

Technology Acceptance Model Of Intention To Use ICT By Academics In Nigerian Higher Education

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Abstract. The technology acceptance model is widely accepted and has proved applicable in identifying the intentions of users to use information communication technology (ICT) and exact usage. The theory postulates that individual attitudes are actually influenced by perceived ease of use and perceived usefulness, while behavioral intention is influenced by attitude. The purpose of this study was to determine factors that influence an individual's intention to use ICT based on the technology acceptance model. Nigerian Academics in the department of Science are the sampling framework of this study. A principal component analysis used to validate the constructs and variance structural equation modeling in AMOS applied to analyze the data. As anticipated, results supported the theory's proposition as that science lecturer's intention to use ICT influenced by perceived usefulness, attitude and perceived ease of use, attitude also supported. Based on the findings, hypothetical and realistic contributions were presented.

Keywords: Technology acceptance model, Nigerian lecturers, ICT Component Analysis

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1.0 Introduction

Technology acceptance model is adopted from the theory of reasoned action. Technology acceptance model ascertain that attitudes predict intentions, and to predict the behaviour of intentions [1]. Technology acceptance model, established two belief (perceived usefulness and perceived ease of use) to foretell about an individual's attitude toward using technology. Davis[1] defined the attributes of Technology acceptance model which are (i) perceived usefulness (ii) perceived ease of use, (iii) attitude, and (iv) behavioral intention to use.

Perceived usefulness is defined as the extent, to which a person believes that can accommodate a particular system which enhance his or her job performance. Perceived ease of use is defined as the extent which a person believes that use a particular system at free will of effort. Technology acceptance model assumed that external variables such as system features, training, documentation, and user support may affect both the ease of use and perceived usefulness. Attitude refers to the degree to which the person has positive or an adverse evaluation for a specific technology. Behavioral intention to use is defined as a measure of the strength of individual's intention to perform a specific behavior or use information and communication technology. Thus, the concepts of TAM is presented in Figure 1.

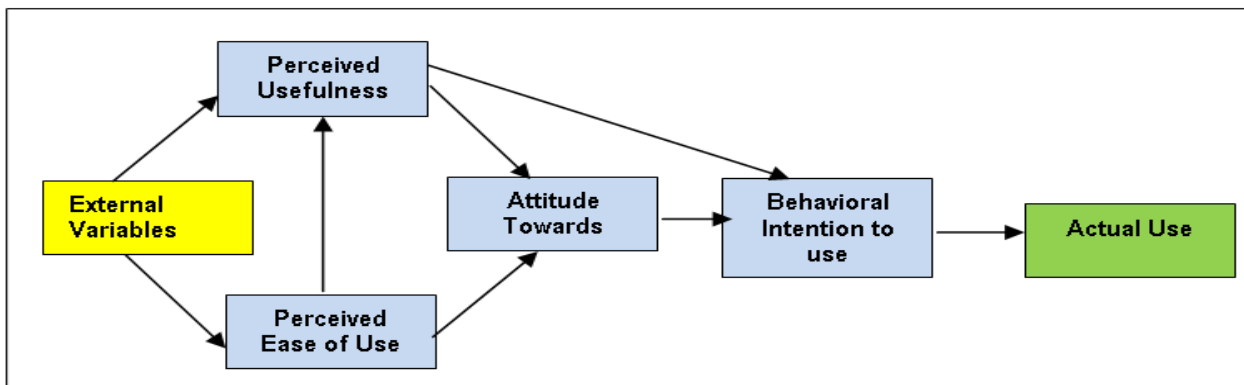


Fig 1: Technology acceptance model

TAM received consideration of experimental interest and support among researchers in many settings in technology acceptance. The model has been tested on techniques, several studies focused on testing the robustness and validity of the questionnaire instrument used by Davis *et al.*[2].

TAM has been widely applied in a variety of research settings such as telemedicine[3], Online meeting[4] and ICT [5], mobile banking[6], evaluation of factors influencing technology adoption[7]. The theory has also been integrated towards building models in the information system field [8-11]

The purpose of this study was to determine factors that influence an individual's intention to use a technology based on TAM. ICT as the target technology and science lecturers in Nigeria subjects as the sampling frame. As proposed in TAM, this study replicated that perceived usefulness and ease of use and attitude positively affect an individual's intention to use ICT. The research model for this study is shown in Figure 2. Based on the technology acceptance model in Figure 2, six replicated hypotheses were proposed.

H₁: Lecturers perceived significant relationship between ease of use and usefulness of the computer in the teaching of science.

H₂: Perceived ease using computer has significantly influence lecturer's attitude towards using the technology.

H₃: Perceived ease of using computer has significant influence on lecturer's behavioral intention towards using the technology.

H₄: Perceived usefulness of computer significantly influence lecturer's attitude towards using the technology.

H₅ Attitude of lecturers significantly influence behavioral intention towards using computer in their teaching.

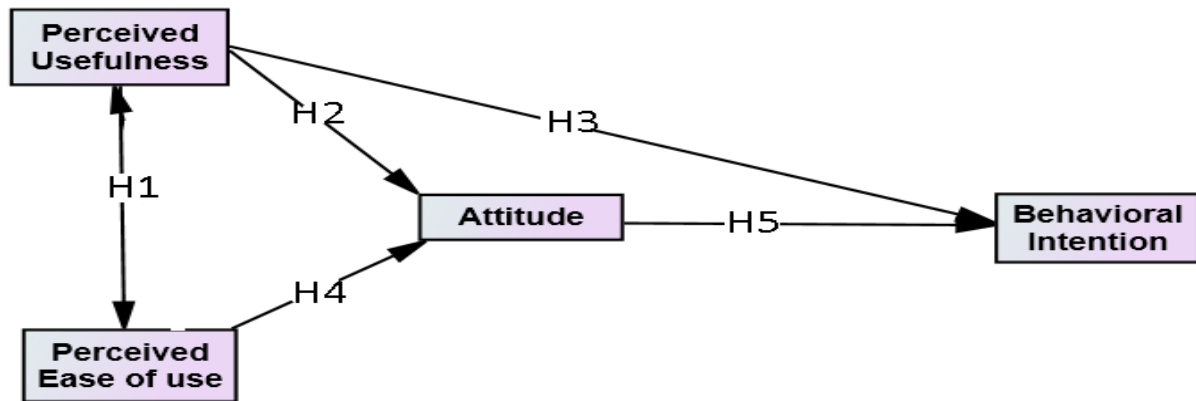


Fig 2: Research Model

2.0 Recent Related Studies.

In the recent decade, most studies confirmed the ability of the TAM to predict behavioral intention to use a certain technology. Nor & Pearson [13] used the TAM to conduct a comparative study on 362 students to provide a more intense user of multimedia learning. Similarly, Loiacono et al. [11] utilized TRA and TAM as a foundation to develop an instrument that could be used to evaluate consumers' perceptions of a specific Web site. Through a rigorous development process, they were able to identify twelve dimensions that had strong measurement validity.

Several studies considered salient of TAM towards predicting behavioral intention to use ICT in learning environment included [12-14, 5 and 15]. In comparison studies Tam also considered most suitable among other theories of technology acceptance such as [9, 16, 17, 8, and 7] affirmed the significance of predicting power of TAM salient's with other technology factors. However, this study intended to investigate the predicting power of TAM in Nigeria context as reviews indicated that there is a need to improve limited research towards ICT acceptance among the Nigeria lecturers.

3.0 Methodology

This research adopted quantitative research method based on post-positivism philosophy because the nature of research problem is deterministic in nature [18]. A sample of 350 respondents randomly drawn based on [19]table of sample size determination from the target population who are the potential lecturers in Northern east part of Nigeria including Adamawa, Bauchi, Borno, Taraba and Yobe States where technology acceptance crawling due to the resistance of western education in the region [20]. Pilot test was carried out and all Cronbach's alpha above the recommended 0.7 [21]. Additionally, standardized instruments was adopted in this study.

4.0 Analysis

4.1 Demographic

A total of 350 questionnaires distributed to the targeted respondents. About 85 percent (297) of the questionnaires were returned by the respondents. The final usable respondents for this study amounted to 269 after dropping 9 incomplete questionnaires, 19 missing data cases. Majority of the

respondents were male representing about 70 percent of the total respondents. The age between 30-39 years old indicated 32 percent of the respondents. The most experienced teaching claimed 1-3 years with about 31 percent of the respondents. Table 1 provides details on respondents' demographic profile.

Table 1: Demographic Profile (n=269)

| Variable/Category | | Frequency | Percent |
|---------------------|----------------|-----------|---------|
| Gender | Male | 189 | 70.3 |
| | Female | 80 | 29.7 |
| Age | 20- 29 years | 76 | 28.3 |
| | 30 -39 years | 86 | 32.0 |
| | 40 -49 years | 44 | 16.4 |
| | 50 years Above | 63 | 23.4 |
| Teaching experience | 1-3 years | 85 | 31.6 |
| | 4-6 years | 79 | 29.4 |
| | 7-10 years | 42 | 15.6 |
| | 10 years Above | 63 | 23.4 |

4.2 Component validity and reliability

A principal component analysis with varimax rotation was performed. Inspection of the correlation matrix showed that all coefficients are more than 0.3. The Kaiser-Meyer-Oklun value is 0.836, which is higher than the recommended minimum of 0.6 [22] Barlett's test of sphericity [23] achieved at (0.000) supporting the factorability of the casual relationship.

The four factors namely perceived usefulness, ease of use, attitude and behavioral intention explained 35 percent of the variance in this study. The items were also subjected to the reliability test. Cronbach's coefficient alpha (α) above 0.7[21]used to measure the internal consistency of the items, all α values were above 0.8 and thus all items provided a relatively high level of internal consistency. Average variance extracted (AVE) recommended to be above 0.5 while composite reliability (CR) should be above 0.6 [24] Table 2 shows the result of the validity and the reliability of the measurement mode.

Table 2: Composite validity and reliability

| Constructs | Items | Factor loading | Cronbach Alpha | Average variance extracted | Composite reliability |
|-----------------------|----------------------|----------------|----------------|----------------------------|-----------------------|
| Perceived ease of use | PEU1 | .879 | .910 | .739 | .934 |
| | PEU2 | .837 | | | |
| | PEU3 | .884 | | | |
| | PEU5 | .829 | | | |
| | PEU6 | .868 | | | |
| | Perceived usefulness | PU1 | | | |
| | PU2 | .873 | | | |
| | PU4 | .848 | | | |
| | PU5 | .741 | | | |
| | PU6 | .812 | | | |
| Behavioral Intention | BI1 | .866 | .878 | .733 | .916 |
| | BI3 | .851 | | | |
| | BI4 | .837 | | | |
| | BI5 | .871 | | | |
| Attitude | AT2 | .903 | .823 | .740 | 0.895 |
| | AT3 | .857 | | | |
| | AT5 | .820 | | | |

Having achieved the recommended construct validity and reliability with the use of SPSS, Figure 3 illustrates estimates based structural modeling using Amos. The model indicated R-square value of 0.350, which means 35 percent of the variance of intention of using ICT in their pedagogical approaches is explained by the exogenous. TAM constructs of perceived ease of use, usefulness and attitude of lecturers towards intention of using the technology, lecturers' attitude influenced by ease of use and perceived usefulness with variance explained of 32 percent.

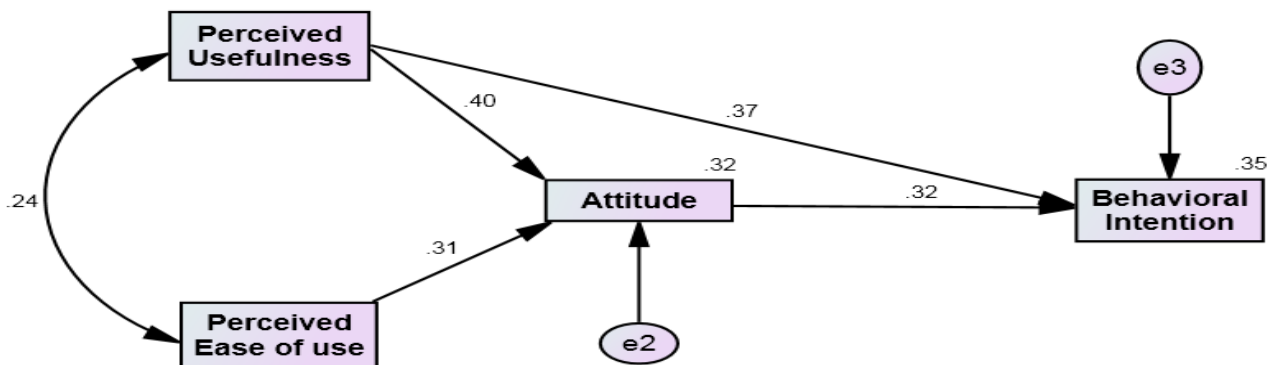


Fig 3: Variance based structural model

Table 3 refers to results of testable hypotheses extracted from Amos estimate views.

Table 3: Results of testable hypotheses

| | Hypotheses/Paths | | Estimate | S.E. | C.R. | P | Supported? |
|----|-------------------|------------------|----------|------|-------|-----|------------|
| H1 | Ease of use | <--> Usefulness | .235 | .063 | 3.765 | *** | Yes |
| H2 | Attitude | <--- Usefulness | .401 | .052 | 7.738 | *** | Yes |
| H3 | Behavioral intent | <--- Usefulness | .370 | .056 | 6.609 | *** | Yes |
| H4 | Attitude | <--- Ease of use | .314 | .052 | 6.051 | *** | Yes |
| H5 | Behavioral intent | <--- Attitude | .318 | .056 | 5.688 | *** | Yes |

*Significant level *** $p < 0.001$*

Towards behavioral intention, perceived usefulness has the highest weight (0.370); attitude path, indicated (0.318), and towards lecturers' attitude, perceived usefulness claimed highest path weight (0.401), perceived ease of use path weight (0.314). The covariance between perceived usefulness and ease of use significantly support the study with path weight (0.235).

5.0 Discussion and Conclusion

In this study, we have attempted to empirically test a research model based on theory of TAM using ICT (computer) to aid teaching science as the target technology. As expected, the results have supported the theory's proposition that lecturers' behavioral intention to use computer is influenced by their perception of usefulness, ease of use and attitude. This study has proved the applicability and ability of TAM to predict intentions.

This study has several practical implications. A significant positive intention to the use of computer to aid teaching science by lecturers was influenced by perceived usefulness, ease of use, attitude. This results consistent with [25, 8, 7 and 26] which affirmed that usefulness of and ease of using computer significantly affect attitude related to acceptance of technology. Thus, Universities and Polytechnics should be encouraged to use ICT such as computer/laptop, and other facilitating conditions to support teaching science.

The results of this study also consistent with [26 and 27] which affirmed a significant and positive relationship between attitude and behavioral intention towards technology acceptance, and this suggests that positive attitude about specific technology could influence individual usage. Professionals can create a positive attitude among its users by promoting its usefulness, ease of use, and compatibility to their value.

One of the restrictions of this study may be traced to the significant number (70%) of male subjects. This may bias the result in term of gender's effect on behavioral intention. This concluded study conducted in Nigeria. The results may not be generalizable to lecturers in other nations and cultures, as lecturers in other nations may not share the same experience, understanding of information technology, infrastructure, the comprehensiveness of educational policies may be differed.

Conclusively, this study investigated the factors that influence the intention to use technology in teaching science among lecturers in Nigeria. Theory of TAM used explain the intention to use technology among the respondents. Perceived usefulness and attitude found constructs with significant influence on behavioral intention. The study also justified the existance correlation between perceived usefulness and perceived ease of use, likewise, both has significant influence on attitude and indirectly influenced behavioral intention.

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