasks more quickly
Using Information Technology improves the quality of my teaching job
Using Information Technology makes it easier to do my job
Using Information Technology improves my job performance

Relative Advantage
Using Information Technology gives me greater control over my work
Using Information Technology increases my productivity
Using Information Technology enhances my effectiveness on the job
Compatibility
Using Information Technology enhances is compatible with all aspects of my job
Using Information Technology enhances is completely compatible with my current situation
I think that using Information Technology fits well with the way I like to work
I think that using Information Technology fits into my work style
Perceived ease of use
I find our online education resources (Learning Management Systems, online course management tools, websites etc.) to be easy to use
I find it easy to get our course management platform (LMS) to do what I need to do in my classes
It is not easy to for me to become more skillful in using IT for my teaching
Overall I believe that Information Technology including internet is easy to use.
Attitude towards computer based teaching
Teaching with computers offer real advantages over traditional methods of instruction
I like using computers for my teaching process
I think students and teachers should use computers in all subject matters
I think computers can be effectively implemented as instructional tools
I allow my students to use the internet to access content related materials

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