

TEACHER TRAINING IMPLICATIONS OF GENDER AND COMPUTER SELF EFFICACY FOR TECHNOLOGY INTEGRATION IN NIGERIAN SCHOOLS

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Abstract

This paper argues for planned, research based and systematic training of teachers for technology use in Nigerian schools to ensure effective training that would translate into appropriate use. Systematic and research based planning involves investigating factors that could affect technology use and by teachers. This study investigated two of such factors-gender and self efficacy. Five hundred and eighty nine teachers were asked to indicate their belief in their capability in the use of computers. T –test statistics analysis showed that the computer self efficacy was average for most of the teachers though female teachers have higher Computer self efficacy than male teachers.

Introduction

Computer education was introduced into the Nigerian education system in the late 1980s specifically based on the recommendation of the 32nd ministerial council meeting of the National Council of Education in 1987. It was introduced to bring Nigerian children into contact with the computer so that they could use it, appreciate its potential, understand how it works, and learn to apply the knowledge and skills to solve emerging problems. The computer systems were introduced into the Federal Unity Schools throughout the Federation in 1989 and since then all state Governments and others concerned with implementing Educational policies have been integrating one aspect or the other of the Computer education policy into the school systems. The revised National Policy on Education (FRN 2004) gave prominence to computer education especially, in the 2004 edition; computer education was made one of the pre-vocational subjects at the basic level of education and a vocational elective at the senior secondary level. This shows the Government's recognition of the pervasive influence of computer technologies in this contemporary age and its commitment to the integration of technology in all its schools.

The teaching and learning process has been altered by the convergence of a variety of technological, instructional, and pedagogical developments in recent times (Bonk & King 1998; Marina, 2001). The technology revolution is challenging and redirecting all forms of education, including higher education (Green 2000), challenging the boundaries of the educational structures that have traditionally facilitated learning. New and innovative teaching strategies have evolved due to the recent advances in computer technology and the diffusion of personal computers, productivity software, multimedia and network resources. Computers are becoming common place and what they can offer the user, more sophisticated and more complex. Information technologies (IT) and Information Communication Technology (ICT) have enormous effects on the way information is shared and can be accessed and also on the way societies work. In summary, the use of computers and other technology tools in educational settings has become necessary for development and advancement in this age. The implication of all these is that since schools are given the responsibility to equip the populace with the ICT skills, the teachers who are responsible for the teaching and learning processes need to be the first to acquire the skills.

Teachers are the key to ensuring effective utilization of IT in educational settings. The way teachers view technology, how they respond to it, how they present it and how they think it will help to accomplish their vision of teaching and learning, will affect the use, the integration of technology and also the future years of educational technology implementation (Roblyer, 2003). Furthermore, apart from the benefits that technology brings to learners, If teachers also have competence, literature points that the following would be the advantages for teachers too (Massy & Zenisky, 2005; Benneth & Benneth, 2003).

- Accessing richer content much more easily, and in much shorter time
- better communication
- Individualization
- Easiness in evaluation
- Fruitful professional interaction

Thus it is mandatory that in a country which seeks to move forward scientifically and technologically, in-service and pre-service training of teachers should be given top priority. One of the greatest barriers to proper computer education in several parts of the world is shortage of trained teachers (Kirschner & Selinger, 2003, Summers, 1990). Teachers therefore need to be trained to become sufficiently competent to make personal use of computers, to make use of information and communication technology as a mind tool, to become master of a range of educational paradigms that use ICT, and also to become sufficiently competent to make use of ICT as a tool of teaching (Kirschner & Paris, 2003).

The training of teachers however must be systematic and well planned. Training programmes should not just be focused on skill acquisition, which is what obtains in educational institutions across the country, that are given the mandate for this training. Such training which just seeks to dump training manuals on teachers irrespective of gender and any other such computer related attributes may not be effective for skill acquisition by these teachers because they do not take into cognizance the entry skills, attitudes and dispositions of the teachers. Training programmes should factor in issues of teachers' computer attitude and anxiety, gender, perceived usefulness of technology and very importantly self efficacy. It is believed that a teachers' self efficacy in relation to computer use is more important in their acquiring competence for integrating the technology into teaching and learning processes than any other factor.

Self efficacy which has been defined as belief in one's ability to mobilize the motivation, cognitive resources, and course of action needed to meet given situational demands (Bandura, 1977) has been investigated as a key factor for success in any training programme. An important aspect of self-efficacy is that it is seen to be task and domain specific (Bandura, 1977). In other words, a person can have high self-efficacy in one area, but low self-efficacy in another. Computer self efficacy (CSE) is a belief of one's capability to use the computer. In order for teachers to use computers successfully for teaching, they need to have self-confidence in computer related tasks according to Compeau & Higgins (1995). CSE positively correlates with a willingness to choose and participate in computer activities, an expectation of success, the ability to persevere when faced with computer related difficulties, and one's computer – related performance (Holcomb, Brown, Kulikowich & Zheng, 2003). Ertimer, Addison, Lane, Ross and Wood (1999) and Pearson et al (2003) suggested that teachers with higher CSE are likely to be more enthusiastic to use technology in their classrooms than those with lower self efficacy. This paper therefore investigates the CSE of teachers in Nigeria.

Another factor worth investigating is gender. Studies that have investigated the issue of gender in computer studies have come up with varied findings (Morris and Venkatesh 2000, Liaw 2002, Broos 2005, Wong et al 2008). Some have found differences in anxiety towards, use of and access to ICT with males more proficient and with better attitudes than females (Madell and Muncer 2004, Isman and Celikli 2009), whereas others found no gender differences (Shaw and Gant 2002, Wong and Hanafi 2007). Theories from psychology and sociology suggest that gender disparity in computer competence and use exists due to sex role typing (Aremu 2008). The gender schema theory suggests that sex typing occurs in children as a means of encoding and organizing information about their environments. Therefore, supporters of this theory believe that society has created an association between computers and "maleness" Under this theory, until computer use is required of all students at a very early age, men will continue to be more attracted to computer use than women, thus creating a gender gap in both experience and knowledge. If the latter is so, then, this issue of gender becomes very important in training of teachers on ICT skills especially in Nigeria, where the number of female teachers is quite high. It is thus important that educators must investigate gender differences and possible biases that they present in the use of computer technology so as to diminish the gender gap in computer use. This is very important especially for a developing country like Nigeria which is still in the beginning stages of interacting with ICT and implementing a computer education policy. The main purpose of this study therefore is to examine computer self-efficacy of teachers in Nigerian secondary schools and to determine the extent to which gender influences the computer self efficacy of the teachers. The study therefore posed the following research question;

RQ1: What is the level of self efficacy of Nigerian Secondary school teachers?
and it tested the following null hypothesis;

H₀: There is no significant difference in the level of computer self efficacy of male and female teachers.

Methodoloty

This study adopted a survey design covering a cross section of secondary school teachers. All the 1,221 secondary teachers in Ondo West Local Government in Ondo State made up the population for this study. In research, at least 10% to 20% is needed to have a chance of having a representative sample. In this study, to have an appropriate representative sample, a sample of 60% of the total population of teachers was used for this study. This gave a sample of 733 subjects, resulting in an average of 23 teachers from each school. Simple random sampling technique was adapted to select the teachers giving every of the subjects equal chance of being included in the sample for the study.

A questionnaire- the computer self efficacy of secondary school teachers (CSESST) constituted the principal research instrument for this study. It is divided into two sections. Section A seeks personal information about the subjects, section B is a computer self efficacy scale; an adaptation of the one that was developed by Bobbi A. Kerlin of Lakehead University. This was however adapted from a scale developed by Peter Eachus and Simon Cassidy. Cassidy and Eachus (2002) used a sample size of 101 to test the validity of the computer self efficacy scale. Internal reliability as measured by Conbach's alpha was high (0.94), indicating a particularly high degree of interval consistency. Test retest reliability over a month period was also high and statistically significant ($r = 0.86, p < 0.0005$). A total of 637 questionnaires were returned however the valid number of questionnaires which had

indication of gender was 589 and this was used for the data analysis on gender.

Results

Data collected for this study was analyzed using both descriptive and inferential statistics. The research question was answered based on the CSE scores as shown in table 1. The hypothesis was tested using the t-test as presented in the table 2;

RQ1: What is the level of self efficacy of Nigerian Secondary school teachers?

The question was answered by analyzing the composite CSE scores. The possible total composite CSE scores ranged from 30 to 180 using all 30 questions with a 6 point rating scale. The degree of efficacy was sorted into 3 categories viz:

- a) Scores less than 90 were categorized as low CSE.
- b) Scores ranging between 91 and 120 were categorized as Average CSE.
- c) Scores above 120 were categorized as High CSE.

Table 1: Frequency and percentage of the levels of efficacy

		Frequency	Percent	Valid Percent	Cumulative Percent
Low	< 90	175	29.8	29.8	29.8
Average	91-120	402	68.2	68.2	98.0
High	>121	12	2.0	2.0	100.0
Total		589	100.0	100.0	

The table shows that most of the teachers fall within the average self efficacy range (68.2%). 29.8% of the sample of teachers had low computer self efficacy and 2% had high self efficacy.

H₀: There is no significant difference in the computer self efficacy of male and female teachers.

Table 2: Summary of t-test statistics on self efficacy between male and female teachers

Variable	N	Mean	Std-D	T	df	Sig(p)	Remark
SELF EFFICACY							
Male teachers	204	33.28	5.86	-3.041	587	.002	Significant
Female teachers	385	34.69	5.08				

Table 2 shows that there is a significant difference between male and female teachers in their computer self-efficacy ($t=3.041$; $df=587$ $p<0.05$). Therefore H_0 is rejected. The mean scores show that female teachers have higher self efficacy score ($\bar{x}=34.69$) than their male counterparts ($\bar{x}=33.28$).

Discussion of Findings

The fact that the CSE of the teachers as shown in table 1 is mostly average is a good indication that majority of the teachers would actually be comfortable with the use of computers. On the contrary however, it can also be said that the fact that they fall in the average range is critical, because they could actually fall to the low range if the facilities are not there. In the same vein, they could move higher if the right sort of motivation is provided. The average range of CSE could be seen as the teachers having the capability to increase in

CSE if the conducive environment is provided. The latter could come in terms of motivating the teachers to use the computers more, by providing incentives for those who design their learning based on computers. The necessary facilities that could enhance positive output from computer use, such as constant supply of electricity, security of equipment and availability of needed software could also be motivators for the teacher.

Furthermore, though the percentage of teachers with low CSE is quite low, it also calls for attention. With the alleged investments in facilities and training, If CSE is low then there is no guarantee that the teachers are effectively using the technology or would effectively use them to bring about the benefits that ICT is supposed to add to the teaching and learning processes. It is not enough to provide facilities and equipment, the CSE of teachers must be put into consideration. Strategies to enhance CSE must be integrated into the training programmes. It has been discovered that the more the experience of a person with computer, the higher the person's CSE (Potosky 2002, Hasan 2003, Hakverdi, Gucum and Korkmaz 2007). Long term, continuous exposure to computers must be integrated into the training programmes of teachers.

Using tutorial modes of Computer assisted Instruction could also be of use in packaging the training because this mode is packaged in small manageable units of instruction with questions and exercises which the learner is expected to respond to. Immediate knowledge of results or feedback which is one of the features of Computer assisted instruction would enable the learner to go at his own pace and rate, without pressure from facilitators or peers. Such individualized training programmes can help increase CSE. Other strategies that could be employed include, mixed ability peer tutoring especially for those who exhibit a high level of computer anxiety. Having someone going through the training together with such a person might give more confidence to the anxious user.

The null hypothesis was rejected which implies that there is a significant difference in male and female teachers' CSE. The study found female teachers to possess higher computer self efficacy than their male counterparts though generally the CSE was low. This means that female teachers are more confident in the use of computer than males. This opposes the works of Awoleye & Siyanbola (2005) and Bimer (2000) which indicated that computers have some gendered attributes that favor man in some ways so that men are more likely to use computers and they are more confident than women. However, the finding supports Loyd & Gressard (1987) who reported that females had less computer anxiety than males and that females like working with computers than males.

In trying to find reasons to why female teachers may have higher computer self efficacy, it was discovered that more female teachers attend organized in-service computer training and workshops than male teachers. The reason given for this through an unstructured interview conducted amongst the teachers was that most males were not really interested in the trainings. In Nigeria, male teachers take up teaching appointments more or less on a temporary basis, hoping for greener pastures, whereas women teachers get settled into the profession especially since it gives more time for the home. Some of the men would probably believe that acquiring more skills to make them better competent as teachers is solidifying their stay in the profession. Thus they may look for other areas of enhancement that would qualify them for other professions, than to attend organized in-service computer training, workshops and seminars that would improve their teaching skills. Most likely their low level of interaction with computers may be responsible.

In the light of these findings, it is recommended that there should be various types of motivational strategies employed to get the male teachers more interested in the training. Motivational strategies could include- organizing awareness workshops where teachers can see evidence of improved performance of students, ease of learning and teaching processes and other benefits of integrating technology into their classrooms, others include seeking corporate support for innovative use of technology by teachers, giving awards and technology related gifts for innovative uses. Gender based training where competition is introduced may also be helpful. The male ego which would not want to be defeated may stimulate the male teachers to be more committed to the training.

Conclusion

To live in an information age, there is the challenge of being familiar with and being able to use IT to meet daily needs. To live effectively in this age, some understanding of the basic concepts, principles and application of IT has become necessary for everyone. In other words, knowledge of basic concepts and applications of computer is inevitable. Training programmes for the acquisition of computer skills is sine qua non to effective use of IT. One can benefit from IT only when one can use the computer effectively. The school is a good place to begin to acquire such skills because it is the largest center of learning for the children, this will therefore necessitate that teachers should be trained in ICT. For the latter to happen effectively, it is necessary that the training of teachers who are the key agents to achieving the objectives and goals of computer education should be considered, they include CSE, computer attitudes, gender, computer anxiety and perceived usefulness of computers. When these are researched as it has been done and presented in this paper, insights and directions towards the nature of training programmes for teachers would be gathered. This will go a long way in ensuring that teachers would not just go back to their traditional methods of teaching after such a huge investment in technology has been made.

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