Factors Influencing ICT Utilization in Select Institutions of Higher Education in India

Minakshi Kapoor *
Prof. (Dr.) Versha Mehta **

Abstract

The organizations worldwide, due to ever increasing constraints on time and space are increasingly recognising the need to facilitate access to services through the exchange of information using information and communication technologies. It has been seen based upon the literature review that ICTs are used by people and organizations for their information processing and communication purposes in a relatively simple and basic manner, however, its utilization has not been so valuable. In this context and background, the present study investigates a set of factors and their influence on ICT utilization in select organizations in the higher education sector. A sample of 150 respondents from the University of Jammu and Panjab University have been surveyed to identify the factors affecting the users' intention to use ICTs. The factor analysis has resulted in a total of 11 factors having 45 items in all. The data thus collected has been analyzed using different statistical techniques which includes descriptive statistics i.e. mean and standard deviation. The paper has established the relationships between variables viz. attitude, belief, self-efficacy, accessibility, ease of use and so on for the utilization of information technologies.

Keywords: *ICT Utilization, Intention, Task-Technology Fit, Individual Context, Organizational Context, Higher Education.*

Introduction

The organizations are undergoing a meta morphosis and going through an unprecedented change world over due to the ongoing changes in the technological landscape which is making the acquisitions, processing and sharing of information faster, equitable and pull driven so as to change the organizational fabric which has to respond to the changes of the environment in a much more dynamic and synergic manner than ever before. In the Higher Education, the new technologies constitute a major part of

* *Research Scholar, the Business School, University of Jammu, Jammu (J&K)*
** *Professor, the Business School, University of Jammu, Jammu (J&K)*

educational programs (Thomas & Stratton, 2006) and are pervasive in almost every aspect of human life and especially in organisations that invest significantly in the complex contemporary information systems (Gable, Sedera and Chan, 2008). Information and Communication Technologies (ICTs) are defined as a diverse set of technological tools and resources used in order to communicate and to create, disseminate, store and manage information. This broad definition of ICT includes technologies such as radio, television, video, DVD, telephone, satellite systems, computer and network hardware and software; as well as the equipment and services associated with these technologies, such as videoconferencing and electronic mail (Loing, 2005).It is an umbrella term for technological developments for the production, analysis, storage, search, distribution and use of information. Also, ICTs powers access to information (Brown, 2002), offer new ways of communication (Brown, 2002; Nachmias, Mioduser & Shemla, 2001), and serve many online services in the spheres of commerce, entertainment, and education (Nachmias et al., 2001). In general, Information and Communication Technologies (ICTs) encompass all those technologies that enable the handling of information and facilitate different forms of communication among human actors, between human beings and electronic systems, and among electronic systems.

Development of Information and Communication Technologies (ICTs) have transformed the contemporary business into new information economy which is digital in nature. Thus, only an effective and efficient usage can help in obtaining a competitive advantage. From this viewpoint, ICT has become an essential ingredient for educational development in the current century (Kozma & Anderson, 2002; Goodison, 2003; Kangro & Kangro, 2004; Hennessy, Ruthven, & Brindley, 2005; Mobaideen, 2006; Kennedy, Krause, Judd, Churchward & Gray, 2008; Bayindir & Inan, 2009). While it supports teaching, learning, and a range of activities in education, it can enhance the quality of teaching and learning in a variety of ways, from offering a source of knowledge (Brown, 2002; Fung, 2001), motivation (Hawkins, 2003), establishing lifelong learning habits (Schollie, 2001), establishing online learning (Hanafi, Zuraidah, Rozhan & Mohdzubir, 2003; Rosseni, Aidiah, Mohamed & Zalizan, 2003; Sridhar, 2005), mobile learning (Oliver & Goerke, 2007), offering a tool for research (Tingling, Parent & Wade, 2003; Oduwole, 2004; Hinson, 2005), offering a means of interaction (Adika, 2003; Applebee, Clayton, Pascoe & Bruce, 2000; Luambano & Nawe, 2004; Oduwale, 2004), improving the delivery of library services (Younis, 2002; Siddiqui, 2003a,b), offering a source of academic databases and e-books (Vicente, Crawford & Clink, 2004; Petrick, 2004), and so forth. Information based technology such as e-learning as one of the most effective modes of delivery of educational services enables to take education and learning go far beyond the confines of institutionalized instructions, structured study programmes and teacher-centred teaching learning process. The World Summit on the Information Society (WSIS) and a series of international conferences in the early 2000s emphasised on e-learning as a priority area. Digital literacy and e-skills overcomes constraints of age, income and class at all levels of education and administration.

According to annual report (MHRD, 2015), the Indian higher education system has

undergone massive expansion to become the largest in the world enrolling over 70 million students. Such expansion would have been unimaginable without the extensive use of ICT tools. Involvement of ICTs in different dimensions of the Indian education system is taking place at a fast pace. Various programs has been initiated under different schemes to focus on appropriate pedagogy for e-learning, providing facility of performing experiments through virtual laboratories, on-line testing and certification, on-lineavailability of teachers to guide and mentor learners, utilization of available Education Satellite (EDUSAT) and Direct to Home (DTH) platforms, training and empowerment of teachers to effectively use the new method of teaching learning etc. Online platforms and ICT tools have helped the students in far-flung areas who would otherwise have no access to university education. It has become the first port of call for many students who were earlier left out of the higher education system, or had to settle for lower quality alternatives. ICT tools encourage students to take responsibility for their own learning and offers problem centred and inquiry based learning which provides easy access and information based resources. It has not only been instrumental in addressing the demand-supply gap for quality education, but has fundamentally changed the nature of several educational processes. Today, classroom lectures and pre-recorded and uploaded to be accessed by students at their comfort. Class time is instead used for creating more in-depth learning experiences through group activities, problem solving and interactive learning. Online analytics provide faculty with data on how and at what pace each student is learning, enabling them to provide personalized support to aid student learning outcomes. In short, technology has been nothing short of disruptive for Indian higher education, solving for three of India's pressing problems – access, equity and quality at once.

As investments in IT by Organizations all over the world continue to grow at a rapid pace, its effective utilization has not been so valuable. However, regardless of potential technical superiority and promised merits, an unused or underutilized technology cannot be effective (Mathieson, 1991). There are numerous barriers that restrict the effective utilization of technology in higher education sector, such as technology infrastructure, faculty effort, technology satisfaction, and graduates competency (Surry, Ensminger & Haab, 2005). Even many higher online educational institutions have failed due to high cost of technology, poor decisions, competition, and absence of business strategy (Elloumi, 2004). Many universities that provide new technologies face enormous difficulties in achieving successful strategies, including the delivery, effectiveness, and acceptance of technology (Saade, 2003). With the growing reliance on information systems and increasing rapidity of the introduction of new technologies into learning environment, identifying the critical factors related to users' acceptance of technology continues to be an important issue (Yi & Hwang, 2003). In this context, the present study has been conducted to investigate a set of factors and their impact on effective utilization of new technologies in terms of Individual, Task-Technology and Organizational Contexts in select organizations in the higher education sector.

Review of Literature

"Utilization is defined as the process of practical and effective usage of something" (Hornby, 2003). It can be considered as the behaviour employed to complete tasks

(Goodhue and Thompson, 1995). System use or utilization is implicitly defined by researchers "as either the amount of effort spent to interact with an information system or, less frequently, as the number of reports or other information products generated by the information system per unit time" (Trice and Treacy, 1988). Continuous and effective Usage of new technologies is considered to be a necessary condition as it affects the organizational performance (Delone and McLean, 2002). Information and Communication Technology utilization capacity helps in building equitable access to information and knowledge so that it can be used by the individuals and organizations to meet their goals (Kyakulumbye et al., 2013). The concept of ICT utilization has been researched by various authors is a significantly researched concept (Taylor and Todd, 1995; Venkatesh et al., 2003; Compeau and Higgins, 1995; Davis et al., 1989; Szajna, 1996) and has been taken as a dependent variable in most of the empirical studies (Bokhari, 2005). Large number of studies (Swanson, 1998; DeLone and McLean, 1992 and Lucas, Schultz and Ginzberg, 1990) and models (Schewe, 1976; Robey, 1979; Lucas, 1975a) have been proposed for the implementation and use of new technologies. According to Holden & Karsh (2010), usage of a particular technology can be increased only by increasing the acceptance of that technology. For this, it is necessary to first investigate the factors that could influence user's intention, and manipulate those factors to promote acceptance, thereby increasing the usage.

Most of the Utilization research is based on theories of attitudes and behaviour (Goodhue and Thompson, 1995) such as the theory of reasoned actions (Ajzen & Fishbein, 1980; Fishbein & Ajzen, 1975), the theory of planned behaviour (Ajzen, 1991), the technology acceptance model (Davis, 1989; Davis, Bagozzi & Warshaw, 1989), technology acceptance model 2 (Venkatesh & Davis, 2000), Unified theory of acceptance and use of technology (UTAUT) (Venkatesh et al., 2003).The Theory of Reasoned Action (TRA) proposed by Fishbein and Ajzen (1975) explain and predict the people's behaviour in a specific situation. According to TRA a person's actual behaviour is driven by the intension to perform the behaviour, and the 'intention' is a function of the person's attitudes toward the behaviour and subjective norms. The theory of planned behaviour is the foundation of models examining users' intentions to utilise organisational systems (Davis et al., 1989) and has been found to effectively explain the use of ICT, thus indicating that ICT use is motivated by similar factors as those influencing other human behaviour (Klobas, 1995).

According to (Hu et al., 2003), One of the most influential models which has been used by many researchers for the adoption of new technologies is the Technology Acceptance Model (TAM), adapted from the theory of reasoned actions, designed for explaining individual technology acceptance decisions towards the utilization of information technologies among user populations and contexts. The main purpose of TAM has been to present an approach to study the effects of external variables towards people's internal beliefs, attitudes, and intentions. The two most important factors has been derived from this model viz: the perceived ease of use (PEOU) and perceived usefulness (PU). By design, TAM is robust but parsimonious theory and is useful to explain a particular information system or technology. Thus, inspite of its popularity and considerable empirical support, it has been criticized for parsimony.

Several studies have been conducted by

researchers to modify the TAM by incorporating new variables to it such as: compatibility, playfulness, experience, self-efficacy, perceived risk and social influence (Agarwal & Prasad, 1998; Moon and Kim, 2001; Lin, 2000; Chau, 1996). These studies suggest that an individual's decision touse a technology depends on multiple key factors or considerations pertinent to the individual, the technology, and the organizational contexts (Hu et al., 1999; Chau & Hu, 2002a; Dishaw & Strong, 1999). This framework has been applied to the acceptance of tele-medicine amongst physicians within the health sector and for its provision of contexts which assist a systematic examination of technology acceptance that can be targeted for recommendations to various stakeholder groups (Schaper & Pervan, 2007).

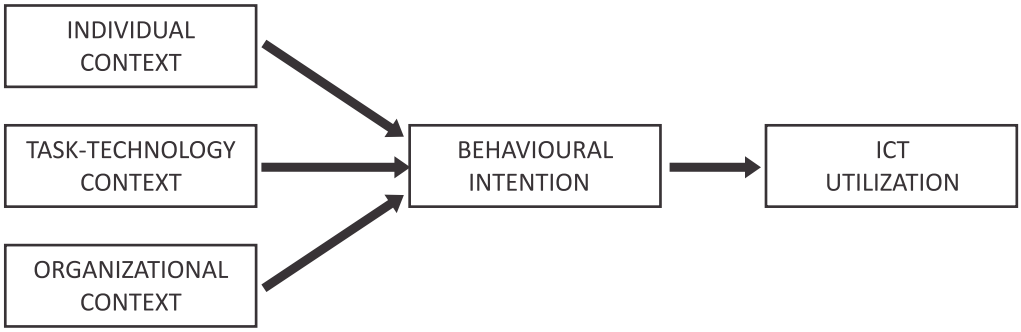
Tornatzky and Fleischer (1990) has provided Technology-Organization-Environment (TOE) framework, assumes a generic set of factors to predict the adoption of electronic commerce by small and medium scale enterprises (SMEs). According to this theory, adoption/ utilization is influenced by technology development (Kauffman & Walden, 2001), organizational conditions, business and organizational reconfiguration (Chatterjee, Grewal, & Sambamurthy, 2002), and industry environment (Kowtha and Choon, 2001). The major problem of T-O-E framework was that some of the constructs for the adoption of information technologies were assumed to apply to large organizations, where clients were sure of continuity and less complaints, than to SMEs. In order to solve this difficulty, T-O-E has been integrated withother models such as TAM and TPB provides larger number of constructs than the original with more affluent theoretical bases to the understanding of adoption behaviour (Awa, Ojiabo & Emecheta, 2015).

Various studies revealed that technology will be used only if the functions available to use through the technology support or fit the user activities (Goodhue and Thompson, 1995; Benbasat et al, 1986; Dickson et al, 1986; Zigurs and Buckland, 1998). After a technology, which provides appropriate support for the user tasks (i.e. has significant task-technology-fit), has been accepted by an individual only if it helps in enhancing the user's performance. However, some individuals may underutilize a technology by restricting their use of the system functionalities to a handful of features while others may fully leverage it by exploiting the technology functionalities. Such differences in the usage of ICTs across individuals arise from many factors such as personality, experience, perceptions, self-efficacy, and user competence (Agarwal, 2000; Marcolin et al., 2000; Boudreau and Seligman, 2003) and manifest themselves in actual use behaviour. From this viewpoint, task-technology-fit is an antecedent to utilization of new technologies in addition to the other behavioral antecedents identified elsewhere (Taylor and Todd, 1995; Venkatesh et al., 2003). Though TRA, TPB, TAM, TAM2 and UTAUT have been referred in many papers as some of the most influential models used to investigate the intention to use technology but still its application in education, particularly in higher education field is yet to be made (Schaik, 2009; Moran et al., 2010).

The Proposed Model

Basedon the previous researches, a model has been proposed which helps in identifying the factors affecting individual's intention for the utilization of information and communication technologies in terms of individual, task-technology and organizational contexts as

Figure 1: The Proposed model



shown in Fig.1. The proposed model for this research has been adapted from Chau & Hu's (2002) 'three-dimensional framework' due to its provision of contexts that helps in systematic examination of technology usage. The conceptual model theorizes that acceptance/adoption of ICT is based on three dimensions: 1) characteristics of individual 2) characteristics of task-technology and 3) characteristics of organizational contexts. The characteristics of individual users such as attitude, belief and self-efficacy are grouped within the individual context. The Task-Technology Context refers to the characteristics of the task and technology itself in which decision to use ICT is based on an individual expectations that the technology may have some impact on the task, or there must be some degree of fit between the task and the technology (task-technology fit) that has been chosen to accomplish it (Goodhue and Thompson, 1995). The Organizational Context refers to the specific environment where the individual works and the investigated technology acceptance takes place (Han, 2003). The interpretation of user behaviour within this organizational context will also help to make clear how important a role the organization plays in determining the user's intention towards the technology usage. The organizational context may encompass certain attributes of organizations such as: organisational facilitating conditions, social influences, management support and image.

Objectives of the Study

The objectives of the study are as follows:

1. To identify the factors affecting ICT utilization in the select institutions of higher learning.
2. To identify the relationship of such factors and their overall impact on ICT utilization.
3. To suggest a model for the utilization of new technologies in select organisations.

Need for the Study

India, like any other knowledge economy, depends on the development of its educational sector. Higher education drives the competitiveness and employment generation in India. Thus, Innovative use of Information and Communication Technologies are a mainstream issue in higher education. In this

context, the present study is conducted to identify the determinants and their impact on utilization of information and communication technologies among the select educational organizations. This study shows the extent of ICT infrastructure utilization in educational sector in order to get a grip of the relationship existing between technological advancement and economic development trend. The study will also benefit the educational sector by providing critical information to management in deciding on the areas which ICT should be adopted, as well as the specific technologies that would improve the performance of the organizations.

Research Methodology

Sample and Data

The research study has been conducted by collecting both primary and secondary data. As the present study is an empirical research in nature, a survey instrument has been formulated in assessing the awareness, receptivity and adoption of information and communication technologies. Also the study is based on factors affecting the utilization of new technologies, therefore, concentrated on the primary data only which has been collected via using questionnaire. Secondary data has also been collected from various books, journals, published papers, newspapers, websites etc. Since the scope of the study extends to the Higher Education Sector, it has been conducted at the University of Jammu in Jammu and Kashmir and also at the Panjab University in Chandigarh. The participants are the students, scholars, teaching as well as non-teaching staff from all the faculties who are involved in the use of new technologies. Approximately 150 questionnaires has been distributed among respondents, out of which only 141 filled questionnaires has been collected. The sample was randomly selected.

Instrumentation

The instrument has been developed on the basis of objectives of the study and previous literature review with modifications to fit the specific context on ICT utilization in higher education. The particular items for Individual context construct were 27, mainly adapted from the studies conducted by: Taylor & Todd (1995); Venkatesh et. al (2003); Chang (2004); Pierce & Ball (2009); Siragusa & Dixon (2008); Park (2009). Items used for the task-technology fit construct were 11 and adapted from the study conducted by Goodhue (1998). Also for the organizational context, total items were 18 adapted from various sources as: Thompson et. al (1991); Chang & Cheung (2001); Abdulwahab & Dahalin (2010); Hsiu-Fen Lin (2007); Taylor & Todd (1995); Moore & Benbasat (1991). The items for behavioural intention and utilization adapted from sources: Dishaw & Strong (1999); Kuo & Lee (2011). All items were randomly arranged and were measured on five-point Likert scale, from 1= strongly disagree and 5= strongly agree.

Data Analysis and Results

Factor Analysis

The multivariate data reduction technique of factor analysis has been used for the study. The primary purpose of factor analysis is to define the underlying structure in a data matrix. It involves examination of interrelationships (correlations) among a large number of variables and reduction of large number of variables into few manageable and meaningful sets (Stewart 1981). Factor analysis has been carried out with the Statistical Package for Social Sciences (SPSS) to simplify and reduce

Table 1: Summary of Means, Standard Deviations, Construct Loadings and Reliabilities

FACTORS	VARIABLES	MEAN	STANDARD DEVIATION	FACTOR LOADINGS	CRONBACH ALPHA
F1 Attitude (AT)	AT1 AT6 AT9 AT4	4.41 3.94 4.19 4.20	.775 .699 .736 .767	.810 .708 .707 .565	.757
F2 Belief (B)	B8 B7 B9 B4	3.24 3.70 3.87 3.76	1.006 .870 .855 .948	.818 .695 .637 .610	.702
F3 Self-Efficacy (SE)	Se1 SE2 SE3	3.62 3.43 3.50	.930 1.016 .976	.832 .826 .823	.780
F4 Accessibility (ACC)	TTF9 TTF8 TTF11 TTF10	3.95 3.83 3.57 4.05	.889 .878 1.009 .750	.819 .726 .726 .714	.772
F5 Ease of use (EOU)	TTF2 TTF7 TTF5 TTF6	3.79 3.90 3.85 4.02	.901 .856 .792 .751	.874 .787 .752 .564	.796
F6 Management Support (MS)	Ms1 MS2 MS3 MS4 MS5	3.57 3.57 3.52 3.70 3.56	1.016 1.129 1.025 .843 1.136	.772 .758 .660 .657 .641	.804
F7 Image (IM)	Im3 IM2 IM4 IM1	3.40 3.50 3.23 3.63	1.006 1.067 .990 .944	.804 .780 .711 .607	.763
F8 Social Influence (SI)	Si3 SI4 SI1 SI2	4.09 3.97 3.82 3.96	.702 .755 .897 .792	.764 .729 .720 .603	.749
F9 Facilitating Conditions (FC)	Fc3 FC4 FC2	3.26 3.32 3.60	1.072 .913 .948	.789 .764 .584	.715
F10 Behavioural Intention (BI)	Bi7 BI5 BI6	4.21 4.03 4.14	.685 .726 .723	.862 .832 .814	.784
F11 Utilization (UT)	Ut1 UT4 UT2 UT3 UT5	4.16 4.14 3.92 3.92 3.94	.759 .833 .972 .802 .843	.761 .759 .757 .739 .660	.814

Reliability and Validity

the data. Principal Component Matrix (PCA) method of factor analysis with varimax rotation has been used to reduce the items. This method has been widely accepted as a reliable method of factor analysis (Alexander and Colgate, 2000). The statements with factor loading less than 0.5 and Eigen value less than 1.0 were ignored for the subsequent analysis (Hair et al. 2007). The result of factor analysis indicated the presence of 11 distinct factors in which the individual context scale has been reduced from 27 items to 12 items, comprised of three factors viz: Attitude, Belief and Self-efficacy. The task-technology context has been reduced to 8 items with two factors after factor analysis i.e. Accessibility and Ease of use and the organizational context has been reduced to 16 statements under four factors such as: facilitating conditions, image, social influence and management support. Intention and Utilization both are the dependent variables and each compressed under single factor with 3 items of behavioural intention (KMO = 0.697) and 6 items of ICT utilization (KMO = 0.776). The high KMO value and $\chi 2$ value in Bartlett's test of sphericity for individual context (0.742 and 473.342), task-technology context (0.823 and 382.772) and organizational context (0.815 and 803.057) revealed the sampling adequacy of data for factor analysis and moreover the value of $\chi 2$ indicated that sufficient non-zero correlations existed among the chosen variables ($p \leq 0.01$).. The total variance explained by these factors has arrived at 58.085% for individual, 62.568% for task-technology and 61.340% for organizational contexts, reflects the soundness of the constructs. The summary of factor analysis of these constructs is presented in Table 1.

Reliability was calculated to measure the internal consistency amongst the items. Internal consistency reliability is the most commonly used psychometric measured assessing survey instrument and scales (Zhang et al., 2000). Cronbach's alpha is the basic formula for determining the reliability based on internal consistency (Kim & Cha, 2002). As shown in Table 1, nearly all constructs exhibited anα-value greater than 0.7, a common threshold for exploratory research (Nunnally & Bernstein, 1994).

Validity is the extent to which a construct measures what is supposed to measure reflecting how truthful the research results are, determining whether the research measures what was intended to measure (Golafshani, 2003). Both Convergent and discriminant validity has been used to confirm the appropriateness of the measurement obtained for the factors used in the study. Convergent and discriminant validity was evaluated by using principal component method of factor analysis with varimax rotation. By and large, an instrument is considered to exhibit satisfactory convergent and discriminant validity when measurement items load highly on the respective constructs than on others. As shown in Table 1, the question items' loadings has been significantly higher on the respective construct (e.g. loadings of 0.5 or above) than on others, thus suggesting our instrument exhibit dissatisfactory convergent and discriminant validity.

Correlation and Regression Analysis

Before regression analysis, the study established the linearity of results. This is one of the pre conditions for computation of Pearson's Product Moment Correlation Coefficient. The correlation coefficients between various factors/dimension for ICT Utilization are shown in Table 2. The results from (Table 2) reveal that all independent

Table 2: Correlation Matrix

		AT	B	SE	ACC	EOU	MS	IM	SI	FC	BI	UT
AT	Pearson correlation	1	.454**	.136	.439**	.599**	.349**	.145	.581**	.252**	.580**	.571**
	Sig. (2-tailed)		.000	.108	.000	.000	.000	.086	.000	.003	.000	.000
B	Pearson correlation	.454**	1	.151	.338**	.389**	.315**	.402**	.347**	.377**	.448**	.449**
	Sig. (2-tailed)	.000		.073	.000	.000	.000	.000	.000	.000	.000	.000
SE	Pearson correlation	.136	.151	1	.244**	.196*	.426**	.302**	.330**	.339**	.197*	.251**
	Sig. (2-tailed)	.108	.073		.004	.020	.000	.000	.000	.000	.019	.003
ACC	Pearson correlation	.439**	.338**	.244**	1	.495**	.360**	.150	.483**	.388**	.368**	.326**
	Sig. (2-tailed)	.000	.000	.004		.000	.000	.076	.000	.000	.000	.000
EOU	Pearson correlation	.599**	.389**	.196*	.495**	1	.509**	.258**	.593**	.277**	.550**	.513**
	Sig. (2-tailed)	.000	.000	.020	.000		.000	.002	.000	.001	.000	.000
MS	Pearson correlation	.349**	.315**	.426**	.360**	.509**	1	.384**	.481**	.472**	.364**	.388**
	Sig. (2-tailed)	.000	.000	.000	.000	.000		.000	.000	.000	.000	.000
IM	Pearson correlation	.145	.402**	.302**	.150	.258**	.384**	1	.211*	.285**	.218**	.250**
	Sig. (2-tailed)	.086	.000	.000	.076	.002	.000		.012	.001	.009	.003
SI	Pearson correlation	.581**	.347**	.330**	.483**	.593**	.481**	.211*	1	.416**	.619**	.553**
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.012		.000	.000	.000
FC	Pearson correlation	.252**	.377**	.339**	.388**	.277**	.472**	.285**	.416**	1	.264**	.331**
	Sig. (2-tailed)	.003	.000	.000	.000	.001	.000	.001	.000		.002	.000
BI	Pearson correlation	.580**	.448**	.197*	.368**	.550**	.364**	.218**	.619**	.264**	1	.626**
	Sig. (2-tailed)	.000	.000	.019	.000	.000	.000	.009	.000	.002		.000
UT	Pearson correlation	.571**	.449**	.251**	.326**	.513**	.388**	.250**	.553**	.331**	.626**	1
	Sig. (2-tailed)	.000	.000	.003	.000	.000	.000	.003	.000	.000	.000	

** Correlation is significant at the 0.05 level (2-tailed).* *** Correlation is significant at the 0.01 level (2-tailed).*

Table 3: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.707[a]	.500	.466	.43455	.500	14.559	9	131	.000

a. Predictors: (Constant), FC, AT, IM, SE, ACC, B, MS, SI, EOU
b. Dependent Variable: BI

Table 4: Coefficients

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	.688	.342		2.013	.046
AT	.238	.099	.208	2.396	.018
B	.166	.069	.187	2.409	.017
SE	.006	.052	.009	.119	.906
ACC	-.022	.067	-.025	-.328	.744
EOU	.142	.083	.155	1.708	.040
MS	.002	.065	.003	.035	.972
IM	.008	.056	.010	.138	.890
SI	.368	.089	.369	4.139	.000
FC	-.041	.059	-.053	-.694	.489

a. Dependent Variable: BI

variables i.e. Attitude, Belief, Self-efficacy, Accessibility, Ease of use, Facilitating Conditions, Image, Social Influence and Management Support have statistically significant correlations with Behavioural Intention and Utilization of ICTs within the acceptable limits of 0.05 and 0.01 at 95% and 99% level of significance. The correlation between social influence (SI) and behavioural intention (BI) is maximum (0.619) and correlation between self-efficacy (SE) and (BI) is minimum (0.197).Also there is significant correlation between behavioural intention (BI) and utilization (UT) and the correlation coefficient is (0.626).

This result shows that the independent

variables (i.e. Attitude, Belief, Self-efficacy, Accessibility, Ease of use, Facilitating Conditions, Image, Social Influence and Management Support) are significant joint predictors of behavioural intention for ICT utilization ($F = 14.559$; $R2 = 0.500$; $P < .05$). The independent variables jointly explained 50% of variance in behavioural intention. Four factors, Attitude, Belief, Ease of use and Social influence has been found to be the significant independent predictors of intention in which social influence has been found to be the most significant factor ($\beta = 0.368$; $P < 0.01$). Furthermore, based on the beta value, the factors are ranked as: Social influence ($\beta = 0.368$; $P < .05$); Attitude ($\beta = 0.238$; $P<.05$); Belief ($\beta = 0.166$; $P<.05$); Ease of use ($\beta = 0.142$; $P<.05$; Facilitating conditions ($\beta = -0.041$; Ns); Accessibility ($\beta = -0.022$; Ns); Image ($\beta = 0.008$; Ns); Self-efficacy ($\beta = 0.006$; Ns) Management Support ($\beta = 0.002$; Ns). Also behavioural intention had the strongest impact on ICT utilization, therefore further analysis has been conducted to identify the impact of intention on utilization. The analysis yielded a regression function with ($R = 0.626$; $R^2 = 0.392$;

$F = 89.785$; $\beta = 0.649$, $P < 0.01$). Thus, it has been found that behavioural intention explained 39.2% of variance and have a strong impact on ICT utilization.

Findings and Conclusion

The study provides valuable insights for IT researchers and practitioners who wish to gain entry into the education sector. The current study has investigated a total of 11 factors in which attitude, belief, self-efficacy, accessibility, ease of use, facilitating conditions, image, social influence and management support are independent variables and behavioural intention and utilization are the dependent variables. From Pearson's correlation results, the study revealed that all independent variables have significant relationships with behavioural intention and ICT utilization within the acceptable limits of 0.05 and 0.01. The multiple regression analysis also revealed a significant influence on ICT utilization. Empirical findings demonstrated the significance of all of these factors but with different relative importance. The study shows that the most significant factor influencing user's intention to use ICT is social influence closely followed by attitude, belief and ease of use. These provide a wider understanding of the factors that impact users when utilising new technologies.

The findings of the study provide a new foundation and draw attention for academic research related to the usage of information and communication technologies which help in improving the performance of universities in India. There are some possible lines of research that are suggested for developing better understanding of this topic. First, the university management needs to put in place an ICT awareness campaign and sensitization addressed by departments and faculties to enhance ICT utilization. Additionally, there is need to implement regular ICT workshops, training programs, seminars and conferences within the university to raise ICT awareness. Top Management needs to offer timely communication in order to create awareness of the ICT innovations so that it can be effectively utilized by departments and faculties of the universities.

The present study does not disqualify previous contributions by various studies rather it compliment these earlier studies which revealed that available ICT infrastructure in universities has a positive and significant influence on ICT utilization. Moreover, it does

not draw a final conclusion that the factors that this study investigated are the only determinants of ICT utilization. There could be other factors influencing ICT utilization that may be studied by another scholars. Thus, future research needs to focus on a larger cross section and more diversified samples to verify the findings of the current study. Finally, an important focus of the future research is the long-term effects on users for the effective use of new technologies. Thus, future studies can gather longitudinal data to examine the causality and interrelationships between variables that are important to the utilization of information technologies.

References

Abdulwahab, L., &Dahalin, Z. M. (2010). A conceptual model of Unified Theory of Acceptance and Use of Technology (UTAUT) modification with management effectiveness and program effectiveness in context of telecentre. African Scientist, 11(4), 267-275.

Adika, G. (2003). Internet use amongst faculty members of universities in Ghana. Library Review, 52(1), 29–37.

Agarwal, R. (2000). Individual Acceptance of Information Technologies. Framing The Domains of IT Management: Projecting the Future Through the Past, 85-104.

Agarwal, R., & Prasad, J. (1998). A conceptual and operational definition of personal innovativeness in the domain of Information technology. Information system research, 9(2), 204-215.

Ajzen, I. (1991). Theory of planned behaviour. Organizational Behaviour and Human Decision Processes, 50, 179–211.

Ajzen, I., Fishbein, M. (1980). Understanding Attitudes and Predicting Social Behaviors. Englewood Cliffs, NJ: Prentice-Hall.

Alexander, N. & Colgate, M. (2000). Retail financial services: transaction to relationship marketing. European Journal of Marketing, 34 (8), 938-953.

Applebee, A., Clayton, P., Pascoe, C., & Bruce, H. (2000). Australian academic use of the internet: implications for university administrators. Internet Research, 10(2), 141–149.

Awa, H. O., Ojiabo, O. U., &Emecheta, B. C. (2015). Integrating TAM, TPB and TOE frameworks and expanding their characteristic constructs for e-commerce adoption by SMEs. Journal of Science & Technology Policy Management, 6(1), 76-94.

Bayindir, N.,&Inan, H.Z. (2009). The educational quality of the technology used teacher training. World Applied Science Journal, 6(6), 855–860.

Benbasat, I., Dexter, A.S., and Todd, P. (1986). An experimental program investigating color-enhanced and graphical information presentation: An integration of the findings. Communications of the ACM, 29(11), 1094-1105.

Bokhari, R. H. (2005). The relationship between system usage and user satisfaction: a meta-analysis. Journal of Enterprise Information Management, 18(2), 211-234.

Boudreau, M.C. & Seligman, L. (2003). A learning-based model of quality of use: Insights from a case study of ERP Implementation. Diffusion Interest Group in Information Technology (DIGIT)2003 Proceedings, 4.

Brown, D.G. (2002). Proven strategies for teaching and learning. In A.J. Kallenberg& M.J.J.M. van de Ven (Eds.). Proceedings of the New Educational Benefits of ICT in Higher Education Conference (pp. 9–11). Rotterdam, The Netherlands: Erasmus Plus BV, OECR.

Chang, P. V. C. (2004). The validity of an extended technology acceptance model (TAM) for predicting intranet/portal usage. University of North Carolina, Chapel Hill, NC.

Chang, M. K., & Cheung, W. (2001). Determinants of the intention to use Internet/WWW at work: a confirmatory study. Information & Management, 39(1), 1-14.

Chatterjee, D., Grewal, R., &Sambamurthy, V. (2002). Shaping up for e-commerce: Institutional enablers of the organizational assimilation of web technologies. MIS Quarterly, 26(2), 65-89.

Chau, P.Y.K. (1996). An empirical assessment of a modified technology acceptance model. Journal of Management Information Systems, 13, 185-204.

Chau, P.Y.K., & Hu, P.J. (2002a). Investigating healthcare professionals' decisions to accept telemedicine technology: an empirical test of competing theories. Information and Management, 39 (4), 297–311.

Chau, P.Y.K., and Hu, P.J. (2002). Examining a model of information technology acceptance by individual professionals: an exploratory study. Journal ofManagement Information Systems, 18(4), 191-229.

Compeau, D.R. and Higgins, C.A. (1995). Computer self-efficacy: Development of a measure and initial test, MIS Quarterly, 19(2), 189-211.

Davis, F.D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. MIS Quarterly, 13(3), 318-339.

Davis, F.D., Bagozzi, R.P., &Warshaw, P.R. (1989). User acceptance of computer technology: a comparison of two theoretical models. Management Science, 35(8), 982-1003.

Delone, W.H., & McLean, E.R. (2002). Information systems success revisited. Proceedings of the 35th International Conference on System Sciences (HICSS). Hilton Waikoloa Village, Island of Hawaii, HI, IEEE Computer Society.

DeLone, W.H., and McLean, E. (1992). Information systems success: The quest for the dependent Variable. Information Systems Research, 3(1), 60-95.

Dickson, G.W., DeSanctis, G., and McBride, D.J. (1986). Understanding the effectiveness of computer graphics for decision support: A cumulative experimental approach. Communications of the ACM, 29(1), 40-47.

Dishaw, M. T., & Strong, D. M. (1999). Extending the technology acceptance model with task-technology fit constructs. Information & Management, 36(1), 9–21.

Elloumi, F. (2004). Value chain analysis: A strategic approach to online learning. In A. Anderson & F. Elloumi (Eds.), Theory and practice of online learning (pp. 61–92). Athabasca, Canada: Athabasca University.

Fishbein, M., and Ajzen, I. (1975). Belief, attitude, intentions and behavior: An introduction to theory and research. Boston: Addison-Wesley.

Fung, A.C. (2001). Using ICT as a strategic tool in education. Paper presented at the First Southeast Asian Ministers of Education Organization Congress, Plenary-Panel Session IV, Hong Kong.

Gable, G., Sedera, D., & Chan, T. (2008). Re-conceptualizing Information System Success: The IS Impact Measurement Model. Journal of the Association for Information Systems, 9(7), 377-408.

Golafshani, N. (2003). Understanding Reliability and Validity in Qualitative Research. The QualitativeReport, 8(4), 597-607.

Goodhue, D. L. (1998). Development and

measurement validity of a task-technology fit instrument for user evaluations of information system. Decision Sciences, 29(1), 105-138.

Goodhue, D. L., & Thompson, R. L. (1995). Task-technology fit and individual performance. MIS Quarterly, 19(2), 213–236.

Goodison, T. (2003). Integrating ICT in the classroom: A case study of two contrasting lessons. British Journal of Educational Technology, 34(5), 549–566.

Hair, J. J. F., Black, W. C., Babin, B. J., Anderson, R. E., & Tatham, R. L. (2007). Multivariate Data Analysis, (6th ed.) New Jersey: Pearson Prentice Hall.

Han, S. (2003). Individual Adoption of Information Systems In Organizations: A literature review of technology acceptance model (Report No. 540). TUCS.

Hanafi, A., Zuraidah, A.R., Rozhan, M.I., &Mohdzubir, M.J. (2003). Readiness towards online learning in physics: Competency in ICT related applications. Paper presented at the International Council of Associations for Science Education (ICASE) World Conference on Science and Technology Education, Pengang, Malaysia.

Hawkins, R. (2003). World links for development program, World Bank. Retrieved May 10, 2005, from http://www.cid.harvard.edu/cr/pdf/ gitrr2002_ch04.pdf

Hennessy, S., Ruthven, K., & Brindley, S. (2005). Teacher perspectives on integrating ICT into subject teaching: Commitment, constraints, caution, and change. Journal of Curriculum Studies, 37(2), 155–192.

Hinson, R. (2005). Internet adoption among Ghana's SME non-traditional exporters: Expectations, realities and barriers to use. Africa Insight, 35(1), 20–27.

Holden, R., & Karsh, B. (2010). The Technology Acceptance Model: Its past and its future in health care. Journal of Biomedical Informatics, 43, 159–172.

Hornby, A.S. (2003). Oxford Advanced Learners Dictionary. Special Price Edition. Oxford: OxfordUniversity Press.

Hu, P. J. H., Clark, T. H., & Ma, W. W. (2003). Examining technology acceptance by school teachers: a longitudinal study. Information & management, 41(2), 227-241.

Hu, P. J., Chau, P. Y. K., Liu Sheng, O. R., & Tam, K. Y. (1999). Examining the technology acceptance model using physician acceptance of telemedicine technology. Journal of Management Information Systems, 16(2), 91-112.

Kangro, A., &Kangro, I. (2004). Integration of ICT in teacher education and different school subjects in Latvia. Educational Media International, 41(1), 31–37.

Kauffman, R., & Walden, E. (2001). Economics and electronic commerce: Survey and directions for re-search. International Journal of Electronic Commerce, 5(4), 5-116.

Kennedy, G. E., Judd, T. S., Churchward, A., Gray, K., & Krause, K. L. (2008). First year students' experiences with technology: Are they really digital natives? Australasian journal of educational technology, 24(1), 108-122.

Kim, W.G. & Cha, Y. (2002). Antecedents and consequences of relationship quality in hotel industry. Hospitality Management, 21, 321-338.

Klobas, J.E. (1995). Beyond information quality: Fitness for purpose and electronic information resource use. Journal of Information Sciences, 21(2), 95-114.

Kowtha, N. R., & Choon, T. W. I. (2001). Determinants of website development: A Study of Electronic Commerce in Singapore. Information & management, 39(3), 227-242.