

Measuring Student Teachers' Attitude and Intention toward Cell Phone Use for Learning in Nigeria

Ahmed Tajudeen Shittu, Amosa Isiaka Gambari, (Federal University of Technology, Minna, Nigeria) Raheem Adaramaja Shehu, (University of Ilorin, Nigeria) & Olalere Waheed Raji (Al-Hikmah University, Ilorin, Nigeria)

Abstract

This study examined student teachers' attitude and intention towards cell phone use for learning in Nigeria. The study involves one hundred and ninety (190) trainee teachers in one of the institutes of education in Nigeria. The data for the study was collected through a questionnaire on a rating of five (5) point Likert-type scale. The data collected was used to test the hypothesized model of the study using structural equation modelling approach. The finding of the study revealed that perceived usefulness (PU), perceived ease of use (PEU), subjective norm (SN) and attitude significantly influence students' intention towards adoption of cell phone for learning. The study showed that perceived ease of use stands to be the strongest predictor of cell phone use. The model of the study exhibits a good match with the data and provides an explanation on student teachers' attitude and intention towards cell phone for learning. It was found that cell phone use for learning has its implications on physical and social health of the respondents. Student teachers that adopt the use of cell phones for learning should be well educated on the health implications of its use for learning. Student teachers should select appropriate cell phones that will be adaptive and ensure positive usefulness among learners. The proliferation of cell phones in the market may bring about subjective negative norms among the learners.

Introduction

The use of mobile technology, especially cell phone in education is becoming preponderance in the world today. According to Mahata, Ayub, and Wong (2011), hand held devices like cell-phone is beginning to revolutionizing education as the word M-learning becomes another paradigm shift in teaching and learning process. M-learning is "any educational provision where the sole or dominant technology use for learning is the handheld or palmtop devices" (Mahata et al, 2011). What encourage the deployment of mobile device as teaching tool are its features. Some of the features of cell phone which include facility to call, to make text messages, to take picture, to record audio and video files, to store data, to store movies and more importantly, accessing the internet has made it a useful tool for teaching and learning in the contemporary world. Couple with this, is capability to make learning immediate, expedient, and convenient (Kynaslahti, 2003). In a study conducted to investigate teacher in training use of mobile device by Seppala and Alamaki (2003) revealed that teacher in training enjoyed the convenience of mobile device because it enable them to better manage their time effectively. The teacher in training also reported that they can access the Internet anywhere and at anytime through cell phone, this make it expedient for them to use in their study. It was also reported in the study that they can do whatever they intend to do anywhere, for instance, writing memos, taking picture and sharing their document with others. Mobile device can also support student learning because of its flexibility and mobility. UNESCO (2012) highlights the importance of mobile learning as a technology:

That can be use to facilitate video observations in pre-service teacher training. Teacher education programmes commonly require teachers to record their lessons for evaluation by professors, supervisors and classmates as well as for self-assessment. Because many Smartphones are now equipped with powerful cameras and microphones, pre-service teachers can use mobiles devices in lieu of more expensive video cameras to film themselves teaching a lesson or lesson segment. The lesson can be viewed in real time, using mobile web-conferencing, or the student can upload the video to a server for professors and peers to access at their convenience. Regularly uploading observation videos creates an archive of student performance that professors can use to conduct authentic assessments and provide feedback based on actual classroom experiences. This approach to observation is also practical, as it requires only high bandwidth, Wi-Fi access and a mid-range smartphone. (UNESCO,2012).

There were a lot of studies that have reported the benefits of various technologies use in teaching and learning. Yet, the issue of attitude of student teachers to acceptance and use of cell phone for learning still continue to gain greater attention. As studies on student attitude and intention toward the use of different technologies in today classroom continue to emerge, yet generalizing some of the finding from these studies needs to be done with caution. For instance, Langley (2012) was of the opinion that mobile device should be use as a vehicle of Instruction in the 21st century classroom. The use of mobile device is also filtering into teacher education programs, thereby preparing the teacher from onset of their training so as to be able to effectively deploy the technology to teach their students after graduation (Allen, 2011). Many other technologies like iPads, iPods, and Smart Phone are gaining considerable use in the classroom in the recent time. Therefore, this study becomes imperative because attitude to the use of any technology for a specific purpose or more importantly for a task different from what it was invented for need to be known prior to its use for teaching and learning. For these reason, this study is carried out to explain and gain considerable information on student teachers attitude in Nigeria on cell phone use for learning in the population of this study. Because users attitude differ from individual to individual, organization to organization, population to population, and from one cultural set-up to another, hence the need for empirical information on the strength of student teachers attitude and intention to adoption of cell phone. According to Callum (2013) the continue advancement in mobile technology has created a need for researching into individual difference in beliefs, attitude and skills of user. Therefore, in this study we try to focus on understanding student teachers attitude and intention to cell phone use for learning.

Literature Review

Today classroom is witnessing considerable changes due to the use of emerging technologies. Among the technology that is revolutionized education in the recent time as professed by Prensky (2001) is mobile technology. Several studies has reported that the advent of mobile phone have increasingly enable teachers to practice constructivist approach in their teaching. The constructivism approach in teaching and learning was derived from the work of Piaget (1970) and Vygotsky (1978), this approach encourages the learners to take control of their learning and enable the learner to construct what they learn through their various experiences. Klopfer, Squire and Jenkin (2002) enumerate the potential of mobile devices as follows: (a) Portability, (b) Social interactivity (c) Context sensitivity (d) Connectivity (e) Individuality. The portability of the mobile phone is that it is usable anytime and in any area, the social interactivity of it is that it can be used as tools for learning, information exchanging and cooperation among users, the

context sensitivity of it is that it enable user (students) to acquired real and virtual information from their various location, the connectivity of it is that it can be use for collecting information and Internet connection as well as building environment for collecting and sharing information, for the individuality, the mobile phone can enable learner and teacher to analyze and record each learner learning process (Klopfer et al. 2002).

Reiterating the significant importance of using mobile device for education, Cochrane and Bateman (2010), Vandewaetere and Clarebout (2011) were of the opinion that mobile device use for learning is bringing new paradigm of mobile learning and new pedagogy which invariably leading to authentic learning. There is a rich literature on the benefit of emerging technology in education, including the adoption of mobile devices. However, Naismith, Lonsdale, Vavoula, and Sharple (2005) highlight a number of challenges that may hinder the adoption of mobile technology in learning. Some of these challenges are: The issues of mobility which enable learning to be anywhere and anytime make learning to be outside teacher managed classroom environment. Also, mobile device enable the student to connect and link to activities in the outside world that in most cases do not correspond with teacher agenda and the curriculum.

Even with these limitations, the potential of mobile device such as cell phone in education is attracting researchers' attention in the recent year, because there is little study that focuses on student teacher attitude to its use for teaching and learning, despite the fact that these categories of learner are being prepared to teach 21st century learners. Barbeite and Weiss (2004), Shapka and Ferrari (2003), Solverg (2002) pointed out in their various studies how attitude of users and their previous experience with ICT can impact computer behavior and that there is link between positive ICT attitude and higher ICT use. Though, emerging technology use in education has been studied extensively and evidence from literature has shown that attitude is crucial in determining adoption of new technology. Ajzen and Fishbein (1980) define attitude to "one positive or negative judgment about a concrete subject" and student confidence on ICT can be explained by the attitude and behaviors of their teachers (Yusuf & Balogun 2011). Attitude was further explained to be a predisposition to respond favorably or unfavorably to an object or event (Ajzen, 1988). Several studies have also explained the importance of attitude as a determinant of future classroom use of emerging technology (Van Braak, 2001; Akbaba & Kurubacak, 1999; Clark, 2006; Myers & Halpin, 2002; Huang & Liaw, 2005; Van Braak, Tondeur, & Valcke, 2004).

The study on adoption of cell phone in teaching and learning by Cui and Wang (2008) explained that attitude is an important issue and that school and institutions do have reasons to worry about on cell phone use. Despite the fact that students can abuse its use by playing game on it while in the class, browsing the internet with it while teaching and learning is going on, yet, it use in education should be encouraged (Cui & Wang 2008). A study of 184 student teachers attitude toward computer use for learning by Khine (2001) found a significant relationship between student teachers attitude and computer use in higher institution of learning in China.

In a study carried out by Shittu, Sule and Gambari (2013) on student attitude and behavioural Intention to adopt the Internet for learning in Nigeria shows that majority of the student 58% indicated to use Internet for educational related activities. In another related study on student attitude to technology use especially Podcasting in education by Chester, Buntie, Hammond and

Atkinson (2011) shows that greater percentage of student are favourably disposed to podcasting technology for studying. Similarly, the study of Callum (2011) on student characteristics and variables that determine mobile learning revealed that majority of students agree that mobile learning is a worthwhile tool and that they are ready to adopt it. The study also shows that students strongly agree that if mobile technology is used for teaching them, it would enable them to learn various applications of mobile devices. The students was reported to do well in a mobile supported class, however, they disagree that a mobile device was better than a computer and that they would choose a computer over a mobile device for learning (Callum, 2011). In another study on student attitude toward mobile learning conducted among Malaysian students shows that the respondents have positive attitude towards mobile learning. The students feel that mobile learning should be adopted for their learning (Mahata et al, 2011).

Since attitude is a predictor of future use of any innovation in education, therefore, teacher educators need to know the dimensions of student teachers attitude towards mobile device for learning before integrating the new innovation is used for preparing them for the challenge of their profession in the contemporary world. Aside this, there is few study that focuses on the acceptance of new innovation for teaching among student teachers in Nigeria, it is expedient therefore, to gain insight to the strength of the attitude of teacher in-training to cell phone use for teaching and learning in order to determine their mindset for its future integration to their teaching practices.

This study therefore, is aimed at understanding student teacher attitude toward mobile phone use for learning.

Research Model and Hypotheses of the Study

Figure 1 below shows the research model of the study. The model is specified using TAM as a theoretical foundation for the study. In sum, the model hypothesized that acceptance to use cell-phone for learning by the student can be explained by a number of factors postulated through Technology acceptance model of Davis (1986).

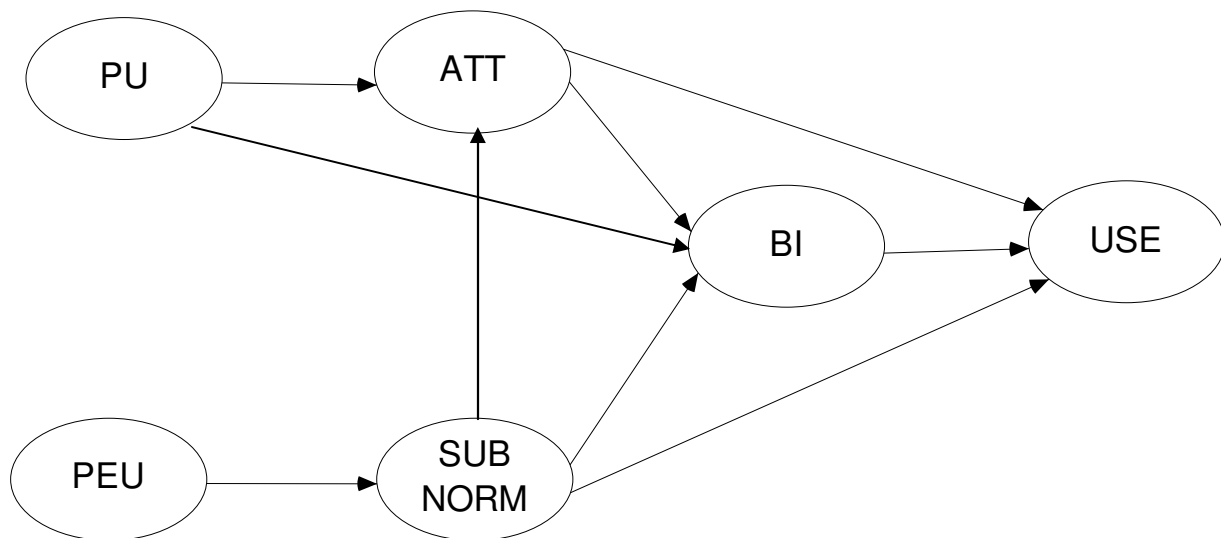


Figure 1:

Hypotheses

Ho₁: Perceive usefulness will positively influence student attitude towards cell-phone use for Learning

Ho₂: Perceive ease of use will positive influence student subjective norm toward cell-phone use for learning

Ho₃: Attitude will positively influence student behavioural intention toward cell-phone use for learning

Ho₄: Subjective norm will positively influence student adoption of cell-phone for learning

Ho₅: Behavioural intention will positively influence student adoption of cell-phone for learning

Ho₆: Attitude will positively influence student use of cell-phone for learning

Ho₇: Subjective norm will positively influence student adoption of cell-phone for learning

Ho₈: Subjective norm will positively influence student attitude on the use of cell-phone for learning

Ho₉: Perceive ease of use will positive influence student attitude toward cell-phone use for learning

Ho₁₀: Perceive usefulness will positively influence student behavioural intention towards cell-phone use for Learning

Methodology

This study was carried-out in the Institute of Education in one of the Nigerian University, and the study involves one hundred and ninety (190) trainee teachers. In the study, cell-phone with internet facility was used for exchanging messages between the students and the lecturer in Introductory to Educational Technology (EDT 205) class. During the fourteen (14) weeks of the lecture (one contact session). Bulk messages on class activities were sent through the internet on weekly basis to trainee teacher. The student received messages related to their studies. The contents of the SMS include: announcements, information on topic to be treated, which include the learning objective of the lesson and sources of the material for the topic. Student teachers were encouraged to seek for clarification on misconception about the topic discussed in the class. Majorly, SMS were used as a supporting medium aside face-to-face class interaction. The use of SMS enables the lecturer to prepare the mind of the students prior to the class activities. Questionnaire were later administered on the students in order to gauge their attitude toward cell-phone which was use to support their instruction.

Instrument

In order to gauge the students' attitude towards cell-phone use for instruction, an adapted research instrument from Technology acceptance model of Davis (1986) was used to gather the data of the study. The participants were asked to respond to statement using a six (6) point Likert scale. The response option range from 1 (Strongly Disagree) to 6 (Agree). Prior to the study, the research instrument was pilot tested, in order to ascertain the validity and reliability of the instrument? The overall reliability of the instrument was (.89) as against Cronbach Alpha Value of (.78) of Mahat et al. (2011) study conducted in Malaysia from where the instrument was adapted.

Validity

The instrument of the study was validated through factor analysis. The items of the study were examined in order to ascertain the dimensionality of the items. The Kaiser-Meyer-Olkin measure of sample adequacy was .83 which is above the recommended value of .6, the Bartlett's test of sphericity was significant ($X^2=(df=28)$ chi-square=1.334, ($p < .000$). In all, the communalities were above .3 with the exception of item 21, this further confirm that each item share some common variance with other items. With this result, factor analysis was conducted with 23 items. Principal component analysis was used as the rotational factor, the initial Eigenvalues showed that the first underlying factor explained student attitude to mobile use for learning was 28.87%, the second factor explained was 36.71%, the third factor is 42.94%, fourth factor was 44.59%, and fifth factor was 48.89%. Based on the rotated component matrix, one item was excluded, using Varimax rotation as the rotation method. A principal component analysis of the items revealed five factors with factor loading exceeding .50 this has meet the minimum criteria (Hair et al. 2006). The factor loadings matrix, Alpha and the Average Variance Explained (AVE) is hereby presented in Table 1.

Table 1:

	ITEMS	SD	M	Loading >.50	Alpha	AVE >.50
BI1	A mobile device is better to use than a computer	1.67	3.69	.59		
BI1	I would do well in a mobile device supported course	1.48	4.33	.50	.62	.55
ADOPT1	Mobile device has assisted my overall learning process this semester	1.40	4.44	.70		
ADOPT2	I can plan better for my learning with mobile device than without it	1.43	4.31	.72		
ADOPT3	Mobile device help me understand the course content	1.29	4.40	.67	.70	.62
ATT1	Overall I believe using mobile learning is very effective	1.25	4.45	.56		
ATT2	I feel using mobile device is a wise idea	1.29	4.34	.66		
ATT3	I like to use mobile device for learning	1.40	4.33	.70		
ATT4	I think it is good for me to use mobile device for learning	1.34	4.33	.67	.80	.64
SUB1	Most people who are important to me would think that using mobile device for learning is a wise idea	1.36	4.03	.62		
SUB2	Most people who are important to me would think that I should use mobile device for learning	1.40	4.07	.76		
SUB3	Most people who influence my behavior would think I should use mobile device for learning	1.30	4.12	.62	.70	.56
PU1	A mobile device is better to use than computer	1.46	4.24	.63		

PU2	Mobile learning can be an effective method of learning as it can give immediate feedback e	1.39	4.52	.68	.70	.55
PEU1	Mobile learning will be more flexible method of learning as it be done anytime, anywhere	1.28	4.45	.63		
PEU2	Poor network may affect it use in our cities	1.22	4.84	.67		
PEU3	Internet support mobile phone may be expensive	1.14	4.69	.72		
PEU4	Mobile learning enable information to be broken into smaller unit and more easy to comprehend	1.07	4.67	.61	.74	.57

Result of the model

The research model of this study was analyzed with structural equation model approach (SEM), using AMOS 6.0 (Arbukle 2006). Maximum Likelihood (ML) was used as the parameters for estimation, prior to testing the model of the study, convergent and discriminant validities of the variables of the study were examined. Factor analysis was conducted and AVE was as well computed to ascertain the overall amount of variance attributable to each variable of the study.

In testing to ascertain the model fit, fit indices from various categories were used (Teo & Koh, 2010). The study used Tucker-Lewis index (TLI), comparative fit index (CFI) and root mean square error of approximation (RMSEA). Schumacker and Lomax (2004) recommended a minimum of .90 for (TLI & CFI), and .08 for RMSEA. The result of this study revealed an acceptable fit for the research with (CFI =.925), (TLI =.901) df= 80 and (RMSEA=.059).

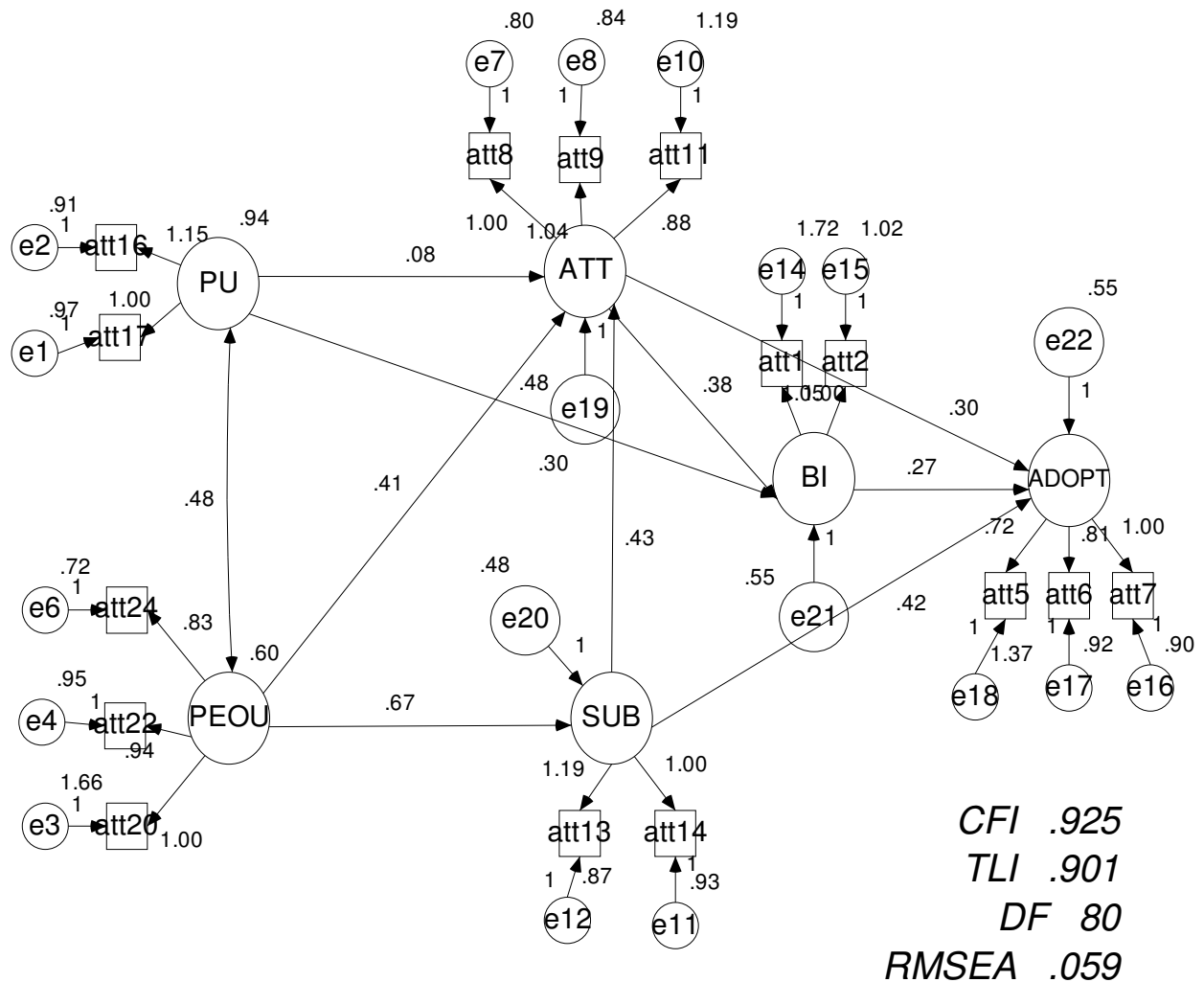


Figure 2: Model results

Table 2: Results of the Hypotheses Test

	Hypothesized Paths	Standardized Path Coefficient	Result
H1	Perceived usefulness → Attitude	0.08	Supported
H2	Perceived ease of use → Subjective Norm	0.67	Supported
H3	Attitude → Behavioural Intention	0.38	Supported
H4	Subjective norm → Adoption	0.42	Supported
H5	Behavioural Intention → Adoption	0.27	Supported
H6	Attitude → Adoption	0.30	Supported
H7	Subjective Norm → Attitude	0.43	Supported
H8	Perceived ease of use → Attitude	0.41	Supported
H9	Perceived usefulness → Behavioural Intention	0.48	Supported

$p < 0.001$; $DF=80$; $RMSEA=.059$; $CFI= 0.923$; $TLI=0.901$

Results of the study

The results of the study indicated that the model was able to account for 30% of the variance on attitude, 48% of the variance on subjective norm, and 55% of the variance on both behavioural intention and final adoption. Furthermore, the result of the path coefficient of the model in-line with hypotheses earlier stated shows that hypothesis 1 (H1) was supported, perceived usefulness positively influence student attitude toward cell-phone use for learning with path coefficient of ($\beta=0.08$, $p<0.001$). Hypothesis 2 (H2) which states that perceived ease of use will positively influence student subjective norm stand validated with path coefficient of ($\beta=0.67$, $p<0.001$). Similarly, Hypothesis 3 (H3) which states that student attitude will positively influence behavioural intention toward cell-phone use for learning equally stand validated with path coefficient of ($\beta=0.38$, $p<0.001$). Consistent with hypothesis 4 (H4) subjective norm positively influence student adoption of cell-phone for learning, with path coefficient of ($\beta=0.42$, $p<0.001$). Similarly, hypothesis 5 (H5) which states that Behavioural intention will positively influence student adoption of cell-phone for learning stand validated with path coefficient of ($\beta=0.27$, $p<0.001$). Hypothesis 6 (H6) of the study which states that attitude will positively influence student adoption of cell-phone for learning was supported with path coefficient of ($\beta=0.30$, $p<0.001$). Hypothesis 7 (H7) which states that subjective norm will positively influence student attitude toward cell-phone use for learning was supported with path coefficient of ($\beta=0.43$, $p<0.001$). In the same vain hypothesis 8 (H8) was supported, subjective norm positively influence student attitude on cell-phone use for learning with path coefficient of ($\beta=0.43$, $p<0.001$). Hypothesis 9 (H9) was supported, perceived ease of use positively influence student attitude toward cell-phone use for learning with path coefficient of ($\beta=0.41$, $p<0.001$). Lastly, hypothesis 10 (H10) which states that perceived usefulness will positively influence student behavioural intention toward cell-phone for learning stand validated with path coefficient of ($\beta=0.43$, $p<0.001$). Overall, all the structural path of the research model are statistically significant.

Modified Structural Equation Model

The research model was modified for further analysis. One of the paths of model was deleted, and the path removed was the path between perceived usefulness and student attitude. After modification, the model still retained its acceptable fit with $p<0.001$, RMSEA= 0.058, $df=0.81$, TLI= 0.90, CFI= 0.92. The modified model revealed 48% variance on attitude and this was explained by perceived ease of use and subjective norm, while 47% variance on subjective norm was explained by perceived ease of use. 55% Variance on behavioural intention was explained by perceived usefulness and attitude, while 55% variance on final adoption was explained by combine effects of attitude, behavioural intention and subjective norm. (See figure 3)

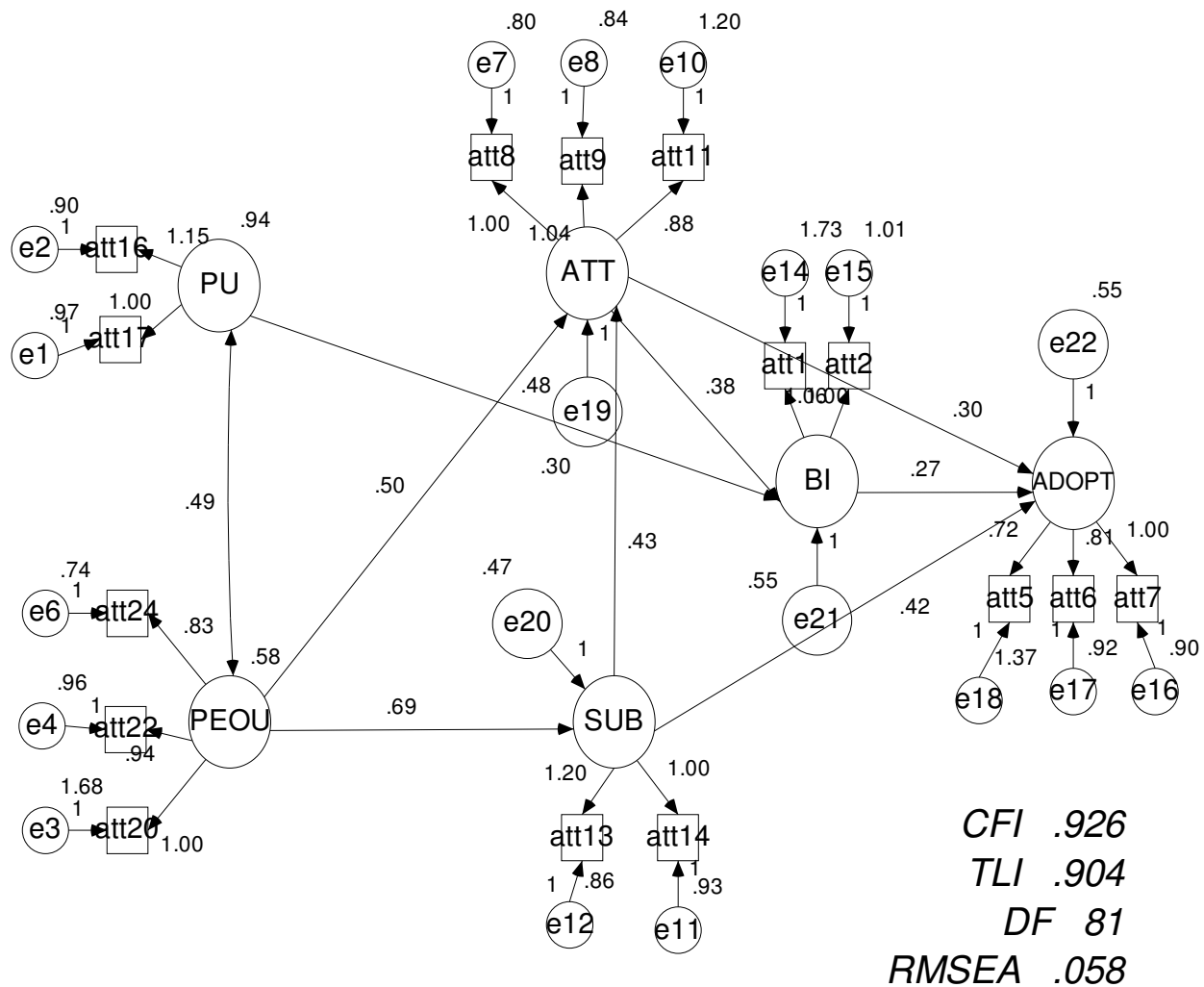


Figure 3: Modified Structural Equation Model

Discussion

The proliferation of mobile technologies in education is becoming a concern in the recent time as researchers try to evaluate students learning and teaching effectiveness of this emerging technology. In this study, we sought to measure student-teacher attitude toward cell-phone adoption for learning. The findings of this study shows that perceive usefulness positively influence student attitude to cell-phone adoption, though the influence is not a strong one. The finding of the study also shows that perceived usefulness positively influence student behavioural intention, this finding was congruent with result from other study. This study also revealed that student attitude positively influences their behavioural intention, and final adoption of cell-phone for learning. The finding of attitude on adoption was consistent with the study of (Cui & Wang, 2008; Shittu et al. 2013).

Another important finding of this study was that perceived ease of use positively influences student attitude and their subjective norm on adoption of cell-phone for learning. In fact, the influence of perceived ease of use stands to be the strongest influence of the study. The finding could be as a result of the previous usage and the student familiarity with the technology.

Another note worthy finding of this study is that subjective norm positively influence student attitude toward cell-phone adoption for learning. What this suggested is that student teacher have good disposition to integration of cell-phone for learning. The good disposition and readiness of student teacher for integration of cell-phone could have account for the finding that shows positive influence of their subject norm on final adoption of cell-phone for teaching and learning process.

Conclusion

Taking into consideration the role that the teacher in training will perform for the society after graduation and the challenges of education amidst several technologies being deploy to facilitate teaching and learning process in the contemporary world, this study provides rich information on student teacher attitude toward cell-phone adoption for learning in Nigeria. Presently, there is growing concern among educators on how best to use emerging technologies to support learning vis-à-vis the general attitude of teachers to integration of technology that are seen as a normal part of our everyday life (Naismith et al. 2005). This study shows what cell-phone use may likely becomes in the hand of educators in the nearest future in Nigeria, due to the positive attitude of the student teacher to mobile adoption for learning.

References

- Barbeite, F.G., & Weiss, E.M (2004). Computer self-efficacy and anxiety scales for Internet sample: testing measurement equivalent of existing measures and development of new scale. *Computer in Human Behaviour*, 20(1), 1-15.
- Ajzen, I. & Fishbein, M. (1980). *Understanding attitudes and predicting social behavior*. Prentice Hall, Englewood Cliffs, New Jersey.
- Ajzen, I. (1988). *Attitude, personality, and behavior*. Chicago IL: Dorsey Press.
- Akbaba, S. & Kuruback, G. (1999). Teachers' attitude towards technology. *Computer in the Social Studies*, 7(2), 833-836.
- Allen, R. (2011). Can mobile devices transform education? *Education Update*, 53 (2). 2, 6-7.
- Chester, A., Buntie, A., Hammond, K., & Atkinson, L. (2011). Podcasting in education: Student attitudes, behavior and self efficacy. *Educational Technology & Society*, 14 (2), 236-247.
- Cochrane, T. & Bateman, R. (2010). Smart-phone give you wings: Pedagogical affordances of mobile web 2.0. *Australian Journal of Educational Technology* 24, 1-4.
- Cui, G. & Wang, S. (2008). Adopting cell phone in EFL teaching and learning. *Journal of Educational Development and exchange*. Vol, (1) pg. 69-80
- Davis, F.D. (1986). *A technology acceptance model for empirically testing new end-user information system: Theory and results*. Unpublished doctoral dissertation, MIT, Sloan School of Management Cambridge, MA.

Hair, J., Black, B., Babin, B., Anderson, R. & Tatham, R. (2006). *Multivariate data analysis (6th edition)*. Upper Saddle River, NJ Prentice-Hall.

Huang, H.W., & Liaw, S.S. (2005). Exploring users' attitudes and intention toward the web as a survey tool. *Computer in Human Behaviour*. 21 (5). 729-743.

Khine, M.S. (2007). Attitudes toward computer among teacher education students in Brunei Darussalam. *International Journal Instructional Media*, 28 (2). 147-153.

Klopfer, E., Squire, K., & Jenkin, H. (2002). *Environmental detectives: PDA's as a window into a virtual simulated world*. Proceeding of IEEE International workshop on wireless and mobile technologies in education. (WMTE) 95-9