Ilorin Journal of Education, Vol. 35, July 2016

FACTORS INFLUENCING FACULTY MEMBERS' UTILIZATION OF INTERACTIVE WHITE BOARD FOR TEACHING IN TERTIARY INSTITUTION

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Abstract

The study investigated factors influencing faculty members' utilization of Interactive Whiteboard (IWB) for teaching. The study employed survey method. The faculty members trained at a workshop for the use of IWB were used as the sample of the study. A survey instrument which was earlier validated and subjected to reliability check was administered to gather the data of the study. The Four hypotheses tested were generated from the proposed model of the study. The data of the study was subjected to statistical analysis using (mean, standard deviation and regression analysis). The finding of the study showed that computer self efficacy, school environment, behavioural intention and attitude positively influence usage behaviour with effect size of (β= .40; β=22; β=13; and β=13 respectively, and the independent variable collectively explained usage behavior with 64% variance. The finding also showed that computer self efficacy is the strongest factor, followed by school environment. Based on these findings, it was recommended that periodic training and retraining be given to faculty members and that adequate resources are provided to guarantee and sustain the usage of IWB.

Keywords: Computer Self-efficacy, Attitudinal disposition, Environment, Behavioural intention

Introduction

In the last two decades, higher education institutions all over the world had witness tremendous growth in the use of several instructional technologies resources for the attainment of educational goals. The desire to provide a better learning environment, well equipped classroom with latest technologies inform the decision of several government to invest substantially in providing information and communication technology (ICT) tools for teaching and learning function (Hsu, 2010).

As noted by Turel and Johnson (2012), the deployment of IWB for teaching has penetrated schools at all levels in most advanced nations of the world. A research report by Mclntype-Brown (2011) showed that schools in England has the highest penetration rate (73%), countries like Denmark has (50%) penetration rate, while USA (35%), and schools in Asia has (2%) penetration rate. Research evidence on African and in particular Nigeria is still at infancy.

Though, there is an increase in the influx of latest technologies especially interactive white board (IWB) into contemporary school system and faculty members are encouraged to key into its use and adopt it for the accomplishment of teaching task. Added to this, is the fact that the present generations of students are technological savvy; they always show enthusiasm when taught through latest technology. Whether the technology if made available will be readily accepted by faculty member for the accomplishment of teaching function is still cloaked with doubt in the cultural setting of this study. Nonetheless, Nigeria government as part of her efforts to provide recent technology to leverage teaching in higher institution of learning had embarked on procuring and training faculty members on effective use of IWB.

As laudable as the government intention, there is an important issue which is often taking for granted, and the issue has to do with acceptability of the tool by those trained to use them. Evidence abound that provision of information technology resources in school is not the only factor that guarantee acceptance and use by the teachers and instructors, it is therefore important to probe into understanding other salient factors that may encourage or discourage the faculty members acceptance of the new innovation in Nigerian higher educational system. This becomes imperative not only because of the huge financial implication in the provision of these resources, but the need to gauge how prepared the faculty members are at the integration of new innovation in their teaching compare to the acceptable global standard and the best practice. This study therefore aims at understanding factors that may influence faculty member adoption of IWB for teaching in Nigerian university.

Literature Review

An interactive whiteboard is a large touch sensitive display unit. It works with computer and a multimedia projector. Unlike previous technologies use in teaching and learning (Television, Tape Recorder/Player, Projectors) that are invented for communication but not for teaching, interactive white board (IWB) is specifically and solely meant for teaching and learning (Abuhmaid, 2014). The features of IWB includes drag and drop, hide and reveal, colour, shading and highlighting, matching items, movement or animation, immediate feedback, indefinite storage and quick retrieval of material (DeVita, Verschaffel & Elen, 2012). Interactive white board allows users to use their finger, special electronic pen, pointer to operate and control computer icons. Work done on the board (IWB) can be saved, revisited and revised. Handwriting of the teachers and the students could be stored and re-accessed when the need arise (Al-faki & Khamis 2014).

Interactive whiteboard has been found to promote learning in several ways, in term of student engagement, motivation and promotion enthusiasm for acquisition of knowledge among learners. Specifically, IWB can be use to facilitate learner participation in their learning process, because it enable them to interact with material on the board; it provide opportunities for interaction and discussion in the classroom; it can be use to facilitate communication among learners, and between learners and the

teachers; it can be use to capture learners attention and encourage their involvement in the topic of discussion; it enable them to see the visual aspect of what teacher is teaching thereby enhancing concretization of information; it allow the use of blended learning (face to face and e-learning) thereby promoting rich learning environment (Al-faki & Khamis, 2014)

As effective as the tool is, it cannot by itself promote student learning. As a result, users' (Teachers) are primary agent for it use for classroom practice. The teachers are the ultimate decider on when and how new technology is integrated and utilized for instructional activities (Cochrain-Smith, 2004; Townsend & Bates, 2007; Sweeney,2013; Abuhamid, 2014). Thus, several studies have been use to examined factors that influence adoption or otherwise use of technology by the teachers. With the present effort of Nigerian government to equip the university system with new technology to facilitate students learning, understanding whether faculty member will key into the use of this technology or not necessitate the need for this study.

Technology Acceptance Model

Several research studies have reported the importance of users' intention towards acceptance and use of emerging technologies (IWB) for classroom instruction (Vita, Verschaffel, & Elen, 2012; Al-Faki, Khamis, 2014; Abuhamid, 2014; & Fathema, Shannon, Ross, 2015). Like other past technologies, researchers are trying to provide empirical evidence and gain insight into factors influencing usage decision of IWB among users.

Prior to invention of IWB, many theories have been postulated for explaining reasons that information and technology user's advanced for accepting to use ICT tools. Some of these theories include Theory of Planned Behaviour (TPB) by Ajzen (1991), Innovation Diffusion Theory (IDT) by Rogers (2003), Technology Acceptance Model (TAM) by Davis (1989), General System Theory (GST) by Raisinghani and Schkade (1997), Task Technology Fit Model (TTFM) by Dishaw and Strong (1997) and the most recent theory is Unified Theory of Acceptance and Use of Technology (UTAUT) by (Venkatesh, Morris, Davis & Davis, 2003). Out of these theories, TAM has been identified as the most parsimonious theory and widely used to gauge user acceptance (Park, 2009). Other issue of interest to researchers was teachers' self-efficacy to use technology for pedagogical practice.

Computer self efficacy (CSE) according to Bandura (1986) is defined as "an individual's judgment of his or her capability to organize and execute the course of action required to attain designated types of performance". Therefore in this study CSE is refers to faculty members judgment of his or her skill in using IWB for teaching and learning function. Prior studies have provided empirical evidence on the importance of CSE as a determinant of Information technology adoption. For instance Fathema, Shannon and Ross (2015) study on faculty member use of learning management system in higher institution reported that CSE significantly influence faculty member attitude toward learning management system use.

Similarly, Wu, Chang and Guo (2008) study of science teacher intention towards integration of technology for teaching also revealed that CSE is an important factor to acceptance of technology by teachers. Other studies that supported the significant importance of CSE as a predictor of technology use include (Compeau, Higgin & Huff, 1999; Ong & Lai, 2006; Fatheema & Sulton, 2013).

Attitudinal disposition has also been identified as a salient factor influencing adoption of information system in education. For instance Davis (1989) opined that attitude of a user is a precondition to his or her adoption of Information system. In a study carried out by Ngai, Poon and Chan (2007) as well as that conducted by Teo (2010) it was reported that user attitude to some degree influence their information technology adoption and usage decision. Contrary to this Venkatesh and Davis (2000) had earlier argue the limited role of attitude in explaining behavioural intention or actual adoption behavior, and that, at best a partial mediator in relation to belief and adoption behavior or intention could occur.

Behavioural intention is another important factor in information technology usage decision. Behavioural intention is the subjective probability and a key to future behavior (Wu, Chang, & Guo, 2008). Previous study has reported the significant influence of CSE on behavioural intention toward the use of Information technology for teaching (Shittu, Gambari, & Alabi 2015). Also, reviewed study suggested a possible relationship between users' behavioural intention and their satisfaction (Islam, 2011). Arising from the reviewed literature we examined the influence which intention may have on faculty member usage decision on IWB and their decision to use the technology for teaching.

Recent findings on factors influencing information technology usage decision have revealed the significant influence of school environment on information technology usage decision. In this study, school environment refers to the support and facilitating condition provided for IWB use by the school administrators as well as support system provided by technical staff. According to Teo, (2010) school environment are perceived enabler or better still condition that influence a user perception of ease or difficulty of performing a task. Panda and Mishra (2007) study of technology adoption revealed that factor relating to facilitating condition are one of the key determinants for adoption of technology for teaching. Supporting this finding, Wong, Hamzah and Hamzah (2014) on what influence the adoption of MOODLE technology in teaching revealed that school environment was one of the strongest factors influencing MOODLE adoption for teaching.

In this study we propose to understand faculty members acceptance of IWB by gauging to know whether the following factors (Computer self efficacy, Attitude, Behavioural Intention, and School Environment) will influence their usage behavior. Therefore, we proposed to explore the faculty member acceptance through the model below.

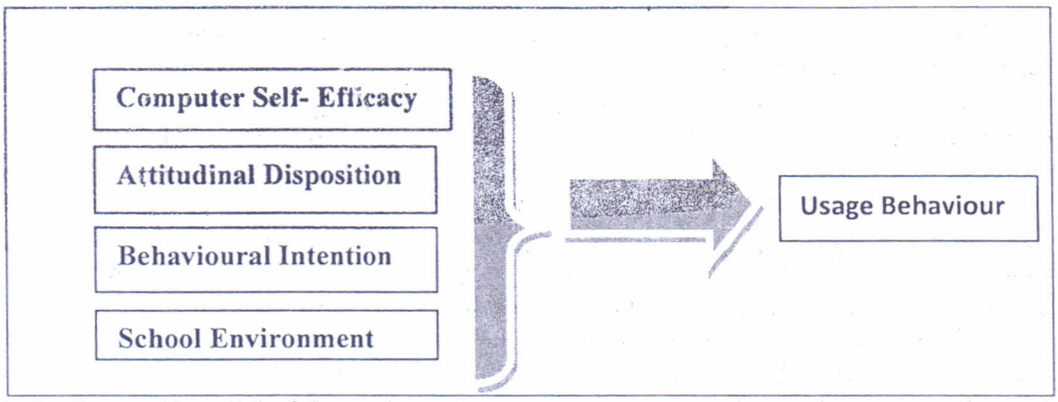

Fig 1: Proposed Model of the study

Research Hypotheses

In line with the above proposed model, the following hypotheses were raised for the study.

H_1: Computer self efficacy will positively influence usage decision of interactive white board among faculty members

H_2: Attitudinal disposition will positively influence usage decision of interactive white board among faculty members

H_3: Behavioural intention of faculty member will positively influence their IWB usage decision for teaching

H_4: School environment will positively influence faculty member usage decision of IWB for Teaching

Methodology

The study employed descriptive survey method and purposive sampling procedure to draw the participants of the study. The samples of the study were faculty members of Federal University of Technology Minna Nigeria that were trained on how to deploy interactive white board for teaching and learning. The research instrument used for the study was a questionnaire developed based on the empirical evidence from the previous study. The instrument has two sections. The first section requested for the participants demography information, while the second section contained 25 statements on the independent and dependent variable of the study. All the items were ranked with seven (7) options ranging from strongly disagree to strongly agree. The survey instrument used was administered on the respondents after the training exercise, in order to gauge the likely behaviour/acceptance of the innovation for teaching among the participants. Out of 150 participants at the training, 106 volunteer to respond to the survey instrument administered. Among those that participated in the study, ninety-four 94 representing (88.7%) were male, while eighteen 18(11.3%) were female see (fig 2). The participants were from different schools and departments of the university. Among them 22(20.8%)

were from school of engineering technology, 10(9.4%) were from school of physical science, 18(17.0%) were from school of information and communication technology, 10(9.4%) were from school of life science, 18(17.0%) were from school of environmental technology, 2(1.9%) were from school of entrepreneurship and management technology see (fig 2).

Demographic information on the participants years of service showed that 48(45.3%) have spend 1-5 years on the job, 18(17.0%) have spend 6-10 years on the job, while 40(37.7%) have spend 10 years above as academic staff. See (fig 2). The data of the study was subjected to regression analysis to test the hypotheses earlier raised.

To assess the validity of the instrument, the instrument of the study was subjected to face and content validity check by expert in instructional technology field. All the observation raised on the item was effected. The reliability check on the construct of the study revealed the following Cronbach alpha values for computer self efficacy, .87, attitude, .91, behavioural intention, .73, environment, .86, and use of interactive white board, .91 respectively. To check for an outlier on the items prior to regression analysis, mean, standard deviation were computed (see Table 1)

Figure 2: The distribution of participants from schools in the university

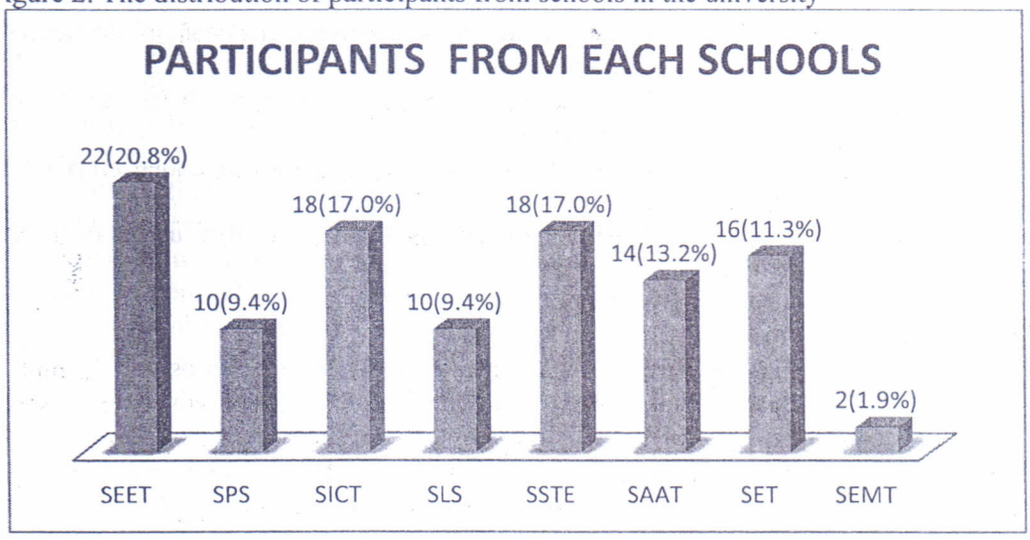

Figure 3: The distribution of participants based on their of service

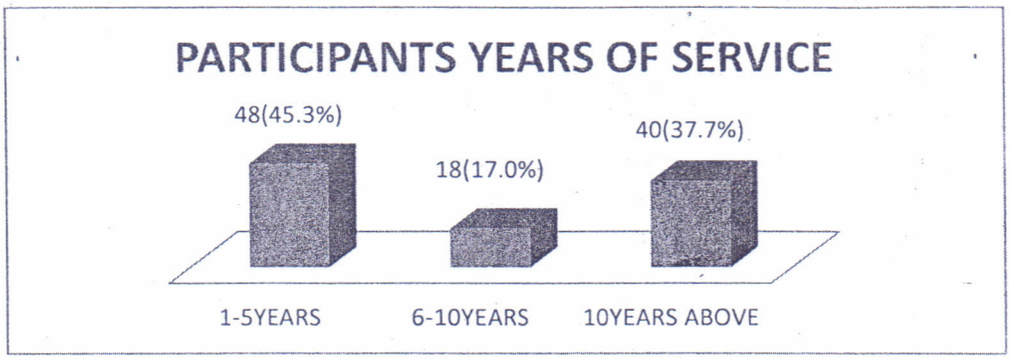

Table 1: Analysis of the mean, standard deviation and cronbach alpha of the item of the study

Items	Mean	Std. Deviation	Cronbach Alpha
CSE1	6.1852	1.22973	
CSE2	5.6852	1.61156	
CSE3	6.3519	1.13532	
CSE4	6.1111	1.22346	
CSE5	5.9630	1.38677	**0.87**
ATT1	6.1481	1.05343	
ATT2	6.0370	1.09825	
ATT3	6.1852	1.04744	
ATT4	6.1667	1.09458	
ATT5	6.2778	.97935	**0.91**
BI1	5.9815	1.18943	
BI2	6.3333	.99052	
BI3	5.6111	1.72021	
BI4	5.9074	1.44416	**0.73**
ENV1	6.2963	.98344	
ENV2	6.3519	.99351	
ENV3	6.2778	1.21960	
ENV4	6.0926	1.03283	
ENV5	5.9815	1.15727	
ENV6	6.3148	1.06087	**0.86**
USE1	6.2593	1.24666	
USE2	6.1852	1.19865	
USE3	6.0556	1.32347	
USE4	6.1667	1.37017	**0.91**

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Hypotheses Testing

Besides ascertaining that the data of the study is free from outlier which multiple regression is sensitive to, the normality of the data was also considered before computing the multiple regression analysis to ascertain the extent of the effect size of the independent variable on the dependent variable. Also, before testing the hypotheses through regression analysis, the basic assumption was checked. One of such assumption is the multicollinearity diagnosis. This refers to a situation where two or more independent variables are highly correlated with each other (Pallant, 2007; Guar & Guar, 2009). A check on the variance inflation factor (VIF) shows that the data does not violate the multicollinearity assumption see Table 4.

Table 2: Summary of correlation coefficient, R-Square and Adjusted R-Square

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.821[a]	.674	.646	2.74502

. Predictors: (Constant), ENVIRONMENT, BEHAVEINTENTION, COMPEFFICACY, ATTITUDE

Table 3:: Summary of the analysis of variance

Model		Sum of Squares	Df	Mean Square	F	Sig.
s1	Regression	746.503	4	186.626	24.767	.000[a]
	Residual	361.686	48	7.535		
	Total	1108.189	52			

a. Predictors: (Constant), ENVIRONMENT, BEHAVEINTENTION, COMPEFFICACY, ATTITUDE

b. Dependent Variable: USAGE

Table 4: Unstandardized and Standardized, Beta, t.cal, Significant of coefficient and Collinearity Diagnostic

Model		Unstandardized Coefficients		Standardized Coefficients			Collinearity Diagnostic	
		B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1	(Constant)	-.679	2.843		-.239	.812		
	COMPEFFICACYY	.338	.139	.401	2.434	.019	.250	3.97
	ATTITUDE	.132	.212	.130	.621	.537	.156	6.43
	BEHAVEINTENTION	.151	.145	.134	1.044	.302	.412	2.43
	ENVIRONMENT	.200	.162	.224	1.232	.224	.205	4.87

a. Dependent Variable: USAGE

Result

The result of the (Table 2) above indicated that the correlation coefficient (R) which is the combination of the predictors of the study is .82 and the adjusted R^2 is .67. What this suggests is that (67%) of the variance in accepting to use interactive white board by the faculty member that participated in the training can be explained by the combination of their computer self-efficacy, attitude, environment and behaviuoral intention. Moreover, the finding suggests that there are others salient factors that are also contributing to acceptance of IWB among the faculty members which was not capture in

the finding supported previous study like Davis (1989), Ngai, Poon and Chai (2007); Teo (2010) finding on the influence of attitude and behavioural intention as a predictor of user decision to acceptance of information technology use. On the partial strength of the two construct, the finding was in agreement with Venkatesh and Davis (2000); Venkatesh et al. (2003) argument on the limited role of attitude in explaining behavioural intention or actual adoption behavior. Furthermore, like previous study, the present finding shows that at best attitude could be a partial mediator between other psychological construct and adoption behavior or intention to use.

Conclusion

In conclusion, the study provides empirical reason for what may influence integration of IWB among the respondents in a developing country. The study has brought to fore what may influence usage decision of IWB. While the study demonstrates that CSE and School environment are the most important factor, it also shows that issue of attitude and behavioural intention cannot be jettison.

Recommendations

Base on the findings, it is important for the university to continue providing training to increase the capacity of using the new technology. Because the first training programme provided was superficial. Therefore, the need to continue to train and retraining the faculty member, so as to increase their competency and knowledge, which will invariably impact on their attitude toward sustainable adoption of interactive white board. The school administrator, the government and stakeholders should provided enabling environment for the uptake of IWB for teaching. The internet strength of the university should be increase; power supply should be sustained as lack of this infrastructure could mar the good intention behind provision of the interactive white board facility in the school system.

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