

## **Self-concept, computer anxiety, gender and attitude towards interactive computer technologies: A predictive study among Nigerian teachers**

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### **ABSTRACT**

Interactive Computer Technologies (ICTs) have crept into education industry, thus dramatically causing transformation in instructional process. This study examined the relative and combined contributions of computer anxiety, self-concept and gender to teachers' attitude towards the use of ICT(s). 454 Nigerian teachers constituted the sample. Three instruments were used to collect the data analysed with Pearson Product Moment Correlation, Multiple Regression and Analysis of Variance. The findings revealed that the combination of the three independent variables significantly predicted the independent variable. Gender did not make any significant contribution to the prediction of the dependent variable. Recommendations were made based on findings.

### **INTRODUCTION**

Globally, Information and Communication Technology is rapidly becoming an accelerator of political, economic, social and educational globalisation. Computer technology is the engine of the modern civilisation and the driving force of the information age (Ituen, 2009). In today's global and competitive environment, Interactive Computer technology (ICT) is becoming a widely accepted tool for multi-facet development in view of the flexible, quality services it offers and the potential to revolutionize the traditional education system. According to Albirini (2004) and Bakar and Mohamed (2008), the last two decades have witnessed a proliferation of these computer technologies in education landscape. In developed countries, the use of individual response pads to promote interaction in the class and the use of Internet to provide course content is becoming more popular (Eastman, 2007; Guthrie & Carlin, 2004). Similarly, Interactive Whiteboards, hand-held mobiles such as Palm and Pocket PCs, PDAs and mobile phones are being used for teaching, learning and assessment purposes (Beeland, 2002; Karadeniz, 2009). As a matter of fact, the rapid change Interactive Computer technology is bringing to teaching and learning is almost un-believable because the learning scenario is imperceptibly like never before. In the new millennium, the tendency to stop this avalanche of change seems invisible.

Across the globe, teachers' roles and power of influence can not be undermined in the successful implementation and sustainability of innovations or national reforms (Albirini, 2004; Baylor & Ritche, 2002). In the same vein, the level of success in ICT integration in schools is not dependent on quality or sophistication of the technology, but rather on the teachers' readiness and positive disposition (Deniz, 2007). For quality to be achieved in education sector, teachers must be responsive to the modern teaching demands by getting acquainted with technology use. Since the focus of learning has changed from teacher-centred approach to learners-centred, government and agencies of education in various nations are not investing heavily to procure more computers in schools so as to ensure increase access and use as needed (Papanastasiou & Angeli, 2008). It is rather unfortunate that in developed and developing countries, despite increasing technology innovations and increase procurement, computers are still under-utilised in most schools (Jung, 2001).

Just like most African countries, the mode of instruction in Nigerian schools was paper-based. Such a system could only equip learners with what they ought to live with in the early 50s and 60s rather than in the present technological advancement age. Nigeria indeed came late into the adoption of ICT. Computers were introduced into Nigerian education system in the late 80s in accordance with the outcome of the 32<sup>nd</sup> ministerial council meeting of the National Council of education in 1987. This curriculum innovation then was meant to expose Nigerian students via teachers to a working mechanism and effective use of computers to solve emerging problems. The National Policy for IT in 2001 was a giant stride entry point of governments' appreciation of ICT in schools at all levels (Yusuf, 2005).

Jegede and Owolabi (2005) reported that the National Council for Accreditation of Teacher Education in Nigeria equally emphasises the integration of technology into education system in order to prepare an average Nigerian student for the 21<sup>st</sup> century. In a bid to assist and position the educational status of Nigeria positively, some states and the Federal Capital Territory have since ceaselessly embarked on extensive training for teachers to ensure that they are empowered to tackle the challenges encumbering students' acquisition of computer-technology. In view of these developments, computers as learning tools are becoming indispensable in most Nigerian schools. The use of computer technology is on the increase in Nigeria, but it seems that the extent of its adoption, effective integration and utilisation for positive output in education is slow and are becoming issues of major concern to the education stakeholders in the nation.

To therefore revamp the education system, there is the need to produce technologically literate workforce with positive disposition to technology use and reasonable competency of performing in a borderless knowledge-based economy. In order to determine teachers' attitudes towards computers, this study has therefore employed two frameworks. The first is the Technology Acceptance Model. The Technology Acceptance Model (TAM) according to Davis (1989) cited in Brown, Park and Jung (n.d) is the extent at which the perceived ease of use and perceived usefulness predict the attitude towards the use of a technology, while attitude towards use is a signpost of individual's intention to use, which then indicates the actual use of the technology. Another framework given consideration in determining attitude in this study is the Socio Cognitive Theory of Bandura which emphasises that the self-system of an individual is a dictator of his thoughts, feelings, emotions, and readiness to learn. This of course is a resultant effect of the inter-play between the self-system and the environment.

Having an assessment of teachers' computer attitudes has a direct link with the tendency to understand and determine their technology adoption and integration capabilities in the education system. As a matter of fact, the successful integration of computers in educational environments does not only depend on students' attitudes towards them, but also that of their teachers. Attitudes are precursors of behaviours and behavioural intents. Positive disposition towards computers is a prerequisite as well as a catalyst to acquiring a high level of computer literacy and successful pedagogical use of technology (Francis, Katz, & Jones, 2000). Literature shows that some identified factors inhibiting teachers' positive disposition towards computers include computer experience (Garland & Noyes, 2004); locus of control (Rovai & Childress, 2003); age (Pope-Davis & Twing, 1991); attributes of technology (Rogers, 1995) and external factors (Norhayati, 2000). Meanwhile, Teo (2008) found a positive disposition towards computer use among the 139 pre-service teachers studied in Singapore. Similarly, Kumar, Che Rose and D'Silva (2008) in a study of 318 Malaysian teachers' attitude towards and confidence in computers discovered that there was a relationship between attitude towards computer use and level of computer training and frequency of use. Pope-Davis and Twing (1991) investigating the influence of some variables on 207 college students' attitude to computers found that attitude to computers is influenced by age and computer experience.

Computer anxiety levels of teachers are significant in the consideration of the integration of computer technology into teaching and learning. Anxiety is a long term physiological construct. The issue of computer anxiety according to Russell and Bradley (1997) has always existed naturally because of human innate suspicious tendencies towards innovations. Raub (1981) described computer anxiety as the complex emotional reactions that evoked in individuals described who interpreted computers as personally threatening. Chua, Chen and Wong (1999) defined computer anxiety as fear expressed towards computers while using it or when an individual is about to use it. However, it is worth mentioning that a pragmatic total elimination of cyberphobia is seemingly impossible, but the identification of the levels and strategies for their reduction are likewise relevant and significant. Computer anxiety directly and indirectly influences an individual's choice of learning about computers and achieving a reasonable level of competency in computers. Morgan (1997) and Brosna and Davidson (1996) observed that a computer anxious person experiences emotions associated with anxiety such as fear, embarrassment, disappointment, irritation, frustration, awkward feelings, feeling of retrogression in task performance, computer avoidance, fear of losing control, sweaty palms, chest pain, trembling etc.

Studies have shown that there is a relationship between computer anxiety and some other variables such as age (Namlu & Ceyhan, 2002); frequency of computer use (Necessary & Parish, 1996); computer experience (Yaghi & Ghait, 2002); neuroticism (Anthony, Clarke & Anderson, 2000) and individual's appraisal of computing situation (Cable, Brodzinski, Scherer & Jones, 1994). Furthermore, Russell and Bradley (1998) in a study of computer anxiety among 350 primary and secondary school teachers in Australia found that teachers' perception of computer usefulness is associated with individual's level of computer anxiety. In a study on computer achievement, attitude and anxiety among 75 Taiwanese computer students, Tsai and Tsai (2003) found a significant association between students' meta-cognitive skills, computer achievement and their level of computer anxiety. It is imperative to note that if teachers' ability is the engine that drives technology integration, then a motivational construct such as self-concept can be thought of as the fuel for the engine. Irrespective of the weight, size or quality of the engine, without fuel, the engine (or in this case, the teacher) is going nowhere. Self-concept is an individual's internal representation of who he/she is (Malle, 1999). According to Hattie (1992), self-concept is the product of all an individual's self-belief and self-evaluation. It is the universal understanding a sentient being has of oneself. Self-concept has been emphasised as a key indicator of an individual's attitudes, behaviour, and coping abilities. A positive self-concept is equated with positive evaluation, while negative self-concept is associated with negative evaluation. Furthermore, researchers (Huitt, 2004) found that individuals with poor self-concept tend to blame failure on external causes and take full credit for successes. Self-concept is a significant predictor of performance, while task goals were associated positively with self-concept, and self-efficacy while performance-approach goals were also associated positively with self-concept; and performance-avoid goals were associated negatively with self-concept, while it has been noted that "I can" attitude empowers individual to make choices, try new things and strive for success.

Sociological theorists view gender as a socio construction rather than being biological. According to Bandura (1999), the socio cognitive theory recognises the influence of environment and observational learning on human adaptation and change. Not all people of the same gender behave the same way; the challenge is to interpret the adaptation diversity within socio-cultural commonality. The introduction of ICT into education has created a new dimension of social stereotypes and gender inequalities (Reinen & Plomp, 1996). The orthodox and conventional gender disparities that existed in science related subjects are now being extrapolated into ICT. Anderson (n.d) remarked that males often see computers as exclusively as male domain and further stressed that it is obnoxiously assumed that males are generally intrinsically able in

computer use. What exists in some schools especially in developing nations is that females still grapple with lack of access to technology and lack of few female role models working with ICT.

Earlier empirical findings about gender and computer attitude reveal that Pope-Davis (1991) found no significant gender differences in college students' attitude toward computer. Similarly, Birisci, Metin and Karakas (2009) also found that among 191 prospective elementary school teachers in Turkey, there was no significant difference in their attitude towards computers based on gender, but female participants in the study were more positively disposed to using Internet than men. Literature reviewed further reveal that female are more anxious or less experienced, less confident in ICT competence (Rekabdarkolaei & Amuei, 2008); majority of positions relating to computers are occupied by male teachers (Reinen & Plomp, 1996); there was no relationship between gender and teachers' computer use (Mehloff, 2001); and female teachers are more nervous and less confident about their computer skills (Hakkarainen, 2000 cited in Namlu & Ceyhan, 2002).

Students are getting used to the various modern technologies ranging from electronic games to the World Wide Web, hence on a daily basis their expectations about their teachers' integration of these technological innovations is on the high rate. Without doubt, teachers' attitudes towards such devices have a far-reaching influence on effective utilisation of such technology in educational setting for improved quality out-put. In the same direction, discovering teachers' attitude towards ICT assists a lot in diagnosing existing problems in the instructional process and possible area to explore in order to help teachers. Meanwhile, there has been a dearth of studies on the combination of the three independent variables of this study to predict teachers' attitudes towards computer technologies even in Nigeria. It is on this premise that this study seeks to examine the contributions of computer anxiety, self-concept and gender to teachers' attitude towards Interactive Computer Technology.

## **RESEARCH QUESTIONS**

To achieve the objective of this study, two research questions were formulated:

1. What is the combined contribution of computer-anxiety, self-concept, and gender to the prediction of teachers' attitude towards Interactive Computer Technologies?
2. What is the relative contribution of computer-anxiety, self-concept, and gender to the prediction of teachers' attitude towards Interactive Computer Technologies?

## **METHODOLOGY**

### **Design**

The study adopted a descriptive survey research design to find out the prediction of the criterion variables on the teachers' attitude towards Interactive Computer Technologies.

### **Participants**

Participants in this study were 454 (males 298 = 65.63%; females 156 = 34.36 %) secondary school teachers from Ogun East senatorial district of Ogun State. Out of the nine Local Government Areas (L.G.A.) that make up senatorial district, four (Ijebu-North, Ijebu-North East, Ijebu-Ode, and Ikenne) LGAs were selected via a simple random sampling technique. 35% of the secondary schools in these local government areas were also selected by simple random technique through balloting. And through this process, 150, 99, 153, and 52 teachers were

respectively selected from the local governments through simple random sampling method. The Mean Age and the Standard Deviation of the respondents were 29.6 and 8.08 respectively.

## **Instruments**

### ***Self-Concept Scale (SCS)***

The self concept instrument used in this study was originally developed by Cambra and Silvestre (2003). The adapted scale consists of 23 items (Yes /No), which are connected to three dimensions of self-concept (academic, social and physical). The instrument was re-worded to reflect measuring teachers' self-concept in that the original instrument was structured to measure the self-concept of students. Items 14, 9, 13, and 17 were targeted towards measuring teachers academic self-concept, while items 3, 5, 7, 8, 10, 12, 1, 16, 18, 21, 22, and 23 were raised to assess teachers' social self-concept and items 2, 6, 11, 15, 19, and 20 were generated to measure teachers' physical self-concept. The instrument was given to two test-items analysts in order to establish its face and content validity. Over previous studies, the original scale Cronbach coefficient alpha was 0.806 and 0.75. The reliability of the scale is ascertained in this study with a Cronbach coefficient alpha of 0.73.

### ***Computer Anxiety Scale (CAS)***

The teachers' computer anxiety was measured by a 19 item self-reported Computer Anxiety Rating Scale designed and validated by Heinssen, Glass and Knight (1987). The word "rating" in title of the adapted instrument was stepped-down for the purpose of use in this study. The tool elicited information about participants' feeling of competency and anxiety with respect to computer usage. The participants responded on a 4-point Likert scale (from strongly agree = 1, to strongly disagree = 4). The instrument was given to two educational technologists and a psychometrician for validity assessment, while the adapted instrument has a test re-test reliability of .79.

### ***Attitude to Interactive Computer Technologies Scale (AICTS)***

To measure teachers' attitude towards Interactive Computer Technologies, a researcher's self-designed scaled named Attitude to Interactive Computer Technologies Scale (AICTS) was used. The instrument measured the attitudes of participants towards computer technologies based on the perceived ease of use and perceived usefulness of computers. The questionnaire comprised 20 items and each item was structured in 4-point Likert scale ranging from a score of 1 to 4, with 1 = "strongly disagree and 4 = strongly agree. Two teachers of educational technology and a psychometrician to scrutinised the items of the scale in order to ascertain its validity. Their observations and comments were given due consideration before the final draft of the instrument was produced. The questionnaire was pilot tested on a group of teachers (N= 35) teaching within the axis of Ogun-East senatorial district but not within the schools selected for this study. The Cronbach coefficient alpha of the instrument was .81.

## **Procedure for Data Collection**

The questionnaires were administered to teachers in all the selected schools with the support of eight research assistants. Copies of the instruments were given to teachers in the schools after due permission had been granted by the school principals. 285 copies (62.7%) of the instruments were retrieved at the first contact-week with the teachers in various schools, while the remaining copies were retrieved at appointed days within a period of one month.

## Data Analysis

This study utilised descriptive statistics such Simple Percentage, Standard Deviation to reflect the features of the variables (attitude towards ICT, computer anxiety, self-concept and gender). Meanwhile, in order to make judgement on the probability that the observed differences in the predictive power of the independent variables on the dependent variable in this study might have happened by chance, inferential statistics such as Analysis of Variance, Pearson Product Moment Correlation, and Multiple Regression were used for the data analysis at 0.05 level of significance.

## RESULTS

This study was directed towards addressing two main issues. First was to determine the extent of the combined contribution of the predictor variables to the criterion variable. The next issue was to find out the predictor variables that best contributed to the prediction of the criterion variable. The results of the data analysis are presented below.

The results of the data analysis indicating the mean and standard deviation of all variables are shown in Table 1.

**Table 1:** Descriptive Statistics and Correlations Matrix for the relationship between the Predictor variables and the Criterion Variable

	Mean	Std. Dev.	Attitude Towards ICT	Computer Anxiety	Self-Concept	Gender
Attitude towards ICT	56.6520	8.24447		.592*	-.489*	.3370*
Computer Anxiety	55.9515	7.37530	.592*		-.565*	.482*
Self-Concept	43.8018	7.66175	-.489*	-.565*		-.462*
Gender	55.5110	7.37530	.370	.482*	-.462*	

The results of Table 1 indicate the Means and Standard Deviations of the responses of the participants. The respondents' attitude towards Interactive Computer Technology (M= 56.6520; SD= 8.24447); computer anxiety (M= 55.9515, SD=7.37530); self-concept (M= 43.8018, SD= 7.66175); and gender (M= 55.5110, SD= 7.37530). Meanwhile, the matrix of correlation between the three independent variables (computer anxiety, self-concept and gender) and the criterion variable (attitude towards Interactive Computer Technology) is also shown in Table 1 above. Attitude towards ICT correlated positively and significantly with computer anxiety (.592) and gender (.482), but negatively and significantly correlated with self-concept (-.489). Computer anxiety correlated significantly but negatively with self-concept (-.565), but positively and significantly correlated with attitude towards ICT (.592) and gender (.482). Self-concept correlated significantly but negatively with attitude towards ICT (-.489), computer anxiety (-.565) and gender

(-.462). Gender correlated significantly and positively with attitude towards ICT (.370) and computer anxiety (.482), but correlated significantly and negatively with self-concept (-.462).

**Table 2:** Summary of Multiple Regression Analysis between the Predictor Variables (computer anxiety, self-concept and gender) and the Criterion Measure (attitude towards Interactive Computer Technologies)

**Multiple R (Adjusted) = .623**  
**Multiple R<sup>2</sup> (Adjusted) = .388**  
**Stand error estimate = 6.47065**

Source of variation	Df	Sum of Squares	Mean Square	F-Ratio	P
<b>Regression</b>	3	11949.813	3983.271	95.136	.000
<b>Residual</b>	450	18841.200	41.869		
<b>Total</b>	453	30791.013			

- Predictors: (constant), computer anxiety, self-concept, gender
- Dependent Variable: attitude towards interactive computer technologies

The results in table 2 shows that the independent variable (computer anxiety, self-concept and gender) combined to contribute a coefficient of multiple regression (R) of 0.623 and a multiple correlation square of 0.388. By implication, 38.8% of the total variance of the participants' attitude towards Interactive Computer Technologies is accounted for by the combination of the three variables. In addition, the table also reveals that the analysis of variance of the multiple regression data produced an F-ratio value significant at 0.05 level ( $F(3,453) = 95.136; P < 0.05$ ).

To determine the contribution of the three independent variables in the prediction of teachers' attitude towards Interactive Computer Technology, a stepwise regression analysis was taken and the results are shown in Table 3.

**Table 3:** Stepwise Multiple Regression Analysis Model Summary and Analysis of Variance of the Predictor Variables and the Criterion Variable

Model	R	R <sup>2</sup>	Adjusted R <sup>2</sup>	Standard Error of Estimate	Change Statistics				
					R <sup>2</sup> Change	F Change	df1	df2	Sig. F Change
<b>a</b>	.592	.350	.349	6.65193	.350	243.872	1	452	.000
<b>b</b>	.621	.386	.383	6.47599	.035	25.893	1	451	.000

- Predictors: (constant), computer anxiety
- Predictors: (constant), computer anxiety, self-concept
- Dependent Variable: attitude towards interactive computer technologies

The results in table 3 revealed that only computer anxiety and self-concept significantly predict teachers' attitude towards Interactive Computer Technology (ICT). When computer anxiety was entered into the model as the first predictor variable based on the strength of relationship with

teachers' attitude towards ICT,  $R^2$  change accounted for 35.0% of teachers' attitude towards ICT ( $F_{1, 452} = 243.872$ ,  $R = .592$ ,  $R^2 = .350$ ;  $P > 0.05$ ). When self-concept entered into the model as the second predictor, there was a contribution of 0.036% to the teachers' attitude towards Interactive Computer Technology ( $F_{1, 451} = 25.893$ ,  $R = .621$ ,  $R^2 = .386$ ;  $P < 0.05$ ), while gender could not enter the model to make any significant contribution to the prediction of teachers' attitude towards Interactive Computer Technology. This revealed that computer anxiety and self-concept as predictor-variables together predicted 38.6% of the variation of the teachers' attitude towards Interactive Computer Technology.

The data were subjected to further analysis using Multiple Regression Analysis (MRA) with all the variables entered into the model at the same time to determine the relative contribution of the predictor variables; computer anxiety, self-concept and gender to the criterion variable; teachers' attitude towards ICT. Results of the MRA analysis that was tested at .05 significance level indicating the Beta coefficients and t-ratio are presented in Table 4.

**Table 4:** Coefficient and t-value of the Regression of the Predictor Variables to the Teachers' Attitude towards Interactive Computer Technologies

Model	Un-standardised Coefficient		Standardised Coefficient	t-ratio	P
	B	Std. Error	B		
(constant)	38.389	4.361		8.803	.000
Computer Anxiety	.518	.050	.463	10.364	.000
Self-Concept	-.245	.048	-.228	-5.088	.000

a. Dependent Variable: attitude towards interactive computer technologies.

The results presented in Table 4 show that computer anxiety ( $\beta = -.463$ ,  $t = 10.364$ ,  $P = < 0.05$ ) was the potent predictor of the teachers' attitude towards Interactive Computer Technologies. While self-concept ( $\beta = -.228$ ,  $t = -5.088$ ,  $P = > 0.05$ ) made the second-best contribution to the prediction of teachers' attitude towards Interactive Computer Technologies when gender made a non-recognisable contribution to the prediction of the outcome measure. By implication, it is evident that gender disparity in technology usage is fading out of focus and getting far from being an issue of contention. This step of the analysis was done to show evidence of relative relevance of the independent variables in accounting for the variations in teachers' attitude towards Interactive Computer Technology.

## DISCUSSION

This study investigated the relative and combined contributions of computer anxiety, self-concept and gender to the prediction of teachers' attitude towards Interactive Computer Technologies. The results revealed that the three predictor variables combined to predict teachers' attitude towards Interactive Computer Technology. The observed F-ratio of 95.136 significant at .05 level is reliable evidence that the combination of the independent variables (computer anxiety, self-concept and gender) in the prediction of teachers' attitude towards Interactive Computer Technologies was neither a game of chance nor accidental. It is evidently clear that the coefficient of multiple regression of .623 and a multiple R square of .388 indicates the magnitude of the relationship that exists between the independent variable and the criterion variables.



Inferring from the results available in Table 2, the linear relationship of the three predictor variables accounted for 38.8% of the total variance in the teachers' attitude towards Interactive Computer Technology.

There seems to be a dearth of research on the combination of the three independent variables of this study (computer anxiety, self-concept and gender) to predict teachers' attitude towards Interactive Computer Technologies. However, seemingly corresponding with the outcome of this study is the finding of Namlu and Ceyhan (2002) that individuals who perceive themselves as computer introverts do have a higher level of computer anxiety and thus tend to exhibit unwelcoming attitude towards computer use. Meanwhile, that computer anxiety, self-concept and gender jointly predicted teachers' attitude towards Interactive Computer technology is not out of place because this outcome is more or less a reflection of natural phenomena and psychological tendencies in man that individuals especially females who perceive him/herself inferior towards carrying out a task often feel jittery and thus exhibit unpleasant or unfriendly attitude when faced with the challenges of performing such tasks.

The results about the relative contributions of each of the independent variables to the prediction of the dependent variable show that when computer anxiety was first entered into the model as the predictor variable in its relationship with the criterion variable, a significant prediction was revealed ( $F_{1, 452} = 243.872$ ,  $R = .592$ ,  $R^2 = .350$ ;  $P > 0.05$ ). By implication, this result shows that computer anxiety singularly contributed 35.0% towards the prediction of teachers' attitude towards Interactive Computer Technology. When self-concept was entered into the model as the next predictor variable, a significant prediction of 38.6% was revealed ( $F_{1, 451} = 25.893$ ,  $R = .621$ ,  $R^2 = .386$ ;  $P < 0.05$ ). The results however imply that self-concept made a contribution of 0.036 to the prediction of teachers' attitude towards Interactive Computer Technology. Meanwhile, gender as a variable did not make any observable contribution to teachers' attitude towards Interactive Computer Technology. In a nut-shell, the results indicate that computer anxiety is the potent predictor of teachers' attitude towards ICT while gender is an insignificant-non-observable least predictive variable of this study.

It is a significant research outcome that computer anxiety in this study is the significant potent predictor of teachers' attitude towards Interactive Computer Technology. One may be prompted to infer from the outcome of this study that many Nigerian secondary school teachers are still seemingly techno-phobic; hence their uptake of computer technology skills for onward transfer into the education system is relatively slow, low and insignificant. The reasons for this is not far-fetched because teachers who are apprehensive about computers and would be restricted in their level of interaction with computers, and this may have ripple effects on quality of education; their attitude may be contagious to their students, student's academic goals may be disrupted and the entire education quality abased. The outcome of this study is in consonance with the previous research (Papanastasiou & Angeli, 2008; Pelgrum & Plomp cited in Russel & Bradley, 1997).

The results of this study further revealed that self-concept significantly predicted the teachers' attitude towards Interactive Computer Technologies. It is quite obvious that the issue of "self" assessment in relation with "performance" is important because no individual can out-perform himself or herself. What an individual thinks about his/her ability of performance in a thing, an event, or a task dictates his/her attitude (positive or negative) towards such. By implication, what many teachers think about themselves in relation to computer use often dictate their attitude towards the acceptance, acquisition of knowledge and skills, integration and effective use of computer technology, hence the relevance of this outcome in educational technology arena. Corroborating the outcome of this study are the findings of Russell and Bradley (1997) who reported that teachers' opinion about their ability to use computers has a relationship with their attitude towards computers. Similarly, Deniz (2007) found that teachers who see themselves as being computer competent and confident are more favourably disposed to computer usage.

Another major outcome of this study is that gender as a variable did not contribute to the prediction of teachers' attitude towards Interactive Computer technologies. This outcome indicate that in the present age, male teachers do not have an edge over their female counterpart in their attitude to computer use, and that teachers' attitude towards computer technology could be determined or predicted by other variables but not gender. The outcome of this study coincides with previous research (Ocak & Akdemir, 2008). The non-predictive power of gender to the dependent variable is a challenge to previous studies which have long reported male bias in attitude towards computer (Sadik, 2006; Schumacher & Morahan-Martin, 2001; Volman & Eck, 2001; Yildirim, 2000)

### **CONCLUSION AND RECOMMENDATIONS**

In order to revamp the education system, there is the need to produce a technologically literate workforce viewed competent to rise up to the challenges of the technological innovations. There is no doubt about the fact that ICT is making continuous changes in the society. Therefore, the education industry of developing nations such as Nigeria should by all means foresee these changes, take the right-immediate steps and re-package the education spectrum because it is too late for any schools to be behind the bar of technological innovations and advancements. In view of this, teachers must in earnest strive to acquire the necessary knowledge and technical skills for computer use and adopt computers as prominent pedagogical tools.

Government at various levels should equip teachers with the necessary tools such as computers, computer laboratories, and technical assistance that would enhance their computer literacy. Since frequent use of computers is an antidote to computer anxiety, Ministries of Education should endeavour to ensure that schools are internet networked so as to encourage more teachers' access to computer technologies for present and future use. Furthermore, government through the various Education Officers in each state's zones should ensure that the teaching of all subjects in the schools witness a paradigm shift from the conventional pedagogy to paperless classroom, while more efforts are intensified on training and the re-training of teachers in computer usage to alleviate their fears of computer use and to boost their career capacity development.

### **SUGGESTIONS FOR FURTHER RESEARCH**

It is pertinent to mention that this study is not all in all. Therefore, it is suggested that other scholars could concentrate on teachers of other sectors of education such as primary and institution of higher learning. In the manner, the geographical scope of subsequent research can be widened so as to give room for a higher tendency of result generalisation. In addition, to determine teachers' attitude towards ICT, the predictive power of some other psychological construct such as locus of control, social emotion and cognition could be researched into. This study can also be replicated in other social and cultural context different from Nigeria.

### **REFERENCES**

- Albirini, A. 2004. "Teachers' attitude toward information and communication technologies: the case of Syrian EFL teachers". *Computers & Education*, vol. 47, no. 4, pp. 373-398.
- Anderson, N. (n.d.). "Why aren't Australian girls getting into IT?" Accessed 25 March, 2009 from <http://www.faess.jcu.edu.au/soe/staff/neil.erson.html>

- Anthony, L. M., Clarke, M. C., & Anderson, S. J. 2000. "Technophobia and personality subtypes in a sample of South African University student". *Computer in Human Behavior*, vol. 16, no. 1, pp. 31-44.
- Bakar, A. & Mohamed, S. 2008). "Teaching using information and communication technology: Do trainee teachers have the confidence?" *International Journal of Education and Development using ICT*, 4 (1). Accessed 25 September, 2009 from <http://ijedict.dec.uwi.edu/viewarticle.php?id=374&layout=html>
- Beeland, W.B. 2002. "Student engagement, visual learning and technology: Can interactive whiteboards help?" Accessed 25 March, 2010 from <http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.135.3542&rep=rep1&type=pdf>
- Bandura, A. 1999. *Social cognitive theory of personality*. Pervin, L., & John. O. (eds), *Handbook of personality (2<sup>nd</sup> edition)*. NewYork: Guilford publications.
- Baylor, A. & Ritche, D. 2002. "What factor facilitate teacher skill, teacher morale, and perceived student learning in technology-using classrooms?" *Computers & Education*, vol. 39, no. 1, pp. 395-414.
- Birisci, S., Metin, M., Karakas, M. 2009. "Prospective elementary teachers' attitude towards computer and Internet use: A sample from turkey". *World Applied Sciences Journal*, vol. 6, no. 10, pp.1433-1440.
- Brosnan, M., & Davidson, M. 1996. "Psychological gender issues in computing". *Journal of Gender, Work and Organisation*, vol. 3, pp. 13-25.
- Brown III, U. J., Park, Y., & Jung, S. (n.d). "The effects of students knowledge and attitude on the classroom performance: Focusing on computer self-efficacy". Accessed 25 March, 2009 from <http://www.abri.com/oc09manuscripts/oc09053.pdf>
- Cambra, C., & Silvestre, N. 2003. "Students with special educational needs in the inclusive classroom: social integration and self-concept" *European Journal of Special Needs Education*, vol. 18, pp.197-208.
- Chua, S., Chen, D.T., & Wong, F.L. 1999. "Computer anxiety and its correlates: A meta-analysis". *Computers in Human Behavior*, vol.15, pp. 609-623.
- Crable, E. A., Brodzinski, J. D., Scherer, R. F., & Jones, P. D. 1994. "The impact of appraisal, locus of control, and level of exposure on the computer anxiety of novice computer users". *Journal of Educational Computing Research*, vol. 10, no. 4, pp. 329-340.
- Deniz, L. 2007. "Prospective class teachers' computer experience and computer attitude". *International Journal of Social Sciences*, vol. 2, no. 2, pp.116-122.
- Eastman, J. 2007. "Enhancing classroom communication with interactive technology: How faculty can get started". *College Teaching Methods & Styles Journal*, vol. 3, no. 1, pp. 31-37.
- Francis, L. J., Katz, Y. J., & Jones, S. H. 2000. "The reliability and validity of the Hebrew version of the Computer Attitude Scale". *Computers & Education*, vol. 35, no. 2, pp. 149-159.

- Garland, K.J., & Noyes, J. M. 2004. "Computer experience: a poor predictor of computer attitudes". *Computers in Human Behavior*, vol. 20, no. 6, pp. 823-840.
- Guthrie, R.W., & Carlin, A. 2004. "Waking the dead: using interactive technology to engage passive listeners in the classroom". A paper presented at the Tenth Americas Conference on Information Systems, August 5-8, New York..  
[http://www.mhhe.com/cps/docs/CPSWP\\_WakindDead082003.pdf](http://www.mhhe.com/cps/docs/CPSWP_WakindDead082003.pdf).
- Hattie, N. J. 1992. *Self-concept*. Hillsdale, N.J: L. Earlbaum Associates, pp 23.
- Heinssen, R.K, Jr., Glass, C.R., & Knight, L.A. 1987. "Assessing computer anxiety: Development and validation of the computer anxiety rating scale". *Computers in Human Behavior*, vol. 3, no. 49-59.
- Huitt, W. 2004. "Self-concept and self-esteem". *Educational Psychology Interactive*. Retrieved September 2, 2009, from <http://chiron.valdosta.edu/whuitt/col/regsys/self.html>
- Ituen, M. 2009. "Expert canvasses increase in ICT budgetary allocation". *The Punch*, 18 May, 2009.
- Jegede, P.O., & Owolabi, J. 2005. "Effects of professional status, subject discipline and computer access on computer attitudes among teacher educators in Nigerian colleges of education". *Information Technology Journal*, vol. 4, no. 2, pp. 158-162.
- Jung, I. 2001. *Singapore's approach to preparing new teachers to use technology in the classroom*. Jurong: SUNY Press.
- Karadeniz S. 2009. "The impact of paper, web and mobile based assessment in students' achievement and participations". *Scientific Research and Essay*, vol. 4 no.10, pp. 984-991. Accessed 25 March, 2009 from <http://www.academicjournals.org/sre>
- Kumar, N., Che Rose, R., & D'Silva, J.L. 2008. "Teachers' readiness to use technology in the classroom: An empirical study". *European Journal of Scientific Research*, pp. 603-616. Accessed 25 March, 2010 from <http://www.eurojournals.com/ejsr.htm>
- Malle, B. 1999. "Self-concept: An introduction". Accessed September 15, 2009 from [http://darkwing.uoregon.edu/~bfmalle/410/L1\\_99.html](http://darkwing.uoregon.edu/~bfmalle/410/L1_99.html)
- Mehloff, C.E. 2001. "Knowledge, commitment and attitude of Home Economics faculty towards computer". *Home Economic Research Journal*, vol. 17, no. 4, pp. 300-308.
- Morgan, A. 1997. "Computer anxiety: A survey of computer training, experience, anxiety and administrative support among teachers". Accessed March 2, 2009, from <http://oas.uco.edu/97/T97/AMORG.HTM>
- Namlu, A., & Ceyhan, E. 2002. "Computer anxiety: A study on university students". Eskisehir: Anadolu University Publishing.
- Necessary, J. R., & Parish, T. S. 1996. "The relationships between computer usage and computer-related attitudes and behaviours". *Education*, vol. 116, no. 3, pp. 384-388.

- Norhayati, A. M. 2000. "Computer technology in Malaysia: Teachers' background characteristics, attitudes and concerns". *The Electronic Journal on Information Systems in Developing countries*. Accessed December 15, 2008 from <http://www.ejisdc.org>.
- Ocak, M.A., & Akdemir, O. 2008. "An investigation of primary school science teachers' use of computer applications". *The Turkish Online Journal of Educational Technology*, vol. 4, 6, pp. 1303-1309.
- Papanastasiou, E.C., & Angeli, C. 2008. "Evaluating the use of ICT in Education: Psychometric properties of the survey of factors affecting teachers teaching with technology (SFA-T)". *Educational Technology & Society*, vol. 11, no. 1, pp. 69-86.
- Pope-Davis, D. B., & Twing, J. S. 1991. "The effects of age, gender, and experience on measures of attitude regarding computers". *Computers in Human Behavior*, vol. 7, no. 4, pp. 333-339.
- Raub, A. C. 1981. *Correlates of computer anxiety and college students*. Unpublished PhD dissertation, University of Pennsylvania, Philadelphia, PA.
- Reinen, I. J. & Plomp, T. 1996. Gender and new technology in Plomp, T & Ely, D. P. (eds), *International Encyclopedia of Educational Technology*, Pergamon, Cambridge, pp. 630-635.
- Rekabdarkolaei, S. M., & Amuei, F. 2008. "Evaluation of ICT literacy differences in trainee student teachers from the view of sexuality". *Campus-Wide Information Systems*, vol. 25, no. 3, 176-188.
- Rogers, E. M. 1995. *Diffusion of innovation* (4<sup>th</sup> ed). New York: The Free press.
- Rovai, A. P., & Childress, M.D. 2003. "Explaining and predicting resistance to computer anxiety reduction among teacher education students". *Journal of Research on Technology in Education*, vol. 35, no. 226-235.
- Russell, G & Bradley, G. 1997. "Teachers' computer anxiety: implications for professional development". *Education and Information Technologies*, vol. 2, pp. 17-30.
- Sadik, A. 2006. "Factors influencing teachers' attitude toward personal use and school use of computers: New evidence from a developing nation". *Evaluation Review*, vol. 30, no. 1, pp. 86-113.
- Schumacher, P., & Morahan-Martin, J. 2001. "Gender, Internet, and computer attitudes and experiences". *Computers in Human Behavior*, vol. 17, no. 1, pp. 95-110.
- Teo, T. 2008. "Pre-service teachers' attitude towards computer use: A Singapore survey". *Australasian Journal of Educational Technology*, vol. 24, no. 4, pp. 413-424.
- Tsai, M., & Tsai, C. 2003. "Students computer achievement, attitude and anxiety, the role of learning strategies". *Journal of Educational Computing research*, vol. 28, no. 1, pp. 47-61.
- Volman, M., & Eck, E. V. 2001. "Gender equality and information technology in education: the second decade". *Review of Educational Research*, vol. 71, no. 4, pp. 613-634.
- Yaghi, M., & Ghaith, G. M. 2002. "Correlates of computing confidence among teachers in international setting". *Computers in the Schools*, vol. 19, no. 1/2, pp. 81-94.

Yildirim, S. 2000. "Effects of an educational computing course on pre-service and inservice teachers: a discussion and analysis of attitudes and use". *Journal of Research on Computing in Education*, vol. 32, pp. 479-495.

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