Chen, W. et al. (Eds.) (2016). Workshop Proceedings of the 24th International Conference on Computers in Education. India: Asia-Pacific Society for Computers in Education

Modeling the Effects of Job Relevance, Facilitating Conditions, Perceived Usefulness and Perceived Ease of Use on Teachers' Intention of Using Technology in Tertiary Schools of LDCs

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Abstract: This study proposes a model that investigates the effects of job relevance, facilitating conditions, perceived usefulness and perceived ease of use on teachers' intention of using technology in schools of least developed countries (LDCs). Borrowing from the perspectives of Technology Acceptance Model (TAM), the study was a survey design conducted among 212 teachers in selected tertiary colleges of Nigeria – Africa. The instrument of data collection was a structured questionnaire adopted from previously validated studies. The study data was analyzed using SPSS 22 for descriptive statistics and AMOS 22 for testing a model for the study. The study model has explained 30% of the variance in teachers' behavioural intention of using technology in the classroom with the R_2 of behavioural intention being .30 and the R_2 values of perceived usefulness and perceived ease of use being 15.1% and 0.2% respectively. Two of the hypothesis of the study were supported with statistically significant p-values. Job relevance was found to have direct significant effects on perceived usefulness. Perceived usefulness was also found to have direct significant effects on behavioural intention. However, contrary to the claim of TAM, the direct effects of facilitating conditions on perceived ease of use was not supported. This peculiar finding might not be unconnected with the weak structure of facilitating conditions among the target population studied, which is a less developed society. Based on this and considering the peculiar sample that participated in the study, the study has limited potential for generalizability. Additionally, it was based on self-report, characterized by high chances of bias responses. Future research can employ experimental or qualitative designs.

Keywords: Job Relevance, facilitating conditions, perceived usefulness, perceived ease of use, behavioural intention, technology, LDCs

1. Introduction

For several decades, researchers have been keenly interested in studying how people accept technology but the question of acceptance has still remained provocative. As observed by Hennington, Janz, Amis & Nichols (2009) and Samantha &, Gaurav (2016), up the contemporary times several organizations and institutions of learning have to use compulsory policies to implement technology; thereby making it even more complex to resolve the problem of acceptance. Basically, technology acceptance is explained by the end users behavioural intention to use technology (Davis, Bagozzi, & Warshaw, 1989) and previous studies have attempted to investigate the influence of subjective norm on job relevance and on intention to use technology, various findings showing significant effects between subjective norm and job relevance and between subjective norm and behavioural intention. However, in Teo, (2011); Isiyaku, Ayub & Kadir (2015a), findings users do not rely on their institutional mandates or expectations to decide to use technology it is not likely that subjective norm will significantly influence behavioural intention or job relevance. Unfortunately, this is one of the common characteristics of LDCs (Peter, Philip & Victor, 2005; Isiyaku, et al, 2015a). The variables investigated in this study are theoretically underpinned in TAM

3 and they are: Job Relevance (JR), Facilitating Conditions (FC), Perceived Usefulness (PU), Perceived Ease Of Use (PEOU) and Behavioural Intention. The purpose of the study was to predict the effects of these variables with regard to technology acceptance in educational institutions of the LDCs. Extant literature has shown that among other things, much of the educational difficulties faced in less developed countries are not unconnected with the ICT infrastructural deficiencies of these countries and the subsequent neglect of their education sectors (Asogwa & Eze, 2013; David, 2012; Ololube, 2014; Prasad, Lalitha, Srikar, (2015). Invariably, lack of ICT integration in educational institutions of a developing country such as Nigeria is a key factor in the existing gap between less developed countries and the developed ones (Isiyaku, Ayub & Kadir, 2015b)

Conducted in the northwestern region of Nigeria where teachers rarely implement ICTs in the classroom Isiyaku, et al. (2015a) and where majority of the people are educationally and technologically disoriented, Kolawole, Omobitan, & Yaqub, (2015) and Ukiwo (2007), this study has potentials for improving teachers perceptions of the job relevance, usefulness and ease of use of technology in the classroom. In effect, it is expected that this would raise their intentions of teaching with new technologies.

Until recently, in regions of less-developed-countries (LDCs) such as Africa, the diffusion of ICTs has remained extremely low, resulting in critical ICT development gaps (digital divide), between regions of Africa and the rest of the world (Anandarajan, Igbaria, & Anakwe, 2002; Odedra, Bennett, Goodman, & Lawrie, 1993). Unfortunately, despite the evidence in recent surveys showing annual growth rate of 90% in purchases of microcomputers/ICT tools in the business sectors of the LDC regions (The Fourteen Major Trends, 1997), the benefits of effective ICT usage have remained far from being actualized in countries like Nigeria, (Anandarajan et al., 2002; Asogwa & Eze, 2013; Delaviz, Andrade, Pouwelse, & Epema, 2012; Ololube, Egbezor, & Kpolovie, 2008; Olusola & Alimi, 2015). Hence, the UNESCO (2010), has observed that while teachers in places like Europe, America, Australia and most of Asia, have advanced in using ICTs for teaching and learning López-Nicolás, Molina-Castillo & Bouwman, (2008), teachers in places like Nigeria – Africa, are still using obsolete technology for traditional learning.

To support the above assertion Okolie (2014) has observed that most of the technical and vocational education departments in Nigerian institutions do not have up-to-date ICTs that are crucial for improving the quality of teaching and learning in schools. Congruently, unfavourable dispositions and perceptions of a large number of the Nigerian citizenry toward ICT adoption and usage has remained one of the foremost challenges facing the Nigerian education system (Okolie, Elom Elisha, Nwuzo Alphonsius, Inyiagu Emmanuel, & Ndem Joseph, 2014). Findings in Olusola Olayiwola and Alimi (2015) have also shown that ICT facilities in tertiary colleges in Nigeria are inadequate for any meaningful ICT program to take off.

2. Research Hypotheses and Model

2.1 Job Relevance

Extant literature indicates that teachers' perception of the relevance of ICTs to their teaching jobs is potentially important in determining how they accept and use such ICTs. Egbri (2012) has observed that the use ICTs for teaching and learning in tertiary institutions is vital for the impartation and acquisition of technology for both the lecturers and the students. Job relevance is defined as the degree to which an individual believes that the target system is applicable to his or her job (Venkatesh & Davis, 2000). In their attempt of developing and testing a theoretical extension of the TAM (Venkatesh & Davis, 2000) found that there are interactive effects between perception of job relevance of technology and the perception of its usefulness (Venkatesh & Davis, 2000)

In TAM2 & TAM3, job relevance was posited to significantly influence individual's perception of the usefulness of technology. Hitherto, Venkatesh et al., (2000) stated that "job relevance is a function of the importance within one's job of the set of tasks the system is capable of supporting". Accordingly,

Venkatesh et al (2000) regarded job relevance to be a cognitive judgment that directly affects perceived usefulness, as distinguished from social influence processes. Unfortunately, some poor systems are used by individuals not because of their relevance to specific job functions but probably, just because of some social influence or other reasons and as a result, individuals do not often maximize the benefits of certain systems. Significant correlations were found between the perception of teachers with regard to the relevance of ICTs for teaching business education contents and the usefulness of such ICTs in a study conducted in Nigeria (Ezeani & Akpotohwo, 2014). Therefore, investigating the job relevance construct is fundamental to underpinning why teachers use technology. Hence, this study hypothesizes thus:

H_1: Job Relevance has a direct significant influence on Perceived Usefulness of technology

2.2 Facilitating Conditions

No matter how positive teachers' perceptions are likely to be, with regard to their capabilities at using ICTs, if they are not supported with adequate facilities, they would be constrained. Facilitating conditions can be referred to as the degree to which an individual believes that organizational and technical resources exist to support the use of the system (Venkatesh et al., 2003). In other words facilitating conditions can be defined as one's control belief concerning the availability of organizational resources and support structure for facilitating the use of technology (Venkatesh et al., 2008).

Venkatesh (2000) & Venkatesh et al., (2008) proposed facilitating conditions as one of the four anchors that drive peoples' initial judgments of their perceptions of the ease of use of technology. Teo, Lee, & Chai (2008) have also revealed that individuals' perceptions of facilitating conditions have significant influence on perceptions of the ease of use technology. In Ahmad, Kamariah & Rohayati (2014) teachers' attitudes towards using ICTs in the classroom were positively correlated with the teachers' access to ICT resources. Unfortunately, learning institutions in Nigeria are lacking ICT facilities and support for the integration of technology in teaching (Onwuagboke, Singh and Onwuagboke, 2014; Isiyaku, Ayub & Kadir, 2015a). From the foregoing, teachers' perception of facilitating conditions are fundamental to their acceptance or rejection of technology. Hence, this study hypothesizes thus:

H_2: Facilitating Conditions have a direct significant influence on Perceived Ease of Use of technology

2.3 Perceived Usefulness

As stated earlier, perceived usefulness and perceived ease of use were the core perceptual beliefs theorized in TAM, determining of individuals' intention to accept or reject technology. Perceived usefulness is defined as the degree to which a person believes that using a particular technology will enhance his or her job performance (Davis et al., 1989). People tend accept or reject technology on the basis of their perception of the usefulness of such technology to their jobs (Davis et al., 1989). In Luan, & Teo, (2009) perceived usefulness of computer technology was found to be a significant determinant of intention to use technology.

Congruently, Teo et al. (2008) has observed that when an ICT application tends to enhance people's job performances by decreasing the time they spend on doing the job or by enabling them to perform more effectively and accurately on the job; they tend to attach more value to it. Hitherto, in order to understand why teachers accept or reject ICTs in the classroom, their perceptions the value of ICTs to their jobs should be investigated. This was the theoretical foundation that supports the investigation of teachers' perceived usefulness of ICTs in this study. Hence, this study hypothesizes thus:

H_2: Perceived Usefulness has a direct significant influence on Behavioural Intention to use technology

2.4 Perceived Ease of Use

When individuals perceive that using technology is easy, it is more likely that they would want to use such technology. Venkatesh et al. (2003) defined perceived ease of use as the degree to which a person believes that using a system would be free of effort. Strong correlations were found between perceived ease of use and perceived usefulness in Igbaria et al. (1995), with perceived ease of use having direct positive effect on perceived usefulness.

In TAM, perceived ease of use and perceived usefulness were the core perceptual beliefs theorized as the determinants of individuals' intention to accept or reject technology. Hitherto, close linkages and associations were identified between perceived ease of use and computer self-efficacy several works (Davis et al., 1989; Venkatesh, 2000; Davis & Venkatesh, 2004 and Venkatesh 2000). This study hypothesizes that:

H_3: Perceived Ease of use has a direct significant influence on Behavioural Intention to use technology

2.5 Behavioural Intention

Being the fundamental measure for technology acceptance in TRA, TPB and TAM, Pynoo &van Braak (2014), behavioural intention was defined as the degree to which an individual is willing to perform a specific behaviour (Davis et al., 1989). It was also defined as the degree of a teacher's willingness to use technology (Teo, 2011).

Studying teachers' behavioural intention is fundamental to understanding their commitment to the use of technology in the classroom; and the extent to which teachers are willing to use ICTs in the classroom will determine whether or not they eventually use those technologies (Isiyaku et al, 2015a). The theoretical underpinning of the behavioural intention construct in this study was derived from the underlying assumption of TAM that people's computer use can be reasonably predicted from their intentions (Davis et al, 1989).

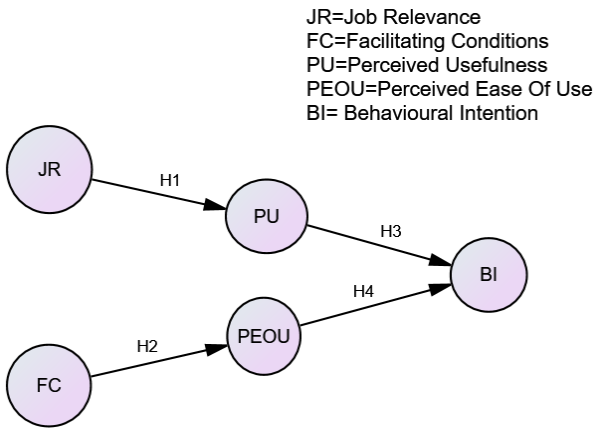

Figure 1. Research Model

3. Research Method

This research was conducted using a quantitative survey design based on the TAM 3 instrument for job relevance, facilitating conditions, perceived usefulness, perceived ease of use and behavioural intention.

A sample of 220 teachers were administered with questionnaires, out of which 212 (96%) were responses were valid 133 (63%) males and 79 (37%) females. The study data was screened for missing values and outliers and for descriptive statistics using SPSS v22. Structural Equation Modeling was employed to test the research model using AMOS v22.0.

4. Data Analysis

AMOS version 22.0 was used to run Confirmatory Factor Analysis (CFA) on all the constructs in the study and to test the fitness of the proposed research model based on technology acceptance theories and the data obtained from the participants of the study (Hair, Black, Babin & Anderson, 2010). We assessed reliability (including construct reliability) and validity (convergent and discriminant) and met all the conditions for Average Variance Extracted (AVE) (Hair, et al, 2010). We used the goodness-of fit values to assess the overall fit of the hypothesized model (Ho, 2006 & Hair et al. 2010). We found satisfactory indices for incremental fit, absolute fit and parsimonious fit as shown on Table 1 for both the measurement and the structural model.

Table 1: Indices for Models of the Study

Model Indices	Measurement Model	Structural Model
Chi Square/df	121.338/67 = 1.811	153.923/72 = 2.138
GFI	.927	.914
CFI	.977	.966
IFI	.977	.966
TLI	.969	.957
RMR	.026	.038
RMSEA	.062	.073

5. Results

Descriptive analyses has revealed that the average mean for facilitating conditions was the lowest among the variables investigated in the study; M=2.71 (SD=0.62). Surprisingly the average mean for teachers behavioural intention to use technology was up to M=4.51 (SD=0.57) being the highest mean score among all the constructs. The study model has explained 30% of the variance in teachers' behavioural intention of using technology in the classroom with the R2 of BI being .300 and the R2 values of PU and PEOU being 15.1% and 0.2% respectively. Two of the hypothesis of the study were supported with statistically significant p-values. We found JR to have direct significant effects on PU, supporting fundamental TAM relationships. PU was also found to have direct significant effects on BI as hypothesized in TAM and in several subsequent studies as summarized in our literature review. However, contrary to the claim of TAM, the direct effects of FC on PEOU was not supported. Possible explanations for this peculiar finding might be because the study has revealed lack of adequate facilitating conditions in the institutions that participated in the study. Hence, FC has predicated a decrease in teachers' perceptions of the ease of use of technology for classroom instructions implying that owing to inadequate facilitating conditions, the teachers do not perceive that using technology for teaching is easy. Similarly, the direct effect of PEOU on BI was not found to be significant. This has also contradicted extant literature. But the explanation for the peculiar scenario may not be unconnected with the negative effects that FC had on PEOU.

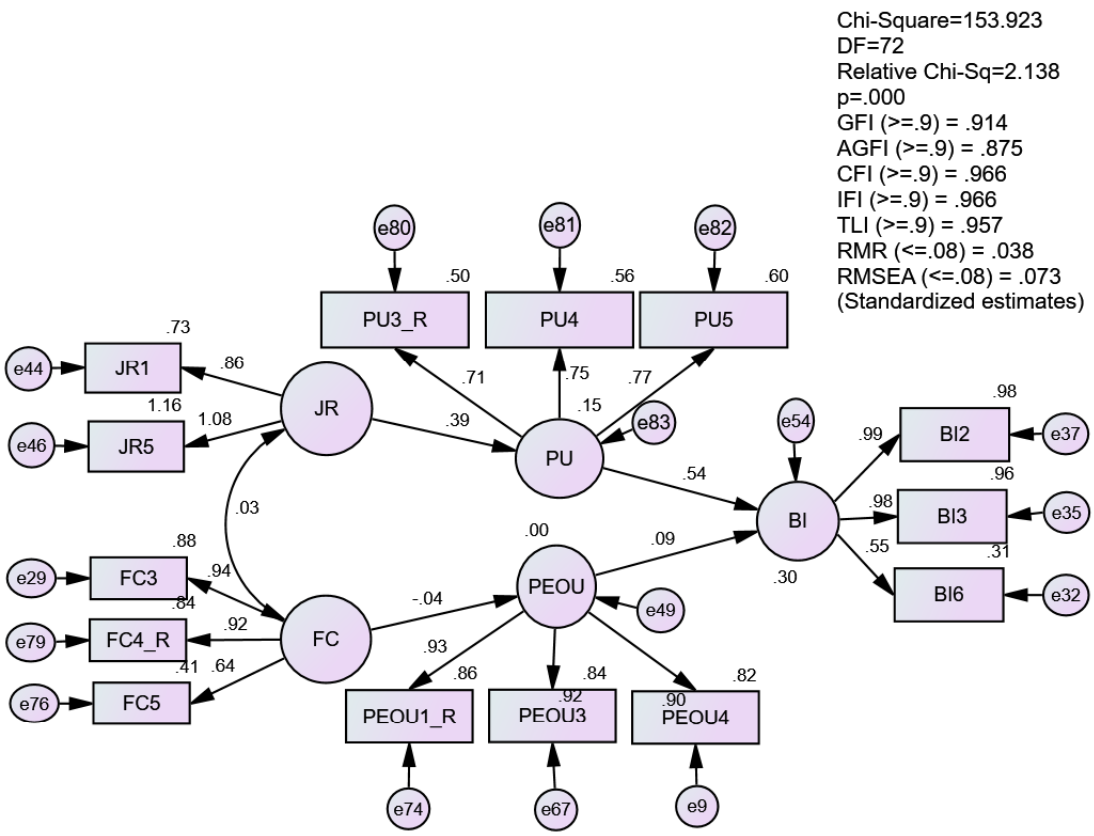

Figure 2. Effects of job relevance, facilitating conditions, perceived usefulness and perceived ease of use on teachers' intention of using technology in tertiary schools of LDCs

6. Discussions

Out of the four hypothesis of this study, two were supported, affirming the influence of JR on PU and PU on BI. One of the key findings in this research is that the effect of teachers' perception of facilitating conditions on their perception of the ease of use of ICTs for classroom purpose was not significant. Based on the standardized negative beta coefficient of the perception of teachers with regard to the adequacy of ICTs in their faculties a decrease was predicted in their perception of the ease of use of ICTs for classroom instructions. This relationship had not been established in previous research. In previous research FC always influence PEOU, but now we find that where FC is weak it is not likely to impact PEOU. Previous research has also shown than PEOU impact BI. But another key finding in our study is that where PEOU is weak, it is not likely to impact BI.

7. Limitations and Future Research

One of the limitations of this study is that it was located in a less developed country where ICT infrastructure is weak and the technology investigated is not contemporary with the technologies of more developed countries. Based on this and considering the peculiar sample that participated, the study has a limited potential for generalizability. Additionally, as the study was based on self-report, there are high

chances that rebiased responses and possibly affect the reality of the situation investigated. Future research can employ experimental or qualitative designs

8. Conclusions

This study has attempted to survey the effects of the interactions of JR, FC, PU and PEOU on BI. The study has contributed to bridging the gap in ICT research between LDCs and the rest of the developed world, using the predictive modeling approach. The study has underscored the need for authorities in LDCs, to enhance ICT support for schools especially around the Northwestern region of Nigeria, because they are more educationally and technologically disoriented. Enhancing the facilitating conditions for ICTs can yield positive results for teachers' perceptions of the usefulness and ease of use of technology in the classroom. Whereas descriptive analyses has revealed a very low average mean for facilitating conditions indicating that these facilities are inadequate in the schools that participated in the study, it is worthwhile to appreciate that teachers' intention to use technology is very high. Consistently, since teachers intend to use technology in the classrooms frequently and would also want to use them to do different things besides teaching in future, school authorities should reinforce efforts to support teachers with adequate ICT infrastructure in order to achieve the desired reform in educational sectors across LDCs.

However, being that the variables investigated in this study have only explained 30% of the variance in teachers' behavioural intention to use technology, it is implicit that there are other important explanations associated with about 70% of the variance in teachers' intention of using technology. School leaders in LDCs should not expect teachers to stop at their intentions of using technology but to also use it. Hence, teachers' high intentions of using technology, should be rewarded with adequate ICTs and regular training programmes and incentives/policies to support their usage of technology in the classroom. Additionally, school authorities can combine the priority of the teachers' perceptions of the relevance and usefulness of technology to ensure that they make important technologies adequately available for use. Although these findings have important implications for ensuring appropriate uptake of technology in LDCs, further research may be needed to investigate how the perceptions, beliefs and attitudes of school leaders towards ICTs affect the appropriate integration and implementation of technology in schools across LDCs.

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