

## TECHNOLOGY READINESS AND ACCEPTANCE IN HIGHER EDUCATION FOR TECHNOLOGY ENABLED TEACHING-LEARNING PROCESS - A CONCEPTUAL FRAMEWORK

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**Abstract:** *Technology plays a vital role in the organizations to increase its performance and productivity. In India, technology is enacting a dynamic action in all the sectors for the past two decades. The Indian organizations have realized the benefits attained by technology and many have started reaping the benefits of technology. As higher education (HE) being a service sector, even it has realized the advantages of technology adoption in various tasks. Many government and private institutes of Indian higher education are adopting Information and Communication Technology (ICT) to meet the three great challenges of higher education addressed by Government of India (GoI)-access, equity and excellence. ICT can be incorporated in academics at various levels, such as teaching and learning, student's engagement, parent engagement, administration, admissions, alumni relationship management, research and development etc.,. Since teaching and learning being the core activity of HE, the paper identifies various factors influencing the faculty members of HE to adopt ICT in teaching and learning process and also a conceptual framework is developed to understand the technology readiness and technology adoption among the faculty members of HE. The model will be helpful to understand the level of preparedness among the faculty towards technology acceptance in the teaching and learning process.*

**Key words:** *ICT, Technology Readiness, Technology Acceptance, Faculty, Higher Education.*

### I. INTRODUCTION

India has one of the largest higher education systems in the world, and has been witnessing healthy growth in its number of institutions and enrollment in the last few decades. The education system has seen a scorching growth over the last decade, trebling in size. In 2013, India had 727 universities, over 35,000 colleges and about 13,000 stand-alone institutions Education is recognized as one of the critical elements of the national development effort and Higher education, in particular, is of vital importance for the nation, as it is a powerful tool to build knowledge-based society of the 21<sup>st</sup> century. India is developing as a knowledge economy and it cannot function without the support of Information Communication Technologies (ICT). Importance of education in almost all walks

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of life has increased with the support of ICT. During the past 20 years, the use of ICT has fundamentally changed the working of education. In the current environment-conscious world, the importance of education and acceptability of ICT as a social necessity has been increasing. We can make our learning more engaging with the use of ICT, it can completely change how our education system works. ICT can help in enhancing the quality of education through blended learning by supplementing the traditional talk and chalk method of teaching. ICT, if used creatively, can make a big difference in the way teachers teach and students learn and can help students acquire 21st century skills like digital literacy, innovative thinking, creativity, sound reasoning and effective communication.

Information and Communication Technologies (ICTs) is a diverse set of technological tools and resources used to communicate and to create, disseminate, store and manage information. This broad definition of ICT includes technologies 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 (UNESCO, 2002). The various kinds of ICT products available and having relevance to education, such as teleconferencing, email, audio conferencing, television lessons, radio broadcasts, interactive radio counseling, interactive voice response system, audiocassettes and CD ROMs etc., have been used in education for different purposes (Sharma, 2003; Sanyal, 2001; Bhattacharya and Sharma, 2007). The following mediums are used for the delivery and for conducting the education process: Voice, Video, Print (Bhattacharya and Sharma, 2007; National Programme on Technology Enhanced Learning, 2007). Fluck (2003) defines the term integration with the degree to which "ICT vanishes into the background of the classroom learning activity" At present there are three basic technology-enabled models of teaching and learning (Fleck, 2007). First, face-to-face teaching with some limited technological add-ons but primarily campus based. Second, a "blended learning" approach, i.e., a much more modern mix of traditional methods with cutting-edge information technology (IT). Third, a more powerful model linking "blended learning" and so-called learning communities, i.e. forms of group-based technology facilitated learning. Lloyd (2006) suggests that the term ICT integration connotes a wide variety of learning environments; from a single personal computer in the classroom to a situation where the teaching is done by the computer through online applications. Integration on the other hand can have the blending and coordinating function where the view is that ICT integration is seen to "seamlessly combine parts or elements into a complex but harmonious whole" (Lloyd, 2006, p. 5).

## **II. INDUCING FACTORS TOWARDS ICT PRACTICES BY THE FACULTY MEMBERS**

Fluck (2003) has defined the term integration with the degree to which "ICT vanishes into the background of the classroom learning activity". Balasubramaniam

(2009) highlights teachers are responsible for quality control, improvement of learning and the aggregate effectiveness of learning process, therefore its teacher's ability to keep pace with the developments decides the success of ICT-based education. The main role of teachers will not be to transmit information and culture, but rather to act as experts and leaders to motivate learning. Elias (2011) identifies uses of ICT and the implementations of pedagogical strategies in the classrooms are the factors to influence teaching with ICT. Jef Paarar *et al.*, (2010) in his study ascertains the important factors for successful implementation of ICT in teaching-learning are ICT skills, confidence to use computer, infrastructure and availability in hardware and software. The age, gender, qualification, perceptions, experience and organizational characteristics are the factors which plays an important part in implementation of ICT in teaching-learning purpose as per the study conducted by Alla Nawaz *et al.*, (2010). Elias *et al.*, (2011) conducted study at Colombian university and concluded that, to support ICT in teaching, pedagogical model is implemented related to new teaching-learning opportunities in the classrooms. Mumtaz (2000) differentiates three interlocking factors as institution, resources and teacher. Ten Brummelhuis in Dreant *et al.*, (2008) categorizes influencing factors which can be manipulated and factors which cannot be manipulated. The factors like age, sex, teaching experience cannot be influenced directly and examples of manipulative factors are attitudes towards teaching and ICT, ICT skills and availability of ICT support. Jones A, (2014) in the literature review has mentioned that a very significant determinant of teachers' levels of engagement in ICT is their level of confidence in using the technologies. Teachers who have little or no confidence in using computers in their work will try to avoid them altogether [Dawes, 2000; Lerner and Timberlake, 1995; Russell and Bradly, 1997]. Individual differences between educators influence access to ICT, use, confidence and skills. One key area of teachers' attitudes towards ICT is their understanding of how it will benefit their work and their students' learning. Cox *et al.*, (2008) expresses the need to measure, among other factors, the teachers' beliefs and understanding of the role of IT within the subject being taught. Hermans *et al.*, (2008) shed light on the intermediating role of teachers' educational beliefs in the resistance and accessibility to integrate computers in classroom practice. Bullock (2004), found that the attitude of teachers is a major enabling/ disabling factor in the adoption of the technology.

Kirkup *et al.*, (2005) in his study conducted at Vietnam differentiates innovators who are enthusiastic for the technology as valuable itself, and later adopters who are less interested in the technology and need evidence that it will improve their lives or work. There are strong and significant correlations between the uses of different ICT applications for teaching practice. This indicates that there are some Vietnamese teacher educators who are ICT minded, enthusiasts or innovators. Teachers who could not be considered 'innovators' or 'early adopters' are unlikely to be adventurous in their use of ICT; instead they will use the technology to

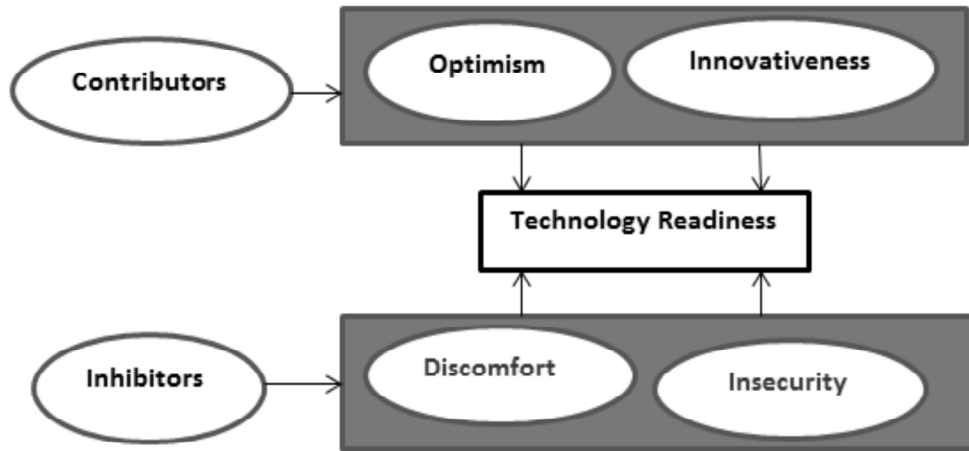
replicate or supplement existing teaching practices. Such uses do not require teachers to rethink their teaching practices or reconsider their understanding of student learning [Laurillard]. Also Ashish *et al.* (2013) with reference to Plomp *et al.* (2007) stated that the experience of many teachers, who are early innovators, is that the use of ICT is motivating for the students as well as for the teachers themselves. Prensky, (2001) identifies the influencing factors for the integration of ICT practice in teaching as gender and age. The younger teacher educators can be seen as ICT natives who have been more exposed to ICT. Jef Pearnar *et al.*, (2011) in his study at Vietnam reveals that teacher educators sometimes or regularly use word processing software for production of documents, presentation and software is used for lecturing or they use ICT to access information. When it comes to more advanced, subject specific applications or electronic communication, which could activate students in the learning process, use of ICT remains low. It is mainly internet skills of teacher educators and computer confidence which influences whether or not ICT applications are used for teaching practice. Teacher educators who have better ICT skills, in particular internet skills, tend to use more diverse ICT applications and on a more regular basis than teacher educators who perceive lower ICT skills. Victoria L.Tino informs that various competencies must be developed throughout the educational system for ICT integration to be successful. Teacher professional development should have five foci: 1) skills with particular applications; 2) integration into existing curricula; 3) curricular changes related to the use of IT (including changes in instructional design); 4) changes in teacher role; and 5) underpinning educational theories (MacDougal *et al.*, 1998). Michael *et al.*, 2012 in his study on web 2.0 and social networking suggest on that change in students need make faculty force ably to change the mode of teaching. The beauty of new social and digital technologies is their immediacy, reach and flexibility.

### **III. TECHNOLOGY ACCEPTANCE THEORETICAL MODELS - A LITERATURE REVIEW**

The paper starts reviewing the literature of various models towards technology adoption and technology readiness. Research by Rogers suggested that there are differences in peoples' disposition towards using technology. He split people into five groups describing their character; ranging from innovators to laggards. The technology readiness index (TRI) was developed by Parasuraman and it is a frame work that relates to technology in general. The traits differ among people and therefore their beliefs about various aspects of technology differ. The relative strength of each trait indicates a person's openness to technology.

#### **Drivers of Technology Readiness**

TRI thus reflects a set of beliefs about technology but is not an indicator of a person's competence in using it. TRI is multifaceted. It defines four groups of users separated

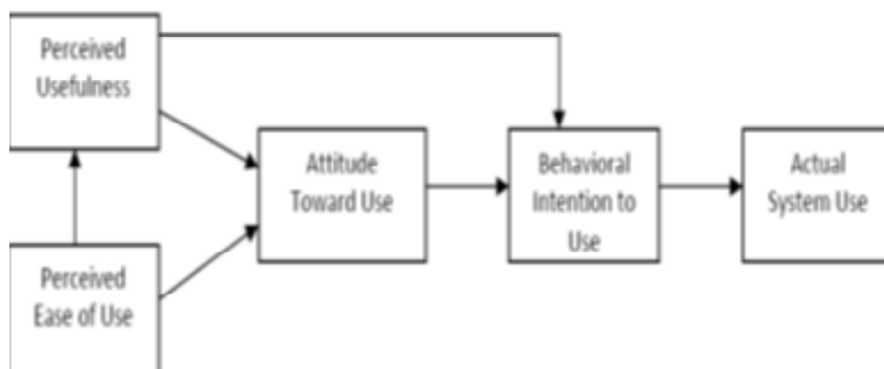


by their prevailing personality trait with two factors being motivators of new technology use and another two being inhibitors; they are:

- \* Optimism: a positive view of technology. Beliefs over in increased control, flexibility, and efficiency in life due to technology
- \* Innovativeness: a tendency to be the first using a new technologies.
- \* Discomfort: having a need for control and a sense of being overwhelmed.
- \* Insecurity: distrusting technology for security and privacy reasons.

#### IV. TECHNOLOGY ACCEPTANCE MODEL (TAM)

Technology Acceptance Model (TAM) by Davis adopted the causal relationship of Fishbein's and Ajzen's Theory of Reasoned Action (TRA) model. Davis included perceived usefulness (PU) and perceived ease of use (PEU) as the two beliefs that determine the attitude towards using an Information System. Davis concluded that the relationship between PU and user acceptance was stronger than that of PEU and user acceptance. Technology Acceptance Model (Davis *et al.*, 1989).



Number of theoretical models have been proposed to facilitate the understanding of factors impacting the acceptance of information technologies (e.g., Davis, 1989; Chau, 1996; Venkatesh & Davis, 2000). Among these studies, the Technology Acceptance Model (TAM) is one of the most influential and robust in explaining IT/IS adoption behavior. The key purpose of TAM was to provide a basis for discovering the impact of external variables on internal beliefs, attitudes, and intentions. TAM assumes that beliefs about usefulness and ease of use are always the primary determinants of information technologies adoption in organizations. According to TAM, these two determinants serve as the basis for attitudes toward using a particular system, which in turn determines the intention to use, and then generates the actual usage behavior. Perceived usefulness is defined as the extent to which a person believes that using a system would enhance his or her job performance. Perceived ease of use refers to the extent to which a person believes that using a system would be free of mental efforts (Davis, 1989). However, the original TAM model was created to examine IT/IS adoption in business organizations. The model's suitability for predicting general individual acceptance, especially in higher education, needs to be explored.

#### **V. UNIFIED THEORY OF ACCEPTANCE AND USE OF TECHNOLOGY (UTAUT)**

The UTAUT was proposed by Venkatesh, *et al.*, as an integrated framework of eight related technology acceptance theories or models. Those theories or models include the diffusion of innovation theory, the TRA theory, the TPB theory, the motivation theory, the hybrid model of TPB and TAM, the original TAM model, the PC utilization model, and the social cognitive theory. The perceived ease of use and the perceived usefulness were incorporated in this model by using the effort expectancy and the performance expectancy dimensions. The UTAUT was conducted in two rounds of studies, in which the data collection from six organizations in three rounds of surveys. The variance of explanations in two rounds reached about 70% and 50% respectively.

In addition to the two most important constructs of performance expectancy and effort expectancy, the other constructs, which include the social influence, the facilitating conditions, the intention to use, and the usage behaviors were also included in this model. Venkatesh, *et al.*, examined the three constructs consisting of self-efficacy, anxiety and attitude toward using technology in UTAUT model. However, these three constructs have no strong impact on others. Thus, three constructs are removed from UTAUT model.

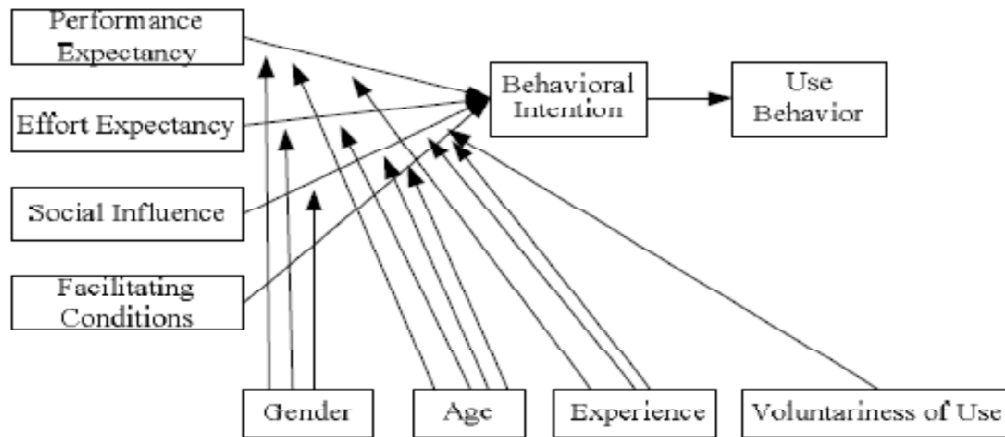
The eight models include Theory of Reasoned Action (TRA), Technology Acceptance Model (TAM), Motivational Model (MM), Theory of Planned Behavior (TPB), C-TAM-TPB, Model of PC utilization (MPCU), Innovation Diffusion Theory (IDT), and Social Cognitive Theory (SCT). UTAUT model integrates the

THE FOUR CORE DETERMINANTS OF UTAUT

UTAUT Determinant	The Sub-Determinant	The Source of Integrated Model
Performance Expectancy	Perceived Usefulness	TAM/TAM2/C-TAM-TPB
	Extrinsic Motivation	MM
	Job-Fit	MPCU
	Relative Advantage	IDT
	Outcome Expectations	SCT
Effort Expectancy	Perceived Ease of Use	TAM/TAM2
	Complexity	MPCU
	Ease of Use	IDT
Social Influence	Subjective Norm	TRA, TAM2, TPB/DTPB, C-TAM/TPB
	Social Factors	MPCU
	Image	IDT
Facilitating Conditions	Perceived Behavioral Control	TPB/DTPB, C-TAM-TPB
	Facilitating Conditions	MPCU
	Compatibility	IDT

points that were addressed in the relevant documents into four core determinants: performance expectancy, effort expectancy, social influence, facilitating conditions; and four control variables: gender, age, experience, and voluntariness of use

Theory of Acceptance and Use of Technology (UTAUT)

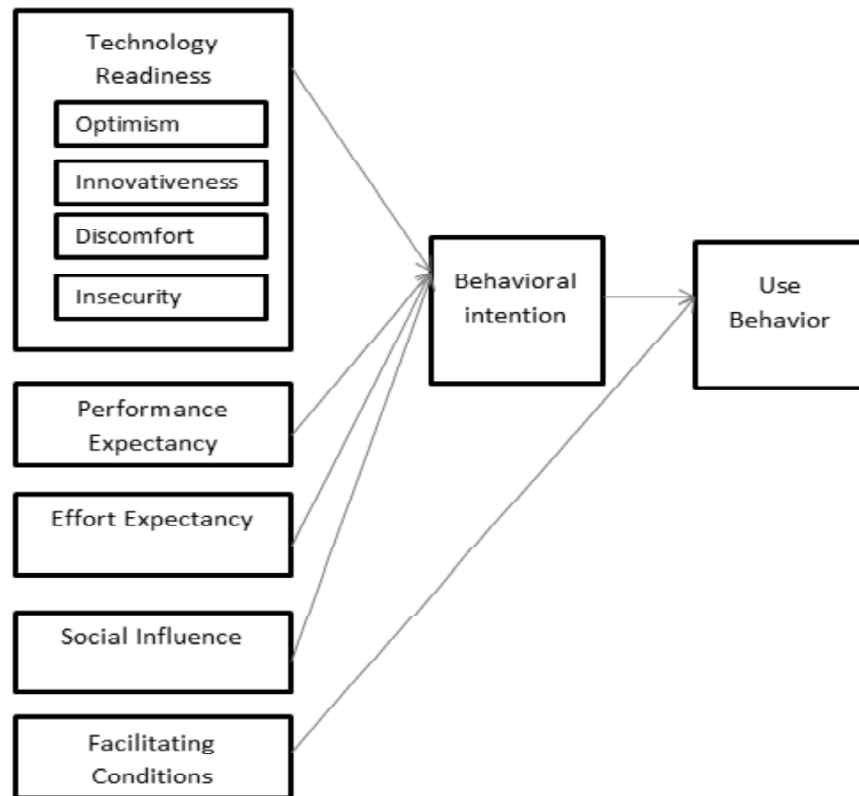


A CONCEPTUAL FRAMEWORK FOR TECHNOLOGY READINESS AND TECHNOLOGY ACCEPTANCE

The TRI model measures the technology belief among the individuals and UTAUT though it measures various dimensions such as performance expectancy, effort expectancy, social influence, facilitating conditions, but no model has integrated the technology belief and attitude towards technology acceptance. The below model

measures the technology readiness and actual behavior of individual towards technology acceptance.

MODEL INTEGRATING TRI AND UTAUT



The proposed model can be tested to measure the usage behavior of information system, which not only measures the performance expectancy, effort expectancy, social influence and facilitating conditions but also includes the most important dimension technology readiness to understand the individual’s belief regarding the technology, since the actual use of IS also depends on the individual’s belief towards technology.

**VI. CONCLUSION**

The proposed model can be tested in future to understand the faculty behavior towards integrating technology for the teaching - learning process. As ICT tools can improve the efficiency and productivity of faculty in teaching-learning process, a study need to be undertaken to understand the behavior of faculty in incorporating ICT tools for the academic purpose. The proposed conceptual model



will be tested in future among the management faculty to understand their behavior towards ICT system.

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