academicJournals

Vol. 8(12), pp. 881-889, 23 June, 2013
DOI: 10.5897/ERR2013.1440
ISSN 1990-3839 © 2013 Academic Journals
http://www.academicjournals.org/ERR

Educational Research and Reviews

Full Length Research Paper

A comparative assessment of computer literacy of private and public secondary school students in Lagos State, Nigeria

Osunwusi, Adeyinka Olumuyiwa[1]* and Abifarin, Michael Segun[2]

[1]School of Education, National Open University of Nigeria (NOUN), P.O. Box 17336, Ikeja, Lagos State, Nigeria.
[2]Centre for Educational Technology, Federal College of Education (Technical), Akoka-Yaba, Nigeria.

Accepted 14 May, 2013

The aim of this study was to conduct a comparative assessment of computer literacy of private and public secondary school students. Although the definition of computer literacy varies widely, this study treated computer literacy in terms of access to, and use of, computers and the internet, basic knowledge and skills required to use computers and the internet, and the patterns of use of computers and the internet. Four hundred students drawn from twenty secondary schools (private school = 10; public school = 10) located in two of the local government areas in Lagos State, Nigeria participated. Data sources included a generally closed-ended computer literacy questionnaire. Data were analyzed using frequency counts, percentages, t-test, z-test, and chi-square test (χ^2) with a level of significance α = 0.05. The study found that private secondary school students have access to, and use, the computer in higher measures than public secondary school students. However, no statistically significant differences were found in terms of access to the internet. Private school students were also found to be more engaged in computer literacy. It was recommended that a supportive policy environment should be instituted and that government should intervene to reduce the cost of acquiring computers.

Key words: Computer literacy, private secondary school, public secondary school, computers, internet, students, Lagos State.

INTRODUCTION

The ability to access, manipulate and use information is the basic requirement for survival and development in the emerging information age in which information is growing by leaps and bounds. However, the capacity and capability to access and apply information must find bearing in information and communication technology in the global village (Aduwa-Ogiegbaen and Iyamu, 2005).

The ability to access and apply information is widely referred to as information literacy, a term which, according to Kubiatko (2007), simply involves the ability to find and use information.

It is important to stress, at this juncture, that, even at its most fundamental level, the ability to find, manipulate and use information must necessarily be grounded in computer literacy, which, at its basic level, involves the ability to use the new computer technologies to effectively perform a variety of tasks involving the processing, manipulation and storage of information.

Remarkably, the definition of computer literacy varies widely. It can be defined as the ability to use a few commercial applications and touch-type smoothly (Kubiatko, 2007). It is also the ability to tell the computer

*Corresponding author. E-mail: aosunwusi@yahoo.com. Tel: +2348029797493/+2348067461324.

what you want it to do and understand what the computer says (Bada et al., 2009). Oluwatayo (2012) defines computer literacy in terms of the amount of knowledge and skills acquired by an individual to perform a given task using a computer system.

For students, the acquisition of computer skills is indisputably a *sine qua non* for survival in today's world. It has become very indispensable in order to be competitive in today's labour markets. Increasingly, an individual is today considered to be truly literate if he or she combines the ability to read and write with the capability to use a computer. As Poole (1996), cited by Aduwa-Ogiegbaen and Iyamu (2005), has rightly indicated, computer illiteracy is now regarded as the new illiteracy.

The increasing realization of the potential benefits of computer literacy amongst students has no doubt been driving efforts to support not only the integration of computer technologies into the learning environment but also the improvement of access to and use of the tools of the information age. In the context of the Nigerian education system, the first official efforts towards integrating computer education into the school system date back to the 1980s.

In 1987, the Federal Government, at the 32nd Ministerial Council Meeting of the National Council on Education, set up a National Committee on Computer Education, which was inaugurated on December 14 of the year. This crystallized into the establishment of a National Policy on Computer Education (1988), the general objectives of which, according to Jegede and Owolabi (2003), are focused on ensuring that: the general populace appreciates the impact of information and computer technology on today's society; and Nigerians are equipped with the knowledge and skills to use and program computers, develop software packages, understand the structure and operation of computers and their history, and to appreciate the economic, social and psychological impact of the computer.

Beyond the primary objective of ensuring that Nigerian secondary school students are reasonably computer literate, the Federal government of Nigeria has a vision that transcends the realm of computer literacy to embrace the gamut of information and communication technology (ICT). It was this vision that prodded the Nigerian Federal Executive Council into approving, in 2001, a National Policy for Information Technology, which envisages the use of information technology (IT) for education, wealth creation, poverty eradication, job creation, and global competitiveness.

For the realization of its education objectives, the National Policy for Information Technology (2001) stresses "restructuring the education system at all levels to respond effectively to the challenges and imagined impact of the information age and, in particular, the allocation of a special IT development fund to education at all levels".

Notwithstanding the existence of enabling policies, questions relating to the depths of integration of computer education and the existence of computer literacy disparities continue to crop up. Recent studies, unfortunately, show low levels of computer integration in the school system. Cawthera (2005) had observed that although there are few countries in the world that do not have at least one computer in at least some schools, yet the vast majority of schools in the world are without any computers.

With respect to differences in computer education integration, Jegede and Owolabi (2003) found that computer education in Nigeria was still limited to Federal Unity Schools and was scarcely offered in any of the state secondary schools, which constitute more than 80% of Nigerian schools.

Even in the face of existing realities and findings, it will sound illogical and improper to conclude that disparities would exist among private and public secondary school students in terms of computer literacy especially given differences in ownership structure and investment priorities.

This study intends to find out whether such disparities exist. In an attempt to further guide the study, the following questions were advanced:

1. What is the level of computer literacy of private and public secondary school students in Lagos State, Nigeria?
2. Will disparities exist among private and public secondary school students regarding access to computers and the internet?
3. Will there be a significant difference between private and public secondary school students in terms of the possession of the knowledge and skills to use the computers and the internet?
4. Is there a significant difference between frequency and patterns of use of computers and the internet among private and public secondary school students?

It was also hypothesized that no significant difference should exist between students attending private and public secondary schools in terms of computer literacy. The following hypotheses were tested at 0.05 level of significance:

H_1: There is no significant difference between private secondary school students and public secondary school students in terms of access to computers.
H_2: There is no significant difference between private secondary school students and public secondary school students in terms of access to the internet.
H_3: There is no significant difference between the proportions of private secondary school students and public secondary school students who possessed the knowledge and skills to use computers.
H_4: There is no significant difference between the proportions of private secondary school students and

public secondary school students who possessed the knowledge and skills to use the internet.
H_5: There is no significant difference between the frequency of use of computers among private and public secondary school students.
H_6: There is no significant difference between the frequency of use of the internet among private and public secondary school students.

Problem statement

Will there be disparities among private secondary school students and public secondary school students in terms of computer literacy?

Sub-problems

1. Is there a significant difference between private and public secondary school students regarding access to computers and the internet?
2. Is there a significant difference between the proportions of private and public secondary school students with the basic knowledge and skills to use computers and the internet?
3. Is there a significant difference between the patterns and frequency of use of computers and the internet among private and public secondary school students?

METHODS

Research model

This study was designed as a basic descriptive study employing the survey research methodology.

Research instrument

A generally closed-ended computer literacy questionnaire (CLQ), largely designed in accordance with the pattern prescribed in the EUROSTAT model questionnaire for a community survey on ICT usage in households and by individuals (EUROSTAT, 2012) was used. The use of the closed-ended questionnaire design derived from the advantages of using closed-ended questions, which, according to the United Nations (2005), include the fact that they yield more uniform responses and are easy to process.

The CLQ consists of three modules. Module A consisted of 8 items on in-school and out-of-school access to computers and the internet. Module B consisted of 5 items addressing the frequency of computer usage, activities engaged on computers and computer knowledge and skills. Module C consisted of 4 items, which addressed the use and patterns of use of the internet. The questionnaire used a four-point scale with the rating assuming the formats: “Within the last 3 months” (4), “Between 3 months and 1 year” (3), “More than 1 year ago” (2), “Never” (1); and “Every day or Almost every day” (4), “At least once a week” (3), “At least once a month” (2), “Less than once a month” (1). The instrument also contained items on access to and use of computers and the internet rated on a two-point scale; namely, Yes = 3 and No = 1. There were also items requiring respondents to select from a list of computer and internet activities.

Sample

The sample consisted of 400 students selected from twenty secondary schools (public = 10; private = 10) randomly selected from Ifako-Ijaiye and Alimosho Local Government Areas of Lagos State, Nigeria. All the public secondary schools involved in the study were Lagos State Government-owned secondary schools. The selection of the secondary schools from which samples were drawn was not informed by similarities or otherwise of computer equipment assets and neither was it influenced by the extent of internet access in the schools.

The stratified random sampling technique was used with stratification recognizing school type and level of students (junior secondary level = 200; senior secondary level = 200). The stratification of the sample according to the level of students, albeit not reflected in the hypotheses, was meant to allow further comparison of the patterns of use of computers and the internet based on the level of the students. The number of students selected from the 10 public secondary schools (n = 200) and the number of students from the 10 private secondary schools (n = 200) were the same with sample selection that were not gender-biased.

Analyses

The instrument was face-validated and content-validated by two educational technology experts and 10 secondary school teachers.

The reliability of the instrument was established using the test-retest technique. The instrument was administered on 20 randomly selected junior and senior secondary school students from four different secondary schools from the main sample in the Ifako-Ijaiye and Alimosho Local Government Areas of Lagos State. This yielded the first (test) scores. A second administration of the instrument on the students after one week yielded the second (retest) scores. Reliability measure was calculated using the Raw Scores Method of the Pearson’s Product-Moment Correlation Coefficient. The correlation coefficient (r) value obtained was 0.94, which is deemed to be adequately high for studies of this nature. According to Monnete et al. (1994), as cited by Otuka (2004), a correlation coefficient of 0.8 or more is normally necessary in order to consider a measure reliable. Thereafter, the questionnaire was given its final form and administered to 400 students in the twenty secondary schools. All the questionnaires were completed and returned, representing a 100% response rate, which was facilitated by the involvement of class teachers, who administered the instruments in the course of normal class sessions and ensured their completion and submission.

Data collected were organized and analyzed using descriptive statistics. Hypotheses 1 and 2 were tested with t-test (two-sided), using α=0.05 level of significance. HO_3 and HO_4 were tested with the z-test using a level of significance α= 0.05. For the hypotheses, HO_5 and HO_6 the Chi-square test with a level of significance α=0.05 was chosen.

RESULTS

Reliability

Table 1 shows the result of the Pilot study’s test-retest reliability measurement for the CLQ instrument.

Table 1. Result of pilot study's test-retest reliability measurement for secondary school students' computer literacy questionnaire (CLQ).

Variable	Test sequence	Mean	SD	r
	1st (test)	50.5	2.06	
Computer literacy	2nd (retest)	50.0	1.98	0.94

Table 2. t-Test comparison between private school students' and public school students' access to computers.

Variables	n	Mean	SD	df	t_{cal}	t_{tab}
Private school	10	23.0	10.3			
Public school	10	9.4	7.9	18	3.32	2.101

$p<0.05$ (statistically significant differences between samples).

Table 3. t-Test comparison between private school students' and public school students' access to the internet.

Variables	n	Mean	SD	df	t_{cal}	t_{tab}
Private school	10	6.2	10.1			
Public school	10	1.4	2.9	18	1.45	2.101

$p<0.05$ (statistically not significant).

Access to computers and the internet

The results of the t-test comparisons concerning private and public secondary school students' in-school and out-of-school access to computers and the internet are presented in Tables 2 and 3. Table 2 shows that the mean scores for private and public secondary school students in terms of computer access were 23 and 9.4 respectively, while the t-test comparison and its corresponding table value were 3.3 and 2.101 respectively. Since $t_{cal} > t_{tab}$, hypothesis 1 in respect of computer access was rejected with the implication that there were statistically significant differences between the two groups of students regarding computer access with private school students having access in higher measures than their public school counterparts.

Table 3 concerning internet access shows mean scores of 6.2 and 1.4, as well as a t-test comparison and critical table values of 1.45 and 2.101 respectively. The results in this case are not statistically significant, so hypothesis 2 concerning internet access was not rejected.

Significantly, the study shows that overall 43 and 38% of both private and public secondary school students had access to computers at home and at school respectively, while just 9 and 10% had internet access at home and at school respectively.

The results concerning alternative access to computers and the internet for both groups of students who responded to not having access to computers and/or the internet at home and/or at school are shown in Figure 1. The cybercafés or the so-called business centres accounted for the largest chunk of alternative access with 45 and 54% points respectively. Access "at friend's or family's" homes accounted for 28% for computer access and a paltry 5% for internet access.

Knowledge and skills to use computers and the internet

Data on the proportions of private and public secondary school students with the basic knowledge and skills to use computers and the internet were analysed using a z-test as presented in Table 4.

Table 4 shows that with regard to the possession of knowledge and skills in each of the aspects of computer and internet use, the absolute value, Z_{cal}, was greater than the corresponding critical value, Z_{tab}. This effectively implies that significant differences existed between private and public secondary school students in terms of the possession of the knowledge and skills to use computers and the internet with private school students possessing the requisite knowledge and skills in higher measures than public school students.

Frequency and patterns of use of computers and the internet

The results of the Chi-square test on data concerning the

Table 4. z-test on the knowledge and skills of private and public school students.

Variable	n	P	p	q	Z_{cal}	Z_{tab}
Computer						
Private	200	0.95				
Public	200	0.6	0.78	0.23	8.38	1.96
Internet						
Private	200	0.9				
Public	200	0.42	0.69	0.31	9.08	1.96

p>0.05 (statistically significant differences between students).

Table 5. Chi-square test on frequency of use of computers and the internet between private and public school students.

S/N	Observed (O)	Expected (E)	O – E	$(O – E)^2$	$(O – E)^2/E$
Frequency of computer use					
1	71	58	13	169	2.914
2	74	64.5	9.5	90.25	1.399
3	45	42.5	2.5	6.25	0.147
4	0	0	0	0	0
5	10	35	-25	625	17.857
6	45	58	-13	169	2.914
7	55	64.5	-9.5	90.25	1.399
8	40	42.5	-2.5	6.25	0.147
9	0	0	0	0	0
10	60	35	25	625	17.857
				χ^2cal =	44.634
Frequency of Internet use					
1	19	17	2	4	0.235
2	103	76.5	26.5	702.25	9.179
3	58	44	14	196	4.455
4	5	2.5	2.5	6.25	2.5
5	15	60	-45	2025	33.75
6	15	17	-2	4	0.235
7	50	76.5	-26.5	702.25	9.179
8	30	44	-14	196	4.455
9	0	2.5	-2.5	6.25	2.5
10	105	60	45	2025	33.75
				χ^2cal =	100.238

χ^2tab = 9.488; df = 4. p<0.05 (statistically significant differences between students).

frequency of use of computers and the internet among private and public secondary school students are shown in Table 5. Since χ^2cal > χ^2 tab for the two possibilities of computer and internet use, both hypotheses 5 and 6 were rejected. This implies that there are statistically significant differences between private and public secondary school students at 0.05 level of significance regarding the frequency of use of both computers and the internet with private secondary school students using computers and the internet more frequently than public secondary school students.

The results of the activities of students on computers and the internet are illustrated in Figures 2 and 3 with “playing computer games, music or watching videos” representing the main activity of both private and public school students on the computer. Private junior and private senior students accounted for 90 and 100 cases respectively as against 40 and 92 cases for public junior

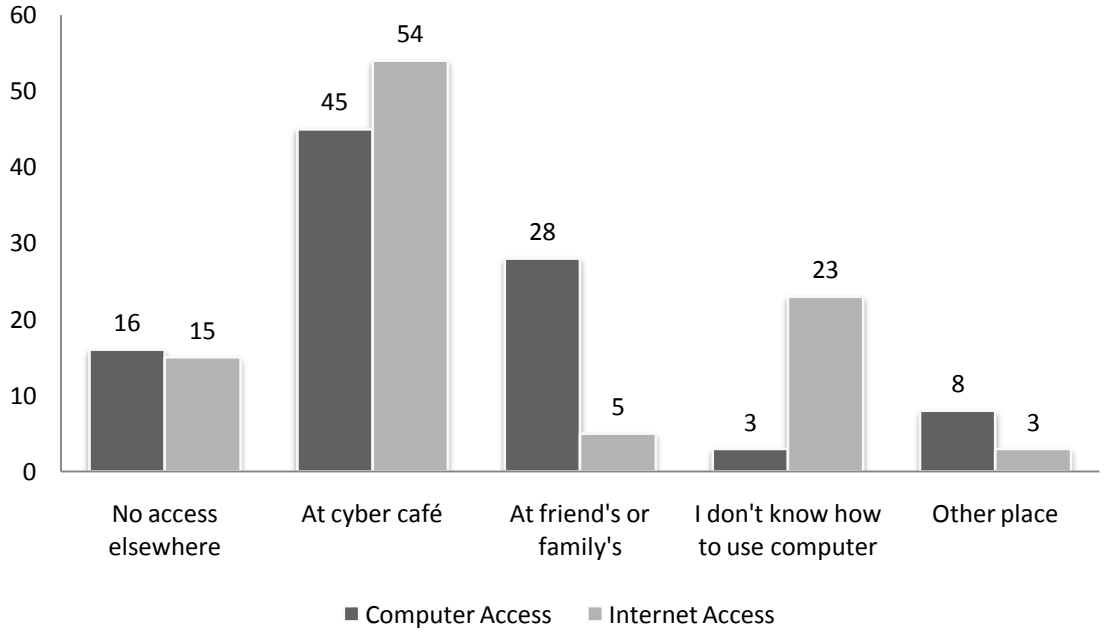

Figure 1. The percentage responses of students on alternative computer and internet access points.

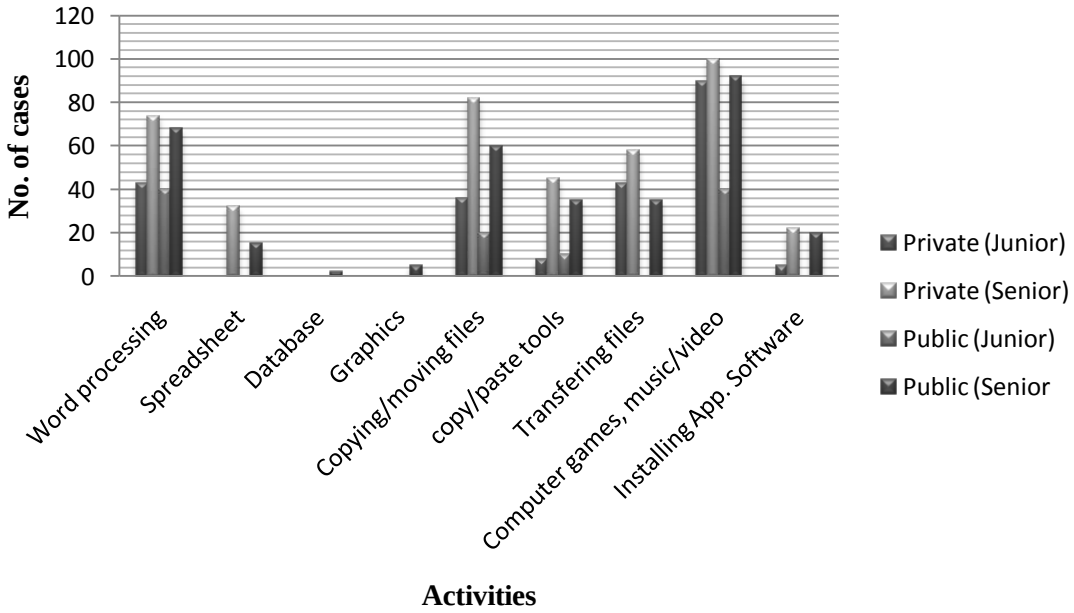

Figure 2. Students' activities on the computer*.
*Responses to other options had a frequency of 0 for all categories of students and were, therefore, not reflected in the Figure.

and public senior students. The second activity area was "word processing" with private secondary school students accounting for the largest share of 117 cases, while public secondary school students accounted for 108 cases. The pattern that was clearly discernible in the results is that private students engaged in all of the activities in higher measures than public students. Aside from this, the results show that both groups of students were scarcely engaged in activities involving graphic and database applications, while no student was engaged in those higher level activities such as compressing or zipping files, creation of electronic presentations, and the installation of new or replacement of old operating system.

With regard to the internet, Figure 3 shows that

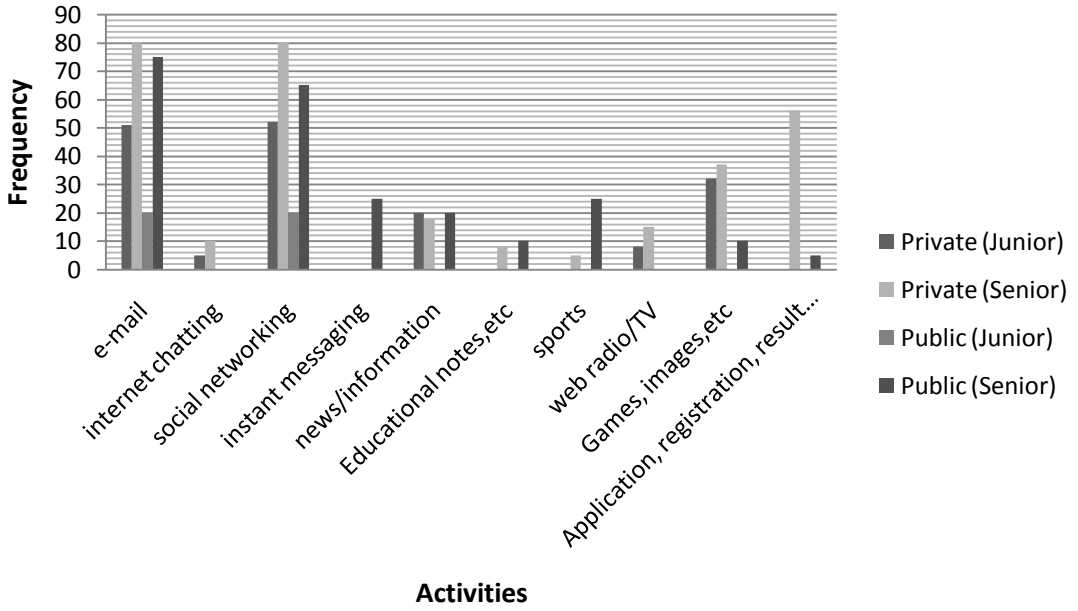

Figure 3. Students' activities on the internet*.
*Responses to other options had a frequency of 0 for all categories of students and were, therefore, not reflected in the Figure.

"sending or receiving e-mail" and "social networking" activity were the main activities of students on the internet, while private school students engaged in the two activities in higher measures than public school students. Also the results show that students of both school types scarcely used the internet for educational or schoolwork-related activities. However, public school students used the internet for educational purposes in higher measures than private school students with 10 cases as against eight cases for private students.

DISCUSSION

This study shows that private secondary school students have access to computers in higher measures than their public school counterparts either at home or at school. Although no statistically significant difference was found in terms of access to the internet, the results are nevertheless highly indicative of higher accessibility to computer technologies not only in private secondary schools but also among students of private secondary schools. They are also a testimony to the higher level of integration of computer technologies into the private secondary school system in Nigeria.

The findings concerning access to computers and the internet for both groups of students are a testimony to the gross inadequacy of internet connectivity to Nigerian homes and schools and the embarrassingly low level of access of Nigerian secondary school students to computer at home and at school. The study found that overall, the percentage access to computers for the two groups of students stood at 43% for out-of-school access and 38% for in-school access.

The results concerning alternative access points to computers and the internet for both groups of students with no access at home and/or at school show that cybercafés or the so-called business centres accounted for the highest percentage of students' access to computer and the internet with 45 and 54% shares respectively. These results and the findings concerning the overall access to computers and the internet are very revealing of the disappointingly low level of ICT integration into the Nigerian education system, a trend that corroborates the report of Bada et al. (2009) that the computer has not really gained its root in Nigerian schools, let alone the entire society as its impact is not strongly felt by all, especially by students. They also reveal the considerable absence of computer or ICT equipment at home and school, a reality that corroborates the observation of Agyeman (2007) that the ICT revolution is yet to attain that critical mass required for it to register the necessary impact in the teaching, student, and civilian population nationwide.

The tendency of students to resort to cybercafés for internet access as a result of the absence of ICT equipment in most Nigerian secondary schools, as typified by the 54% alternative access to the internet, has been confirmed by Adomi and Kpangban (2010).

The results in Table 4 show statistically significant differences between private secondary school students and their public school counterparts in terms of the possession of the basic knowledge and skills to use the computer and the internet as the absolute values of 8.38

and 9.08 for computer and the internet respectively were less than the table value of 1.96 at 0.05 level of significance. This is not surprising given the previous results which found statistically significant difference in terms of computer access, albeit no statistically significant difference existed with respect to internet access.

Students attending private secondary schools are also more engaged in computer literacy than their public school counterparts in terms of the frequency and patterns of use of computers and the internet as shown in Table 5. This is also not surprising if the results concerning access to computer and knowledge and skills level were to be factored in.

The study also found that students generally use the computer mainly for playing computer games, music and video (Figure 2) with more private school students engaging in all the activity areas than public school students. The low level or absence of activity in the more technical areas such as database and graphic applications as well as activities involving file compression and installation of new or replacement of old application software suggests that computer literacy of Nigerian secondary school students is still very low.

In terms of internet activity, the study found that the main activity of Nigerian secondary school students on the internet is sending or receiving e-mail, which accounted for a 30.1% share, while social networking sites and playing/downloading online games, music and images accounted for 28.9 and 10.5% shares respectively. For all activity areas, private school students engaged in the activities in higher measures than public school students.

A particularly disturbing phenomenon is the 2.4% share recorded for activity involving accessing or downloading online educational resources, which shows that Nigerian secondary school students are not using the internet to acquire knowledge. This unfortunate reality, though, might have a lot to do with the abysmally low level of integration of ICTs into the Nigerian school system.

Conclusion

In summary, it can be concluded that the results of this study do not support all the hypotheses, with the exception of hypothesis 2 that relates to internet access.

It can, therefore, be concluded: that private secondary school students have access to computer in higher measures than public secondary school students; that the proportion of private school students who possess the basic knowledge and skills to use computer and the internet is higher than that of public school students; and that private secondary school students use computer and the internet in higher measures than their public secondary school counterparts.

With the low level of access to computer technologies, it can also be concluded that computer literacy among Nigerian secondary school students is still very low and is not improving. Further research on the factors responsible for this is, however, necessary.

From the results concerning in-school access to computer and the internet, it can be concluded that ICT application and use in education remains very low in the Nigerian secondary school system. It can also be concluded that the public secondary school system in Nigeria is on the backseat with respect to the use of computer in education.

RECOMMENDATIONS

Based on the findings and conclusion of this study, the need for a supportive policy environment fortified with a clearly articulated rationale for access to, and use of, computers and the internet in the secondary school system was stressed.

Public secondary schools need to develop their own initiatives for establishing computer laboratories and introducing computer education. This, though, would require a level of autonomy. Miller (2004) gave an insight into a similar scenario in Jamaica, where about 40 schools were able to introduce computer education and establish computer laboratories despite the lack of ministry policy and provision of equipment. The feat, according to Miller (2004), was made possible “largely as a result of the considerable autonomy that exists in the Jamaican school system”.

Finally, it was recommended that government should intervene in the reduction of the costs of computer and internet connectivity, preferably through the granting of subsidies tied specifically to the Education Tax Fund.

REFERENCES

Adomi EE, Kpangban E (2010). Application of ICTs in Nigerian Secondary Schools. Library Philosophy and Practice 2010. Retrieved March 8, 2012 from www.Webpages.uidaho.edu/~mbolin/adomi-kpangban.htm/.

Aduwa-Ogiegbaen SE, Iyamu EOS (2005). Using Information and Communication Technology in Secondary Schools in Nigeria: Problems and Prospects. Educ. Technol. Soc. 8(1):104-112. Retrieved, March 2, 2012, from www.ifets.info/journals/8_1/13.pdf/.

Agyeman OT (2007). Survey of ICT in Education in Nigeria. Survey of ICT and Education in Africa: Nigeria Country Report. Washington-DC: infoDev/World Bank, pp.1-10.

Bada T, Adewole A, Olalekan O (2009). Uses of Computer and Its Relevance to Teaching and Learning in Nigerian Educational System. Educ. Res. Rev. 4(10):443-447. Retrieved March5, 2012 from http://academicjournals.org/err/PDF/Pdf%202009/Oct/Bada%20et%20al.pdf

Cawthera A (2005). Computers in Secondary Schools in Developing Countries: An Analysis of Costs. School Net Africa. Retrieved March 2, 2012 from www. Schoolnetafrica.org/fileadmin/resources/An%20analysis%20costs.pdf.

EUROSTAT (2012). Community Survey on ICT Usage in Households and by Individuals, Eurostat Model Questionnaire 2012, Version 3.2. Retrieved March 15, 2012 from http://circa.europa.eu/Public/irc/dsis/emisannexes/library?1=data_-_database/theme_3_-_popul/isoc/householdsindiv&vm=detailed&sb=Title.

Jegede PO, Owolabi JA (2003). Computer Education in Nigerian Secondary Schools: Gaps between Policy and Practice. Meridian: A Middle School Computer Technology Online Journal, 8(1), Retrieved March 4, 2012 from www.ncsu.edu/meridian/sum2003/nigeria/2.html/.

Kubiatko M (2007). Information and Computer Literacy of High School Students. Variety of Education in Central and Eastern Europe 2:31-36. Retrieved, March 3, 2012 from www.ped.muni.cz/weduresearch/publikace/0048.pdf/.

Miller E (2004). The Introduction of Computers in Secondary Schools in Jamaica: A Case of Bottom-up Reform. In: Chapman DW, Mahlck LO (eds). Adapting Technology for School Improvement: A Global Perspective. Paris: International Institute for Educational Planning/UNESCO pp.101-121.

Nigerian National Policy for Information Technology (2001). National Information Technology Development Agency. Retrieved March 3, 2012 from www.nitda. gov.ng/document/nigeriaitpolicy.pdf/.

Oluwatayo JA (2012). Assessment of Computer Literacy of Secondary School Teachers in Ekiti State, Nigeria. J. Int. Educ. Res. 8(2):1-8. Retrieved March 8, 2012 from www.journals.cluteonline.com/index.php/JIER/article/download/…/6904.

Otuka JO (2004). Educational Research Methods (EDU 702). Lagos: Macmillan Publishers Limited/National Open University of Nigeria pp.110-111.

United Nations (2005). Designing Household Survey Samples: Practical Guidelines. United Nations, Series F (98):26-27.