

Implications of Students' Access to Computer and Academic Performance in Selected Public Secondary Schools in Tarauni and Kano Municipal Local Government Areas, Kano State, Nigeria

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ABSTRACT

Relevance of computer based education cannot be overemphasized in the 21st century. The use of computers in education impacts academic performance of students. In Nigeria, the use of computers especially in secondary schools is on the rise. A focus on North-western Nigeria, a region considered as educationally disadvantaged compared to other regions of the country, is vital to the nation. Although there is an affirmative national policy on the integration of Information and Communication Technology (ICT) in the secondary school curriculum, implementation of the policy at the level of school management is called to question. This research investigated the implications of student's access to computer and academic performance in some selected public secondary schools in Kano State, Northwest Nigeria. The research adopted a survey design that used randomly selected but purposive sample of students from four schools in Kano metropolis with a view to investigating the level of availability of computers and the impact of the outcome on students' performance. Results showed that some schools suffer non-existence of computers, most schools exhibit low level of computer availability but with students who indicate the capacity of to use computers. Results also indicated that students still suffer restricted access to computer at school, with the students having more access mostly from homes and cyber cafes. This has serious implications as most of the students fear that they cannot handle a computer based test (CBT). Provision of more computers by the school and a non-restricting computer access to students should be promoted.

Keywords: Computer Based Education, Northern Nigeria.

1.0 INTRODUCTION

1.1 Background to the Study

Computer based education (CBE) has become a necessity in the 21st century education, in which the use of computer is the norm with significant impact on delivery of education. There is a growing global evidence that CBE has a strong capacity to raise students' performances (e.g., Schindler *et al.*, 2017; Rachmadtullah *et al.*, 2018; Bond *et al.*, 2020; Lepper and Malone, 2021; Adarkwah *et al.*, 2024; Onjewu *et al.*, 2024). However, Poole (1996) stated lack of computer knowledge is now often regarded as the new form of illiteracy. It has been posited that methodologies in education have been revolutionized with the coming of computers and Information and communication Technology (ICT) (Ololube, 2006; Ullah and Anwar, 2020). Previous studies by Richard and Herbert (1970) showed that CBE can improve student's performance by 0.42 standard deviation in the United States of America. A report by Becker (1986) indicated that of all Elementary and Secondary schools in the U.S.A., over one million computers are available, with over 15 million students and 0.5 million teachers having access to use the computers, and that 16,500 secondary schools have at least 15 computers within the same period. This development cost several millions of Dollars and these figures

surely would have increased by now after 30 years the report was published.

In Nigeria, existing policies on ICT are insufficient to properly place the education system to deliver on the intended benefits to the students (Mudasiru, 2005). There are indications that the institutions especially most of the public schools are not well-equipped to provide the much needed computer assisted instructions (CAI) that has become the norm to the students. Abdulkareem and Lennon (2023) evaluated the impact of digital divide on students' performance in computer-based university entry examinations for in Nigeria, with 63% of students from Nigerian rural public schools having no prior computer experience. For this reason, studies on the level of student's access to computers and implications on their academic performance in Nigeria are imperative.

Low availability of computers for the teaching Computer based instruction (CBI) in most Public secondary schools the especially in the Northern part of Nigeria is a huge challenge (Mudasiru, 2005; Yusuf, 2005; Olanrewaju *et al.*, 2021). Even when they are available, student's access is limited (Yusuf, 2005; Yusuf and Onasanya, 2004). This presents a major problem since CBE has already been introduced



in the secondary school curriculum in Nigeria. The main questions are that what is the level of computers available to students? Do the students currently receive any teachings or training on CBE? How much access does the students have to use computers and such affect their academic performance. Therefore, this study seeks to investigate the implication of the level of student's access to computers and how its affect students' performance in Kano State, North-western Nigeria. Specifically, we seek to assess the level of availability of computers in some public secondary schools, investigate the level of access to computers and analyse the impact of the use of computers on students' academic performance in four secondary schools in the cosmopolitan state of Kano. Kano is a suitable case study for the other Northern states because of its strategic political and commercial status and as the largest city in Northern Nigeria.

This study is significant in that it will allow for further appraisal of the level of implementation and integration of CBE into the school's curriculum in Kano, assessment of the level of implementation of the national policy on the inclusion of ICT in the secondary school curriculum, student's preparedness for use of CBE or CBI and serve as one of the bases for teachers, researchers, and government to develop a review of the policy on ICT in Nigerian secondary schools. Hence, the aim of this current research, restated, is to investigate the impact of students' access to computers on their academic performance by utilizing questionnaire responses from selected public secondary schools in Kano State, Northwest Nigeria.

1.2 Literature Review

1.2.1 The relevance of Computer based education

Studies on the use of computers, ICT and the emergence of CBE are abundant in literatures (e.g., Baro *et al.*, 2010; Aduwa-Ogiegbaen and Iyamu, 2005; Yusuf, 2005; Yusuf and Onasanya, 2004; Kulik and Kulik, 1991; Ekundayo, 2022). Particular to Nigeria, researches in this area especially on the effectiveness and the use of computers have steadily increased (e.g., Ajayi, 2008; Yusuf and Onasanya, 2004; Usman and Madudili, 2020; Wordu *et al.*, 2020; Joy, 2023; Okagbue *et al.*, 2023). In particular, Okagbue *et al.*, 2023 stated that the covid-19 pandemic has revealed the strengths and weaknesses in the global education system, with Nigeria exhibiting strong deficiencies in the area of CBE. Therefore, a study on the case example of the Northern Nigeria has become important and relevant in contribution to the growing body of knowledge on the topic.

The use of computers have gained much significance in countries like the U.S.A. where it has become a culture such that the availability of computers in elementary schools have increased by a factor of 10 in

the 1980s (Becker, 1986). The use of ICT equipment in CBE involves a feedback system, computer based operations, teleconferencing, and internet usage and a host of other multimedia gadgets (Lee, 2000; Umeifekwan, 2005). Taylor (1980) highlighted three basic functions of computers and these include uses (i) as a programming tool that evaluate student's performance serially, (ii) as a tool for mathematical and statistical analyses, and (iii) as a tutee to the students (i.e. carrying out instructions giving to it by students). In addition, computers empowers teachers with unlimited access to teaching and learning processes (Ajayi, 2008).

1.2.2 National policy on ICT in Nigerian schools

Following the resolutions in 1995 by the African Information Society Initiative (AISI) and those of Economic Commission for Africa (ECA) and UNESCO, all of which were aimed at bridging the digital divide between the advanced world and Africa, ECA's conference of ministers through its resolution 812 (XXXI) approved the AISI framework to develop an "Africa Information and Communication Infrastructure" (Ajayi, 2002; African Development Forum, 1999). The AISI framework seeks an ongoing National Information and Communication Infrastructure (NICI); the NICI plans, strategies and implementation of country-specific pilot projects on ICT. But Yusuf (2005) reported a near failure of the NICI task in Nigeria especially in the early 1999, while a significant progress were made later same year.

Consequently, a policy aimed at promoting, instituting and regulating ICT was approved in October, 1999 (Ajayi, 2002). The national policy on ICT specifically seeks to empower the youths on ICT, incorporate ICT in education and to establish ICT centres for development. In order to implement this policy, the federal government of Nigeria in October 2001 launched the National Information Technology Development Agency (NITDA) to carry out this function (Ajayi, 2002). Part of the ICT policy intends a vertical approach which is focused on addressing the issues of freedom of information, tariff and pricing as well as cyber security. The policy recognizes the need for the integration of ICT into the mainstream education and training of the citizens. Part of the strategies, as reported by Yusuf (2005) include but not limited to:

- i. making the use of ICT at all levels of schooling compulsory;
- ii. development of ICT curricula at primary, secondary and tertiary levels of education;
- iii. ICT investment in education;
- iv. study grant and scholarship in ICT;



- v. working with local and international organizations for the transfer of ICT knowledge.

The feeling is that most of these objectives has not been comprehensively implemented and that the policy itself is inadequate. Some problems identified as militating against the policy include:

- i. Lack of sectoral allocation (unlike the health and tourism sectors) specifically dedicated for education as this is often put under human resource development.
- ii. Lack of focus on student's early ICT needs especially in the primary and secondary schools as the policy is market driven concentrating on the students learning for job opportunities and not really for education; hence its potential as learning aid is limited.
- iii. Teacher's incompetence (Yusuf, 2005) have been identified as one limiting factor; and as the policy stands currently, teachers ICT development have not been given the attention it deserves.

So the existence of these problems, or if effort have been committed to solving them in respective and how it affect student's performance in Nigeria need to be investigated. Hence the focus of this study is to appraise the availability of and students' access to computers in some secondary schools in Kano State.

1.2.3 The use of computers and ICT in Nigerian secondary schools

As a matter of policy, ICT must be integrated into the curricula at all levels of education in Nigeria. Despite the numerous significance of CBE (as reported in Dede, 1998; Digest, 1996; Umeifekwan, 2005), the problems of low availability of ICT tools and inadequate capacity to teach ICT in schools continue to prevail in most schools and colleges of education (Ajayi, 2008). Aduwa-Ogiegbaen and Iyamu (2006) have identified high cost, weak infrastructure, inadequate skills, poor software and low internet availability as major obstacles standing in the way of CBE in Nigerian schools. To compound issues, the Unified Tertiary Matriculation and Examination (UTME), the body responsible for the conduct of the examinations into Nigerian tertiary institutions, have recently (in 2017) incorporated into the conduct of its assignment a computer based test (CBT) as an approach. This means that secondary schools (students, teachers and administrators) can no longer escape CBE if they hope to uphold the existence of tertiary education. Therefore, a study focusing on the level of CBE performance and its implication on student's performance in Kano metropolis becomes extremely important so as guide administrators and policy makers on areas where attention should shift.

This is especially important considering the fact that the northern Nigeria is mostly considered as educationally disadvantaged region.

According to Olakulehin (2007), most secondary schools in Africa are poorly exposed to the use of ICT in education which raise the question of how will the teachers give what they do not know.? And how will this impact on the end receivers (the students)? This study will attempt to provide answers to some of these questions.

2.0 METHODOLOGY

2.1 Research Design

This research followed a survey design. The target populations were students of public secondary schools in the cosmopolitan city of Kano. Public secondary schools were chosen for the study because they are the ones that have more difficulty adopting CBE because of the challenges of funding, schools perceived to be lacking in the ICT facilities and policy implementation and of students drawn mostly from humble background where ICT facilities may be regarded as luxury.

2.2 Population, Sample, and Sampling

Kano State is the most populous State in Nigeria with a in the 2006 census of 9,383,682. It has a total of 44 Local Government Areas (LGAs). The survey is drawn firstly from 2 local government areas (Kano Municipal and Tarauni) from among the 44 local government areas of Kano State; the combined population of the two LGAs is about 1,000,000. Secondly, 4 secondary schools (2 from each of the selected 2 Local Government Areas) were randomly selected. From the 4 randomly selected secondary schools 1000 students (250 from each secondary school) make up the total sample size.

2.3 Methods of Data Collection

Purposive sampling was used to select only the senior secondary students for the. The reason was because the pre-test revealed that the majority of the junior secondary students had little or no knowledge on the subject matter especially on the availability of ICTs in their respective schools. The questionnaires were distributed to students during class hours and retrieved at the end of a 60 minute period and hence resulting in a 100% response rate. Presented below (Table 1) is the demography of the selected secondary schools. From Table 2, 51.8% of the students were males, while the females were relatively fewer with 48.2%. Table 3 shows that students within the ages of 16 to 18 years (44.7%) are the highest, while others are; 10 to 12 years (6.4%), 13 to 15 years (42.2%) and 19 to 21 years (6.7%). From Table 4, the distribution shows that more of the students (54.7%) are in SSS2, while others are SS1 (30.3%) and SS3 (15.0%).

Table 1. Demographic information of selected secondary schools



Local Government Area	Number of schools and respondents	Names of selected public school
Kano Municipal/Tarauni	2 (500)	Government Secondary School Kofar Nasarawa and Government Boys Secondary School Rumfa College Kano
Kano Municipal/Tarauni	2 (500)	Governors College, Kano and Government Secondary School Unguwa Uku
Total	1000	4

Source: Ministry of Education Kano, 2017

3.0 RESULTS AND DISCUSSION

3.1 Data Presentation and Results

The results of the survey are presented in Tables 1 – 5. From Table 2, 51.8% of the students were males, while the females were relatively fewer with 48.2%. Table 3 shows that students within the ages of 16 to 18 years (44.7%) are the highest, while others are; 10 to 12 years (6.4%), 13 to 15 years (42.2%) and 19 to 21 years (6.7%). From Table 4, the distribution shows that more of the students (54.7%) are in SSS2, while others are SS1 (30.3%) and SS3 (15.0%).

Table 2. Gender distribution of student respondents

Gender	Frequency	Percentage
Male	518	51.2
Female	482	48.2
Total	1000	100

Source: Fieldwork, 2017

Table 3. Distribution of respondents according to age

Age	Frequency	Percentage
10 – 12	64	6.4
13 – 15	422	42.2
16 – 18	447	44.7
19 – 21	67	6.7
Total	1000	100

Source: Fieldwork, 2017

Table 4. Distribution of students according to class

Class	Frequency	Percentage
SSS 1	303	30.3
SSS 2	547	54.7
SSS 3	150	15.0
Total	1000	100

Source: Fieldwork, 2017

Table 5. Availability of computers in secondary schools

No.	Questions	Yes (2)	No (1)	Mean	Std. deviation
1	Presence of a computer laboratory	229 (22.9)	771 (77.1)	1.22	0.42
2	Availability of computers in the lab	731 (73.1)	269 (26.9)	1.73	0.44
3	Sufficiency of the computers	349 (34.9)	651 (65.1)	1.35	0.48
4	Use of computers	544 (54.4)	456 (45.6)	1.54	0.50
Weight average mean		=	1.40		

Source: Fieldwork, 2017

Table 6. Level of computer skills

No.	Questions	Frequency	Percentage
1	Can you operate a computer	357	35.7
2	Do you study computer education	561	56.1



3	Do you use computer based on self-taught	462	46.2
4	Do you think you can handle CBT	531	53.1

Source: Fieldwork, 2017

Table 7. Frequency of access to computer

Response	Frequency	Percentage	Mean	Std. Deviation
Never (1)	314	31.4		
Occasionally (2)	403	40.3		
Often (3)	165	16.5	2.09	0.97
Very often (4)	118	11.8		
Total	1000	100		

Source: Fieldwork, 2017

Table 8. Places of access to computers

Response	Frequency	Percentage
Home (1)	346	34.6
School (2)	184	18.4
Cyber café	256	25.6
Mobile phones	177	17.7
Friends and relatives' homes	37	3.7
Total	1000	100

Source: Fieldwork, 2017

Table 9. Purpose of using computers

Response	Frequency	Percentage
Social networking	874	87.4
Solving assignments	719	71.9
To receive class lectures	505	50.5
Other purposes	621	62.1

Source: Fieldwork, 2017.

Table 5 shows that approximately 30 % claims that their schools have computer laboratories, with 73.1% claiming that their schools possess computers, while about 35% believes that the available computers are sufficient for learning. Another 54.4 % claims they actually make use of computers in their respective schools. A weight average mean of 1.40 was obtained out of a total of 4.0 which shows that availability and access to computers in the studied school is poor. Even as many respondents claimed that computers are available in their schools, there appears to low access to use of computers in the schools.

In Table 6, 35.7% of the students claimed the can operate the computer, whereas 56.1% claimed that computer education is included in their school curriculum. This shows a disparity between curriculum and the practical reality in terms of computer knowledge. While 46.2% of the respondents claimed that their computer skills was acquired from self-taught activities, 53.1 % were of the perception that they cannot handle any computer based test (CBT) which indicate some gaps in the knowledge.

On the level of access to computers, Table 7 revealed that majority of students either occasionally have access to the computer room or laboratory (40.3%) or never have access to the computer room (31.4%). Other results showed that students that often have access to the computer room constitute 16.5%, and very often have access to the computer room (11.8%). The mean score of 2.09 out of a maximum score of 4.00 indicated that the level of access to the computer rooms or laboratories, where present, is poor. This is because either the systems are faulty or/and they are not being put to use. In addition, many schools do not allow their students to have full access to the computer when they are in need of information; even in some cases are totally restricted from gaining access. In other results as presented in Table 8, Table 8 revealed that majority (34.6%) of student's access computers from their homes. This is followed by cyber café (25.6%). Other places of computer access available to the students obtained very low percentages namely: schools (18.4%), mobile phones (17.7%) and friends/relatives homes (3.7%). This is an



indication that, students access the computers more frequently from their homes, while a few others use the cyber cafes and mobile phones. As seen in Table 9, 87.4% which represent the majority of students use the computer for social media and networking, followed by those who use it for solving school's assignments (71.9%). Some significant level of usage for computer based education (CBE) were obtained representing 50.5%, while use of computers for any other purposes by students account for 62.1%. Therefore, it can be deduced that students significantly make use of computer for educational activities.

4.0 DISCUSSION

In relation to the research questions, the analyzed data fully showed that the availability and use of computers and internet is very poor. Many schools may boast of computer laboratory but only a few can pride themselves on the internet access. This situation is similar to that revealed by Goldman *et al.* (1999), who claimed that most schools have computer laboratories and many computers in the classrooms, but since internet services are the latest technology in the educational system, other factors still hampers computer availability and internet access within and outside the school environment. As implied by Ukpebor and Emwanta (2012), most of the schools that claim to possess computers either only parade outdated versions or non-functional computers, stating that there is need for schools to acquire computers for teaching practical.

The study showed that there exist significant adoption and implementation of the national policy on ICT as most school have introduced CBE in their curriculum, which is in line with the integration of ICT into the mainstream education and training of the citizens (Yusuf, 2005). This represent a significant improvement in the number of schools that offer CBE, it is however still not sufficient for what the policy recommends; the expected ratio of students to computer is 10 :1 but most public secondary schools have membership in the range of 50:1 (Philip and Josiah, 1988). Also related to this situation is the practice by some schools not allowing students to have access to computers when they need them; this is against the assertion that students increasingly utilize the computer to do research on their own initiative and satisfy their information needs (Yusuf, 2005). This was later echoed by Olakulehin (2007), who stated that most secondary schools in Africa are poorly exposed to the use of ICT in education

The study reveals that relatively low number of the students have the capacity to use the computer, and these internet skills are majorly learnt from friends against the teachers who only encourage them to use the computer for school assignments and other school

works that requires the use of Internet. Formal skills are acquired through courses in institutions where the skills are taught, while informal skills can be acquired through friends, self-taught or personal arrangement with people who are experts in that particular field of study. Even at that the research has showed that students learn these skills more from friends who should not be unexpected as researches on internet usage by Ojoko and Asaolu (2005) revealing that 67.9% of the students acquired skills through teaching by friends, 39.3% through self-teaching while 20.7% acquired their skills by reading of books. One of the strongest indications of this study is that more students cannot handle effective CBT or computer based examinations when compared with the general population of the students.

Results from the study also revealed that students access computer more frequently from their homes and fewer others from cyber cafes and mobile phones. Many of the students of the middle or upper class of the respondents could boast of computer access either through personal computers or through use of mobile phones, which is a major trend of accessing the internet in the country. However, previous study indicates that computer ownership and internet access in the home strongly influence students' overall use of the computer. This can have a significant impact on student performance on CBE, buttressing the notion that the presence or lack of a computer in the home is the key driver in the observed gaps in computer use in general, and, in particular, between whites and blacks (Hoffman *et al.*, 2000). The result here is also broadly consistent with those of Abdulkareem and Lennon (2023).

The general implication of this study is that ministry of education and other relevant agencies should adhere to the national policy on ICT and key into the information age where CBE is fast becoming the norm in education management and considered as an inevitable tool in the upbringing of children in secondary schools. This should be done by ensuring the implementation of standards for all secondary schools in the acquisition of computers and adoption of CBE for such schools to be accredited for operating. It is now more convincing that CBE has become inevitable for secondary school students.

5.0 CONCLUSION

The increasing adaptation of secondary school curriculum to accommodate Computer Based Education constitute the major force behind this research. Previous studies about computer education in Nigeria highlighted the problems of funding, lack of student's access, poor teacher knowledge and digital divide as militating factors against computer education (Aduwa-Ogiegbaen and Iyamu, 2005; Yusuf, 2005; Ukpebor and Emwanta, 2012; Abdulkareem and Lennon, 2023). Because the



northern Nigeria is considered as educationally less developed, an assessment of student's access to computers and implications on their academic performance becomes imperative. The research followed a survey design with a purposive sampling of some public secondary schools Kano. Results revealed that low availability of computer, low students access to computers are common in public secondary schools in Kano.

From the results and analysis carried out in this study, the following conclusions were drawn:

- i. More than half of the schools surveyed in this work possess computers and computer laboratories
- ii. But availability of computer is low in most of the secondary schools
- iii. Computer Based Education (CBE) has been introduced in most of the schools
- iv. But CBE and students' computer skills is generally low because of restricted access to computer
- v. The students access to computer generally come from homes and cyber cafes
- vi. The low students access to computer has adverse effect on students' performance in schools
- vii. Most of the students fear that they cannot undertake a computer based test (CBT)
- viii. There is a general indication that the national policy on ICT and CBE has not been fully implemented in secondary schools.

Therefore, we recommend the following:

- i. The schools should acquire more computers so that more of the students make use of it for CBE.
- ii. The policy of the school management restricting students' access to computer rooms should be relaxed so that students can learn more computer skills from schools.
- iii. Policy makers and curriculum developers should include in secondary school curriculum retrieval skills from computers.
- iv. Training and retraining of teachers should be given importance so that they can pass sound computer knowledge to the students
- v. The government should increase funding in the education sector especially for acquisition of computers.
- vi. And as the use of computer in secondary school is promoted, issues of standards and ethics should be incorporated.

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