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Solving E-Learning Adoption Intention Puzzles among Private Universities in Nigeria: An empirical Approach.

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Solving E-Learning Adoption Intention Puzzles among Private Universities in Nigeria: An empirical Approach

Abstract

Purpose: E-learning system has been widely acknowledged to have positive impacts on the learning process. Nevertheless, the intention to use it is globally low thereby constituting puzzles to be solved. This study is conducted to proffer some insights to solve the puzzles.

Design/Methodology: The data of the study were collected through an online survey among 425 students of four Private Universities using Interactive Electronic Board Systems. Partial Least Square Structural Equation Modelling was used to analyze the data.

Findings: The significant results of the study reveal that system quality, information quality, and teaching materials significantly influenced perceived usefulness. Technology innovativeness and information quality also significantly influenced perceived ease of use. Perceived usefulness and perceived ease of use equally influenced e-learning intention.

Originality: This research is one of the few studies that conceptualize a framework to study intention to use e-learning generally, and Interactive Electronic Board in particular among 4 private universities using Technology Innovativeness, System Quality, Information Quality, Perceived Usefulness, Perceived Ease of Use, and Teaching Materials.

Keywords: TAM, E-Learning, Teaching Materials, Technology Innovativeness, Information Quality, System Quality

Introduction

Electronic Learning (e-learning) platform/system is a novel paradigm within the sphere of the educational system. This paradigm is assisting many higher institutions of learning to move from traditional and teacher-centered methods of teaching to students' engagements (Wekerle et al., 2020). Though e-learning platforms (ELPS) are meant to augment the traditional system of learning (Islam and Azad, 2015), they are however more exigent in this internet-enabled environment while equally facilitating learning without any form of a boundary. It is estimated that the global investment of instituting the ELPs will reach $325 billion by 2025 (Techjury, 2019).

Despite the benefits of ELPs, evidence suggests that many academic institutions from developing and sub-Saharan African countries continue to use traditional methods of teaching and learning pedagogy due to scarcity of required resources and other challenges (Boateng et al., 2016; Yakubu and Dasuki, 2019; Sarker et al., 2019). Where a few institutions have however implemented the ELPs, the students are not using the platforms to the fullest and which in its self poses a puzzle as investment from instituting the platforms cannot be reaped except the learners use them fully (Al-Rahmi et al., 2019).

Given the importance of the ELPs, various empirical studies have been conducted from the perspectives of developed and developing countries (e.g., Boateng et al. 2016; Islam and Azad, 2015; Rajak et al., 2018; Sarker et al., 2019; Tarhini et al. 2017; Yakubu and Dasuki 2019). Nevertheless, scholars have not reached a consensus about the precise determinants of e-learning adoption intention (Al-Aaraibi et al., 2019; Hamidi and Chavosi, 2018). Specifically, most of the extant studies have not paid attention to how technology innovativeness (Rogers, 2003), DeLone and MacLean Information System Model variables (DeLone and MacLean, 1992;), and teaching

materials (Lee et al. 2009; Rajak et al., 2018) can be combined holistically with technology acceptance model core variables (Boateng et al., 2016; Davis, 1989) to predict intention to adopt e-learning system generally, and interactive electronic board in particular despite their relevance to improving intention to adopt e-learning. Though Rajak et al. (2018) and Lee et al. (2009) narrowly considered technology innovativeness and teaching materials in their studies; more holistic attempts are required to fill the existing void in order to have a proper understanding of what derives e-learning intention. This is in line with the recommendation of Boateng et al. (2016) and Yakubu and Dasuki, (2019) who assert that new studies are required, especially among the private universities that have been grossly under-researched. Thus, to fill the existing gap, this study intends to answer a research question: which factors can effectively predict e-learning intention among private universities in Nigeria?

To address this research question, we conceptualized a new model using technology innovativeness, system quality, information quality, perceived usefulness, perceived ease of use, and teaching materials to examine e-learning intention (Boateng et al., 2016; Lee et al., 2009; Rajak et al., 2018; Rogers, 1983). To our limited knowledge, this is the first study to integrate these variables holistically in a framework to explain ELPs in general, and Interactive Electronic Board (IEB) in particular, among private universities. Our study, therefore, contributes to the body of knowledge and practice by providing a comprehensive model and results to guide academia and practitioners to come up with e-learning systems that will gain wider acceptance especially with the huge investment that is involved in the system.

This study is, therefore organized as follows: Section 1 introduces the study. Section 2 provides a critical review of relevant literature on e-learning that centers on theories, constructs, and hypotheses development. Section 3 covers the research methodology, where the emphasis is laid on the data collection and analysis methods. Section 4 presents results, discussion of findings, implications, conclusion, limitations, and future research recommendations.

Literature Review and Hypotheses Development

During the last few decades, studies have extensively researched the intention to use technology. Various models such as universal theory of acceptance and use of technology (UTAUT) (Venkatesh, 2003; Venkatesh et al., 2012), theory of planned behavior (TPB) (Ajzen, 1991), theory of trying (Bagozzi and Warshaw, 1990), and Technology Acceptance Model (TAM) have been used to predict technology adoption. However, TAM (Davis, 1989) is the mostly cited theory by scholars within this domain considering its parsimony and veracity at prediction (Alkraiji, 2020; Salimon et al., 2017). Though TAM has transited from its nascent stage to TAM 3, its initial conceptualization is regarded to be the most parsimonious, theoretically sound, and relevant model to explain e-learning intention than any other related models as evidenced by recent e-learning scholars (e.g., Boateng et al., 2016) especially in developing countries.

However, while TAM has been reasonably proven potent at predicting behavioral intention and user behavior by some researchers (e.g., Salimon et al., 2017), others have advocated that such prediction is narrowly centered on the individual perspective of system usage (Boateng et al., 2016). This, therefore, suggests that other constructs can be added to TAM to facilitate e-learning intention prediction. Recently, Ngafeeson and Sun (2015) excluded attitude from TAM but included innovativeness, subjective norm, and system exposure. Some other studies (e.g. Chen et al., 2013) have also excluded attitude from TAM with the explanation that attitude is of little significance in predicting new technology intention. Likewise, Joo et al. (2014) while extending TAM included user interface, personal innovativeness, and user satisfaction. These extensions

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justify the inclusion of teaching materials, technology innovativeness, and system quality, and information Quality to extend TAM to predict e-learning intention (ELINT) in the context of a developing country where the usage is still evolving.

Technology innovativeness

 Rogers et al. (2003), p. 242) defined innovativeness as "the degree to which an individual or other unit of adoption is relatively earlier in adopting new ideas than other members of a system". This position has been reiterated earlier by Agarwal and Prasad (1998) and recently supported by Aldahdouh et al. (2020) who emphasized that an innovative individual is willing to accept new technology quicker than others. Indeed, ELP could be regarded as a novel system in their earlier introductory stage in many developing countries. Therefore, for students to be motivated to use this system, they must have some degree of innovativeness (Alalwan et al., 2018). This is in line with the findings of Lewis et al. (2003), Ngafeeson and Sun (2015), and Joo et al. (2014) who also affirmed that personal and technology innovativeness significantly influences usefulness and ease of use. The usage of technology innovativeness in this study is justified on the argument that it has the capability to improve student e-learning among students tremendously (Zwain, 2019). Hence, the following hypotheses are formulated:

H1: Technology Innovativeness has a significant effect on Perceived Usefulness
H2: Technology Innovativeness has a significant effect on Perceived Ease of Use

System Quality (SQ)

SQ can be regarded as a significant component that either an individual or an organization user considers when choosing a particular system (Alsabawy et al., 2016). In the context of an information system, Eom and Stapleton (2011) asserted that SQ is the extent to which a particular system has the unique features anchoring on its response time, accessibility, reliability, suppleness, usefulness, ease of learning, and ease of use. This has further been reiterated that SQ revolves around a set of system features that will make the users to be attracted and attached to the system (Salloum et al., 2018). However, when ELPs lack these qualities, users may consider dropping the system (Shah and Attiq, 2016). In their groundbreaking research, DeLone and McLean (1992) conceptualized SQ as a key construct that can improve system usability. Other recent studies confirmed the veracity of SQ and its relevance in system usage and ease of use for e-learning purposes (e.g., Alsabawy et al., 2016; Salloum et al., 2018). SQ is included in this study as previous studies asserted that it is a critical success factor that can enhance learning among students (e.g., Chopra et al., 2019). Hence, the following hypotheses are formulated:

H3: System Quality has a positive and significant effect on Perceived Usefulness
H4: System Quality has a positive and significant effect on Perceived Ease of Use

Information Quality (IQ)

Traditionally, IQ refers to the outputs/reports being generated by a given system. In measuring the quality of such outputs, users consider certain characteristics: precision, accuracy, wholeness, relevance, conciseness, reliability, timeliness, understandability, and so on (Swaid and Wigand 2009). However, ELPs' users' expectations of IQ, specifically center "on information accuracy, completeness, relevance, content needs, and timeliness". (Freeze et al., 2019, p. 175). These features signify that the outputs produced by ELPs are of the desired quality that can assist ELPs'

users to perceive the system to be useful and easily used (Al-Fraihat et al., 2020). This is becoming more important, especially with the poor perception that users may have about the system. An ELP that produces desired quality outputs will, however, negate such perceptions and will be regarded to have useful and easy-to-use elements that can attract users. Fewer studies have established the relationship between IQ, PU, and PEU (e.g., Salloum et al., 2019) as evidence justifies that IQ is a recent concept that is just being used to predict e-learning system due to its veracity (Sharma et al., 2017). Hence, the following hypotheses are formulated:

H5: Information System Quality has a significant and positive effect on Perceived Usefulness
H6: Information System Quality has a significant and positive effect on Perceived Ease of Use

Teaching materials (TM)
Teaching materials are the most essential parts of e-learning systems. An ELP system that is devoid of the required materials will frustrate, confuse, and reduce the interest of students (Rajak et al., 2018; Zhang et al. 2004). Primarily, the central purpose of ELPs is to avail the students with teaching materials that will make them perceive the ELPs to be beneficial and convenient to use. This has been buttressed by Lee et al. (2009) who affirm that ELPs should be augmented with e-learning services such as online lectures and interactive e-classroom which will ease the students' learning process as students can refer to them at their convenience (Pearson 2016; Rajak et al., 2018). Zhang et al. (2004) had initially reiterated that learners are often bored heavily by ELPs that are predominantly loaded with text-based and traditional materials. The boredom often accounted for high dropout rates among students since their degree of understanding is often depleted (Rajak et al., 2018). This indicates that teaching materials are important factors that can increase the satisfactory experience of the users who may perceive the system beneficial and easily used. Teaching materials as a construct is included in this study as literature suggests that it will make teaching and learning easy and efficient (Yusuf et al., 2018). Hence, the following hypotheses are formulated:

H7: Teaching materials have a significant and positive effect on Perceived Usefulness
H8: Teaching materials have a significant and positive effect on Perceived Ease of Use

Perceived usefulness (PU)
PU refers to the perception which an individual has about the benefits to be derived while using a given system. According to Davis (1989), the degree of that perception has a major influence on attitude and behavior towards an innovation such as ELPs. The usefulness will particularly attract the interest of the students to use the system (Boateng et al., 2016; Jaiyeoba and Iloanya, 2019). This is anchored on the assumption that the criteria which an individual e-learner adopts to measure the usefulness of technology will significantly depend on their expectation that the ELPs will assist them to achieve their goals of usage. PU is therefore considered a significant factor to be investigated within the context of a developing country to increase the rate of intention to use ELPs (Boateng et al., 2016). Usage of PU in this study is justified as previous studies argued that it is crucial for e-learning adoption (Zhao et al., 2020) especially in a developing context like Nigeria (Salimon et al., 2017) where technology like e-learning is still emerging. Hence the following hypothesis is presented:

H9: Perceived Usefulness has a significant and positive effect on e-learning intention

Perceived Ease of Use (PEU)

PEU is regarded as "the degree to which an individual believes that using a particular system would be free of physical and mental effort" (Davis, 1989). This importantly indicates an advantage that may be associated with the configuration that makes a system to be easily interacted with. But such an advantage may not be optimized, when for instance, the learners discover that the usage of the system is complex and tedious (Venkatesh and Davis, 1996). Hence, it is clear that when a system is easily operated, it will significantly influence the behavioral intention of the users. PEU has equally been found to have a direct influence on PU of new technology such as ELP (Davis, 1989; Salloum et al., 2019) since the decision to determine if a system is useful or otherwise, will be based on whether the system gives the user some difficult tasks to do or eases their activities (Suki and Ramayah, 2010). Perceived ease use is included in this study as previous studies position that students tend to perceive ELP useful when it is easily used therefore representing a success factor in the e-learning environment (Sukendro et al., 2020). Hence, the following hypotheses are presented:

H10: Perceived Ease of Use has a positive and significant effect on Perceived Usefulness
H11: Perceived Ease of Use has a positive and significant effect on e-learning intention

Based on the previous discussions and hypotheses presented, the conceptual framework of the study is presented in Figure 1.

Insert figure 1

Methodology

In dealing with the methodology of this study, the researchers adopted a quantitative research design. A quantitative research design refers to the master plan of how the researchers intend to collect quantifiable data, measure and analyze this data with statistical, mathematical, or computational techniques to achieve research objectives (Sekaran and Bougie, 2016). In this regard, this study developed and used an online questionnaire survey to collect data from students who enrolled in four different private universities in the South West Region of Nigeria. There are 36 private universities in the region (Mogaji, 2019) as experience has shown that the private institutions have similar structures and modes of operations. Nevertheless, the researchers randomly selected only four universities that have superior technological facilities and have consistently employed ELP for a significant number of years (Yakubu, 2019).

Questionnaire Design

In designing the questionnaire, the researchers surveyed existing literature concerning the variables of the study and eventually adapted valid and reliable items. Having adapted these items, the researchers sought opinions of 2 academics to help clarify the appropriateness of the questions finally adapted.
Consequently, the final questionnaire has 2 sections with a clause of voluntary participation, anonymity, and confidentiality as demanded by the four institutions. Sekaran and Bougie, (2016) emphasized that research anonymity and confidentiality give assurance to the participants that their

privacy is guaranteed thereby makes them freely respond to the questionnaire. Previous e-learning studies have also used this method (e.g., Boateng et al., 2016; Valencia-Arias, 2019).

Section 1 of the questionnaire covered the demographic information and relevant learning experience of the respondents. In this section, the researchers asked the students to indicate if they had participated both in synchronous and asynchronous e-learning using IEB. For instance, asynchronous modes include online group collaboration, online quizzes, lecture notes, online announcements, online assignments, video, and audio streaming while synchronous include online live chat and face-to-face online meetings with their instructors. A positive answer to this question qualifies the respondent to partake in the study.

Participants
The study population for this empirical research consisted of registered students at private universities in the South Western region of Nigeria. Based on the information collected from the selected 4 universities, 5200 students registered during the second semester of 2019, which coincided with the period of our data collection. The registered students represent the sampling frame for this study that the sample will be drawn from and enable the researchers to determine the population and sample size of the study.

Procedure
Section 2 of the questionnaire comprised statements that evaluate the seven variables of the proposed conceptual model. According to Krejcie and Morgan (1970), for a population of 5200, the minimum sample size is 357. However, the researchers used simple random sampling methods to invite 534 respondents from these Universities (University A – 150, University B – 134, University C & D – 125 each). The questionnaire distribution was anchored by the administrative offices through a random selection of the students in their database. To avoid a low response rate that is often associated with online questionnaire distribution (Sekaran and Bougie, 2016), these universities shared the google spreadsheet link for this questionnaire on their IEB. The researchers were able to attract participants via the questionnaire link embedded by these universities in their IEB platforms. During the data collection, participants from these 4 universities were given complete freedom by their administrative offices. Therefore, the data that were collected empirically reflect on participants' preferences. A combined of 482 responses were received from the four universities, of which 30 were unusable. In all, 452 valid questionnaires which represent an 85% response rate were received and were included subsequently in the final analysis. Therefore, the responses received (N D 452) are far greater than the minimum sample size requirements (N D 357) indicating an acceptable size.

Demographic information
The information covered here includes the age, gender, levels of course of study, and the e-learning experiences of the respondents with the majority of the respondents falling between the ages of 20-26 (68.54 percent). This is followed by the age range of 27-30 (11.01 percent) while age categories: 16-20, 31-35, and 36-40 had percentages of 7.63, 7.85, and 4.97 percent, correspondingly. Regarding the gender category, the male respondents had a higher percentage of 57. 55 over 42.45 percent of the female respondents. The respondents' level of study includes undergraduate (77.34 percent), masters (21.20 percent), and doctorate (1.46 percent). All the students who participated in the study had used ELP based on IEB at least for one year.

Instrumentations and scale of measurements

The measurement items for all the seven constructs used in this paper are adapted from various sources. PU, PEU, IQ, and SQ items are adapted from Ngafeeson and Sun (2015), and Salloum et al. (2019). TI, TM, and ELINT items are adapted from Nagfeeson and Sun (2015), Rajak et al (2018), and Lee et al. (2009). All these items are measured by using a 5-point Likert Scale. All the adapted items were subjected to expert reviews and subsequent pilot studies to ensure that the instruments are valid for use.

Statistical analysis results

In conducting the data analysis, the researcher used the Partial Least Square Structural Equation Modelling (PLS-SEM) version 3.20 with a two-step approach (Chin and Newstead, 1999; Hiar et al., 2016). PLS-SEM technique has been widely used by researchers across fields of studies including social sciences as it is equally capable of predicting multiple relationships in a complex model while its primary objective is to focus on the endogenous construct (Hair et al., 2016). Researchers also consider PLS-SEM over other techniques due to its robust result, data distribution assumption, and theory development (Hair et al., 2014). The first step involves the measurement model, while the second step is the establishment of the structural model.

Measurement Model

The measurement model tests the validity and reliability of the constructs being used in the study. Three empirical parameters of content, convergent, and discriminant validity are essential for the establishment of the measurement model. To establish content validity, all items measuring a given construct must display greater loadings on their given constructs than other constructs in the research model (Chin 1998; Hair et al., 2014) as displayed in cross-loading Table 1 below.

Insert Table 1

The convergent validity displays the level to which a particular factor has a positive correlation with another factor of the same construct (Hair et al., 2014). To establish convergent validity, researchers need to examine item loadings, composite reliability (CR), Rho _A, (Rho_A), and average variance explained (AVE). For item loadings, the minimum value is pegged at 0.5 while the values of AVE, CR, and Rho _A, must not below 0.5, 0.7, and 0.7 respectively (Hair et al., 2014). Information in Table 2 presented below depicts that the convergent validity has been met. Likewise figure 2 shows that the measurement model parameters have been met.

Insert Figure 2

The discriminant validity (DV) shows the extent to which a given construct is empirically dissimilar from other constructs (Hair et al., 2014). This, in essence, indicates that the items of a given construct should be variant from the variances they shared with others. To achieve the DV this research employed Fornell and Larcker (1981). Table 3 shown below indicates that the threshold of DV is achieved.

Insert Table 3

The Structural Model

The researchers also examined the structural model to test the hypothesized relationships, and to establish effect sizes (f^2) and predictive power relevance (Q^2) of the model (Hair et al., 2014). To test the hypotheses, the researchers employed the bootstrapping technique (1- tailed test), and t-values (significance level $p \leq 0.05$ and t-statistics ≤ 1.620). Concerning the obtained data, the analysis shows that eight out of eleven hypothesized relationships are statistically significant. In this instance, Technology Innovativeness significantly and positively influences Perceived Ease of Use (PEU) (b= 0.681, t =16.254, p < 0.000). System Quality has a positive-significant effect on Perceived Usefulness (PU) (b= 0.074, t =2.486, p <0.013). System Quality positively and significantly influences Perceived Ease of Use (b = 0.189, t =4.650, p < 0.001). Information Quality has a significant and positive effect on Perceived Usefulness (b = 0.389, t =9.376, p < 0.000). Information Quality has a significant positive effect on Perceived Ease of Use (b = 0.096, t =1.916, p < 0.056). Teaching Materials equally affects Perceived Usefulness significantly and positively (b = 0.507, t =12.733; p < 0.000). Perceived Usefulness has a significant and positive effect on e-learning intention (b= 0.306, t =6.366, p <0.000). The relationship between Perceived Ease of Use and e-learning intention is also significantly positive (b= 0.390, t =7.271; p < 0.000). In this regard, hypotheses: H2, H3, H4, H5, H6, H7, H9, and H11 are accepted. However, Technology Innovativeness has no significant effect on Perceived Usefulness (b= 0.040, t < 0.981, p = 0.320), Teaching Materials do no significant influence Perceived Ease of Use (b= 0.025, t =0.562, p =0.575) as Perceived Ease of Use does not equally influence Perceived Usefulness significantly (b= 0.42, t =0.932, p =0.331). This indicates that hypotheses H1, H8, and H10 are not accepted. These results are shown in Figure 3 and Table 4 below.

Insert Figure 3

Insert Table 4

Coefficient Determinant (R^2), and Predictive Relevance (Q^2), and Effect size (f^2) of the model

A coefficient determinant (R^2) is the degree of variance of the endogenous construct that is explained by the exogenous construct. The R^2 obtained for the three endogenous constructs of this study is 0.770 (PU), 0.580 (PEU), and 0.350 (ELINT). These values are acceptable based on the recommendation of Falk and Miller (1992) that R^2 of 0.10 and above is acceptable. Apart from the R^2, the predictive relevance, which equally shows that the model has sound predictive power was also established. For the predictive relevance to be acceptable, its value must be higher than zero as obtained in this study as 0.178, 0.351, and 0.238 are recorded for ELINT, PU, and PEU respectively.

Likewise, the effect (f^2) size which explains the contribution of each construct to the R^2 value was equally ascertained. Based on the recommendation of Cohen (1988), f^2 values of 0.02, 0.15, and 0.35 indicate small, medium, and large effects of the exogenous latent variable, respectively (Hair et al., 2014). Table 5 shows the effect sizes of each of the endogenous constructs.

Insert Table 5

Discussion of Findings

This study investigated factors that influence the intention to use the e-learning system in 4 private universities in Nigeria. Based on the reviewed existing literature, eleven (11) hypotheses were formulated based on factors that previous studies have proved to influence the ELINT. Out of the eleven (11) hypotheses formulated, eight (8) are significantly supported while three (3) others are not supported.

Hypothesis (H1) which states a positive relationship between TI and PU is not statistically and significantly supported. This result aligns with the findings of Joo et al. (2014) and De Smet et al. (2012) indicating that being open to other technology platforms does not necessarily signify that the students would regard the ELPs to be useful. Considering the concept of PU, a platform like the e-learning system is regarded as useful when it avails the users some anticipated benefits. Therefore, the findings of this study seem to suggest that students are willing to use IEB not necessarily because they are innovative but due to the benefits the platform offers them. This is line with the arguments of other studies that asserted that main reason why students use ELP especially in a mandatory setting is because of the benefits it offers (e.g., Ngafeeson and Sun, 2015) and not because students are innovative.

Hypothesis (H2) proposes a positive relationship between TI and PEU. The result obtained confirmed this relationship and aligns with the findings of Cheng and Huang (2013) and Wang et al, (2018). The result suggests that being innovative makes an individual perceive less difficulty while using a similar technology platform. One of the characteristics of an innovative person is that they see opportunities where others see problems or difficulties. And since the respondents of this study are a group of students who are assumed to be savvy in technology usage, they seem not to encounter any difficulty or challenge using another form of technology like ELP based on their previous experience. The finding further reiterates the definition of innovativeness as proposed by Rogers et al (1983) and recently re-echoed by other researchers (e.g., Shi, 2018) that when users are innovative, they tend to embrace new technology with ease and with the objective of having new experience.

Hypotheses (H3) and (H4) are supported. The results tally with the findings of Al-Fraihat et al. (2020) indicating that when the ELPs are embedded with system quality features such as fast response time, systems accessibility, and reliability, flexibility, and so on, the users would regard the ELPs to be beneficial and easy to use for their schools' activities. One of the reasons why users embrace ELP over other traditional methods of teaching is that the former is robust and provides facilities that make learning faster and handy. Cheng (2012) has initially asserted that users who are sensitive about SQ may usually perceive that the system is useful and easily used especially with the functionality and features of the system which center on controllability, and system interactivity among others. It could therefore be said that the ELPs with these features based on the finding of this study attract more users than otherwise.

Hypotheses (H5) and (H6) are equally supported, thereby, confirming the results of previous studies such as Freeze et al., (2019) and Al-Fraihat et al. (2020). The results suggest that when an ELP provides all required, accurate, complete, relevant, context-specific, and timely information that can assist the students in their day-to-day online learning activities, they would regard the system to be useful and easily used. As initially argued, this significance further indicates that a system with high information quality is capable of satisfying the users' desires since the system will equally be regarded to have thecapacity to generate the desired outputs/reports that would help the users to achieve their predetermined objectives of using the system. This is also in line with the findings of Cheng (2012), and Liu et al (2010) who affirmed that when leaners feel that ELP

materials are in abundance and regularly updated, they would believe that the platforms are useful and easily used to accomplish their learning objectives.

Hypothesis (H7) is also supported. The result is in line with the findings of Lee et al. (2009), and Pearson (2016). This consonance indicates that the ELP would be regarded as useful when all required teaching materials are uploaded in the e-learning system to benefit the students. The finding of Pearson (2016) specifically reported that 44% of students still want all their teaching materials accessible in physical printed forms and not in digital copies. This indicates that when such materials are uploaded, the students can view or download them at their convenience, thereby making them regard the system to be useful. This further underscores the initial argument that ELP is meant to augment the traditional teaching system where emphasis is often laid on the availability of teaching aids to help the students in their learning activities.

Hypothesis (H8) which states a positive relationship between TM and PEU is, however, not supported. The result sounds logical as students would seem to regard the ELP as easily used when configurations that ease their lives are embedded in the system. For instance, mere loading of materials such as video, books, and others would be regarded as a utility rather than easiness. In some cases, excess materials could become a burden to the students, thereby causing boredom that could make the system be perceived as difficult. This finding is in line with the results of previous studies (e.g., Rajak et al., 2018). Previous studies have equally asserted that ease of use of a system like ELP may be determined by other factors such as enjoyment, accessibility, computer playfulness, and subjective norm (Salloum et al., 2019) and not necessarily the TM.

Hypothesis (H9) which posits a positive relationship between perceived usefulness and e-learning intention is supported. Previous studies of Davis, (1989), and Boateng et al. (2016) have reported similar findings. The conceptual definition of PU indicates that users would be willing to use a system that avails them anticipated benefits over others. Students adopt ELP because they believe that the system would be useful and aids them in their learning activities. This finding, therefore, reinforces this as an ELP that provides necessary online learning benefits such as quality information, useful user interaction, and other features would be adopted than otherwise. Al-E-Emran and Teo (2020) reiterates this by further affirming that students are attracted to an online learning platform that offers anticipated benefits and which enhances their learning goal.

Hypothesis (H10), is not supported. This result contradicted the results of previous studies that confirmed the PEU and as a predictor of PU (e.g., Al- Rahmi et al., 2019; Davis, 1989). These studies indicate that the easier to use the ELP, the more useful the students would think the ELP is. However, our result aligns with the finding of Lee and Letho (2013). The likely explanation for this result is that the respondents in this study have some experience using other technology platforms. Therefore, the easiness associated with ELP usage might not be regarded as a factor that makes them feel that the ELP is useful. Other recent studies have also emphasized that perception about usefulness of a system may not necessarily be its ease of use but other factors such as result demonstrability, subjective norm, content quality, lecturers' features (Hanif et al., 2018; Rajak et al., 2018; Salloum et al., 2019) and others.

The last hypothesis (H11) is supported. This result which confirmed the hypothesized relationship between PEU and ELINT is associated with the findings of previous studies (Al-Rahmi et al., 2019; Davis, 1989). The result indicates that when ELP is easily used to upload assignments, and easily navigated to perform other tasks, the intention to use will be sustained. Extant studies including that of Ngai et a. (2007) and Hu et al. (1999) have equally situated that the intention to use e-learning will be predicated on the easy operability of the e-learning system.

Considering the discussions of the findings, the researcher presents the implications of the study in the next section.

Implications of the study
This study empirically investigated ELINT among 4 private universities by conceptualizing a new framework that was underpinned by Technology Innovativeness, System Quality, Information Quality, Perceived Usefulness, Perceived Ease of Use, and Teaching Materials to predict IEB. Out of 11 hypotheses proposed, 8 were supported, while three were not. Given this, the new conceptual framework and its findings suggest that some of the significant variables can be used theoretically and practically to improve the development and management of e-learning intention among private universities and other institutions.

Theoretical Implications
This study contributes to the body of literature by conceptualizing a new framework through the extension of TAM to study e-learning intention. We achieve this extension by incorporating rare but essential variables of technology innovativeness, teaching materials, system quality, and information quality to examine e-learning intention. This extension fills a major gap in the body of knowledge as this study, to the best knowledge of the researchers is the first to integrate these variables concomitantly in a framework to explain ELP among private universities and to elicit an understanding of academics. Most importantly, the findings of this study concerning the direct significance influence of teaching materials on PU and technology innovativeness on PEU provide new lens through which academics can equally predict this relationship as previous studies have narrowly paid attention to this conceptualization. This contribution is more exigent especially in the context of developing and other countries that are lacking rigorous research, characterized by cultural diversities, societal idiosyncrasies (Boateng et al., 2016), and where users are still grappling with technology like ELPs.

Practical Implications
Practically, the finding regarding the significant influence of TI on PEU indicates that innovative students would likely regard the ELP platforms to be easily used. This, therefore, implies that higher educational institutions should institute programs and training that would enhance the openness of students towards embracing the ELPs. It might be helpful to organize training and workshop sessions that will assist the students to deal with some anxieties that are related to the use of the ELP, and provide resourceful persons whom the students can consult when faced with any form of difficulties while using the system (Ngafeeson and Sun, 2015). Such facilitating conditions may help boost technology innovativeness. Practically, since innovativeness involves the ability to embrace innovation before others, it might also be important for e-learning platform designers to design such platforms to be adaptable to fit all devices, flexible to match users experience, and interactive to be more engaging, and foster learning for retention purpose of the students (Westmoreland, 2017).
The significant relationship between SQ, PU, and PEU equally provides some guidelines to the provider by ensuring that special attention is paid to system quality. In this regard, while setting up the ELP, the institution can liaise with the designer of the ELP to incorporate SQ features that will make the system quickly respond to the requests of the students, make the system easily accessible, reliable, and flexible to be used. When such configurations are in place, the users will perceive the system as useful and easily used, thereby, make their intention to use the ELPs

increase. Apart from fast response time, designers should equally ensure that the system is embedded with all other advanced technological system and resources within the e-learning platform (Kim et al, 2012) that would make the users feel that the system is easily used and has the benefits to sustain their learning without any form of hindrances.

Additionally, university institutions and designers of the ELP can take some lessons from the significant relationship between IQ, PU, and PEU by ensuring that the system is configured with the required features that provide the students with enough, precise, relevant, content-specific, timely, and explicit information (Freeze et al., 2019). Kim et al (2012) had initially emphasized the practical relevance of this finding by stating that information quality content of e-learning should equally contain appropriate suitable learning content, structures, and effective learning materials to sustain the e-learning outcomes.

Furthermore, the universities should equally ensure that the ELPs are designed in such a way that uploading of materials such as YouTube videos, books, and other relevant materials is easily achieved while the materials are made available to the students. As initially argued at the introduction of this research, the e-learning system is meant to augment the traditional system of learning, therefore, uploading the teaching materials would serve the double purpose of supporting online learning while making the materials available to the students at their convenience. Practically, the availability of such materials would make students believe that the system is useful for their learning purpose as the students would prefer such a system to others. The significant and positive influence of technology innovativeness on perceived ease of use has been statistically validated by Eze et al (2020)'s argument that, if teachers and students in Nigerian private universities are professionally trained to use e-learning tools, they will become more innovative. To the government and other stakeholders, it is important to reallocate additional funding to the insufficient budgets for education.

Lastly, the significant relationship between PEU, PU, and e-learning intention suggests to the practitioners that for ELP to be largely embraced, it must be embedded with features that make the platform to be easily used and useful. For instance, the platform should be easily accessed without much physical and mental rigor. The platform should not give the students 'unnecessary herculean tasks' that would make their lives difficult. Likewise, the platform should save the students time, and provide users with other benefits that make them feel that the ELPs are far more useful than the traditional classroom. Practically, the school management needs to let the students know that the e-learning system has these benefits and they should equally be educated on how to explore the benefits to improve their learning.

Conclusion, limitations, and future research

The impact of COVID-19 on both domestic and international education has further confirmed the benefit of e-learning in offering distance learning via the internet. This is a useful platform where the students and the learning providers can enjoy an interactive quality educational experience. Although some researchers have argued that e-learning cannot efficiently replace traditional on-campus face-to-face teaching, however, e-learning has proved to be a reliable and secured alternative during these difficult COVID-19 lockdowns and border restrictions.

The technology acceptance model (TAM) has been extensively adopted by many researchers and practitioners for various technology applications, particularly for e-learning within academic institutions. This paper extended TAM by incorporating system quality, information quality, and

teaching materials to study intention to use e-learning system generally and IEB in particular among four private universities in Nigeria. Based on the variables, and the framework developed, the researchers conducted a questionnaire survey to collect data from 425 private university students. PLS-SEM was used to analyze the data while the findings of the study reveal that 8 out of 11 hypotheses were statistically significant and accepted. TI has the most significant relationship with PEU followed by the relationship between TM and PU, IQ and PU, PEU and ELINT, PU and ELINT, SQ and PEU, SQ and PU.

While interpreting the results of this study, however, some limitations should be noted. First, the study was conducted among private universities. This comes as a limitation as the result obtained might not be generalizable to the public universities since the modus of Operandi of the private universities is quite different from that of public universities.

The second limitation is that this study considered only six (6) independent variables to predict e-learning intention indirectly. It is suggested that future researchers should increase the number of variables to be used as direct and indirect predictors to improve the predictive capability of our model.

The last limitation of this study is that it is cross-sectional. Other researchers may therefore consider the mediating effect between perceived usefulness, perceived ease of use, the selected independent variables, and dependent variables of this study in a longitudinal study. As argued by Turnes and Ernst (2016) and Jose (2016) a mediating effect is better hypothesized in a longitudinal study to avoid the ambiguity that may be associated with results of running mediation with concurrent data as the longitudinal study would enable the researchers to track changes that occur in the intention and behaviour of users over time. To achieve robust analyses of the implementation of e-learning at the national level, future studies should randomly select private universities from the six geopolitical zones in Nigeria. Future studies can also investigate both the private and public universities, such an investigation will enable relevant stakeholders to develop appropriate strategies. Additionally, coming researchers may also conduct cross-countries e-learning research for a robust result that could have more commercial impact.

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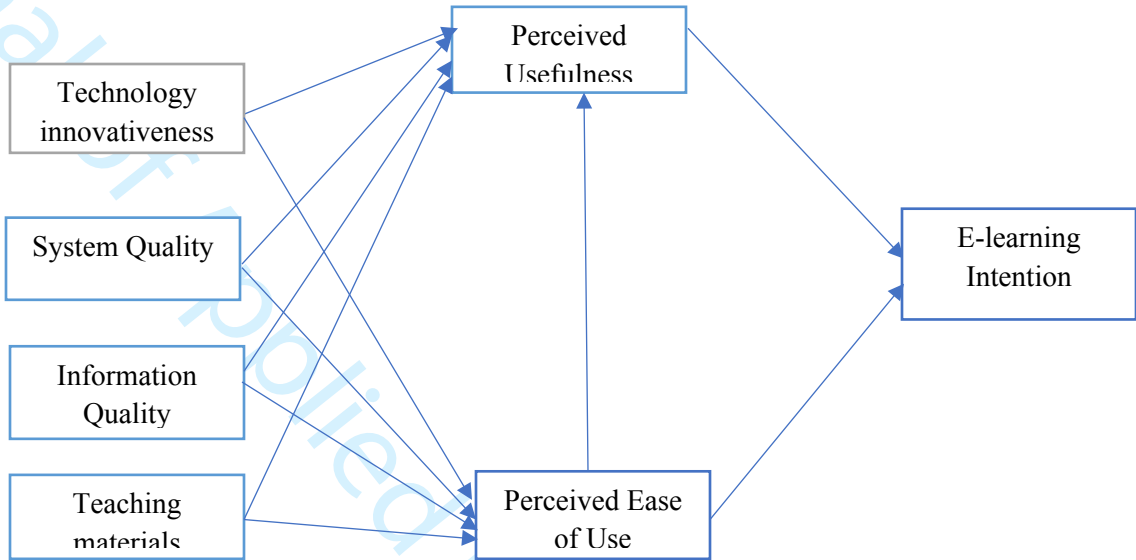43
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Figure 1: Conceptual Framework

Figure 2: Measurement Model
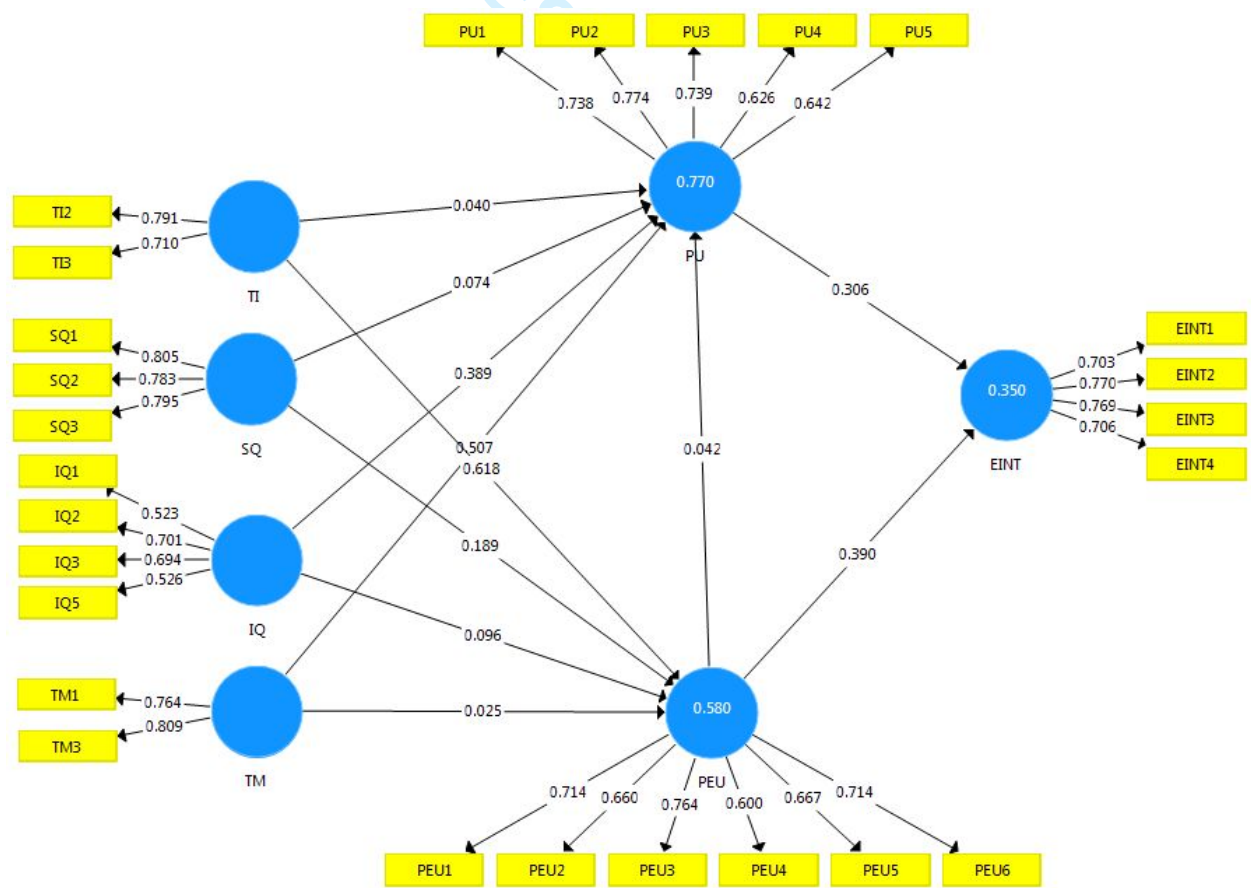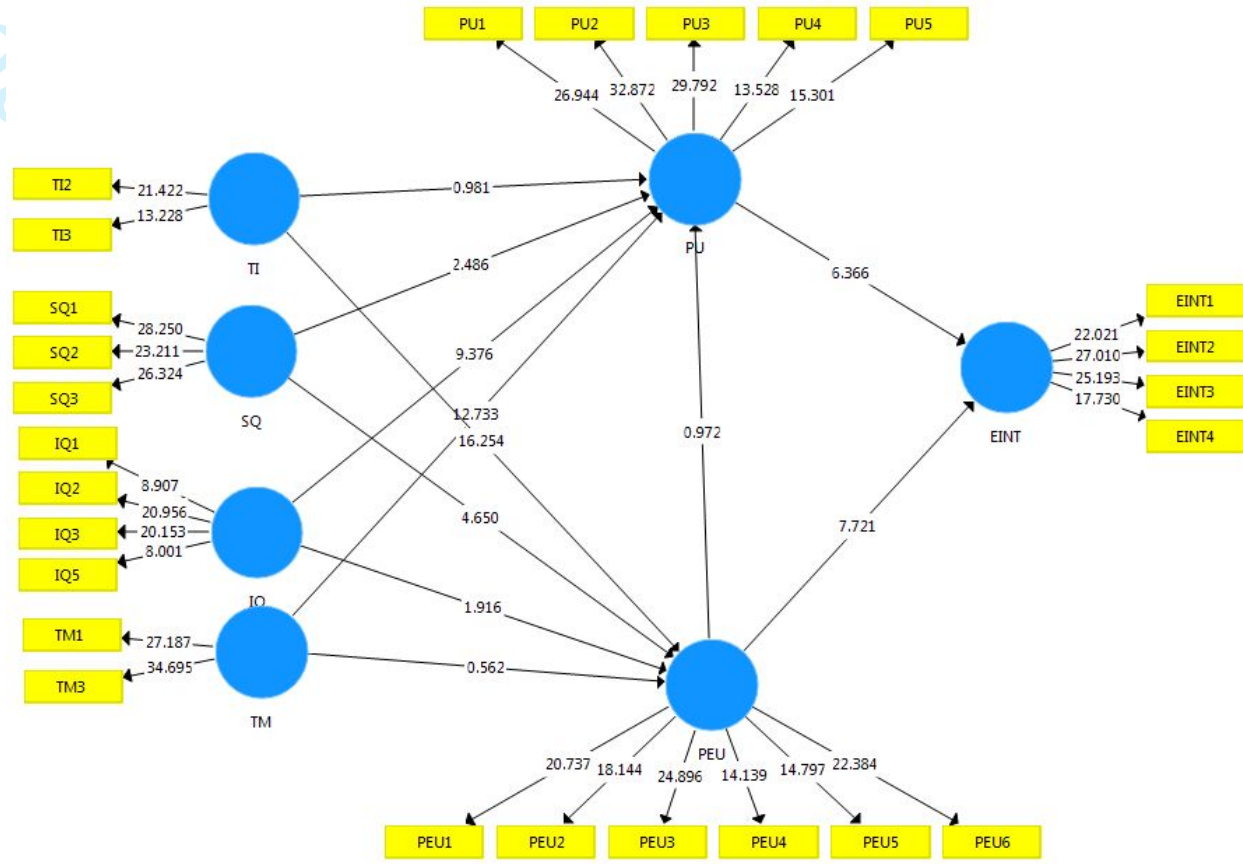
Figure 3: Structural Model

Table 1
Cross loading

	ELINT	IQ	PEU	PU	SQ	TI	TM
ELINT1	**0.703**	0.424	0.379	0.374	0.370	0.264	0.302
EINT2	**0.770**	0.283	0.396	0.299	0.374	0.247	0.242
EINT3	**0.769**	0.426	0.318	0.504	0.480	0.294	0.355
EINT4	**0.706**	0.221	0.462	0.207	0.390	0.310	0.177
IQ1	0.299	**0.523**	0.360	0.250	0.323	0.297	0.206
IQ2	0.335	**0.701**	0.262	0.567	0.347	0.242	0.369
IQ3	0.308	**0.694**	0.313	0.556	0.251	0.281	0.574
IQ5	0.204	**0.526**	0.132	0.451	0.184	0.109	0.286
PEU1	0.393	0.207	**0.714**	0.216	0.346	0.383	0.165
PEU2	0.340	0.342	**0.660**	0.317	0.312	0.315	0.276
PEU3	0.399	0.325	**0.764**	0.284	0.282	0.423	0.187
PEU4	0.407	0.404	**0.600**	0.482	0.296	0.659	0.323
PEU5	0.213	0.193	**0.667**	0.136	0.249	0.651	0.134
PEU6	0.365	0.225	**0.714**	0.275	0.343	0.448	0.232
PU1	0.342	0.439	0.236	**0.738**	0.366	0.222	0.716
PU2	0.408	0.667	0.357	**0.774**	0.378	0.329	0.502
PU3	0.357	0.646	0.433	**0.739**	0.325	0.342	0.732
PU4	0.291	0.362	0.260	**0.626**	0.331	0.279	0.371
PU5	0.267	0.532	0.221	**0.642**	0.265	0.168	0.404
SQ1	0.384	0.364	0.342	0.394	**0.805**	0.247	0.298
SQ2	0.395	0.357	0.298	0.385	**0.783**	0.251	0.329
SQ3	0.525	0.336	0.417	0.347	**0.795**	0.292	0.287
TI2	0.390	0.369	0.526	0.412	0.269	**0.791**	0.268
TI3	0.165	0.183	0.567	0.151	0.229	**0.710**	0.154
TM1	0.261	0.355	0.160	0.634	0.317	0.162	**0.764**
TM3	0.318	0.594	0.354	0.623	0.286	0.282	**0.809**

Table 2
Results of Measurement Model

Constructs	Items	Loading	AVE	CR	Rh_A
E-L Intention	EINT1	0.703	0.544	0.826	0.721
	EINT2	0.770			
	EINT3	0.769			
	EINT4	0.706			
Info Quality	IQ1	0.523	0.581	0.707	0.477
	IQ2	0.701			
	IQ3	0.694			
	IQ5	0.526			

Perceived Ease of Use	PEU1	0.714	0.674	0.843	0.777
	PEU2	0.660			
	PEU3	0.764			
	PEU4	0.600			
	PEU5	0.667			
	PEU6	0.714			
Perceived Usefulness	PU1	0.738	0.598	0.832	0.765
	PU2	0.774			
	PU3	0.739			
	PU4	0.626			
	PU5	0.642			
System Quality	SQ1	0.805	0.631	0.837	0.710
	SQ2	0.783			
	SQ3	0.795			
Technology Innovativeness	TI2	0.791	0.565	0.721	0.234
	TI3	0.710			
Teaching Materials	TM1	0.764	0.619	0.765	0.388
	TM3	0.809			

Table 3

Discriminant Validity (Fornell and Larcker, 1981)

	ELINT	IQ	PEU	PU	SQ	TI	TM
E-learning Intention	**0.738**						
Information Quality	0.465	**0.617**					
Perceived Ease of Use	0.524	0.427	**0.688**				
Perceived Usefulness	0.477	0.763	0.438	**0.706**			
System Quality	0.550	0.443	0.446	0.472	**0.795**		
Technology innovativeness	0.379	0.375	0.623	0.386	0.332	**0.752**	
Teaching Materials	0.369	0.609	0.332	0.698	0.382	0.286	0.787

Table 4

Structural Model Result

Hypotheses	Paths	b	SE	T Values	P Values	Decision
H1	TI -> PU	0.040	0.041	0.981	0.327	Not Supported
H2	TI -> PEU	0.618	0.038	16.254	0.000***	Supported
H3	SQ -> PU	0.074	0.030	2.486	0.013**	Supported
H4	SQ -> PEU	0.189	0.041	4.650	0.000***	Supported
H5	IQ -> PU	0.389	0.041	9.376	0.000***	Supported
H6	IQ -> PEU	0.096	0.050	1.916	0.056*	Supported
H7	TM -> PU	0.507	0.040	12.733	0.000***	Supported
H8	TM -> PEU	0.025	0.045	0.562	0.575	Not Supported

H9	PU -> ELINT	0.306	0.048	6.366	0.000***	Supported
H10	PEU -> PU	0.042	0.043	0.972	0.331	Not Supported
H11	PEU -> ELINT	0.390	0.050	7.721	0.000***	Supported

Note: ***Significant at 0.01, **Significant at 0.05, *Significant at 0.1