Students' Attitude and Behavioural Intention on Adoption of Internet for Learning among Al-Hikmah University Students in Nigeria: A Test of Technology Acceptance Model

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Abstract

This study was conducted to understand students' attitudes and behavioural intention toward the adoption of the Internet for learning. To gather data for the study, 200 questionnaires were administered to undergraduate students of Al-Hikmah University in Ilorin, Nigeria. Of these questionnaires, 164 were included in the study. The study was theory-driven. Structural equation model (SEM) was used as a statistical tool for analysing the hypotheses of the study. The study's findings revealed that perceived usefulness was the strongest determinant for the adoption of the Internet for learning. Further, the students' attitudes were found to significantly influence their adoption of the Internet for learning. However, the facilitating condition was found to be statistically insignificant in influencing the student adoption of the Internet for learning. These findings have implications for Internet users and the providers for educational activities.

Keywords: Internet, students' attitude, behavioural intention, facilitating condition, adoption

Introduction

The invention of the Internet has brought a radical change to how teaching and learning are implemented in today's educational world. The Internet has changed the education landscape by greatly altering the skills requirements for the working world. According to Leiner (2009), the Internet is an international network of networks. It is a repository of information for all fields of knowledge. In recent years, the richness of information from the Internet and other evolving resources has attracted educators to its use for pedagogical activities (Shittu et al., 2011). Khan (2005) quoted Rosenberg (2001), stating "Internet technologies have fundamentally altered the technological and economic landscapes so radically that it is now possible to make quantum leaps in the use of technology for learning." A study has revealed that students were able to learn through the Internet in a similar manner as traditional interaction regardless of factors such as academic background, ethnicity, computer skill, gender or academic aptitude (Navarro and Shoemaker, 2000).

Modern-day students are described as digital natives or Internet-savvy because most of their activities involve using the Internet. Despite the tremendous influence of the Internet on how knowledge is being constructed, acquired and disseminated, the issue of digital divide is still contentious among researchers in education and information technology. This issue explains why some researchers believe that not all current students can be classified as digital natives and that some cannot operate a computer, much less use the Internet, especially students from third world nations (Nganji, Kwemain and Taku, 2010).

In education, the use of the Internet has become a global phenomenon. Educators are exploiting the power that is inherent in the Internet to leverage teaching and learning to students both directly and indirectly. In developed countries, most universities encourage their faculty members to adopt a blended learning method to teach their students. Blended learning involves both face-to-face and online interaction with the students to provide them with all the required skills to function both inside and outside the school. While students and faculty in these developed nations have adopted this innovation for their teaching and learning, students in less developed countries, such as Nigeria, are still learning how to productively use emerging technology to supplement their learning. Many

higher institutions of learning in the country are attempting to create Internet-friendly environments for students' learning, including the university where this study was conducted. The Nigerian government also encourages all higher institutions of learning to provide technologically-rich environments for student learning. Whether the opportunity created by the Internet is being optimally utilised for learning by the student is still a subject of research. For example, in the United States of America, college students were reported to use the Internet to communicate with their classmates and their teachers. Additionally, these students utilised the Internet to conduct research and to access material from the library (Pew Internet and American Life Project, 2005). Similarly, Zarina (2009) reported that secondary school students in Malaysian schools use the Internet for social interaction and learning.

All over the world, educators have identified the potential of the Internet in the educational process and have taken advantage of it. Despite the awareness of the significance of the Internet for the implementation of curriculum, an overview of the research on the application of the Internet for educational purposes in Nigeria has not received adequate attention. Although studies have found that Nigerian students use the Internet via mobile devices for social interaction and communication (Shittu et al., 2013), there has not yet been sufficient research on whether they use the Internet to supplement their education. Similarly, few theoretical studies have been conducted on factors influencing the use of the Internet for educational activities among Nigerian students, especially when compared to the number of studies from the United Kingdom (UK), the United States of America (US), Australia, Asia and other parts of the globe. It is against this backdrop that this study probes into factors that may influence the use of Internet for learning purposes among the students of Al-Hikmah University in Ilorin, Nigeria, using the technology acceptance theory perspective.

Theoretical Background

Many researchers have studied the factors that influence the present generation of students' usage of Internet for academic purpose from different theoretical viewpoints. These theories and models have mostly been developed in the UK, the US, Australia and other advanced countries to explain acceptance of emerging technology. Researchers continue to

modify, extend, and revise some of these theories due to rapid change in technological advancement of the world and the environment of users (Kripanont, 2007).

The most prominent theories used for understanding users' acceptance of information system (IS) include the Technology Acceptance Model (TAM) developed by Davis (1986), the Innovation Diffusion Theory of Rogers (1989), the Theory of Reasoned Action developed by Fishbein and Ajzen (1975), the Social Influence Theory of Kelma (1954) and the Theory of Planned Behaviour of Ajzen (1991). All these theories have been empirically tested by researchers and have been found to possess explanatory power on reasons advanced by users for adopting information technology. Research studies have also revealed that while many learning institutions have expended huge investments by providing wireless Internet service for their students and faculty members, these facilities are either not used for the intended purpose or are under-utilised because of limited user acceptance. The most widely used parsimonious theories for understanding user acceptance is the TAM, which states that user acceptance of any technology is a function of the following factors: perceived ease of use (PEOU), perceived usefulness (PU), and user's attitude toward the technology itself (Davis, 1989). Many information and instructional technology researchers have a positive disposition toward these three factors as a mean of measuring users adoption of technology related to information system. Davis, Bagozzi and Warsaw (1989) opined that a user's perception of system ease of use and usefulness results from users' behavioural intention to use or not use said system. The available literature also shows that Davis (1989) thought TAM can explain user behavioural intention toward technology and innovation because it can explain the link between the user's belief in terms of ease of use and usefulness to actual use of technology.

This study aims to understand the attitude and behavioural intention of students toward acceptance of Internet usage for academic activities among students at a private university in Nigeria. This will enable us to re-examine the previously developed model of Davis (1986) by using the following factors: Ease of Use, Perceived Usefulness, Behavioural Intention, and Attitude and Facilitating Condition. Re-examining the model will bring to the forefront germane issues relating to the adoption of new innovation for education among students. It will also provide reasons

for students' acceptance or resistance toward Internet usage despite the huge investment put into providing our higher institutions of learning with Internet capability. This study is imperative because we cannot extrapolate the findings from studies conducted in developed countries to the present setting of this study. Most importantly, Masrom and Hussein (2008) stated that user acceptance of IT resources is a not yet well understood phenomenon. Hence, this study is necessary to gain more insight into what influences acceptance of Internet usage for education among students in Al-Hikmah University.

TAM was employed for this study for the following reasons: TAM has been identified as a robust and parsimonious theory for understanding technology acceptance. TAM is simple to use for studying initial, future, and continuous user intentions to accept innovation. Currently, only a limited number of studies have used TAM as a theoretical model for examining the acceptance of IT usage for learning purposes. The original TAM is shown in Figure 1.
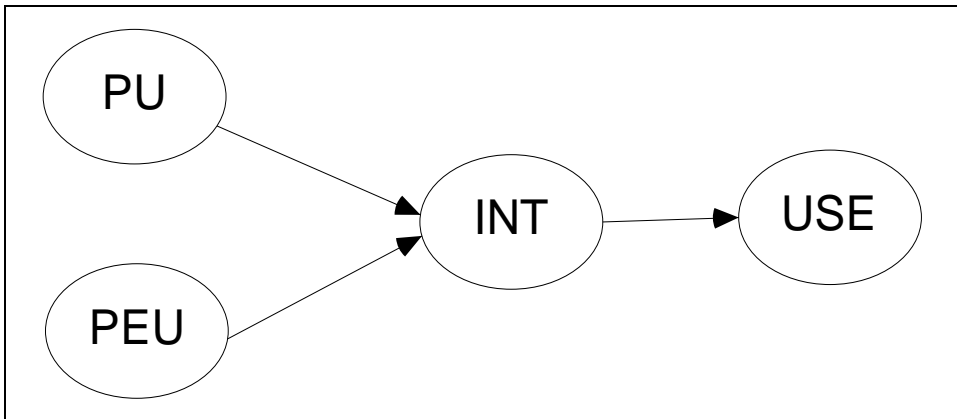

Figure 1 The original Technology Acceptance Model (TAM)

Davis (1986) developed TAM by adapting the theory of reasoned action. In an attempt to further understand what constituted user acceptance of IT, Venkatesh and Davis (2000) developed TAM2, which is a theoretical extension of the earlier TAM. In TAM2, additional factors were added to the existing factors, including social influence and subjective norm.

Venkatesh et al. (2003) introduced the Unified Theory of Acceptance and Use of Technology (UTAUT). This theory was used to explain that acceptance of IT was a function of the following factors: performance expectance; effort expectance; social influence and facilitating condition. UTAUT shows a refined view on how the determinants of intention and behaviour evolve over time (Kripanont, 2007). While some studies reported that the original TAM is sufficient to predict user's acceptance of IT, others argue that other factors should be considered, especially when comparing newer technology and Perceived Usefulness and Perceived Ease of Use may not be sufficient to explain technology acceptance (Tunku Badariah et al., 2010). Similarly, several studies encourage researchers to extend TAM to increase its explanatory strength. For example, Eastin and Larose's (2000) study on computer self-efficacy of Internet use between experienced and novice users reported that computer self-efficacy and facilitating condition are determinant factors in bridging the digital divide between groups of users. In the context of this study, we look at student attitude and their behavioural intention of using the Internet for learning by extending the original TAM to include the facilitating condition. Davis (1989) defined perceived ease of use as "the degree to which a prospective user of a technology expects that using the technology will be free of effort" and defined perceived usefulness as the extent to which an individual believes that using the technology will enhance his or her performance. PU has been identified as a determinant of users' behavioural intention to use IT resources and Internet-based systems in many studies (Adam, Nelson and Todd, 1992; Burton-Jones and Hubona, 2006, Igbaria et al., 1997; Shittu et al., 2011.

In a study conducted by Sumak et al. (2011) on factors affecting the acceptance and use of Moodle, Internet-based software, it was reported that the actual use of Moodle depends on behavioural intention and the attitude towards using the software. The study further reported that PU was the strongest and most important predictor of attitude toward using Moodle. In another study that used TAM to measure the acceptance of mobile Internet, the study both PU and PEU were found to be strong determinants of the attitude toward the use of mobile technology, which in turn influences actual use (Lee, Kim and Chung, 2002). A study on usage of technology among student of Utara University in Malaysia shows that PU is the highest predictor of technology use among the student (Raman,

2011). In this study, we postulate that PU will significantly influence the use of the Internet for learning among Al-Hikmah University students.
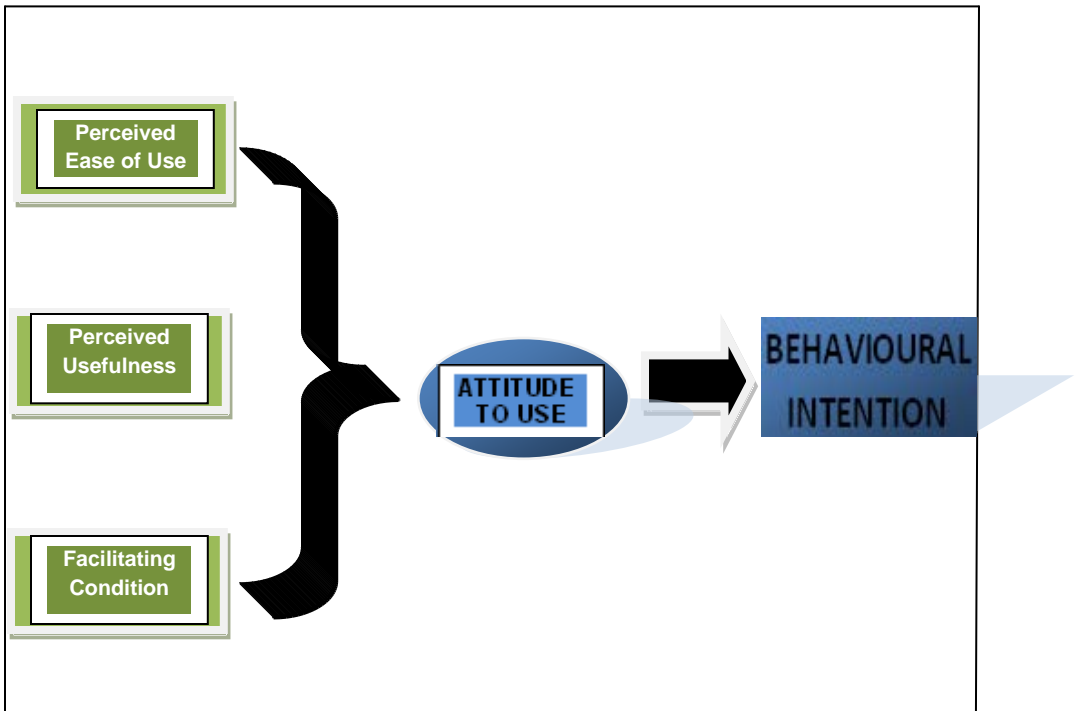

Figure 2   Research model of the study

Purpose of the Study

The purpose of this study was to determine the influence of the following independent variables (perceived ease of use, perceived usefulness and facilitating condition) on the two dependent variables (attitude and behavioural intention) on Internet adoption for learning. This study examined the influence of the independent variables on dependent variables and examined the relationship that exists among the variables selected for the study. Other objectives included understanding the rate of use and purpose of use of the Internet for learning.

Research Questions

Based on the objectives of the study, the following research questions were drawn:

1. What is the influence of perceived ease of use on students' attitudes toward Internet adoption for learning?
2. What is the influence of perceived usefulness on students' attitudes toward Internet adoption for learning?
3. What is the influence of facilitating condition on students' attitudes toward Internet adoption for learning?
4. What is the relationship between perceived ease of use and usefulness of Internet for learning among students?
5. To what extent is the influence of students' attitude on behavioural intention due to the adoption of Internet?

Research Hypotheses

Base on the above stated questions, the following hypotheses were generated and tested in this study:
1. Perceived ease of use will significantly influence students' attitudes toward the adoption of Internet for learning
2. Perceived usefulness will significantly influence students' attitudes toward the adoption of Internet for learning
3. Facilitating condition will significantly influence students' attitudes toward the adoption of Internet for learning
4. Students' attitudes will significantly influence their intentions for adopting Internet usage for learning
5. Perceived ease of use will significantly influence students' behavioural intentions for adopting Internet usage for learning

Methodology

The participants of the study comprised of 164 undergraduate students of Al-Hikmah University in Ilorin, Nigeria. Of these students, 101 (61%) were male and 63 (39%) were female. All participants were randomly selected for the study.

The instrument used in the study was adapted and modified for the purpose of the study. Before final administration of the instrument, construct validity was conducted. According to Cronbach (1951), construct validity is the degree to which a variable measures what it is intended to measure. Similarly, the reliability of the instrument was ascertained. Factor analysis was carried out to determine the dimensionality of the construct. Principal Component Analysis (PCA) was used for extraction and Varimax was employed as rotation method. The Kaiser-Mayer-Olkin measure of sample adequacy (KMO) value obtained was greater than 0.6 as recommended by Pallant, (2007). Bartlett's Test of Sphericity value was significant (P = 0.000). The Eigen value was greater than one. The total variance explained was 62%. In all, five factors were extracted. The reliability of the instrument was conducted with Cronbach's Alpha. The result shows 0.73 alphas, which indicated good internal consistency reliability.

Data Analysis

The data of the study and all the hypotheses were analysed using the Structural Equation Modelling technique (SEM) with AMOS 16 Software. SEM is a statistical tool that allows a researcher to test a set of multivariate. SEM enables a researcher to carry-out path analysis, confirmatory analysis, factor analysis, regression analysis and analysis of variance (Masrom and Hussein, 2008). Because of the robustness of this tool and its use in studies that involve cause and effect, SEM has gained considerable popularity in the last decades among researchers in education, medicine and IT related fields. Tables 1 and 2 show the demographic data, descriptive statistics and valid items of the study as well as their corresponding loadings and the Cronbach Alpha value of the constructs.

Table 1 Demographic information and descriptive statistic

Gender	Frequency	Percentage (%)
Male	101	61.2
Female	63	38.2
Age of respondents	Frequency	Percentage (%)
15–20	99	60.0
21–25	50	30.3
26–30	14	8.5
36–40	1	0.6
Purpose of use of the Internet	Frequency	Percentage (%)
Research	27	16.4
Entertainment	3	1.8
Education	96	58.2
Communication	20	12.1
Collaboration	8	4.8
Social Interaction	10	6.1
Frequency of use of the Internet	Frequency	Percentage (%)
Daily	69	41.8
2–3 Times a week	55	33.3
2–3 Times a month	11	6.7
Once a month	27	16.4

Table 2   Valid items and their corresponding Loadings, Alpha Values and Average Variance Explain

Perceived Ease of Use	Items Loading	
PE1: Learning to use the Internet for learning would be easy	**0.70**	
PE2: I would find it easy to get Internet to do what I want it to do	**0.71**	
PE3: My interaction with Internet would be clear and understandable	**0.61**	**AVE: 0.7**
PE4: I would find the Internet to be flexible to interact on	**0.63**	
PE5: It would be easy for me to become skilful at using the Internet	**0.70**	
PE6: I would find it easy to search for learning material on the Internet	**0.71**	
Total Reliability: 0.86		
Perceived Usefulness		
PU1: Using the Internet would make it easier for me to learn	**0.61**	
PU2: Using the Internet would improve my learning performance	**0.60**	
PU3: Using the Internet would enhance my effectiveness in learning	**0.64**	
PU4: Using the Internet would improve my efficiency in my learning	**0.65**	**AVE: 0.7**
PU5: Using the Internet would give me greater control in my learning process	**0.62**	
PU6: I would find Internet useful for online learning	**0.61**	
Total Reliability: 0.83		

Table 2 *(continued)*

Attitude to Internet Use		
AT1: Using the Internet for learning would be a very good idea	**0.81**	
AT2: Using the Internet for learning would be a very bad idea	**0.76**	**AVE: 0.6**
AT3: In my opinion it would be very desirable to use Internet for learning	**0.74**	
AT4: I like the idea of using Internet for learning	**0.67**	
AT5: I dislike the idea of using Internet for learning	**0.60**	
Total Reliability: 0.70		
Behavioural Intention		
BI1: I intend to use the Internet whenever possible	**0.81**	
BI2: I intend to increase my use of the Internet in the future for learning	**0.67**	**AVE: 0.5**
BI3: Instantly I would adopt the Internet for learning	**0.65**	
BI4: I would adopt the Internet for learning in the future	**0.64**	
Total Reliability: 0.66		
Facilitating Condition		
FC1: I have the resources necessary for using Internet for learning	**0.75**	
FC2: I have knowledge and skills that are necessary for using Internet for learning	**0.70**	
FC3: In my university, my lecturer have been helpful in the use of Internet for learning	**0.68**	**AVE: 0.6**
FC4: In general, my university has supported the use of Internet for learning	**0.66**	
FC5: In my university, there is wireless Internet service for the student	**0.64**	
Total Reliability: 0.72		

Result of the Structural Model of the study

A look at the fit indices of the model of this study in comparison to the common measure shows a not too fitted structural model. However, the purpose of the study was not to have a perfect fit model but to assess the effect size of the independent variable on the dependent variable and to understand the relationship that existed among the construct as it influenced students' adoption of the Internet for educational activities. Figure 1 shows the graphical output of the study's SEM, which was used to answer the hypotheses generated for the study.
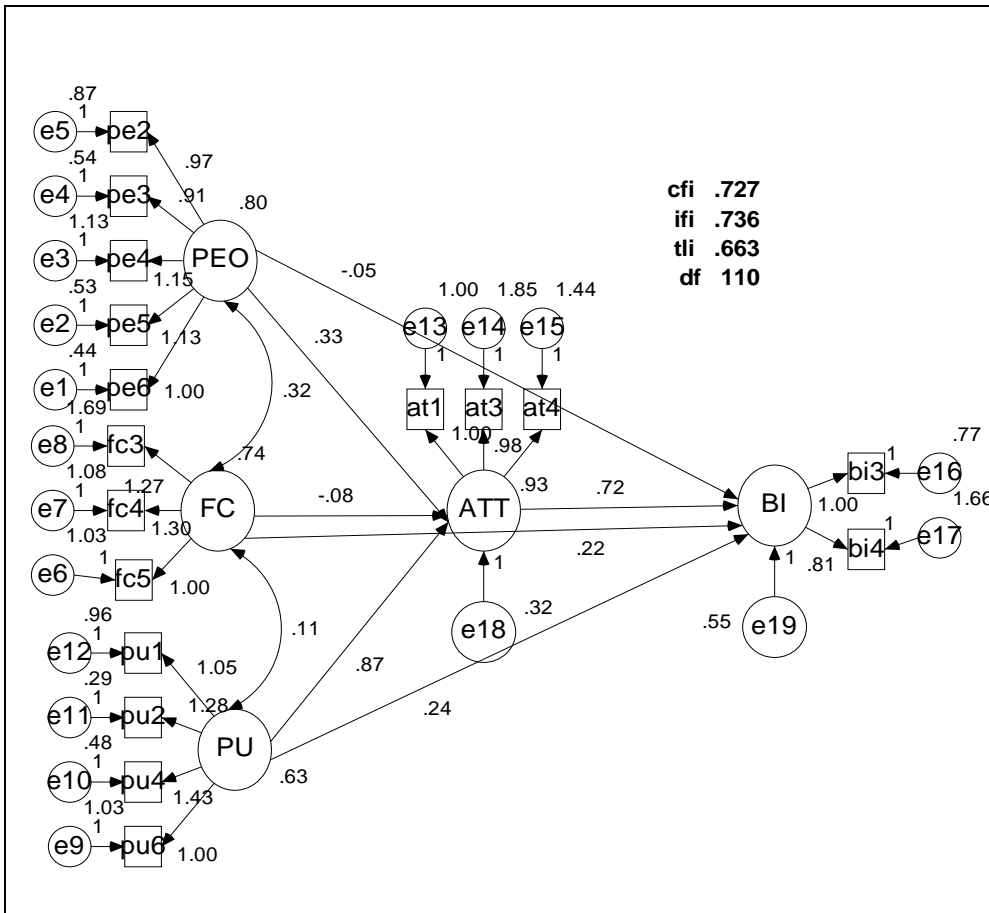

Figure 1   Structural Equation Model output showing the "effect size" of independent variable on dependent variable

The structural output of the model revealed the following results. Perceived ease of use (PEO) shows a negative effect size of beta value of (–0.05) on Behavioural intention. Perceived ease of use (PEO) shows a positive effect size of beta value of (0.33) on attitude. Facilitating condition shows a negative effect size of beta value of (–0.08) on attitude and shows a positive effect size of beta value of (0.22) on attitude. Perceived usefulness shows a positive effect size of beta of (0.87) on attitude and a positive effect size of beta of (0.24) on behavioural intention.

Summary of the graphical results

PEO→BI= –0.05
PEO→ATT= 0.33
FAC→ATT= –0.08
FAC→BI= 0.22
ATT→BI= 0.72
PU→ATT= 0.87
PU→BI= 0.24

Analysis of the Hypotheses of the study

(H1) Perceived ease of use will significantly influence students' attitude to adopt the Internet for learning.
Based on the graphical result of the regression weight of the model above, perceived ease of use significantly influences the attitude of students on the adoption of Internet for learning, with direct effect size of $\beta = 0.33$, at (CR>1.96). This finding shows a good effect size (Kline, 2005). This hypothesis is supported by these findings.

(H2) Perceived usefulness will significantly influence students attitude to adopt the Internet for learning.
The regression weight of the path analysis between perceived usefulness and students attitude shows a large effect size of $\beta = 0.87$, (CR>1.96). This result supports the hypothesis, and the effect size stand-out is the highest compared with the others, which implies that perceived usefulness statistically influences students' attitudes toward the adoption of Internet for learning.

(H3) Facilitating condition will significantly influence students attitude to adopt the Internet for learning.

The regression weight of the path between facilitating condition and students' attitude was statistically insignificant. The regression weight shows a $\beta = -0.08$, (CR>1.96). This result indicates that facilitating condition does not influence students' attitudes; therefore, the hypothesis is not supported.

(H4) Students' attitude will significantly influence their intention to adopt the Internet for learning.

The regression weight between students' attitude and their behavioural intention was statistically significant with weight of $\beta = 0.72$, (CR>1.96). The effect size is on the higher side based on Kline's (2005) suggestion. This hypothesis is supported by these findings.

(H5) Perceived ease of use will significantly influence students' behavioural intention to adopt the Internet for learning.

A look at the regression weight between perceived ease of use and students' behavioural intention shows a weight of $\beta = -0.05$, (CR>1.96), which is statistically insignificant. Therefore, the hypothesis is not supported.

Discussion of the results

The main objective of this study was to understand students' attitudes and their behavioural intentions toward adopting the Internet for learning. The findings from this study have highlighted issues relating to the use of the Internet by the students. The majority of the respondents of the study (n = 96, 58.2%) indicated that they use the campus wireless Internet for educational activities. Similarly, some of the respondents indicated that they use the Internet for research. However, few students indicated that they use the Internet for social interaction and entertainment.

Likewise, the findings of the study revealed that the students perceived the Internet to be useful for learning because the construct (PU) appeared to be the strongest factor influences students' attitudes toward adopting the Internet for learning. This result implies that as long as the university provides wireless Internet, students are willing to utilise it for learning.

Surprisingly, facilitating condition was statistically insignificant in influencing the students' attitude to adoption of Internet for learning. In fact, the effect size is negative. This result suggests that there is no encouragement to facilitate the adoption of the Internet for learning. Perceived ease of use was also found to be insignificant in influencing students' behavioural intentions to adopt the Internet for learning.

Theoretically, this study has further brought attention to what truly influences students' attitudes and their behavioural intention toward adopting the Internet for learning. The results of the study have supported the claims of Davis (1986), Tunku Badariah et al., (2010), Adam, Nelson, and Todd (1992), Burton-Jones and Hubona (2006), Igbaria et al. (1997) and Shittu et al. (2011), who posited that perceived usefulness was a strong determinant of students' attitudes and their intention to adopt the Internet for educational activities. Additionally, our results show that perceived ease of use was an insignificant predictor of the students' intentions to use the Internet, despite some studies that supported the claim of Davis (1989) that perceived ease of use is another determinant of acceptance of IT by users.

Additionally, the results of this study supported the findings of Sumak et al. (2011), who student attitude was a strong determinant of their behavioural intention to use Internet software. While the construct of facilitating condition was a statistically insignificant predictor of students' attitudes toward Internet adoption, it statistically influenced the students' behavioural intentions toward using the Internet for learning. This finding supported Venkatesh et al. (2003) findings that showed that the strong effect of facilitating condition on the adoption of innovation is dependent on the environment receiving support from those who are important users (e.g., the teacher to students, the university administration to faculty members). In the case of a school environment, support services were available.

Conclusion

In conclusion, the study has shown that the usefulness of the Internet was a major predictor of students' attitudes and their behavioural intention to use it for learning. The results of this study show that the students were fully aware of the inherent advantage of the Internet for learning-related

activities, which explains why most of the respondents indicated that they use the Internet for education and research. This study also shows that faculty members and trainers need to assist the students by using the Internet for educational purposes such that the university receives value from its investment in the provisional resources. The findings of this study show that provision of a facility sometimes does not imply usage. Therefore, we recommend that the lecturers and trainers in the university be encouraged to use the Internet for educational purposes via training and retraining on how to effectively use the emerging resources for implementing the university's curriculum. This training will enable both students and faculty members to make use of the unlimited advantages that are inherent in the present information explosion of the Internet age. Using the Internet will equip the students with both skills and competency to face the challenges of modern life.

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