Relationship between Computer Attitudes and Literacy of Science Teachers in Secondary Schools in Nigeria *(Pp. 263-273)*

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Abstract
This study investigated the relationship between computer attitudes and literacy of science teachers in secondary schools in Nigeria. A sample of two hundred and forty (240) science teachers drawn from the four political divisions of Ogun State, Nigeria was used for the study. Two valid and reliable instruments namely Computer Attitude Scale (CAS) and Computer Literacy Self-Assessment Scale (CLSAS) were used to collect the needed data. Frequency, count, mean, standard deviation and Pearson Product Moment Correlation were employed for data analyses. The findings revealed that there is a significant relationship between the computer attitudes and literacy of the science teachers. However, only computer confidence out of all the sub-scale of computer attitudes is significantly related to computer literacy, while others like computer anxiety, liking and usefulness are not. It is recommended all the stakeholders in education in Nigeria should be exposed to regular seminars and workshops with the aim of making them see the reality that computers are very important in today's effective teaching and learning.

Key Words: Computer Attitudes, Computer Literacy, Science Teachers, Nigeria.

Background to the Problem

That the use of computers in the teaching and learning process is no longer new is to say the obvious. Larkin (2003) observed that advances in computer technology have caught the attention of many educators and researchers. Also computer-based instructional applications are considered an effective alternative to traditional teaching methods (Leigh, 1996).

Actually, computers have been used in education for more than four decades, and they have now been accepted 'unconditionally' as an integral part of educational system (Yushau, 2006). Nonetheless, Kadijevich (2002) identified some issues as critical to proper and effective use of computer technologies in teaching. Top among them is computer attitude, followed by software selection of a proper utilization direction, and web-based professional development of teachers. Similarly, in his meta-analysis of the factors that are instrumental to promoting the use of computer aided learning, Griffin (1998) found that teacher attitude towards computer is an important factor related to the teachers' role towards the effective use of computers in education.

Stressing the importance of computers in education, Mudasiru (2005) affirmed that computers is being employed in the instructional process through computer – assisted instruction, integrated learning systems and collaborative networked technologies among others. Indeed, according to Yushau (2006), previews correlation studies have long forecasted that the use of computers in education world very much depend how well teachers integrate them in everyday activities. Therefore, the question of attitude of teachers towards computer is central to any successful use of computers in education (Yuen, & Ma, 2001).

Studies (e.g. Woodrow, 1991) have shown that computers anxiety, lack of confidence, and lack of enjoyment influence both the acceptance of computers and their use as a teaching and learning tool. The need to therefore, disabuse the minds of teachers from such fears and replace these negative attitudes with confidence – building measures is very importance many teachers are intimidated by technology and are comfortable with their own teaching styles (Hawkins, 1991). Any teacher – training programme should help teachers see beyond the technology to the pedagogical and

educational gains that use of technology can bring to the classroom. Referring to, computer literacy, Hawkins (1991) emphasized that teachers need to be transformed from information consumers, using the internet to access resources, into information producers, adapting the information for their particular cultural and educational reality. Teachers need to use technology as a tool, and to transform their classrooms into interactive, inquisitive learning environments.

Although some empirical studies (Chen, 1986; Busch, 1995) have found out that computer literacy significantly related to a positive attitude toward computers among teachers, other studies (e.g. Yushau, 2006) just stated that teachers, whether male or female need to improve their attitude in order to become sufficiently competent to make personal use of Information and Communication Technology (ICT) as a mind tool, to become masters of a range of educational paradigms that use ICT, and also to become sufficiently competent to make use of ICT as a tool for teaching. Collins (1996) in his own case was of the opinion that once teachers are computer literate, they will be less inclined to doubt the usefulness of the computer in their classrooms. Thus perceived usefulness of computers may influence attitudes toward computers, and the amount of confidence a teacher possesses in using computers also influences the implementation of acquired skills in the classroom (Bandura, 1977; Gressard & Loyd, 1986; Yuen & Ma, 2001).

The background provided so far, indicates the interplay of some variables such as computer anxiety, computer confidence, computer liking, computer usefulness and computer literacy among teachers generally. So far, no specific reference is made to teachers of science which from the bedrock of scientific and technological development of a nation. Therefore there is need that seeks to gather data on science teachers on this direction.

In the light of the above, this study sought to examine the relationship between the computer attitudes and literacy of science teachers in secondary schools in Nigeria with a view to make suggestions that will promote computer – aided teaching and ultimately teaching effectiveness in Nigeria schools.

Research Questions
This study was guided by the following research question. It should be noted that computer attitudes are broken down.

1)   Is there any significant relationship between the computer attitudes and literacy of the science teachers?
2)   Is there any significant relationship between the computer anxiety of the science teachers and their computer literacy?
3)   Is there any significant relationship between the computer confidence of the science teachers and their computer literacy?
4)   Is there any significant relationship between the computer liking of the science teachers and their computer literacy?
5)   Is there any significant relationship between computer usefulness of the science teachers and their computer literacy?

Methodology
This study employed expost-facto design in carrying out the study. Here, there is no manipulation of variables but seeks to establish cause-effect relationship based on existing data. The sample for this study consisted of two hundred and forty (240) science teachers. The sampling technique used was multi-stage stratified random sample where Ogun State was stratified into four based on the existing political divisions namely, Ijebu, Remo, Yewa and Egba divisions. Ten schools were randomly selected from each of the four divisions making forty senior secondary schools. Thereafter, six teachers comprising of physics, chemistry and biology teachers were drawn from each of the forty schools making up to hundred and forty teachers.

However, in all, the sample consisted of one hundred and eight (108) male teachers and one hundred and thirty-two (132) female teachers). Out of the total of 240 teachers, 80 were physics teachers, 80 were chemistry teachers and the remaining 80 were biology teachers.

Two instruments were constructed and used for the purpose of gathering data for this study. The instruments are:

(a) Computer Attitude Scale (CAS)
This scale was used to collect needed data on the computer attitude of the male and female science teachers. The instrument has two sections. Section A elicited information on the personal data of the respondents such as sex, subject taught etc. Section B elicited information on the computer attitude of the science teachers. This section has four (4) sub-scales: (i) computer anxiety (ii) computer confidence (iii) computer liking and (iv) computer usefulness. The science teachers were required to indicate their level of

agreement or disagreement with the listed statements. Strongly Agree attracted 4 points, Agree, Disagree and Strongly Disagree attracted 3, 2 and 1 respectively for positively worded statements and vice-versa for negatively worded statements.

The validity of the items on the scale was ensured through rational logical analysis and scrutiny by some experts in computer and questionnaire construction. The reliability index of 0.73 was established for the test though test-retest method of two weeks interval. This confers a high degree of reliability on the instrument.

(b) Computer Literacy Self-Assessment Scale (CLSAS)

This instrument was used for collecting data on the level of computer literacy of the male and female science teachers under study. The instrument has two sections. Section I asked for the background information of the science teachers such as sex and class taught. Section II has a list of the common software and the science teachers were asked to rate themselves on their level of competence in handling the operations on the levels of Very Good (5 points), Good (4 points), Average (3 points), Poor (2 points) and Very Poor (1 point). The computer operations included are file management, word processing, spreadsheet, presentation and internet application.

The validity of this instrument was ensured through scrutiny by some computer experts while 0.74 was established as the reliability index of the instrument through test-retest method of two weeks interval. This indicates that the instrument was reliable.

The data generated for this study were analyzed making use of simple frequencies, percentages and standard deviation as descriptive statistics while Pearson Product Moment Correlation was used as inferential statistics.

Results

The results of this study are presented based on the order of the research questions raised.

Research Question 1: *Is there any significant relationship between the computer attitudes of the science teachers and their computer literacy?*

Table 1 shows that there is a significant correlation between the computer attitudes and computer literacy of the science teachers. Although the correlation of 0.241 is low but it is positive implying that as computer attitudes of the science teachers are increasing, the computer literacy is also increasing.

Research Question 2: *Is there any significant relationship between the computer anxiety of the science teachers and their computer literacy?*

Table 2 reveals that there is no significant relationship between the computer anxiety and literacy of the science teachers. The correlations coefficient of 0.07 is extremely low and it yielded significant level of 0.254 which is found not to be significant at 0.05 level (2-tailed). This implies that high or low computer anxiety may not significantly translate to high or low computer literacy.

Research Question 3: *Is there any significant relationship between the computer confidence and literacy of the science teachers?*

Table 3 indicates that there is a significant relationship between the computer confidence and literacy of the science teachers. The correlation coefficient of 0.288 yielded significant value of 0.00 which is found to be significant at 0.05 level (2-tailed). Also, the value of 0.288 appears to be low but it is positive, indicating that as computer confidence of the science teachers is increasing, their computer literacy also increases. This means that high computer confidence of the science teacher translate to high computer literacy.

Research Question 4: *Is there any significant relationship between the computer liking of the science teachers and their computer literacy?*

Table 4 shows that there is no significant relationship between computer liking and literacy of the science teachers. The correlation coefficient value of 0.034 is extremely small and it yielded significant value of 0.60 which is found not to be significant at 0.05 level (2-tailed). This result implies that whether the science teachers like computers or not does not translate to high low computer literacy.

Research Question 5*: Is there any significant relationship between the computer usefulness and literacy of the science teachers?*

Table 5 reveals that there is no significant relationship between computer usefulness and literacy of the science teachers. The correlation coefficient of 0.119 yielded a significant value of 0.065 which is found not to be significant at 0.05 level (2-tailed). The implication is that whether the science teachers perceived computers to be useful or not does not translate to high or low computer literacy.

Discussion
The outcomes of this study indicate that there is a significant relationship between there is a significant relationship between the computer attitudes and literacy of the science teachers in Nigeria. This finding is in live with Griffin (1998) who did a meta-analysis of the factors that are instrumental to promoting the use computer – aided learning and came out with the fact that teacher attitude towards computers is an important factor. Moreover, Yushau (2006) when concluding his study affirmed that literacy as well as use of computers in education depended very much on how well teachers perceived and integrate computers in everyday activities. Also, Kadijevich (2002) identified some issues as critical to high literacy and effective use of computer technology in education. Top among them is computer attitudes some earlier empirical studies (Chen, 1986; Busch, 1995) also found out that computer literacy significantly related to a positive attitude towards computer among teachers.

More revealing in this study is that although computer attitudes were significantly related to computer literacy, only the sub-scale of computer confidence out of the four sub-scales was significantly related to computer literacy. In other words, the sub-scales of computer anxiety, computer liking and computer usefulness were not significantly related to computer literacy. This finding is at variance with some previous studies such as Woodrow (1991) that indicated that computer anxiety, lack of confidence and lack of enjoyment influence the acceptance of computer. Concerning computer usefulness with was found not to be significantly related to computer literacy, Collins (1996) was of the opinion that once teachers are computer literate, they will be less inclined to doubt the usefulness of the computer in their classrooms. Thus perceived usefulness of computer may influence attitudes toward computer (Collins, 1996).

In short, this study has proved that generally computer attitudes can be significantly related to computer literacy but some sub-scales (e.g. computer confidence) can be more potent than others (e.g. computer anxiety, liking and usefulness) impacting on computer literacy.

Conclusion and Recommendations

This study has proved that generally computer attitudes can be significantly related to computer literacy. However, while some sub-scales (i.e. computer confidence was found to be significantly related to computer literacy, others (i.e. computer anxiety, liking and usefulness) were found not to be significantly related to computer literacy among the science teachers in Nigeria.

Therefore, it is recommended all the stakeholders in education in Nigeria should be exposed to regular seminars and workshops with the aim of making them see the reality that computers are very important in today's effective teaching and learning. Moreover, the teachers of science in secondary schools should also be motivated to improve their attitudes towards computers. The science teachers should also exposed to regular computer trainings especially during long vacations. This will eliminate their anxieties and enhance their confidence.

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Table 1: Relationship between the computer attitudes and computer literacy of the science teachers

Variables	N	Mean	Std. Dev.	r	Sig.	Remark
Computer attitude	240	60.10	2.03	0.241	0.000	*
Computer literacy	240	16.30	3.62			

*Correlation is significant at the 0.05 level (2-tailed)

Table 2: Relationship between the computer anxiety and computer literacy of the science teachers

Variables	N	Mean	Std. Dev.	r	Sig.	Remark
Computer anxiety	240	15.30	1.10	0.07	0.254	NS
Computer literacy	240	16.30	3.62			

NS = Not Significant at the 0.05 level (2-tailed)

Table 3: Relationship between the computer confidence and literacy of the science teachers

Variables	N	Mean	Std. Dev.	r	Sig.	Remark
Computer confidence	240	14.80	0.81	0.288	0.00	*
Computer literacy	240	16.30	3.62			

*Significant at the 0.05 level (2-tailed)

Table 4: Relationship between the computer liking and computer literacy of the science teachers

Variables	N	Mean	Std. Dev.	r	Sig.	Remark
Computer liking	240	14.95	0.74	0.034	0.60	NS
Computer literacy	240	16.30	3.62			

NS = Not Significant at the 0.05 level (2-tailed)

Table 5: Relationship between the computer usefulness and computer literacy of the science teachers

Variables	N	Mean	Std. Dev.	r	Sig.	Remark
Computer usefulness	240	15.05	1.25	0.119	0.065	NS
Computer literacy	240	16.30	3.62			

NS = Not Significant at the 0.05 level (2-tailed)