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RESEARCH PAPER

Factors Influencing Teachers' Behavioral Intention to Use Information System (IS) Innovation Services in Bangladesh: An Empirical Study

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ABSTRACT

The aim of this study is to measures the factors influencing the teachers' behavioral intention to use of information system (IS) innovation services in educational institutions. Based on the research model the questionnaire was developed by using previous work in the areas of IS innovation. The data used to test the hypothesis are collected from the teachers at Barisal division in Southern part of Bangladesh. A total of 380 questionnaires were sent to teachers, and 260 completed questionnaires were collected with a respondent rate of 68.42%. A preliminary regression analysis was conducted to remove outliers that exceeded limits on specific measures. Ten surveys were removed during this step, leaving a final sample size of 250, which satisfies the generalizability conditions and the adequacy of analysis. The research model was applied using the Structural Equation Modeling (SEM) technique. The study determined that perceived feasibility, perceived desirability, effort expectancy, facilitating conditions, and propensity to use ($p < 0.05$) had a significant impact on the teachers' behavioral intention to adopt Information System (IS) innovation services. In this study, facilitating conditions is an important factor that has a significant effect on teacher behavioral intention. Moreover, precipitating events does not moderate the relationship between behavioral intention and use behavior. This study revises the Entrepreneurial Event Model (EEM) and Unified Theory of Acceptance and Use of Technology (UTAUT) Model to develop a more robust model, and identify new variables that affect the relationship between intentions and use behavior. Results of this study support policymaker and guide concerning the adoption and usage of IT innovation. The nature of this study may restrict its generalizability to other research settings.

Key words: Behavioral Intention, Information System, Innovation Services, Structural Equation Modeling (SEM)

1. Introduction

Information and Communication Technology (ICT) has added a new dimension in our everyday life for the many people in business, entertainment, education and many other areas of human activity (Alshahrani et al., 2018). It is generally known as the diverse set of technological tools and resources which are used to create, disseminate, store, and manage information (Yadav & Mehta, 2013). In promoting quality of education worldwide ICT has become a useful tool (Braslavsky & Fumagalli, 2000). In the context of education, investment in ICT enhances economic growth, accelerates social development, advances education reform and supports education management (Kozma, 2008). In transforming from the traditional teacher-centric classroom to learner-centric classroom ICTs serve as the ways to communicate information at anytime and anywhere basis (Capper, 2001).

In educational institutions, student minds are open to new ideas, show creativity, develop critical thinking and above all, they are ready to absorb surrounding information for informed decision making at any later stage of their life

(Tuparova, Kaseva, & Tuparov, 2014; Yadav & Mehta, 2013). Comprehending the prominence and potential for accelerated or advanced learning, ICT has therefore been introduced in different levels of education in many countries. The adoption of ICT has yielded opportunities for teachers to be developed professionally (Chapman, Mahlck, & Smulders, 1997; Haddad & Jurich, 2002) and for education services to be improved in countries such as Belgium (Vanderlinde & van Braak.Johan, 2011) China (Sang, Valcke, van Braak, Tondeur, & Zhu, 2011), and Korea (Lee & Cho, 2011).

Bangladesh is one of the developing countries in the world having poor ICT infrastructure like the other less developed countries (Alshahrani et al., 2018). Bhuiyan (2011) states that recently, Bangladesh has made considerable progress in introducing ICT in the public sector, although, in terms of e-readiness, the latest report of United Nation in 2018 identified Bangladesh as one of the poor performers in the Southern Asian region. In recent years, aligned with the current trend, Bangladesh also has considered ICT seriously for educational enhancement. ICT has got importance in policies and curriculum. The government, NGOs and development-partners are playing a significant role in introducing ICT in education (Babu & Nath, 2017).

However, there is a need to find the variables that will be able to capture the role of factors that affect a teacher's intention to adopt and use IS-related innovations. This study integrated the unified theory of acceptance and use of technology (UTAUT) and Entrepreneurial Potential Model (EPM) to create a robust model, and provide a better understanding of the adoption behavior. The principal aim of this research was to understand and measure the level of awareness that exists among teachers in educational institutions in Bangladesh about IS-innovation services. Consequently, the following research question was postulated to achieve the aim of the research: How do the factors influence the adoption and use behavior of teachers in IS-innovation services?

Across the world, many governments are now using Information Systems (IS) to provide their citizens with more convenient access to information and services. ICT is a scientific, technological and engineering discipline and management technique used in handling information, its application and association with social, economic and cultural matters. In modern science and technological societies education demands more knowledge of teacher regarding ICT and skills to use ICT in teaching –learning process. The knowledge of ICT also required for pre-service teacher during their training programme, because this integrated technological knowledge helps a prospective teacher to know the world of technology in a better way by which it can be applied in future for the betterment of the students. Nowadays, ICTs are transforming schools and classrooms a new look by bringing in new curriculum based on real world problems, projects, providing tools for enhancing learning, providing teachers and students more facilities and opportunities for feedback. Teachers must know the use of ICT in their subject areas to help the learners for learning more effectively. So, the knowledge of ICT is very much essential for the both prospective teachers as well as in-service teachers also. The results of this study will help decision-makers to gain a better understanding of the factors that determine teacher adoption and use of IS-innovation services.

2. Theoretical Background and Model Development

The current study employed Technology Adoption Decision and Use (TADU) model (Moghavvemi et al., 2016) by integrating the Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh et al., 2003) and Entrepreneurial Potential Model (EPM) (Krueger, & Brazeal, 1994) to predict a teacher's intention to use IS innovation services. This study combined relevant predictors of technology adoption based on three reasons: (i) UTAUT model does not measure direct effect of the individual characteristic (attitude, self-efficacy) toward behavioral intention (BI) to use new technology (Straub, 2009; Yuen et al., 2010) (ii) limitations that exist in the relationship between intentions and use behavior, (Negahban & Chung, 2014) and (iii) the EPM's ability to measure perceived desirability, perceived feasibility, and the propensity to act toward technology adoption and capture the effect of external factors (precipitating events). This study adds precipitating events as a moderator between intention and behavior to fill the intention behavior gap. The research model is shown in Figure 1. Following this rationale, this study integrated constructs from the EPM to the UTAUT model.

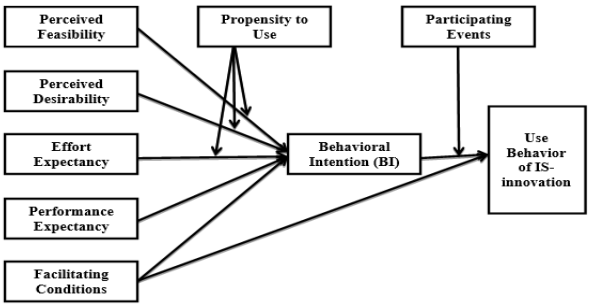

Figure 1: Research Model

2.1 Perceived Feasibility (PF)

PF is defined as the degree to which one feels personally capable of performing a task (Krueger, & Brazeal, 1994; Krueger et al., 2000). Locke (1987) argued that taking action requires consideration of not just outcome expectations (perceived desirability), but also perceived self-efficacy (feasibility) which is comparable to perceived feasibility reflecting the perception of the personal capability to do a particular job or set of tasks. A higher level of self-efficacy will lead to higher levels of behavioral intention and IT usage (Compeau et al., 1999; Thong et al., 2002;Venkatesh, 2000; Venkatesh & Davis, 1996) Numerous studies have found significant empirical relationships between the perceived feasibility and the intention across a wide range of behavioral domains (Veciana et al., 2005; Guerrero et al., 2008; Fitzsimmons & Douglas, 2011; Devonish, et al, 2010; Krueger, 1993; Liñán & Santos, 2007; Shook & Bratianu, 2010). Thus, the perceived feasibility is considered as distinct proximal determinants of behavioral intention. In this study, the authors intended to examine the degree to which

teachers are capable and have the skills necessary to use IS-related innovation in their job.

2.2 Perceived Desirability (PD)

PD, adopted from the EPM Model (Krueger, & Brazeal, 1994) is defined as the degree of attraction an individual perceives towards a specific behavior though intentions are driven by perception. This construct combined the attitude and objective norm and can measure the effect of it in one construct (Krueger et al., 2000). Prior studies using the EEM Model confirmed that PD is the strongest determinant of (Liñán & Santos, 2007; Shook & Bratianu, 2010; Zampetakis, 2008; Nasurdin et al., 2009). Thus, a higher level of PD will lead to higher levels of intention to take action (Devonish et al., 2010; Krueger, 1993). According to Fitzsimmons and Douglas (2011), PD is a strong determinant of user intention to use of IS innovation. As PD showed a significant positive influence on BI to use IS innovation, a higher level of PD leads to a higher level of intention to use IS innovation.

2.3 Effort Expectancy (EE)

EE is defined as "the degree of ease associated with the use of the system"(Venkatesh et al., 2003). In another study Sun et al., (2013) suggested that EE has a strong influence on the users' intention to use IS adoption and acceptance. For example, EE has been identified as an important factor directly influencing users' intention to use IS-related service in educational institutions (Boontarig et al., 2012). It is an important predictor of technology acceptance behavior that would affect its acceptance and usage of IS-innovation (Damanpour & Schneider, 2006). Thus, the authors of this study postulated that the teacher would use IS-related innovation if the new technology is easy to use.

2.4 Performance Expectancy (PE)

Venkatesh et al. (2003) defined PE as "the degree to which an individual believes that using the system will help him or her to gain job performance". Additionally, Venkatesh et al. (2008) postulated that PE is the strongest determinant of a user's BI to adopt the technology. Pai and Huang (2011) indicated that PE affects BI to use IS. Furthermore, Venkatesh et al., (2012) revealed that PE is related to expected outcomes in using IT, and thus, PE has a strong influence on user intention to use a new system and remains significant (Jackson et al., 2013; Venkatesh et al., 2007). Thus, empirically demonstrated that the greater the PE, the more likely IS-related services would be adopted (Sun et al., 2013).

2.5 Facilitating Conditions (FC)

FC is defined as the degree to which individuals believe that appropriate organizational and technical infrastructure should be in existence to support the use of the system (Venkatesh et al., 2003). In IS adoption context, IS researchers suggest that users who believe that there is organizational and environmental support to use new IS are more likely to use the system (Yeow & Loo, 2011; Kijsanayotin et al., 2009; Venkatesh & Zhang, 2010; Alawadhi & Morris, 2008). Further, a higher level of organizational support promotes more favorable beliefs regarding IS innovation use (Rho et al., 2015; Steele et al., 2009). Similarly, Kijsanayotin et al. (2009) reported that an increase in FC influences increased BI to use IS services. Yi et al., (2017) found that FC is a direct determinant of BI and the use of technology. Bhattacherjee and Hikmet (2008) confirmed the critical role of infrastructure support on IS systems usage. A study by Boontarig et al. (2012) suggested that FC positively influences the BI and UB of using IS-related innovation services. In UTAUT2, FC was hypothesized to influence both BI and UB directly (Venkatesh et al., 2012).

2.6 Propensity to Use (PU)

Shapero (1985) defined PU as the individual's disposition to act on individual decisions which reflects volitional aspects of intentions. The PU was conceptualized as a stable personality trait and is closely related to the locus of control (Krueger et al., 2000; Bateman & Crant, 1993). According to Krueger (1993), without a significant PU, it is hard to arrive at well-formed intentions. On the other hand, users' proactive tendency denotes a higher level of desirability, and feasibility to use IS innovations in their job (Schindehutte et al., 2000). A higher level of PU would increase the BI to use IT innovation (Shapero, 1985). Moreover, in this study, the PU moderates the relationship between PF, PD, and EE with intention and usage behavior and bridge the gap between intention and behavior.

2.7 Participating Events (PaE)

PaE is defined as a certain exogenous variable that facilitates the realization of intention into behavior (Shapero, 1985; Krueger, 1993). PaE is an important factor in the EPM that captures the effect of external factors on intention to take action and is considered as a moderator of the link between intention and behavior (Krueger et al., 2000; Krueger, & Brazeal, 1994; Schindehutte et al., 2000). According to Shapero (1985) that PaE may be the emergence of something that the individual perceives as a facilitating action or the removal of a perceived barrier. Krueger et al. (2000) argued that exogenous factors impact attitudes, and may moderate the relationship between intention and behavior. Extending the above finding to this study, PaE is hypothesized to moderate the relationship between BI and UB.

2.8 Intention to Use Behavior (UB) of IS Innovation Services

Krueger et al. (2000) posited that intention is defined as a person's willingness to pursue a given behavior and represent an individual's commitment toward a target behavior. BI is conceptualized as the degree to which an individual has formulated conscious plans to use the IS innovation to improve their services (Krueger, & Brazeal, 1994; Stopford & Baden- Fuller, 1994). The relationship between BI and UB is well documented in many research fields and that indicates BI is a valid predictor of actual UB (Venkatesh & Davis, 2000; Sheppard et al., 1988). A study by Kijsanayotin et al. (2009) found that BI is a predictor of actual UB of IS services. According to Krueger (1993), intention is the best predictor of human behavior. Venkatesh et al. (2003) empirically tested that BI explains the user's actual UB of technology. Consistent with the UTAUT model and other underlying intention models, this study hypothesized that usage intention is an important factor to predict UB.

3. Methodology

3.1 Sample Size and Data Collection Strategy

The population of this study comprises the teacher of the educational institutions specifically from colleges and university teachers. The survey questionnaires were distributed among the Bangladeshi teacher. The aim is to obtain their views and comments about the acceptance and use of IS-innovation services. We distributed the printed version of the questionnaire among teachers' who is currently working in the educational institutions. Respondents had the opportunity to complete the questionnaire without assistance. Participants were selected randomly, while dispersed equally across all regions of the division, both rural and urban environment. In total, 380 surveys were administered to selected informants and convenient sampling is also used to collect data in this study.

3.2 Questionnaire Design

The questionnaire was constructed based on UTAUT (Venkatesh et al., 2003) and EEM (Krueger, & Brazeal, 1994) studies to determine the actual use and intention to use IS-innovation services. We used a Likert scale with five levels of the possible answer concerning the UTAUT and EEM model. The questionnaire was written carefully using clear and simple language to encourage participant to express their views freely and emphasized the privacy and confidentiality measures that were put in place. The questionnaire consists of two parts. Part one collected demographic and additional informational about respondents. Part two contained UTAUT and EEM model statements which describe participant's perception about IS-innovation service in their job.

3.3 Measurement Instruments

This study employed previously validated scales and revised them to the context of IS innovation service (See Table-1). In this study, some of items are modified to better fit the current research context. To ensure the validity of all measures, the measurement items for latent constructs within the proposed model were developed from prior studies. Measurement items for PE, EE, FC, BI, and UB were adopted from the technology acceptance literature (Venkatesh et al., 2012; Venkatesh et al., 2008; Venkatesh et al., 2003). Four other constructs; PD, PF, PaE, and PU are adopted from the EMP model (Krueger, & Brazeal, 1994) literature (Krueger, 1993; Krueger et al., 2000; Schindehutte et al., 2000). The detailed items of each construct and their sources are listed in Table 1.

3.4 Data Analysis Techniques

The Statistical Package for the Social Sciences (SPSS) software and its supplement AMOS (version-23) were found to be the appropriate and the most suitable tools for analyzing the data analysis. Moreover, this study is applying the Structural Equation Modeling (SEM) techniques to evaluate the relationship and to test the hypothesis among the variables in the model. The current study used one exploratory procedure, namely Confirmatory Factor Analysis (CFA) to identify the underlying data structure for each construct. CFA has been used to assess the multidimensionality and factorial validity of the construct of the research model (Byrne, 2010). Thus, SEM is helpful as a confirmatory technique, with strong mathematical and statistical grounds (MacCallum & Austin, 2000). SPSS 23.0 and AMOS-23.0 was applied for analyzing the descriptive statistics, parameter estimation and evaluation in causal relationships, and hypotheses testing of structural equation model.

4. Results and Discussions

4.1. Demographic Characteristics of Sample

The following Table 2 provides a general overview of the teacher demographic information, such as age, gender, educational level, computer knowledge, and internet knowledge and use experience.

The demographic characteristics of respondents presented in Table 2 show those percentages who participated in the study. As shown in the table, 70% were male and 30% were female. Also, the age distribution shows about half of the respondents 44.8% were aged 41 to 50 and the second group was aged '31 to 40' of 34.4%. The percentage of the '51 to 60' year's old age group was 20.8% and the percentage of those who were older than 50 years. In terms of access, 100% of respondents owned a mobile phone or laptop or desktop computer in their life. Respondents were asked to specify their education level. As shown in the table, above 47.6% have a Bachelor and degree level education, while 47.6% have a master's degree, very few have attained what is termed higher education including doctoral degree; with 69.2% of them having more than 1-6 years of mobile phone usage experience. As the table reveals, one-third of the respondents 37.6% were from the moderate group, 34.4% of the participants were poor in computer knowledge while a small percentage of about 25% did not have very good computer skills or experiences. As normal in a random sample, only 8% reported they had very good knowledge and information about the internet. This finding indicates that there is a high usage of internet and web applications amongst the sample. Over more than 54% of the sample have a good moderate level of internet knowledge and experience. Consequently, this result has a significant effect on the user's intention to adoption decision and use of IS-innovation in educational institutions.

4.2 Investigating Univariate-Normality

According to Field (2009), the statistical techniques of testing normality are sensitive to the size of research data, as a result, it is recommended to check the histogram with the values of skewness and kurtosis to evaluate univariate normality. In this study, visual assessment of the histogram of the data distribution of all constructs demonstrated that the shapes of all univariate distributions were reasonably usual and acceptable. Additionally, the findings in Table 3 indicate that all values of the variables were within the accepted range of skewness and kurtosis.

4.3 Measurement Scale Analysis

This section presents the results of the analysis of scale reliability through the assessment of internal consistency. And the next section details the procedures and presents the result of the Confirmatory Factor Analysis (CFA), which is employed to confirm and refines the identified structure of model construct to ensure its validity and unidimensionality.

4.3.1 Reliability

Reliability is concerned with the consistency and stability of the measurement. To prove that the reliability coefficient was run on SPSS for each set of constructs

Table 1. Sources of Items

Construct	Code	Corresponding Items	Source
Perceived Feasibility (PF)	PF-1	I would feel comfortable using IS innovation in my job.	(Krueger, Jr. & Brazeal, 1994; Krueger et al., 2000)
	PF-2	I have the skills and capabilities required to use IS innovation.	
	PF-3	I am confident I can put in the effort needed to use new IS innovation in my job.	
	PF-4	It would be very feasible for me to use IS innovation in my job.	
Perceived Desirability (PD)	PD-1	Using IS innovation in my business is much more desirable for me.	(Krueger, & Brazeal, 1994; Krueger et al., 2000)
	PD-2	Using IS innovation would increase the quality of work in my job	
	PD-3	Using IS innovation in my business is an attractive idea.	
	PD-4	The success of my business lies in the use of IS innovation.	
Effort Expectancy (EE)	EE-1	My interaction with IS-innovation would be clear and understandable.	(Venkatesh et al., 2012; Venkatesh et al., 2003)
	EE-2	I would find IT-related innovation easy to use.	
	EE-3	I find that using IS-innovation would be simple	
	EE-4	I find that using IS-innovation would be easy to learn	
Performance Expectancy (PE)	PE-1	I find the IS innovation to be useful in my job.	(Venkatesh et al., 2012; Venkatesh et al., 2003)
	PE-2	Using IS innovations enable me to accomplish tasks more quickly.	
	PE-3	Using IS innovation increase my productivity.	
	PE-4	Using IS innovation gives me competitiveness power in my job.	
Facilitating Conditions (FC)	FC-1	I have the resource necessary to use the IS innovation in my job.	(Venkatesh et al., 2012 ; Venkatesh et al., 2003)
	FC-2	I know the necessity to use the IS innovation.	
	FC-3	Innovation is not compatible with other IS systems I use.	
	FC-4	There are special allocations (i.e. loan, intensive) for using IS innovation for entrepreneurs, from Government.	
Propensity to Use (PU)	PU-1	I will learn to operate IS innovation in my job.	(Krueger, & Brazeal, 1994; Krueger et al., 2000)
	PU-2	I will use IS innovation to achieve more opportunity in my job.	
	PU-3	I will use IS innovation because I cherish the feeling of useful service.	
	PU-4	I will use IS innovations that enable me to run my business successfully.	
Participating Events (PaE)	PaE-1	If you experience any changes in your work situation, how much have these changes influenced your decision in using IS- innovation?	(Krueger, & Brazeal, 1994; Krueger et al., 2000)
	PaE-2	If you experience any change in your work environment, how much have these changes influenced your decision in using IS- innovation?	
	PaE-3	If you decided to change your work situation due to recent opportunity or lack of opportunity, how much have these assessments influenced your decision in using IS- innovation?	
	PaE-4	If you experience any technical change in your work environment, how much have these changes influenced your decision in using IS-innovation?	
Behavioral Intention (BI)	BI-1	I predict I would use IS innovation, if it is available in the future.	(Venkatesh et al., 2003)
	BI-2	My philosophy is to do whatever it takes using IS innovation in the future.	
	BI-3	I plan to use the current IS innovation in my work in the next year.	
	BI-4	I intend to use similar IS innovation technology in the future.	
Use Behavior (UB)	UB-1	IS-innovation service is a pleasant experience.	(Venkatesh et al., 2008)
	UB-2	I use IS-innovation service currently.	
	UB-3	I spend a lot of time on IS-innovation service	

and the results are presented in Table 4, which shows the Cronbach's alpha (α) value for each variable. The result of this analysis shows that all of the constructs got high reliability and more than 0.70. Cronbach's value result varied between 0.833 and 0.977. Overall, the result shows that all alpha values of the study instruments are reliable and exhibit appropriate construct reliability.

4.4 Assessment of Construct Validity and Unidimentionality

In this study, the validity and unidimensionality of the scales were assessed by using Confirmatory Factor Analysis (CFA) and examination of the correlation coefficients for all of the instrument's scales. Also, convergent and discriminant validity of the measurement scales was assessed using CFA.

Table 2: Demographic Information's of the respondents

Variables	Description	Frequency	Percentage	Cumulative Percent
Gender	Male	175	70.0	70.0
	Female	75	30.0	100.0
Age	21-30	20	08.0	-
	31-40	66	26.4	34.4
	41-50	112	44.8	79.2
	51-60	52	20.8	100.0
Education	HSC	11	4.40	4.4
	Bachelor	119	47.6	52.0
	Masters	119	47.6	99.6
	Higher Education	1	0.40	100.0
Own Mobile Phone/Computer	Yes	250	100.0	100.0
	No	-	-	-
M/C Use experience	1-3	79	31.6	31.6
	4-6	94	37.6	69.2
	7-9	77	30.8	100.0
Computer knowledge	Poor	86	34.4	34.4
	Moderate	94	37.6	72.0
	Good	45	18.0	90.0
	Very Good	25	10.0	100.0
Internet knowledge	Poor	93	37.2	37.2
	Moderate	99	39.6	76.8
	Good	38	15.2	92.0
	Very Good	20	8.00	100.0

Table 3: Skewness and Kurtosis Statistics for the study variables

Variables	Skewness	Kurtosis
Perceived Feasibility (PF)	-1.569	2.415
Perceived Desirability (PD)	-1.233	2.993
Effort Expectancy (EE)	-.9600	0.942
Performance Expectancy (PE)	-.4870	0.168
Facilitating Conditions (FC)	-.5650	0.830
Propensity to Use (PU)	-.7000	1.082
Participating Events (PaE)	-.1620	0.090
Behavioral Intention (BI)	-1.333	1.746
Use Behavior (UB)	-.5060	0.193

Table 4: Cronbach's Alpha Reliability Results

Variables	No. of Items	Cronbach's Alpha	Comments
Perceived Feasibility (PF)	4	0.881	High Reliability
Perceived Desirability (PD)	4	0.833	High Reliability
Effort Expectancy (EE)	4	0.847	High Reliability
Performance Expectancy (PE)	4	0.977	Excellent Reliability
Facilitating Conditions (FC)	4	0.918	Excellent Reliability
Propensity to Use (PU)	4	0.857	High Reliability
Participating Events (PaU)	4	0.925	Excellent Reliability
Behavioral Intention (BI)	3	0.862	High Reliability
Use Behavior (UB)	3	0.967	Excellent Reliability

4.4.1 Convergent Validity

Convergent validity relies on the average variance extracted (AVE) as a base. The loadings, AVE, and composite reliability are presented in Table -5. It can be seen from Table 5 that the calculated AVE values ranged from 0.549 to 0.842 and CR values ranged from 0.650 to 0.892, which supports strong internal reliability. Table 5 also shows that the estimated constructs loading ranged from 0.590 to 0.947 that is greater than the recommended levels. Therefore, the conditions for convergent validity are satisfied in this study.

4.4.2 Discriminant Validity

In this study, discriminant validity was assessed by comparing the absolute value of the correlations between the constructs and the square root of the average variance extracted by a construct. As shown in Table 6, all squares roots of the AVEs (diagonal cells) are higher than the correlations between constructs and that confirms adequately discriminant validity.

4.5 Structural Model Assessment Results

The findings in the Table 7 reveal that the PF construct in the technology adoption decision and use of IS-innovation positively predicted the BI constructs ($p<0.001$). Second, PD positively predicted the BI construct ($p<0.001$). Third, EE significantly predicted BI ($p<0.001$). Forth, PE does not affect BI construct ($p>0.001$). Fifth, FC positively predicted BI construct ($p<0.001$). Sixth, PU positively predicted the PF, PD, EE to the teacher's BI to use of IS-innovation (UB) in their institutions'; ($p<0.001$). PaE does not affect BI construct ($p<0.001$). Finally, BI will have a significant effect on the teacher's actual use ($p<0.001$) of IS- innovations in their predefined jobs over time. The study tested the relationship between dependent and independent variables by path coefficient (β) and t-statistics.

Table 5: Convergent Validity for the Constructs

Variables	Items	Loading	AVE	CR
Perceived Feasibility (PF)	PF-1	.832	0.567	0.765
	PF-2	.824		
	PF-3	.740		
	PF-4	.590		
Perceived Desirability (PD)	PD-1	.747	0.549	0.756
	PD-2	.779		
	PD-3	.801		
	PD-4	.623		
Effort Expectancy (EE)	EE-1	.936	0.842	0.892
	EE-2	.894		
	EE-3	.894		
	EE-4	.947		
Performance Expectancy (PE)	PE-1	.926	0.842	0.892
	PE-2	.923		
	PE-3	.885		
	PE-4	.936		
Facilitating Conditions (FC)	FC-1	.816	0.711	0.840
	FC-2	.879		
	FC-3	.842		
	FC-4	.836		
Propensity to Use (PU)	PU-1	.822	0.570	0.768
	PU-2	.702		
	PU-3	.657		
	PU-4	.825		
Participating Events (PaE)	PaE-1	.893	0.784	0.871
	PaE-2	.889		
	PaE-3	.909		
	PaE-4	.850		
Behavioral Intention (BI)	BI-1	.832	0.640	0.650
	BI-2	.824		
	BI-3	.740		
Use Behavior (UB)	UB-1	.926	0.830	0.749
	UB-2	.923		
	UB-3	.885		

5. Discussions

The main constructs of the research model depicted that PD, PF, EE, PE, FC, PaE, PU, and BI and UB contribute significantly to teachers' adoption and use of IS-innovation services. Moreover, the investigation of the moderating effect in the model showed that PaE and PU had a moderating influence on all the PD, PF, and EE constructs which affect the BI to use of IS innovation services.The findings suggest that PD is the strongest predictor toward intention to use IS innovations. Thus, teachers' PE had a significant positive effect on their BI to use of IS innovation, and their BI to use of IS had a significant and direct relationship with UB of IS innovation services. Consequently, this finding is consistent with the results of other studies which also confirmed that EE has a strong effect on BI of IS-innovation services in their job (Fathema et al., 2015; Jackson et al., 2013). It can be argued that if the teachers were provided with proper facilities, they would use IS-innovation services in their professional activities. This finding is consistent with the basic idea of the UTAUT model, which suggested that PE would have a significant relationship with BI. The position is consistent with Al Mulhim (2014) and Albugami et al., (2015) who suggested that perceived improvement in performance, could motivate teachers to use ICT facilities more frequently. Therefore, it can be concluded that, the stronger the performance expectancy of the teacher, the greater their intention to use ICT.The SEM model found that EE had a moderately strong positive relationship with BI to use IS-innovation in Bangladeshi educational institutions ($p<0.05$).The results indicated that if ICT proved easy to use, the teachers would be more likely to adopt the technology. However, Alenezi (2017), Al Mulhim (2014), and Alhawiti (2013) have previously pointed out that lack of access to technology, lack of training and lack of time made the use of IS-innovation much more difficult, which concurs with the findings captured in this study. The teachers' model found that FC had a weak negative and insignificant ($p>0.05$) relationship with the BI of the teachers. This result indicated that facilities existing in the educational institutions did not influence the intention to use IS-innovation services. Several previous studies have mixed views regarding this, Timothy Teo (2011), Teo et al., (2008), and Panda and Mishra (2007) indicated that FC might have influence on the adoption of new technologies, while Pynoo et al. (2011) showed that FC had no impact on intention to use ICT by teachers, rather it affected the actual use. As found in the qualitative interviews, the facilitating conditions for the educational institutions in this study were poor. On the whole, teachers in Bangladesh do not have appropriate or reliable technical facilities to use in their daily activities. Some of these statements explain that the FC might be responsible for lower actual use of IS-innovation by the teachers, while not influencing the intention to use ICT under the right circumstances. Thus, in general, it can be argued that poor FC does not influence intention to use, but that they are responsible for lower actual use of IS-innovation. The teachers currently face several structural issues that reduce their actual use of IS-innovation in spite of their intentions (Al Mulhim, 2014; Alhawiti, 2013). Our study demonstrated, however, that they are very positive about using IS. The model showed a moderate positive relationship between BI and UB ($p<0.05$) of ICT by the teachers. However, as noted previously, teachers' BI to use ICT did not sufficiently explain their actual use (R-square value for the actual use is only 0.102), with only 10.2% of the actual use of IS-innovation in classes. This is very low, indicating that they are not using ICT in class despite their intention to use. As a whole, the model predicted the BI of the teachers with greater accuracy than actual use (R-square value for the BI is 0.561), indicating that the factors that influenced the desire to use ICT (56.1% of BI) were different from those that resulted in its actual use. The interviews complemented these results by adding the insight that most of the teachers were positive about the use of ICT, but that they were not doing it currentlydue to the absence of facilities and support (Albugami et al., 2015).This explains why their actual use was lower, despite their intentions. Drawing upon prior research from the technological context, and the results provide support for the capability of the UTAUT and EEM model to measure the individual perception towards

Table 6: Discriminant Validity Results for the Measurement Model

	PF	PD	EE	PE	FC	PU	EP	BI	UB
PF	**0.753**								
PD	.548**	**0.741**							
EE	.672**	.543**	**0.918**						
PE	.531**	.387**	.528**	**0.918**					
FC	.385**	.330**	.299**	.286**	**0.843**				
PU	.462**	.370**	.412**	.367**	.517**	**0.755**			
EP	.253**	.288**	.223**	.103**	.244**	.232**	**0.885**		
BI	.543**	.502**	.650**	.505**	.373**	.464**	.116	**0.800**	
UB	.531**	.407**	.543**	.226**	.293**	.375**	.103	.505**	**0.911**

Table 7: Structural Model Results

Path of Variables	Beta	t-value	Sig. level
Perceived Feasibility (PF) → Behavioral Intension (BI)	0.158	2.28	0.0277
Perceived Desirability (PD) → Behavioral Intension (BI)	0.166	1.67	0.0511
Effort Expectancy (EE) → Behavioral Intension (BI)	0.429	5.21	0.000*
Performance Expectancy (PE)→ Behavioral Intension (BI)	0.018	0.65	0.2600
Facilitating Conditions (FC) → Behavioral Intension (BI) and Use Behavior (UB)	0.310	4.33	0.000*
Facilitating Conditions (FC) → Use Behavior (UB)	0.430	5.87	0.000*
Propensity to Use (PU) → Perceived Feasibility (PF) and Behavioral Intension (BI)	0.301	3.44	0.000*
Propensity to Use (PU) → Perceived Desirability (PD) and Behavioral Intension (BI)	0.429	1.98	0.0271*
Propensity to Use (PU) → Effort Expectancy (EE) and Behavioral Intension (BI)	0.366	7.55	0.000*
Participating Event (PaE) → Behavioral Intension (BI) and Use Behavior (UB)	0.059	0.80	0.2121
Behavioral Intension (BI)→ Use Behavior (UB)	0.322	2.87	0.003*

technology adoption decision and use. Applying this model in technology adoption decision and use will shed additional light on this area, and reveal new knowledge perspectives. In other words, if the advantages and benefits of the IS-innovation services were demonstrated and promoted to the teacher in an interactive manner, the technology adoption and use of IS innovation service would most likely increase.

6. Conclusions

The technology adaption decision and use model was empirically tested. The results showed that the data fit the model very well and provided strong empirical support for the new model. Furthermore, we revealed evidence of the influence of PD, PF, EE, PE, FC, PaE and PU on the teachers' intention to use IS-innovation. Based on the structural model, all of the hypotheses were accepted, and revealing a significant directs relationship between intention and the use behavior of IS-innovation services in educational institutions. Similar to the technological context, researchers have suggested that the integrated model offer a significant opportunity toward a better understanding of predicting teacher's technology adoption decision and use IS-innovation. Therefore, UTAUT and EEM is a conclusive model, which provides a useful theoretical basis to identify technology acceptance factors that apply to IS-innovation services. The researchers can use this model to measure individual perception towards technology adoption. Like any research project, there were two limitations in this study; first, the fact that this study was single cross-sectional study and second, the limited number of focus groups. There are some other limitations in the study due to specific geographic context chosen for administering the survey. Future research will be necessary to validate the findings of this study by applying the integrating model in different contexts or cultures. It will provide the opportunity to test the robustness of the model across cultural boundaries. Future research should consider the effect of moderating variables such as age and gender on the determinants of intention.

This study has several important theoretical contributions. The main theoretical contribution is in improving the UTAUT and EEM model for the technology adoption decision and use context. Based on the available and updated literature review on IS-innovation, this is the first study to utilize and apply TADU model in the context of the education sector to determine the factors that influence a teacher intends to use IS-innovation services. Most importantly, TADU can capture the effect of external factors in the relationship between behavioral intentions and user behavior, which are relatively important in the context of technology acceptance and use. Second, this study attempts to mitigate the limitations arising from the relationship between behavioral intention and use behavior from the UTAUT and EEM model. The study relies on a modified UTAUT and EEM model as a basic theoretical model which was amended by adding moderator in the original model. Our empirical findings provide a practical guideline to the successful adoption of IS-innovation services in developing countries. From the methodological perspective, this study offers

important insights into analyzing technology adoption decision and use behavior. The results provided strong empirical support and showed that the model is a robust model that is capable of measuring teachers' intention to use IS-innovation services. The result of this study produced a practical guideline and strategic document based on the findings of this research which would help the higher authority. This study provides new information to policymakers that may be useful in understanding teacher's use behavior of IS innovation services. This study extends the implications of the intentions model to the context of education sectors. Education planners may able to utilize this model to interpret the factors influencing teacher's intention to use IS-innovation services in their jobs.

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