

Assessment of ICT Infrastructures for Computer Education in Secondary Schools, Katagum Education Zone, Bauchi State, Nigeria

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The Federal Government of Nigeria through its agency, the Federal Ministry of Education has incorporated Information and Communication Technology (ICT) or Computer Education as a subject of study at all levels of education system. Looking at the ICT infrastructures for effective teaching and learning of this subject/discipline in the various schools, it seems not to be adequate for the teeming students. This study therefore assesses the availability of ICT infrastructure for effective teaching and learning of Computer Education in secondary schools of Katagum Education Zone, Bauchi State, Nigeria. It adopted survey research design. The population of the study comprised 44 ICT/Computer education teachers and all students (N=5,300) in Senior Secondary School II in Katagum Education Zone of Bauchi State. Proportionate stratified simple random sampling technique was used to draw sample of students into the study, while all the ICT/Computer education teachers were used since it has a small population. Researchers self-developed structured questionnaire, known as questionnaire for availability of ICT infrastructure (QAICTI) was used as an instrument for data collection, and it was validated by experts in the field of Education and Computer Science, while the reliability of the instrument yielded 0.79 using Crobach alpha test of reliability to measure internal consistency of the items in the questionnaire. Data obtained were analyzed using simple percentage, mean and standard deviations with the aid of SPSS. The results revealed majority of ICT/Computer studies/Education teachers that teach the subject are not majored in computer related discipline and sourced from other discipline; ICT facilities are not available in the secondary schools, thereby making the teaching and learning of ICT/Computer studies/Education subject difficult and that there are enough ICT/Computer studies/Education textbooks in the schools' library, which assist students to study ICT/Computer studies/Education subject on their own. Recommendations such as state government should invest heavily on schools in terms of ICT infrastructure procurement; conducive learning environment and philanthropists in the community should also contribute their own quota to the development of the schools in terms of provision of these electronic gadgets with qualified teachers in ICT/Computer education field should be employed by state government.

Background to the Study

ICT is an acronym that stands for Information and Communication Technology. It is all forms of technological tools that can be used in transmitting, disseminating or communicating, storing and managing of information. ICT, according to United Nations Development Plan (UNDP) as cited in Bervell (2012), has been defined to include the full range of electronic technologies and techniques used in managing information and knowledge. The use of ICT in every facet of human endeavours cannot be overemphasized. It has become tools that can be utilized by staff and students to improve the quality of teaching and learning in all levels of education (Moseley, Higgins, Bramald, Hardman, Miller, Mroz, Tse, Newton, Thompson, Williamson, Halligan, Bramald, Newton, Tymms, Henderson & Stout, 1999). Teaching and learning process require the use of ICT so as to make process of imparting knowledge a worthwhile. Higgins, Xiao & Katsipataki (2012) opined that the use of computer and digital technologies is usually more productive when it supports collaboration and interaction, particularly collaborative use by learners or when teachers use it to support teaching, discussion, interaction and feedback. Medical Education Partnership Initiative –MEPI (n.d.) asserted that the use of ICT is valuable tool to enhance learning experience and assessing resources.

Teaching and learning, according to Ayeni & Ogunbaru (2013) is an organized instructional process that is consciously geared towards transforming and developing learners' intellectual ability, skills, ethics and values to enable them function effectively and become self-reliant, and contribute positively to societal development. Teaching, according to Clark and Star as cited in Owodunni (2011) is an attempt to assist students in acquiring or changing some knowledge, skill, ideal, attitude or appreciation. In essence, teaching includes setting up of different activities to enable a learner acquire certain traits which can improve the learner's knowledge, skills, attitude and values. These can only be achieved through effective teaching. Effective teaching is therefore described as ability of teacher to efficiently impart knowledge and skills to students and students in turn exhibit such traits. For a teacher to engage in teaching, a guideline known as curriculum is provided from which he/she would select topics to teach students within a specified period of time. Figure 1 depicts interaction between teaching and learning process.

With the emerging of information driven society, ICT or Computer Studies/Education has been included in the curriculum at all levels of education system. Computer Science / ICT education, according to Jimoh & Kazeem (2014) entails the design and the use of Computer peripherals or devices, such as software and hardware. The software includes all system and application programs that will enable computer to perform its laid-down objectives, such as operating system, device drivers, antivirus, programming languages, to mention but a few, while hardware includes all ICT tools that work effectively with software, such as computer system, printers, mobile phones, satellites, communication network gadgets, tablets, CD-ROM/DVD player, and so on.

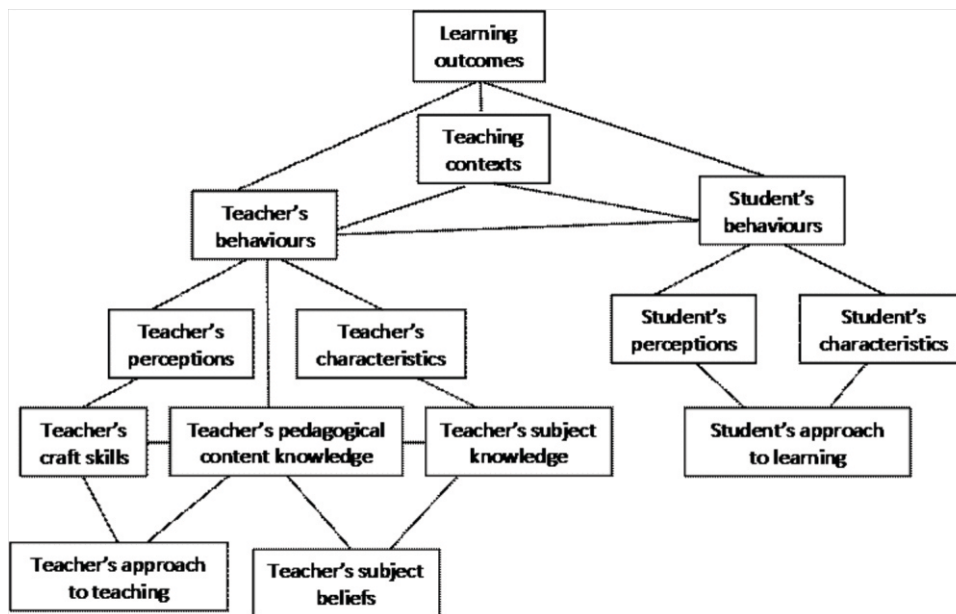


Figure 1: An interactive model of teaching and learning process. Source: Moseley et.al. (1999).

Having integrated ICT components in the subjects to be taught at all levels of education system by Federal Government of Nigeria (FGN) through its agency, Federal Ministry of Education – FME, (FGN, 2001 & 2004), many public secondary schools in Nigeria have embarked on teaching of ICT or otherwise known as computer studies or computer education/data processing into the subjects to be taught in the school and as such, national examination bodies such as West African Examination Council (WAEC), National Examination Council (NECO) National Business and Technical Examination Board (NABTEB) have started examining students in the subject at secondary school level.

Secondary school, according to Hornby (2006), is a school for young people between the ages of 11 and 16 or 18. Thus, secondary school in the context of this study is an organized institution for young people between the ages of 11 to 18 where teaching and learning take place using both horizontally and vertically planned curriculum. A critical look at these secondary schools offering the subject under investigation, it seems the required technological tools for training of students for effective teaching and learning of subject is not adequate, therefore, this study is sought to assess the availability of ICT infrastructures (gadgets and buildings) for effective teaching and learning of Computer Education in secondary schools of Katagum Education Zone, Bauchi State, Nigeria.

Theoretical Framework

This research work is based on Bandura's Observational Learning Theory or Model which was proposed in 1986 (Moore, 1999 & Anonymous, 2017). This theory states that learners learn new skills by observing others. The learners in this case create a mental picture of the skilled movement, learn through demonstrations and copy from a role model (that is teacher). This theory is related to this study in the sense that the learners (students) learn

from their teachers by observing and emulate or copy what teachers use computer to do in a practical class. There are four stages to Banduras' theory mentioned as follows:

Attention: Learners need to watch a suitable demonstration of the skill. This must be aimed at their ability level, performed correctly by a role model or competent peer. During this stage, long time should be avoided on what to be carried out; otherwise learners may get tired or bored and miss parts of the demonstration.

Retention: Learners retains what they learnt because practical nature of demonstration thereby creating the mental picture of the skill acquired. To retain the skills for long there is a need to practice skills in the mind as well as computer machine over and over so that the accurate way of doing the work can be achieved in the correct order.

Reproduction: Learners must have the ability to repeat the skill either first time or through a series of progressions.

Motivation: Presence of equipment to use for demonstration motivates learners to practice the required skills appropriately. The four stages are shown in figure 2 below: Anonymous (2017) opined that feedback is very important after this four stages. Feedback is beneficial in improving performance. Thus, learners exhibit learnt skills which improve their performance in the usage of computer system and as such improved their performance in the national examinations.

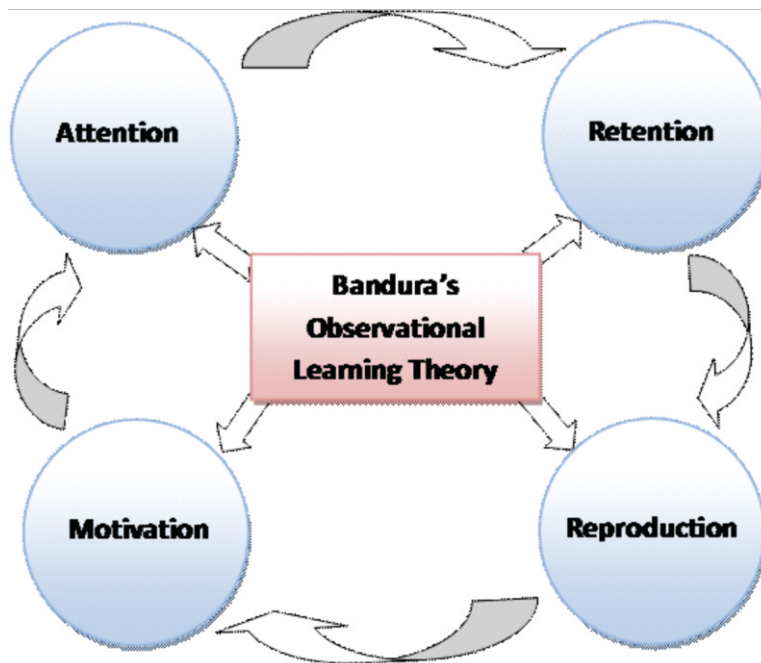


Figure 2: Stages of Bandura's Observational Learning Theory. Source: Adapted from Moore (1999)

Conceptual Framework

All the concepts x-rayed in this study are interrelated together and mapped up to build the conceptual framework as a computer architecture, developed by the authors as shown in figure 3 below:

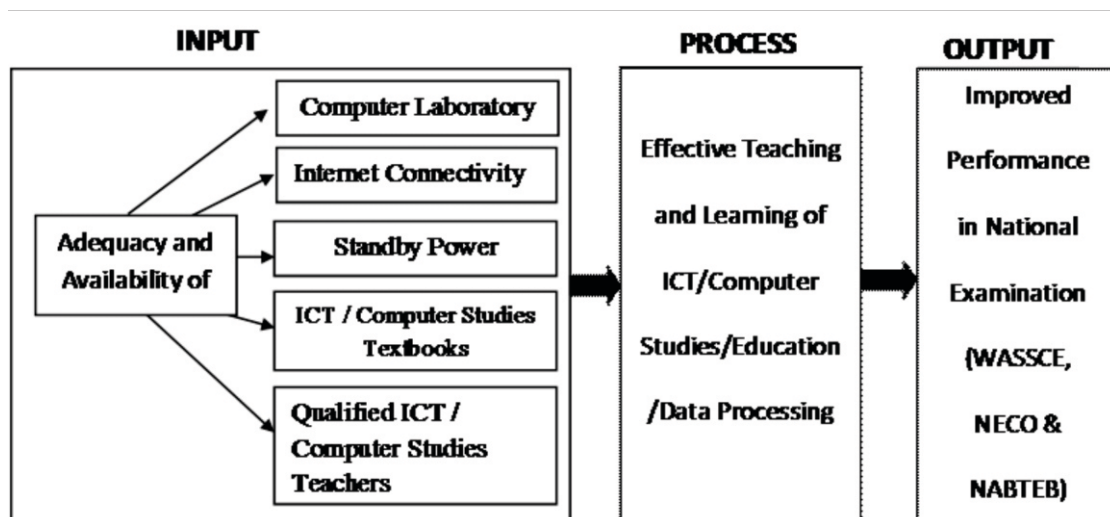


Figure 3: Conceptual Framework of the study. Source: Developed by the authors (2017)

In the figure 3 presented above, the computer architecture showcases the provision of adequacy, availability and functioning of computer laboratory, Internet connectivity, standby power supply, ICT / Computer Studies/ Education textbooks in the library and qualified ICT/ Computer Studies teachers will make teaching and learning process conducive, comfortable, efficient, effective for teachers and students which will eventually produce improved performance of students in the national examinations such as WASSCE, NECO and NABTEB results.

Review of Related Works

Many researchers have worked on the availability, adequacy and usage of ICT infrastructure in tertiary institutions in Nigeria. For instance, Hamilton-Ekeke & Mbachu (2015) investigated the availability of ICT facilities as well as its usage in one of the newest government owned universities in Niger Delta region of Nigeria. The study adopted survey research design with a sample size of 843 undergraduate students from the Niger Delta University, Wilberforce Island, Bayelsa State, Nigeria. Both quantitative and qualitative methods of data collection were employed to gather data for the study. The data generated were analyzed using simple percentages and chi-square statistics. The result showed that basic ICT facilities like computers were unavailable, students were unable to afford personal laptop and this was grossly affected e-learning and e-communication channels like email, e-board, internet and organized networking system among staff and students.

Similarly, Ali (2015) conducted a research to determine the implementation of ICTs programmes in Primary and Basic Secondary schools and to relate the interest of students and teachers in ICTs programmes in Primary/Secondary schools in Ahoada East Local

Government Area of Rivers State, Nigeria. The study employed descriptive survey research design. 180 Primary school pupils from 11, 260 population were randomly selected for the study using simple random sampling technique. Structured questionnaire was used to collect data for the study. The findings indicated that ICT education at the basic level of our education system is very low. The schools in the local government area are yet to be equipped with computer facilities. There was significant difference between the attitudes, interest and quest for ICT education among pupils/students and teachers.

Apagu and Wakili (2015) conducted a research on availability and utilization of ICT facilities for teaching and learning of Vocational and Technical Education in Yobe State Technical Colleges, Nigeria. The study adopted descriptive survey design and structured questionnaire was used to collect data for the study. The result revealed that Yobe state technical colleges lacked ICT facilities making teachers and students exposure to ICT facilities to be low. The result also study pinpointed some of the benefits of using ICT in technical college as making teaching and learning interesting; helping teacher to be up to date in enhancing the quality of work of both teachers and students, while some of the indicated challenges facing ICT were: irregular power supply; inadequate computer literate teachers; inadequate ICT facilities.

Besides, an investigation was carried out by Akuegwu, Ntukidem & Ntukidem (2011) on the utilization of ICT facilities for quality instruction delivery among lecturers in Nigeria with a focus on Akwa Ibom and Cross River States. The study employed survey research design. A total of 400 lecturers were selected for the study using random sampling technique. Structured questionnaire was used to generate data for the study. Data generated was analysed using t-test statistics. The results indicated that availability of ICT facilities for quality instructional service was significantly low, except internet-connected desktop computers which were being used by few lecturers. It was also discovered that lecturers from federal universities in the two states utilize ICT facilities more than lecturers from universities in Akwa Ibom State and differed significantly with their Cross River State counterparts.

In a nutshell, all researches reviewed in this work are mostly focused on Nigerian tertiary institutions, except few ones which were investigated in secondary and primary schools. Meanwhile, this current research is assessing availability of ICT infrastructure for effective teaching and learning of computer education in secondary schools, Katagum Education Zone of Bauchi State, Nigeria.

Purpose of the Study

The purpose of this study is to:

- (i) Identify the qualifications and area of specializations of employed Computer studies teachers that teach ICT / Computer Studies/Education in secondary schools.
- (ii) Determine level of ICT infrastructure availability for teaching and learning of Computer Education in secondary schools.
- (iii) Find out whether teachers and students in secondary schools use ICT facilities in teaching-learning of computer education.
- (iv) Find out if there are ICT/Computer studies/Education textbooks for effective teaching and learning of the subject.

Research Questions

The following research questions are raised to guide the study:

- (i) What are the qualifications and area of specializations of employed Computer studies teachers that teach ICT/Computer studies/Education in secondary schools?
- (ii) What is the level of ICT infrastructures availability for teaching and learning of Computer Education in secondary schools?
- (iii) To what level teachers and students make use of ICT facilities in teaching-learning of Computer Education in secondary schools?
- (iv) Are there ICT/Computer studies/Education textbooks for effective teaching and learning of the subject in secondary schools?

Methodology

This study employed survey research design and was carried out in secondary schools of Katagum Education Zone of Bauchi State, Nigeria. The population of the study consists of Computer Education teachers with total number of is 44, while the population of SS II students which are target of this study is 5,300. In the zone under study, there are 7 local government areas (LGAs) and each is forming a stratum on its own. Two schools were chosen from each of these LGAs bearing in mind one in rural area and another in urban area using proportionate stratified simple random sampling technique. Using this technique to draw sample size from the population based research advisor's Sample Size Table (The Research Advisor, 2006), a total of 360 SSII students was selected for this study, whereas all the ICT/Computer education teachers (N=44) were used since it has a small population. Researchers' self-developed structured questionnaire, known as questionnaire for availability of ICT infrastructure (QAICTI) was used as an instrument for data collection, and it was validated by experts in the field of Education and Computer Science, while the reliability of the instrument yielded 0.79 after applying Crobach alpha test of reliability so as to measure internal consistency of the items in the questionnaire.

For this study, four-point scale was adopted and enumerated as follows: Strongly Agreed (SA) = 4, Agreed (A) = 3, Strongly Disagreed (SD) = 2 and Disagreed (D) =1. Data obtained were analyzed using simple percentage, mean and standard deviations with the aid of Statistical Package Social Scientists (SPSS) software version 17.0. All research questions were answered using simple percentage, mean and standard deviations. The criterion to agree to an item statement is based on computed mean. Mathematically, $\bar{X} = (4+3+2+1)/4 = 2.50$. This implies that any computed mean on item statement which is greater than or equal to 2.50, then the item statement is agreed upon otherwise it is disagreed upon

Results and Discussions

This section provides the analysis of data collected from the teachers and students and as well give basis to answer all research questions in this study.

Research Question 1: What are the qualifications and area of specializations of employed Computer Education teachers that teach Computer Education in secondary schools?

Table 1: Qualifications and area of specialization of Computer Education teacher that teaches the subject in secondary schools in Katagum Education zone of Bauchi State

Qualification	Computer Related Discipline	Other Discipline	Total
NCE	13(29.6%)	21(47.7%)	34(77.3%)
Diploma	03(6.8%)	-	03(6.8%)
B.Sc.	02(4.6%)	01(2.3%)	03(6.9%)
B.Sc. (Ed.)	-	04(9.1%)	04(9.1%)
Total	18 (40.9%)	26 (59.1%)	44(100%)

Source: Field work, 2017

It is clear from the data presented in Table 1 above that most of teachers which constitute 59.1% that teaches Computer Education/ICT subject in the secondary schools are not majored in Computer related discipline, while those who majored in computer related discipline are 18 (40.9%) with NCE 13(29.6%), diploma 03(5.8%) and B.Sc. 02(4.6%) out of 44 teachers in the studied schools. Therefore, it can be deduced here that most of the Computer Education / ICT teachers in Katagum Education zone secondary schools are not majored in Computer related discipline.

Table 2: Mean and standard deviation on responses of teachers in the teaching ICT / Computer studies/Education in secondary schools of Katagum Education Zone, Bauchi State

S/N	Item Statement	N	\bar{X}	SD	Remark
1	The school lacks qualified teachers to teach ICT/Computer studies/Education effectively	44	2.61	1.05	Agreed
2	Science teachers are borrowed to teach Computer Education/ICT subject	44	3.21	1.11	Agreed
3	Computer studies /ICT/Data processing is only done once in a week	44	3.13	0.91	Agreed
4	Computer Education /ICT teachers in this school are inadequate	44	3.30	1.00	Agreed

Keys: N = Number of Respondents, \bar{x} = Mean, SD = Standard deviation

Source: Field work, 2017

Data presented in table 2 is buttressing the answer to research question 1 on teachers who teach ICT/Computer studies/Education in the schools. All items statements in table 2 are agreed upon by the teachers because each statement has mean value that is greater than the average cut-off point of 2.50. Computer Education /ICT teachers in this school are inadequate has highest mean value (3.30) followed by Science teachers are borrowed to teach Computer Education/ICT subject with mean value (3.21). Besides, Computer studies/Education/ICT/Data processing lesson is only done once in a week and the school lacks qualified teachers to teach ICT/Computer studies/Education effectively with mean values of 3.13 and 2.61 respectively.

Research Question 2: What is the level of ICT infrastructures (gadgets and buildings) availability for teaching and learning of ICT/Computer studies/Education in secondary schools?

Table 3: Mean and standard deviation on responses of students on availability of ICT facilities for teaching and learning of ICT/Computer studies/Education in the secondary schools of Katagum zone of Bauchi State

S/N	Item Statement	N	\bar{X}	SD	Remark
1.	The library/laboratory has adequate computer systems.	360	2.12	0.76	Disagreed
2.	The library/laboratory is spacious which ease free movement during practical lessons.	360	2.08	0.79	Disagreed
3.	The library/laboratory is equipped with projector for lesson presentation by the teacher.	360	2.09	0.78	Disagreed
4.	There is availability of scanners and printers to be used during practical lessons.	360	2.72	0.93	Agreed
5.	My school is connected to internet 24 hours @7 days	360	2.00	0.72	Disagreed
6.	Signal fluctuates in most of time.	360	2.86	0.90	Agreed
7.	Student hostels are connected via internet facility.	360	1.84	0.73	Disagreed

Keys: N = Number of Respondents, \bar{x} = Mean, SD = Standard deviation

Source: Field work, 2017

Data in Table 3 showed availability of ICT facilities for teaching and learning of ICT/Computer studies/Education subject in secondary schools of Katagum Education zone of Bauchi State. It is evident from the table 3 that students disagreed with the statement that laboratory has adequate computer system with mean value 2.12, laboratory is spacious for practical lessons with mean value 2.08, equipped laboratory with projector 2.09, internet connectivity with mean 2.00 and connectivity of hostels with internet facility with mean value of 1.84. However, students agreed with statement that availability of scanners and printers with mean values of 2.72 and network signal fluctuates in most of time with mean value 2.86. The SD values obtained for each statement is low indicating that there is closeness in the scores obtained from respondents (students) from the field. With these data, it can be concluded that the availability of ICT facilities for teaching and learning of ICT/Computer studies/Education in secondary schools of Katagum Education zone of Bauchi State is very low at the time when this research was conducted.

Research Question 3: To what level teachers and students make use of ICT facilities in teaching-learning of Computer Education in secondary schools?

Table 4: Mean and standard deviation on responses of students on the use of ICT facilities for teaching and learning of ICT/ Computer studies/Education in the secondary schools of Katagum zone of Bauchi State

S/N	Item Statement	N	\bar{x}	SD	Remark
1.	I do go to computer laboratory/ library to do practical work.	360	2.16	0.75	Disagreed
2.	A group of two students use a computer during practical lesson.	360	2.91	0.81	Agreed
3.	All students get computer to use during practical lesson.	360	2.01	0.75	Disagreed
4.	I use the school internet facility to access learning resources.	360	2.03	0.77	Disagreed
5.	Our teachers use computer and other facilities to teach us during practical lessons.	360	2.59	1.01	Agreed

Keys: N = Number of Respondents, \bar{x} = Mean, SD = Standard deviation

Source: Field work, 2017

Data presented in table 4 is indicating the use of ICT facilities for teaching and learning of ICT/ Computer studies/Education in the secondary schools of Katagum zone of Bauchi State. Students disagreed with the statement “I do go to computer laboratory to do practical work” with mean value 2.16 which is less than average cut-off point of 2.50. This implies some students go for practical work in the computer laboratory, but their mean response is not up half. Also, students disagreed with the statement saying that all students get computer to use during practical lesson with mean value 2.01. “I use school internet facility to access learning resources” was disagreed upon by students with mean value 2.03. Whereas, students unanimously agreed that a group of two students use a computer during practical lesson and their teachers uses computer and other facilities to teach them during practical lessons with mean values of 2.91 and 2.59 respectively. The values of SD obtained for each statement is small showing that there is closeness in the scores obtained from respondents (students) from the field.

Research Question 4: Are there ICT/Computer studies/Education textbooks for effective teaching and learning of the subject in secondary schools?

Table 5: Mean and standard deviation on responses of students on availability and use of ICT/Computer studies/Education textbooks for effective teaching and learning of ICT/Computer studies/Education subject in the secondary schools of Katagum zone of Bauchi State

S/N	Item Statement	N	\bar{X}	SD	Remark
1	There are enough ICT or computer textbooks at secondary school levels in the library	360	2.66	0.96	Agreed
2	The library officials do allow us to borrow books on computers or ICT	360	3.13	0.78	Agreed
3	The library is spacious enough to accommodate half of students at a time	360	3.26	0.71	Agreed
4	The ICT or Computer books provided by the ministry of education are not outdated	360	3.20	0.81	Agreed

Keys: N = Number of Respondents, \bar{x} = Mean, SD = Standard deviation

Source: Field work, 2017

From the data presented in table 5, it is evident that students unanimously agreed on all four statements with the mean values greater than average cut-off point of 2.50. In essence, students are of the opinions that there are enough ICT or computer textbooks at secondary school levels in the library, the library officials do not allow them to borrow books on computers or ICT, the library is spacious enough to accommodate half of students at a time and the ICT or Computer studies books provided by the ministry of education are not outdated. It is also clear that the values of SD obtained for each statement is small indicating closeness in the scores obtained from respondents (students) from the field.

Findings from the study

This study has found that:

- (i) Majority of ICT/Computer studies/Education teachers that teach the subject are not majored in computer related discipline and sourced from other discipline, hence the schools lack qualified teachers.
- (ii) ICT infrastructures (gadgets and buildings) are not readily available in the secondary schools, though there are scanners and printers in the computer laboratories of the schools.
- (iii) Non-availability of ICT supporting facilities, purpose built infrastructures (gadgets and buildings) in the schools makes teaching and learning ICT/Computer studies/Education subject it difficult.
- (iv) The schools are equipped with ICT/Computer studies /Education textbooks.

Discussion of Findings

This research revealed that majority of ICT/Computer studies/Education teachers that teach the subject are not majored in computer related discipline and sourced from other discipline, hence the schools lack qualified teachers. This finding supports the view of Kommers & Simmerling (2005) who opined that the dominant paradigm is that teachers in the field need to be taught professionally before they teach later in the society. Besides, the study conducted

by Davis, Preston & Sahin (2009) collaborates the finding in this study that teacher training should be conducted in the same manner that the teachers are expected to integrate ICTs and training needs to go beyond simple computer skills such as word-processing. There is the need to provide technical aids/support for educators and to prepare them to be useful in their fields.

This study has found that ICT infrastructures (gadgets and buildings) are not readily available in the secondary schools, though there are scanners and printers in the computer laboratories of the schools. This finding is in line with the study of Department of Education and Science (2008) which observed that the level of ICT infrastructure in schools in Ireland needs to be improved and should be working towards equipping not just all schools but all classrooms with an appropriate level of ICT infrastructure, though schools were found to use a limited range of ICT peripherals, mainly printers, scanners, and digital cameras. In the same vein, this collaborates the study conducted by Bartlett, Akala, Semyalo & Stafford (2013) in Kenya which concluded that schools studied in the research lack an adequate number of computers to enable frequent access by all teachers and students and with student populations in the hundreds, teaching staff between 13-26, and average class sized between 40-60, larger numbers of computers are required to meet the needs of all students and teachers. Also, in a survey conducted in Lagos state on ICT facilities for primary schools by Oguegbu (2016) published by The Guardian newspaper revealed that the ICT laboratory, which serves 32 schools in Alimosho area has inadequate facilities and incapable of impacting meaningfully on the pupils with the present arrangement. This is in agreement with present study.

Non-availability of ICT supporting facilities in the schools make teaching and learning of ICT/Computer studies/Education subject difficult as it was also observed by Usuel, Askar & Bas (2008) that insufficient or lack of ICT facilities appears as significant barriers or hindrances in effective implementation of ICT curriculum standards in schools in developing country such as Philippines. The finding here also supported as rightly opined by Adeyemo (2010) in Abdulkadir, Ibrahim, & Ma'aji (2014) that the non-availability of ICT facilities has put many students at disadvantage in practical application of procedure involved in learning ICT, while teachers involved face the challenges of not being able to give most students the desire individual attention to explain difficult concept to concretize their knowledge and such predicament narrow the opportunity available to stimulate students for further usage of ICT facilities for independent learning beyond the normal classroom interaction.

This study also revealed that the schools are equipped with ICT/Computer studies /Education textbooks which students help to study the subject themselves. This is in line with the study of Schauer, Ožvoldová & Tkáč (2013) which asserted that when web page is supplemented by the text, providing the necessary theory and resources will give learners better understanding of the concepts.

Conclusion

This study assessed the availability of ICT infrastructures for effective teaching and learning of Computer Education in secondary schools, Katagum Education Zone of Bauchi State, Nigeria. Some concepts such as ICT, Computer Education, teaching and learning have been x-rayed. Besides, Bandura's Observational Learning Theory or Model proposed in 1986 was

used as basis for theoretical framework while various concepts and variables were mapped up to build the conceptual framework for the study. Four research questions were raised and answered in the study. However, the study revealed that the schools lack qualified Computer Education/ Studies/ ICT teachers; ICT infrastructures are not available in the secondary schools making it difficult to teach the subject under investigation and lastly the schools are equipped with ICT/Computer studies /Education textbooks.

Recommendations

Based on the findings in this study, the following recommendations are suggested thus:

- (i) Bauchi state government should ensure adequate provision of ICT supporting facilities, purpose built infrastructures (gadgets and buildings) in all the post-primary schools of the state for effective teaching and learning of Computer studies / Education/ICT subjects.
- (ii) Bauchi State Ministry of Education through Teachers service Commission (TSC) should employ qualified teachers in the field of Computer related discipline who will impart required practical skills into learners.
- (iii) Capacity building training workshop should be organized for ICT/Computer studies/Education Teachers to enable them have up-to-date knowledge as new knowledge are discovered in the field from time to time.
- (iv) There should be provision of an alternative electricity supply (solar or generating set) instead of depending solely on national power grid.
- (v) Philanthropists in the community should also contribute their own quota to the development of the schools in terms of provision of ICT gadgets.

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