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Perceived Competence of Nigerian Secondary Schools Teachers in the Use of Information and Communication Technology (ICT).

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Abstract
One of the numerous goals of Nigeria as a nation is to aggressively promote ICT as an instrument of mass education, growth and development (NEEDS, 2004). There is no doubt that teachers are indispensable for successful teaching and learning with ICT and their competence in the use of ICT is crucial to successful implementation of contemporary school curriculum. This study therefore examined teachers' perceived competence in the use of ICTs with respect to computer basics, use of the internet, and their ability to use simple softwares.
A research question and three hypotheses were raised for the descriptive survey study. The instrument used for the study was the ICT Competence Questionnaire (ICTCQ). Simple random sampling technique was used to select 300 public secondary school teachers in the four geo-political zones in Ogun State. Frequency count and percentages were used for the research question while chi square was used in analyzing the hypotheses at 0.05 alpha level.
Findings indicated that;
- Most teachers in Ogun State secondary schools do not have the required competence in ICT.
- Those teachers in the humanities have more competence in ICT than teachers in the sciences.
- Academic qualification of a teacher does not have any effect on teacher's competence in ICT.
- Teachers' competence in the use of ICT is not influenced by their teaching experience.

It is then evident that the present crop of teachers needs to be retrained to improve their competence in ICT usage. Consequently training of teachers in ICT through seminars and workshops organized by state government should be regulated to termly schedule as against occasional exercise that is prevalent presently. The government should increase the supply of computer system to schools and also make provisions for their maintenance. Internet facilities should also be put in place for schools by the government and credit facilities can also be provided for teachers by the government to encourage individual teacher to have personal computer.

KEYWORDS: ICT Competence, Subject Specialization, Educational Qualification, Teaching Experience.

Introduction

The Federal Government of Nigeria, recognizing the fact that attainment of qualitative education requires improving on teaching, learning and educational system in general, has made several attempts to effectively integrate ICT into the educational system. For instance it enacted the National Policy on Information and Communication Technologies in Education (FRN, 2010). The main thrust of the policy was to meet the human resources requirements of the nation for attaining and enhancing sustainable socio-economic development, global competitiveness as well as the individual's ability to survive in a contemporary environment. The policy is the latest framework of government on ICT integration into the educational system, as similar policies has been enacted in the past (FRN, 2004).
The Nigerian National Policy on Education (FGN, 2004) aims at enhancing and improving the competence of teachers in the development and promotion of effective use of innovative materials in schools. This affirms that the nation appreciates that competence of the teaching workforce is a key factor in its sustainable development.
Emerging information communication technologies are defining competence of teachers and changing both the educational system and classroom structure. Learning with the use of computer today can be likened to the air we breathe in, which is indispensable for every living thing, be it human, mammals or plants. Use of ICT is sine qua non for any individual or organization to function effectively in this age of knowledge economy.
The Nigerian National Policy on Information and Communication Technologies in Education (FRN, 2010) defines ICT as any equipment, including computing machines- computer hardware, software, etc. and tools,

methods, practices, processes, procedures, concepts, principles and the sciences, that come into play in the conduct of information activities; acquisition representation, processing, presentation, security, interchange, transfer, management, organization, storage and retrieval of data.

Information and Communication Technologies include traditional hardware and software such as radio, television, motion picture, projector, camcorders and emerging hardware and software like computers, netbooks, mobile phones, MPS, e-book readers, personal digital assistances, interactive white board, e-mail, video conferencing etc. (Anderson, 2010; Curtin, 2002; Moursund & Bilefeldt, 1999, as cited in Yusuf, 2012)

Therefore, ICT can be regarded as the technologies used for accessing, processing, gathering, manipulating, and presenting or communicating information and these could include software, hardware, and even connectivity.

Gusen and Olarinoye (2007) posit that ICT in education is crucial to political economic and cultural empowerment. In education, ICT possess the potentials of

- Reforming pedagogical methods
- Expanding access to quality education
- Improving the management of education systems.

The ICT has had tremendous impact on the school social system. It has engendered more constructivist approaches to teaching, improved overall student motivation to learn, to stay and behave better in school, and it has radically improved teachers' professional development through constant update of their knowledge on the latest technologies, and the latest use of computers in content areas. Also, ICTs have been useful as tools in ensuring a safe school environment as improved communication is facilitated among parents, teachers, students, and administrators' (Kmitta & Davis, 2004).

ICT provides students with varieties of opportunities as contained in the research review of Davies and Tearle (1999); Lopez (2003). First, ICT offers a constructivist approach to learning through the provision of interactive learning experiences. When interactivity is prominent in learning, it increases students' performance. ICT also increases interactivity with instructional programmes. Second, learning through ICT is more effective as it provides opportunities for using multiple technologies (video, computer, telecommunication etc), thereby providing visualization aids in the internalization and understanding of difficult concepts and processes. This gives opportunities for providing links between theory and practice.

Third, ICT provides opportunities for students to gain valuable computer skills which are germane in today's job market. That is, they can be used as ready means of preparing today's students for future work places. Students as future employees will be occupied with the requisite competence and knowledge to use ICT in their work, thereby increasing the preparation of students for careers and vocations.

Also, ICT provides opportunities for flexible learning as course information are always available and accessible, thereby catering for students of different learning styles. This increases opportunities for students' constructed learning, and individualization of instruction. Students are therefore encouraged to develop their problem solving skills and this promotes students' creativity.

Teachers are indispensable to successful ICT integration in the school system, because the ultimate decision to use or not to use the ICT is dependent upon them. Albion (1999), notes that teachers' self-efficacy and capacity to work effectively with computers is a significant factor in determining their patterns of computer use. He noted further that decisions to use computers in classrooms or in schools are likely to be influenced by teacher beliefs. That is, teachers' beliefs about their capacity to work effectively with computers are a significant factor in determining patterns of classroom usage.

Research findings have also indicated that the extent to which teachers integrate ICT in their teaching and students' learning is related to several factors, among which are the teachers' knowledge and competence. Furthermore, teachers' ability and willingness to integrate ICT into their teaching will largely be dependent on the professional training and development which they receive (Watson, 2001; Pearson, 2003; Selinger & Austin, 2003; Williams, 2003).

Yusuf (2005) asserts that teachers' competence is of particular concern when new subjects or media are introduced into the school system. This is because teachers' experience and competence will form the foundation of their ability to implement the innovation in schools.

UNESCO (2005) defines competency as a set of attributes covering knowledge, skills and attitudes for enabling one to effectively perform the activities of a given occupation or function to the standards expected in employment. The notion of competence with regard to the use of ICT in education is broader than the technical skills needed to use ICT.

The type of ICT competence needed by teachers is a collection of knowledge, skills and attitudes that are inextricably bound up with the context and pedagogy. Competence needs to be embedded in teacher practices. A

number of countries have developed national or regional ICT competency standards including Australia, Canada, People's Republic of China, India, New Zealand, United Kingdom and the United States. Competency standards, therefore, are often closely tied to local standards for students, so that expected student outcome in a particular field of study implies a set of competencies with ICT that their teachers should possess (UNESCO, 2005).

Teachers' teaching experience could also be a factor in the ICT competence of secondary school teachers. Ojo (2005) observes that the greater the relevant experience in a given field or performance of an act, the easier will be the learning of fresh ideas in that particular field or performance of related action. Adeyemi (2007) reported that schools having more teachers with five years and above teaching experience achieve better results than schools having more teachers with less than five years teaching experience

Likewise academic qualification and subject specialization may also influence the competence of teachers in ICT. Teachers with high educational qualification and specialization in science related subjects are expected to be more competent in ICT use than teachers with lesser educational qualifications or specialization in humanities, presumably because science, like computer deals with quantitative analysis and requires manipulation of technologies than humanities.

Objective of the Study

In spite of the recognized potentials of ICT, their integration into learning process will be dependent on teachers' competence in their use. This study attempted a value judgement of teachers' perceived competence in ICT with respect to computer basics, use of the internet, and their ability to use simple software like word processing, multimedia and spreadsheet.

Research Question

(i) What is the perceived competence of secondary school teachers in the use of ICT?

Research Hypotheses

Ho1: There is no significant difference in the perceived competence of science teachers and teachers in humanities in the use of ICT.

Ho2: There is no significant difference in the perceived competence of graduate and non-graduate teachers in the use of ICT.

Ho3: There is no significant difference in the perceived competence of experienced and less experienced teachers in the use of ICT.

Methods

Design

This research is a descriptive research of the survey type. Questionnaire was used to ascertain the perceived competence of secondary school teachers in the use of ICT.

Sample and Sampling Technique

The population for this study consisted of all the teachers in the public secondary schools in Ogun State. The study covered secondary school teachers in the four geo-political zones in Ogun State namely; Ijebu, Remo, Egba and Yewa.

Simple random sampling technique was used to select 5 schools in each of the zones and 15 teachers from each of the schools which gave a total of 300 respondents for the study.

Instrument

The research instrument used for this study was an ICT Competency Questionnaire (ICTCQ). This instrument was designed by the researchers. The questionnaire is divided into two sections. Section A seeks for demographic data of each respondent. Section B consists of sub-sections 1-3 that has a total of 30 items divided into: (a) perceived competence in computer basics; (b) perceived competence in using internet; (c) perceived competence in using softwares; and with the response format of High Competence, Average Competence, Low Competence and Incompetence.

Validation of the Instrument

After designing the ICT Competence Questionnaire (ICCQ), the draft was presented to experts and specialists in ICT for face validation and their comments were factored into improving the content.

The test-retest method was used to determine the reliability of the ICTCQ. The instrument was administered on a set of respondents who were not part of the sample, twice, within an interval of two weeks and the responses of the first administration compared with the second using Pearson Product Moment Correlation Coefficient which yielded a reliability coefficient of 0.61.

Method of Data Collection

Research assistants were engaged by the researchers in the administration of the instrument. The principal of each school was met for permission to administer the instrument before proceeding to the staff rooms to meet the teachers. The copies of the questionnaire were administered and collected the same day.

Method of Data Analysis

The collected data from the administered instrument were coded and analyzed using frequency and simple percentage. Chi square was used to test the hypotheses at 0.05 alpha level and only 282 questionnaires were valid for the data analysis.

Results

Research Question

What is the perceived competence of secondary school teachers in the use of ICT?

To answer this question, teachers were asked to identify their perceived competence in various items relating to computer basics, use of internet and use of computer softwares.

The results are presented in Table 1.

Table 1: Summary of Teachers Perceived Competence in ICT.

ITEMS	HIGH COMPETENCE	%	AVERAGE COMPETENCE	%	LOW COMPETENCE	%	INCOMPETENCE	%
COMPUTER BASICS	21	7.47	63	22.23	100	35.43	98	34.95
USE OF INTERNET	24	8.41	39	13.83	85	30.10	134	47.66
USE OF SOFTWARE	26	9.03	70	24.88	77	27.37	109	38.71
MEAN	24	8.30	57	20.31	87	30.96	114	40.44

In Table 1, 21(7.47%) of the teachers who took part in the survey indicated high competence in computer basics, 63(22.23%) indicated average competence, 100(35.43%) indicated low competence while 98(34.95%) indicated incompetence.

In the use of internet 24(8.41%) indicated high competence 39(13.83%) indicated average competence. Furthermore, 85(30.10%) indicated low competence and 134(47.66%) indicated incompetence.

The data on teachers' use of computer softwares shows that 26(9.03%) indicated high competence and 70(24.88%) indicated average competence. Also 77(27.37%) indicated low competence and 109(38.71%) indicated incompetence.

Test of Hypotheses

Hypothesis 1

There is no significant difference in the perceived competence of science teachers and teachers in humanities in the use of ICT.

Table 2: Chi Square Analysis of Perceived Competence of Science Teachers and Teachers in Humanities in the Use of ICT.

SUBJECT SPECIALIZATION	HIGH COMPETENCE	AVERAGE COMPETENCE	LOW COMPETENCE	NO COMPTENCE	N	df	X^2 cal	X^2 cri
SCIENCES	12	17	22	43	282	3	8.403	7.815
HUMANITIES	22	21	55	90				

Decision

Since X^2 cal 8.403 is greater than X^2 cri 7.815, the null hypothesis was rejected. Thus, there was no significant difference in ICT competence of teachers in the sciences and those in the humanities.

Hypothesis 2

There is no significant difference in the perceived competence of graduate and non-graduate teachers in the use of ICT.

Table 3: Chi Square Analysis of Perceived Competence of Graduate and Non-graduate Teachers in the use of ICT.

EDUCATIONAL QUALIFICATION	HIGH COMPETENCE	AVERAGE COMPETENCE	LOW COMPETENCE	NO COMPTENCE	N	df	X^2 cal	X^2 cri
GRADUATE	11	30	75	65	282	3	2.976	7.815
NON GRADUATE	5	17	33	46				

Decision

Since X^2 cal 2.876 is less than the X^2 cri 7.815 the null hypothesis was not rejected. Thus there was no significant difference in the ICT competence of graduate and non-graduate teachers.

Hypothesis 3

There will be no significant difference in the perceived competence experienced and less experienced teachers in the use of ICT.

Table 4: Chi Square Analysis of Perceived Competence of Experienced and Less Experienced Teachers in the use of ICT.

TEACHING EXPERIENCE	HIGH COMPETENCE	AVERAGE COMPETENCE	LOW COMPETENCE	NO COMPTENCE	N	df	X^2 cal	X^2 cri
EXPERIENCED	15	34	63	59	282	3	4.191	7.815
LESS EXPERIENCED	14	16	33	48				

Decision

Since the X^2 cal 4.456 is less that the X^2 cri 7.815, the null hypothesis was accepted. Thus, there was no significant difference in the ICT competence of Experienced and Less-experienced teachers.

Discussion

Research question shows in Table 1 that just 8.30% of the teachers have high competence in ICT, 20.31% have an average competence, 30.96% have low competence and 40.44% are incompetent in ICT. These figures indicate that majority of teachers in the secondary schools do not have the required competence in the use of ICT. This corroborates the report of Kirschner and Selinger (2003) that the vast majority of teachers do not know how to use the computers to promote educational efficiency, and they are not adequately trained to use modern information media. It also confirms the assersion that teachers have not developed competence in the use of ICT, thus they cannot model good use of technology (Idowu, Adagunodo & Popoola, 2003). Similarly, Adomi and Kpangban (2010) assert that 75percent of teachers have no or very limited experience and expertise regarding ICT in education.

The first hypothesis shows that there is a significant difference in the ICT competence of teachers in the sciences and humanities with teachers in the humanities scoring higher than science teachers. This finding is in consonance with the findings of Oludipe (2004) that there exists a low level of acquaintances with many computer packages among science teachers. Thomas and Mart (2006) also reported that there is a considerable difference in computer literacy level of teachers based on their subject specialization. Similarly, Agbatogun (2010) also affirmed that commercial subject teachers were found to have higher level of literacy than their counterparts. However, one would have ordinarily expected science teachers to be much inclined to and possess higher ICT literacy level.

The results of this study also show that ICT competence of secondary school teachers is not academic qualification specific as confirmed through hypothesis 2. The results are consistent with the findings of Agbatogun (2010) that teachers' response to acquiring knowledge, skills and competence in the manipulation of ICT is on the rise without academic qualification prejudice. On the other hand, these results are in variance with the findings of Atkins and Vasu (2000) which states that attitude of teachers towards the acquisition of computer literacy skills and usage depreciate as they attain high academic qualifications.

The outcome of this study makes it evident that teachers' teaching experience has no mutual relationship with teachers' competence in ICTs. The number of years spent in the teaching profession may not determine competence in the use of ICTs since computer is not used by the teacher to teach and there are no other school activities that require teachers to be using the ICT on regular basis. ICT competence can only be influenced by the extent to which teachers expose themselves to adequate use of the ICT particularly outside the school hours. This finding is not in agreement with Ojo (2005) which reported that the greater the relevant experience in a given field or performance of an act, the easier will be the learning of fresh ideas in that particular field or performance of related action. Schools having more teachers with five years and above teaching experience achieved better results than schools having more teachers with less than five years teaching experience (Adeyemi, 2007). Perhaps the result of this study on teaching experience would have been different if the teachers had been regularly exposed to in-service training on innovative technologies and practices.

Recommendations

Information and communication Technology is now a key tool on how we see the world and how we live in it. ICT is in fact gaining prominence and becoming one of the most important elements defining the basic competence and literacy of people and education is not an exception.

ICT is an influential instrument for the development of quality teaching and learning in educational system and for the preparation of students in meeting the innovations in the global arena. These can only be achieved through teachers who are competent in all facets of ICT usage, so that Nigeria as a nation can advance educationally.

The study revealed that the present crop of teachers cannot take the Nigerian secondary school students to the desired ICT literacy level, so meaningful steps need to be taken to reverse the status quo.

Training of teachers in ICT through seminars and workshops organized by state government and relevant agencies should be more frequent. Moreso, the schools can also organize such training for their staff locally by making use of competent teachers in the school to train others or invite competent teachers from other schools.

The government should increase the supply of computer system to schools and also make provisions for their maintenance. The schools on their part should develop good maintenance of the systems.

Internet facilities should also be put in place for schools by the government. The school can also do this at minimal cost. The development levy paid by students every term could be a direct source for financing such projects.

The government should endeavour to supply CAI softwares in school subjects where they are available. Teachers should also be allowed to study the software, learn how to use them and then organize special classes for their students for acquisition of the required skills.

Credit facilities can also be provided for teachers by the government to encourage individual teacher to purchase personal computer.

Lastly the Parent Teachers Associations and Old Students' Associations should also contribute to improving competence of teachers by donating computers to schools, funding ICT training of teachers, and providing internet facilities to schools. All these will go a long way in mitigating the problem of ICT incompetence among Nigeria secondary school teachers.

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