

Factors Affecting Bhutanese Teachers' Attitude Towards Acceptance of Technology in Teaching

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Abstract

Information and Communication Technology (ICT) is one of the tools available to enhance teaching and learning in schools. But in many developing countries, ICT is just being introduced and its integration is limited to schools.

This study is an endeavor to examine the factors that affect attitude of Bhutanese teachers towards adopting ICT in teaching. Four factors - Perceived Ease of Use (PEOU), Perceived Usefulness (PU), Facilitating Conditions (FC) and Social Influence (SI) - have been used for regression analysis to find out their significance. The result of regression analysis of the data collected from 466 Bhutanese teachers revealed that all the factors significantly affected their attitude. However, Perceived Usefulness (PU) and Perceived Ease of Use (PEOU) have been seen to have greater significance than Facilitating Condition (FC) and Social Influence (SI).

Introduction

The most essential tool required in the 21st century school is technology supported by a policy framework to point towards the right direction. In Bhutan, however, as pointed out by Tobgay and Wangmo (Tobgay and Wangmo, 2008), the goal to equip school, with technology seems bleak when looking at the Ministry of Education's aim of achieving computer-student ratio of 1:20 in lower secondary and primary schools by 2020, 5 years from now.

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A study by Tenzin and Bhattarakosol (2013) showed encouraging result regarding Bhutanese teachers' view towards technology. It has shown that although the Bhutanese educators are ready and willing to welcome the introduction of technology in the teaching/learning process, the actual ICT integration was lacking. Therefore, there was a need to study the factors that affected the attitude of teachers towards technology adoption in teaching.

Literature review

Many researchers have shown that technology can enhance learning outcomes in students. Technology can motivate students and offer access to information beyond the confines of the class room. The advantage of technology in education has been firmly established by many studies.

The effort to infuse technology in teaching is by no means recent. Effort has been put by different countries with varying degrees of success. In case of Bhutan, analogue telecommunication network was launched in 1963 and computers during the early 1980s. However, television and internet were introduced much later in the year 1999 (Tobgay and Wangmo, 2008). Therefore, the history of technology in education is a fairly recent phenomenon in Bhutan. Not much has been achieved although effort has been made to integrate technology in classroom teaching. There is a dire need for literatures to kick-start the effort to implement technology in classroom teaching. Currently in Bhutan, computers in schools are mainly used for teaching IT to students taking the subject. Other students rarely visit computer lab because, besides the IT teachers, other subject teachers hardly use computers for teaching. Amenyedzi, Lartey et al. (2011) reported that teachers use technology mostly for daily routine works. Gyeltshen (2013) also reported that teachers in Bhutan use computers mainly for preparing question papers.

Ertmer (n.d.) argued that the decision to implement technology in classroom teaching rests on the teacher and urged the need to examine the beliefs the teachers have regarding technology. It is, therefore, important to study attitudes of teachers towards

use of technology in teaching. Attitude toward ICT adoption in classroom teaching has been identified by several studies as the major factor that leads to integration of ICT in the classroom teaching. Factors that affect attitude towards technology use was studied by Davis (1998). They proposed Technology Acceptance Model (TAM) which suggested that a person's behaviour intention to use technology is affected by Perceived Ease of Use (PEOU) and Perceived Usefulness (PU).

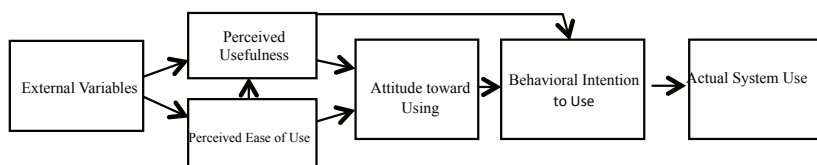


Figure 1. Technology Acceptance Model (Davis 1989)

The model for our study is adapted from TAM with two additional factors besides PEOU and PU. The two additional factors are Facilitating Condition (FC) and Social Influence (SI). These four factors are further explained below.

Perceived Ease of Use (PEOU): Perceived ease of use is defined as the degree to which a person believes that using a particular system would be free of effort (Davis, 1998). It directly influences teacher's behavior intention to use the technology. Teachers would not risk making mistakes in their teaching by using technology that is difficult to use. They will not risk exposing their weakness to be taunted by the students. Hence teachers will make use of those systems that are easy to perfect, over which they can have total control and confidence.

Perceived Usefulness (PU): Perceived usefulness is defined as the degree to which a person believes that using a particular system would enhance his or her job performance (Davis, 1998). If a teacher believes that technology use will benefit him or her, they would be willing to make use of it. Faud and Sharifah (2013) pointed out perceived usefulness as a direct determinant of technology use.

Social Influence (SI): Social influence refers to the influence on one's emotions, opinions, or behaviour by others action or behaviours especially by somebody who is important in one's life. In schools, principals can have significant effect upon the behavior of teachers. A teacher sharing success story of the technology integration can raise curiosity of their fellow colleagues. A group of teachers supporting each other by sharing resources, pedagogical practices and helping each other will have greater chance of successful integration than a teacher who is not extended any support for his/her effort.

Facilitating Conditions (FC): Resources refers to hardware, software and even technical assistant. Most schools in Bhutan have a single computer lab with an average of 15 computers in higher secondary schools, 13 computers in middle secondary schools, 9 to 3 computers in lower secondary and primary schools (Ministry of Education, 2012). With a huge number of students in schools, it will be difficult to provide computer access to every class. Many researchers in the field felt that every class should be equipped with a system and a projector to be able to utilize technology while teaching - a distant dream for the Bhutanese education system. Availability of hardware should be supported by suitable software to be of any benefit. Technical Assistant is yet another important element necessary to aid and support the teaching faculty in their effort to integrate technology. The success rate to integrate technology into teaching would drop significantly if any of the aforementioned factors is not present in the school. A study by Kinley, et al. (2013) indicated that lecturers in Samtse College of Education, a teacher training college in Bhutan, pointed out internet as an important resource to encourage them to engage in adopting technology.

Teacher's Attitude Towards ICT (ATT): Attitude is defined as teacher's perception of technology in teaching. It is also defined as the positive or negative feeling of an individual and the effect the feeling have on their behaviour. Attitude is one of the main factors that can directly influence the behavior intention to use the technology. Several studies conducted in institutions that

were well equipped with technology (hardware and software) has revealed attitude towards technology to be an important factor influencing adoption of technology in teaching.

Method

A paper-based survey consisting of 34 items were constructed to conduct the survey. The survey questionnaire was split into two major sections. The first section contained question that inquired demographic details of research participants such as their age, teaching experience, gender etc. The next section containing 28 items were Likert Scale questions. The scales ranged from 1 to 5 (5: strongly agree, 4: agree, 3: neutral, 2: disagree, 1: strongly disagree). These questions inquired the views of teachers on the factors considered for the study. The questions were adapted from two papers – Hsu et al (2007) and Teo (2011).

Teachers teaching pre-primary schools to higher secondary school were asked to fill the questionnaire based on their willingness to participate in the study. The survey was conducted for over a month in March 2013. 466 teachers' responses from around the country were finally considered for analysis. The items from the second section of the questionnaire are shown below.

1. Technology-based instruction can improve learning achievement.
2. Technology-based instruction is one of the future trends in education.
3. Technology-based instruction can make my teaching more lively and energetic.
4. Technology-based teaching can increase students' motivation.
5. School policy on implementing technology-based instruction is most suitable.
6. Using technology will create good relationship between teacher and students.
7. Technology helps me create an innovative teaching

- technique.
8. I have designed activities that allow students to learn through the Internet.
 9. I have used pictures, audios, videos, animations and educational software to promote learning.
 10. I have used document management software, such as Word and PowerPoint, in classrooms.
 11. I have used email or Face book to interact with my students
 12. In my school my colleague use technology in their teaching
 13. In my school, teachers often discuss computer-related topics and exchange ideas about computer hardware and software.
 14. In my school, administrators provide hardware for supporting technology-based instruction.
 15. In my school, administrators provide software for supporting technology-based instruction.
 16. When I encounter difficulties in using technology, a specific person is available to provide timely assistance.
 17. In my school there is enough financial support to create and use technology in learning.
 18. I will not feel anxious when I take any computer-related courses.
 19. Learning software will NOT make me feel nervous and uncomfortable.
 20. I feel technology will replace teachers in the future
 21. While using technology I feel that student will lose their attention to the subject content and me.
 22. Once I start using technology, I find it hard to stop.
 23. I look forward to those aspects of my job that require the use of technology.
 24. I like working with technology.
 25. Learning to use technology is easy for me.
 26. My interaction with technology does not require much effort.
 27. I plan to use technology in the future.

28. I have no intention to use technology in my class.

Data analyzing method

Reliability analysis with accepted Cronbach’s alpha value set at 0.7 to test the reliability of the questions was carried out followed by factor analysis to group the questions under different factors. Finally, regression analysis was performed on the four loaded factors after factor analysis to validate the hypothesis drawn for the study. Regression analysis shows the effect of independent variables on the dependent ones, hence regression analysis was employed to try to discover factors that positively affect attitude of teachers towards acceptance of technology by Bhutanese teacher in their classroom teaching. Technology Acceptance Model, postulated by Davis was the base for the model adopted for the research. Two additional factors, Social Influence (SI) and Facilitating Conditions (FC) were considered taking into account the context of Bhutanese society besides the other two factors, Perceived Usefulness (PU) and Perceived Ease of Use (PEOU) proposed in TAM model. The extended TAM model proposed for the study is shown in the Figure 2.

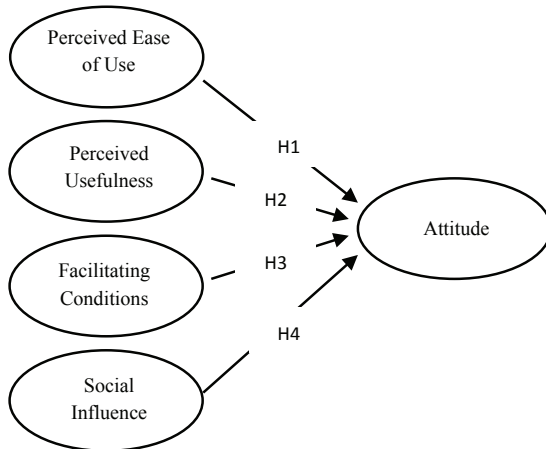


Figure 2. Research Model

The proposed model therefore has four independent factors viz. Perceived Ease of Use (PEOU), Perceived Usefulness (PU), Facilitating Condition (FC) and Social Influence (SI). Attitude (ATT) of teachers towards ICT adoption in teaching is the lone dependent factor.

The following four hypotheses were drawn:

H1: Perceived Ease of Use has a significant effect on attitude towards adopting ICT in teaching.

H2: Perceived Usefulness has a significant effect on attitude towards adopting ICT in teaching.

H3: Facilitating conditions has a significant effect on attitude towards adopting ICT in teaching.

H4: Social Influence has a significant effect on attitude towards adopting ICT in teaching.

Analysis result

Reliability test

Reliability Test to test the internal consistency of the items generated the results shown in Table 1. No question/item was required to be eliminated since a value for all the constructs were greater than the accepted standard reliability coefficient value of 0.70.

Table 1. Result of the reliability test

Constructs	Items Code	Cronbach's alpha (α)
Perceived Usefulness (PU)	PU1 PU2 PU3 PU4 PU5 PU6 PU7	0.839
Social Influence (SI)	SI1 SI2	0.78
Facilitating Conditions (FC)	FC1 FC2 FC3 FC4	0.846
Perceived Ease of Use (PEOU)	PEOU1 PEOU2	0.845
Attitude (ATT)	ATT1 ATT2 ATT3 ATT4 ATT5	0.716

Factor analysis

For factor analysis, principle component analysis was used. Factor analysis generated groups of questions that were related to each other. These related questions were grouped under four different factors. Five items were loaded into perceived usefulness, four items were loaded into facilitating conditions, and two items each were loaded into social influence and perceived ease of use as shown in Table 2.

Table 2. Rotated Component Matrix^a

Item Code	Component			
	1	2	3	4
PU3	0.832			
PU4	0.816			
PU1	0.779			
PU2	0.721			
PU5	0.66			
FC2		0.85		
FC1		0.84		
FC4		0.816		
FC3		0.71		
PEOU2			0.914	
PEOU1			0.896	
SI1				0.837
SI2				0.814

Regression analysis

Regression analysis was applied to the factors loaded after the factor analysis. Regression analysis was used to identify factors that influence the attitude of teachers toward ICT adoption in teaching. Table 3 shows the result of the regression analysis.

Table 3. Result of the regression analysis

Model B	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	Std. Error	Beta			
(Constant)	-.001	.036		-.021	.983
1 PU	.353	.036	.353	9.702	.000
FC	.173	.036	.173	4.757	.000
PEOU	.458	.036	.458	12.581	.000
SI	.170	.036	.170	4.657	.000

The result of the regression analysis shows that all the factors significantly affect teachers’ attitude towards ICT adoption in teaching. Of these four factors, perceived ease of use ($\beta = 0.458, p < 0.001$) and perceived usefulness ($\beta = 0.353, p < 0.001$) are the most significant. These findings are consistent with findings in many studies (Faud and Sharifah, 2013; Teo, 2011; Davis, 1998), which found perceived ease of use and perceived usefulness to have positive significance on attitude and behaviour intention to use technology. Therefore, it can be concluded that Bhutanese teachers will use technology if they perceive that technology use can enhance their productivity and when they find technology easy to use. Facilitating condition ($\beta = 0.173, p < 0.001$) and Social Influence ($\beta = 0.170, p < 0.001$) are also significant factors influencing attitude of teachers for adopting ICT in teaching. Figure 3 shows the model displaying the result of the regression analysis.

Bhutan has remained in isolation until the 1960s. Though Bhutan is modernizing at a very rapid pace, the social dependence is very strong and effect of urbanization at the moment has not affected the traditional social structure and interdependence among Bhutanese people. In fact “community vitality” has been recognized as one of the nine domains of Gross National Happiness, the development philosophy of Bhutan (Dorji, 2013). Hence this justifies, why social influence

emerged to have positive significance on the attitude of teachers in adopting ICT in classroom teaching.

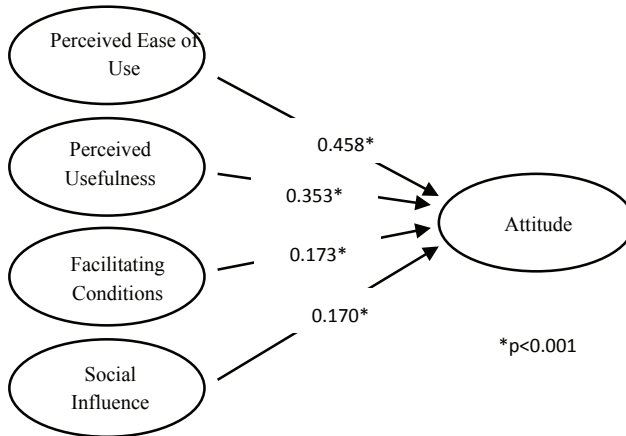


Figure 3. Result of regression analysis

Conclusion

Result of the regression supported perceived usefulness and perceived ease of use to have greater significance than facilitating condition and social influence on attitude of teachers towards ICT usage in teaching. This indicates that in order for teachers to develop positive attitude towards technology, teachers must be aware of the benefits of adopting technology in their teaching. Training of teachers to use technology seems to be necessary because if teachers perceives using technology to be difficult, it would affect their attitude towards technology.

In conclusion we can confidently say that the number of Bhutanese teachers adopting technology in their teaching will increase with time. ICT facilities in schools are being developed at a faster pace than it has ever happened before. More importantly, the younger, generations of teachers joining the teaching profession are confident technology users, thus eliminating the need for vigorous training that was deemed

highly necessary in the past.

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