JFSR

J. of Family & Society Res. 2 (1), June 2023, pp. 14 -28 ISSN 2955 – 1668

Availability and the Extent of Utilization of Information Communication Technology among Senior Secondary School Students in Nsukka Local Government Area, Enugu State

Umennuihe, C. L.[1], Shu'ara, J.[2], Okechukwu, F. O.[1], Alutu, C.E.[3] & *Umennuihe, A.E.[4]

[1]Department of Home Science and Management, University of Nigeria, Nsukka
[2]Department of Marketing, Baze University, Abuja
[3]Department of Educational Foundation, Nwafor Orizu College of Education, Nsugbe
[4]A P Leventis Ornithological Research Institute Jos, University of Jos Biological Conservatory, Laminga Village Jos East, Plateau State
*__Correspondence__: anthony.umennuihe@gmail.com

Abstract

The study investigated the availability and the extent of utilization of information communication technology (ICT) among senior secondary school students in Nsukka Local Government Area. The study adopted a descriptive survey research design. Four objectives guided the study. Simple random sampling was used to select a sample of 268 out of 3,467 senior secondary students. A questionnaire was used for data collection. Data were analysed using frequencies, percentages, means, and standard deviation. Findings showed that the majority (80.20%) of the respondents have desktop computers, 71.60%; internet, 71.60%; laptops, 69.80%; smartphones and 79.50% have television available to them. Over 50.00% never use digital cameras, e-book readers and presentation tools. Some of the barriers to ICT usage identified by the respondents were the high cost of new ICT devices and internet data bundles ($\bar{x}$ = 2.50), teachers' lack of technological skills ($\bar{x}$ = 2.51), school administrators' dismissive attitude towards learning through computers ($\bar{x}$ = 3.00), poor electric power supply ($\bar{x}$ = 2.51), a large number of students in a class ($\bar{x}$ = 2.90), poor internet access ($\bar{x}$ = 2.59), substandard quality of existing ICT tools ($\bar{x}$ = 2.53) and poor educational funding by the government ($\bar{x}$ = 3.02). Some ways of improving the utilization of ICT for studies identified by the respondents were the provision of computer laboratories with versatile ICTs for usage ($\bar{x}$ = 2.95) and promoting sharing of knowledge with ICTs among students ($\bar{x}$ = 2.61). Therefore, the government should make adequate provisions for ICT facilities and a constant power supply for secondary schools. This will help to increase the use of ICT for academic purposes.

Keywords: Information Communication Technology, School, Availability, Utilization, Students

Introduction

The introduction of Information Communication Technology (ICT) into different areas of man's activities, particularly in schools, has become the most effective step taken to improve teaching and learning methods and promote educational goals. As such, many countries now regard understanding ICT and mastering the basic skills and concepts of ICT as part of the core of education, alongside reading, writing and numeracy (Ratheeswari, 2018). ICT has been described as any equipment or interconnected system of equipment that is used in the automatic acquisition, storage and manipulation of information. ICT comprises electronic devices which are utilized for the information and communication needs of institutions, organizations, students and individuals (Ezeuwa, 2014). It also involves skills around computing and communications devices, software that operates them, applications that run on them, and systems that are built with them (Chen et al., 2015). Modern ICTs have created a global village in which people communicate with others across the world as if they were living next door (Khan et al., 2015). ICT can be defined as a technological means of collecting, processing and transferring information. That is technologies that provide access to information through communications (Ajayi, 2014).

ICTs cover Internet service provision, telecommunications equipment and services, information technology equipment and services, media and broadcasting, libraries and documentation centres, commercial information providers, and network-based information services, among others (Okoro & Ekpo, 2016). According to Khan et al. (2015), ICT encompasses radio, television, cellular phones, computer and network hardware and software, satellite systems and so on, as well as the various services and applications associated with them, such as videoconferencing and distance learning. Amuche (2015) listed some examples of ICT tools including computers, laptops, video machines, multi-media projectors or power points, digital cameras, internet facilities, computer networks, telephone (GSM and land phones), e-library, television programmes, databases among others. ICT has now become a global phenomenon and there is a need for nations to embrace it and integrate it into the teaching and learning process.

Integration of ICT in education refers to the incorporation of computer-based communication into the daily classroom instructional process. ICT integration aims to improve and increase the quality, accessibility and cost-efficiency of the delivery of instruction to students (Ghavifekr & Rosdy, 2015). The use of ICTs in the educative process has been divided into two broad categories: ICTs for Education and ICTs in Education. ICTs for education refer to the development of ICT specifically for teaching/learning purposes, while the ICTs in education involve the adoption of general components of ICTs in the teaching and learning process (Hussain et al., 2017). ICTs have the potential to innovate, accelerate, enrich, and deepen skills, motivate and engage students, help relate school experience to work practices, create

economic viability for tomorrow's workers, as well as strengthening teaching and helping schools change. ICTs are generally accepted as a modern educational instrument that enables educators to modify their teaching methods to increase students' academic performance (Okoro & Ekpo, 2016). A study by Selwyn (2004) showed that to improve students' achievement, it is not enough for schools to provide access to ICT; they must also provide real opportunities to use the technologies as well as adequate quality of access.

Numerous studies have shown the benefits of ICT in the teaching and learning process in the last few decades. For example, effective use of technology has been found to enable students to become active learners while also developing their problem-solving, critical thinking, and creativity skills. Furthermore, ICT provides students and teachers with more flexible and extensive access to information and learning materials. It can provide students with the abilities they need to be lifelong learners and global citizens in the twenty-first century (Ghavifekr & Rosdy, 2015). It encourages learning; motivates the individual and at the same time gives him/her the capability to do certain activities. Besides that, its presence betters the learning environment and enriches the learning experience (Markovac & Rogulja, 2009). It also lays the foundation for lifelong learning and personal development, because among other things it also develops the digital and technical competencies, which are needed for employment, education, self-development, and general activeness in modern society (Mewcha & Ayele, 2015). The introduction of ICTs in schools will not change students' outcomes alone without the support and manipulation of teachers who are capable of exploiting the possibilities of ICT in the teaching and learning process (Ikwuanusi et al., 2016).

ICT provides a variety of tools to support and facilitate teachers' professional competence. It can contribute to universal access to education, equality in instruction, quality in teaching and learning and the professional development of teachers, as well as to more efficient management and administration of education systems (West & Chew, 2014). ICT transforms teaching and helps teachers to be more efficient and effective, thereby increasing their interest in teaching. It increases teachers' emphasis on individualized instruction, and as such enables them to spend more time with individual students. This helps students to carry out more independent work and gives the teacher more time to focus on teaching higher-level concepts in the classroom (Ikwuanusi et al., 2016). The implication is that teachers should upgrade, appreciate and develop a positive attitude towards the application of ICT in the teaching and learning process.

A general decline in the performance of students has been reported by researchers and educationists. According to Duruji et al. (2014), the poor performance of secondary school students in different subjects as observed in the yearly results of the Senior School Certificate Examination conducted by WAEC and NECO which are external bodies justifies the claim of dwindling academic performance of students in Nigeria. Educators and

librarians have blamed "progressive education" and technological evolution for taking away students' attention from reading to other digital media and ICT tools. However, Aina (2013) argued that the benefits of ICT could be exploited and integrated into the teaching and learning processes to increase students' interest in learning and, as a result, improve their academic performance. A study conducted by Hue and Ab-Jalil (2013), showed that the integration of ICTs into the curriculum is a crucial process in ensuring the quality of education and increased students' academic performance. Nevertheless, implementation of these findings in Nigeria has been recorded to be difficult if not impossible. For instance, a study by Nnamani et al. (2019) revealed that only three ICT resources were available for teaching the English language in secondary schools in Nsukka Urban. The study also revealed that the very few that were available were grossly underutilized. Another study by Olelewe and Nzeadibe (2014) also showed that there is a gross shortage of computer teachers and inadequacy of ICT resources which affected the quality of education given to students in post-primary schools in Nsukka Educational Zone of Nigeria. This has been attributed to unsatisfactory conditions of secondary schools in Nsukka local government area in the form of large class sizes; poorly equipped laboratories and libraries; unavailability of instructional materials; poorly maintained buildings and unavailability of qualified teachers (Enujuba, 2019). Although many educational institutions have embraced digital solutions by using smart devices in classrooms and creating online communities (Shankar, 2018), the effective inclusion of these technologies into teaching practice has encountered and continues to encounter practical and pedagogical barriers. According to Ikwuanusi et al. (2016), effective utilization of ICT in teaching and learning depends on the availability of these facilities and teachers' competence in using them. This study, therefore, determined the availability and the extent of utilization of ICT by students in senior secondary schools in Nsukka local government area.

Objectives of the Study

The broad objective of the study was to investigate the availability and extent of utilization of ICT among senior secondary school students in Nsukka Local Government Area, Enugu State. Specifically, the study determined:

1. various types of ICT available to senior secondary school students in Nsukka L.G.A;
2. the extent to which students utilize the available ICTs for their studies;
3. barriers to the use of ICT in secondary schools in Nsukka L.G.A; and
4. ways students' utilization of ICT for their studies could be improved.

Methodology

***Study design*:** The study employed a descriptive survey research design. This design allowed for the study of population variables at one specific time.

***Study population*:** The population of this study was 3,467 Senior Secondary (SS) two students in the 31 government secondary schools in Nsukka L.G.A. (Post Primary

School Management Board – PPSMB, Nsukka Zonal office, 2018). The students were mostly aged between 15-17 years old and more than half of them were females.

***Sample for the Study*:** Sampling was done using a multi-stage sampling technique. Firstly, six schools, which represent twenty per cent of the 31 schools, were selected from the list of schools using systematic random sampling. Secondly, to determine the sample size, thirty per cent of all SS 2 students in each of the six schools was selected and this gave a sample size of 268. Finally, the samples for each school were selected using simple random sampling without replacement.

***Instruments for Data Collection*:** The instrument used to elicit information from the respondents on the objectives of the study was a questionnaire developed by the researchers after an extensive literature review. The questionnaire consisted of five sections; A to E. Section A contained background information of the respondents; B obtained data on the availability of ICT devices; Section C elicited data on the extent of utilization of ICT for academic purposes; Section D was used to elicit information on barriers to the use of ICT for academic purposes and section E was used to obtain data on different ways of improving students' utilization of ICT for their studies. The instrument was content and face validated by three experts from the Department of Home Science and Management, University of Nigeria, Nsukka. Cronbach's alpha reliability method was employed to obtain a reliability coefficient of 0.87 for the instrument, indicating a high internal consistency of the items.

Method of Data Collection: Two hundred and sixty-eight (268) copies of the questionnaire were hand administered to students with the help of research assistants. The respondents filled out the questionnaires immediately with little or no assistance. All the questionnaires were distributed and retrieved, giving a 100% return rate.

***Method of Data Analysis*:** The results were analysed using frequencies, percentages, means and standard deviations. Frequency and percentage were used to present results on the respondents' background information, availability and extent of utilization of ICT. Mean and standard deviation was calculated for barriers to ICT usage and ways of improving students' utilization of ICT for their studies. Underutilization of ICT facilities, any item that had up to 50% of regular and occasional use was accepted as highly utilised while below 50% was accepted as low utilisation. For items on the four-point scale, means of 2.50 and above were regarded as agreed while means of less than 2.50 were regarded as disagreed.

Results

Background information of the respondents

Data analysis on the background information of the respondents shows that 53.70% of the respondents were females while 46.30% of them were males. The majority (64.20%) of the respondents were aged between 15-17 years. A good proportion (44.40%) of the respondents had their family monthly income between ₦10,000-50,000; 40.30% of their fathers and 42.50% of their mothers had obtained

tertiary education qualifications. More than a third (38.40%) of the respondents' fathers and 36.20% of mothers were civil servants.

Availability of ICT for Senior Secondary School Students in Nsukka LGA

Table 1 shows the frequency and percentage of responses on types of ICT available to the students. Over 50% of the respondents had the following ICT tools available to them; desktop (80.20%), internet facility (71.60%), laptop (71.60%), tablet (56.70%), projector (56.00%), radio (65.70%), storage devices (67.20%), gaming devices (57.80%), smartphone (69.80%) and television (79.50%).

Table 1: Availability of ICT for Senior Secondary School Students in Nsukka LGA

ICTs	Available F (%)	Not available F (%)
Desktop computer	215 (80.20)	53 (19.80)
Internet	192 (71.60)	76 (28.40)
Tablet	152 (56.70)	116 (43.30)
Laptop	192 (71.60)	76 (28.40)
Smartphone	187 (69.80)	81 (30.20)
Digital camera	124 (46.30)	144 (53.70)
E-book reader	130 (48.50)	138 (51.50)
Interactive whiteboard	151 (56.30)	117 (43.70)
Television	213 (79.50)	55 (20.50)
Presentation tools such as PowerPoint	120 (44.80)	148 (55.20)
Projector	150 (56.00)	118 (44.00)
Radio	176 (65.70)	92 (34.30)
Storage devices e.g. memory cards, CDs, flash drive	180 (67.20)	88 (32.80)
Gaming devices	155 (57.80)	113 (42.20)

Key: F = frequency, % = percentage, N = 268

The extent of utilization of ICT by Senior Secondary School Students in Nsukka L.G.A

Table 2 shows the frequency and percentage responses on the extent of utilization of ICTs. ICT facilities that were highly utilised by the respondents included desktop computers (50% always used and 30.2% sometimes used), internet (38.1% always used and 33.6% sometimes used), tablet (34.3% always used and 22.4% sometimes used), laptop (45.1% always used and 26.5% sometimes used), smartphone (31.3% always used and 38.4% sometimes used), television (31% always used and 48.5% sometimes used) and gaming devices (31.7% always used and 26.1% sometimes used) among others, while the digital camera (25.4% always used and 20.9% sometimes used), e-book reader (31% always used and 17.5% sometimes used) and presentation tools (30.6% always used and 14.2% sometimes used) had low utilisation.

Table 2: Frequency and percentage responses of students on the extent of utilization of ICT

ICT	Always F (%)	Sometimes F (%)	Never F (%)	Utilization level
Desktop computer	134 (50.00)	81 (30.20)	53 (19.80)	High
Internet	102 (38.10)	90 (33.60)	76 (28.40)	High
Tablet	92 (34.30)	60 (22.40)	116 (43.30)	High
Laptop	121 (45.10)	71 (26.50)	76 (28.40)	High
Smartphone	84 (31.30)	103 (38.40)	81 (30.20)	High
Interactive whiteboard	60 (22.40)	91 (34.00)	117 (43.70)	High
Television	83 (31.00)	130 (48.50)	55 (20.50)	High
Projector	103 (38.40)	47 (17.50)	118 (44.00)	High
Radio	65 (24.30)	111 (41.40)	92 (34.30)	High
Storage devices (memory card, CDs, flash drive)	149 (55.60)	31 (11.60)	88 (32.80)	High
Gaming devices	85 (31.70)	70 (26.10)	113 (42.20)	High
Digital camera	68 (25.40)	56 (20.90)	144 (53.70)	Low
E-book reader	83 (31.00)	47 (17.50)	138 (51.50)	Low
Presentation tools such as PowerPoint	82 (30.60)	38 (14.20)	148 (55.20)	Low

Key: F = frequency, % = percentage, N = 268

Barriers associated with the use of ICT for secondary students in Nsukka L.G.A

Table 3 shows the barriers to ICT usage in teaching and learning. From the table, the respondents agreed on the following student-related barriers to ICT usage; poor access to ICT devices (2.88), lack of training on the use of some of the devices (2.79) and high cost of new ICT devices and internet data bundles (2.50). Teacher-related barriers include lack of confidence and skills for using the technologies (2.51), disbelief and distrust of ICT benefits (2.60), lack of training and experience on how to effectively integrate technology into the teaching and learning process (2.58) and no time to successfully integrate the technologies in the curriculum (3.05). School administrator-related barriers are a lack of technical staff to solve technological problems (2.93), the problem of dismissive attitude towards learning through computers (3.00), insufficient technological and administrative support for teachers to use ICT devices (2.62) and the school as an institution provides teachers with little or no time to learn about ICT skills (2.56). Environment-related barriers include a poor electric power supply (2.51), poor school space organization (2.53), a large number of students in a class (2.90), the physical condition of classes not suitable for technology integration (2.53) and classes are very crowded making use of the ICT difficult (2.73). Infrastructure-related barriers include the insufficient number of technological devices in the classroom for students' use (2.53), poor internet access in the form of slow internet connectivity (2.59), lack of required ICT infrastructure

and digital learning resources (2.66), malfunctioning of computers in need of repairs (2.62), lack of computer software adaptable to the curriculum (2.56), substandard quality of existing ICT tools (2.53) and outdated ICT equipment that needs replacement (2.79). Government-related barriers are poor educational funding by the government (3.02), unfavourable government policies (2.86), inflexible regulatory environment (2.65) and lack of centralised ICT support from the government (2.84).

Table 3: Mean and standard deviation responses of students on the barriers to ICT usage for teaching and learning

Barriers	Mean	SD	Remark
Student-related barriers			
Lack of required ICT skills	2.31	1.185	Disagree
Poor attention to classes when using technology	2.34	1.167	Disagree
Poor access to ICT devices	2.88	1.26	Agree
Lack of training on the use of some ICT devices	2.79	1.32	Agree
High cost of new ICT devices and internet data bundles	2.50	1.19	Agree
Inexperience with ICT learning tools	2.14	1.36	Disagree
Teacher-related barriers			
Lack of confidence and skills for using the technologies	2.51	1.101	Agree
Poor awareness of ICT benefits	2.60	1.352	Agree
Lack of training and experience on how to effectively integrate technology into the teaching and learning process	2.58	1.145	Agree
No time to successfully integrate the technologies into the curriculum	3.05	1.361	Agree
Technology integration limits the role of teachers in the classroom	2.40	0.977	Disagree
The use of technology negatively affects the quality of instruction	2.39	1.095	Disagree
Classroom management is more difficult when ICT is in use	2.37	1.119	Disagree
School administration-related barriers			
Lack of technical staff to solve technological problems	2.93	1.211	Agree
Problem of dismissive attitude towards learning through computers	3.00	1.502	Agree
Difficulty integrating ICT into the school curriculum	2.32	1.140	Disagree
Difficulty organising school/lesson time when ICT is in use	1.72	0.869	Disagree
Insufficient technological and administrative support for teachers to use ICT devices	2.62	1.181	Agree
The school as an institution provides teachers with little time to learn about ICT skills	2.56	1.246	Agree

Environment-related barriers			
Poor electric power supply	2.51	1.123	Agree
Poor school space organization	2.53	1.114	Agree
Large number of students in a class	2.90	0.974	Agree
Physical condition of classes is not suitable for technology integration	2.53	1.345	Agree
Classes are very crowded making use of the devices difficult	2.73	1.284	Agree
Infrastructure-related barriers			
Insufficient number of technological devices in the classroom for students' use	2.53	1.210	Agree
Poor internet access in the form of slow internet connectivity	2.59	1.164	Agree
Lack of required ICT infrastructure and digital learning resources	2.66	1.183	Agree
Malfunctioning computers in need of repairs	2.62	1.187	Agree
Lack of computer software adaptable to the curriculum	2.56	1.243	Agree
Substandard quality of existing ICT tools	2.53	1.347	Agree
Outdated ICT equipment that needs replacement	2.79	1.001	Agree
Government-related barriers			
Poor educational funding by the government	3.02	1.186	Agree
Unfavourable government policies	2.86	1.255	Agree
Inflexible regulatory environment	2.65	1.229	Agree
Lack of centralised ICT support from the government	2.84	1.363	Agree

Key: SD = Standard Deviation

Ways of Improving Students' Utilization of ICT for Their Studies

Table 4 shows the mean and standard deviation responses of students on ways of improving students' utilization of ICT for their studies.

Findings showed that the respondents agreed to all the items as ways of improving students' utilization of ICT for their studies. Some of the ways include delivering lessons through the use of internet-based learning activities (3.05), expanding access to learning to take place at all times and locations with ICT tools (3.00), provision of computer laboratories with versatile ICTs for usage (2.95), accepting the fact that inclusion of technology can increase efficiency and effectiveness of learning (2.81), and promoting and encouraging sharing of knowledge with ICTs among students (2.61).

Table 4: Mean and standard deviation responses of students on ways of improving students' utilization of ICT for their studies

Variables	Mean	SD	Remark
Enrichment of the curriculum to incorporate ICT contents	2.79	1.724	Agree
Delivering lessons through the use of internet-based learning activities	3.05	0.841	Agree
Acceptance of the flexibility of ICTs in teaching and learning	2.51	1.822	Agree
Accepting the fact that the inclusion of technology can increase the efficiency and effectiveness of learning	2.81	1.883	Agree
Provision of computer laboratories with versatile ICTs for usage	2.95	1.679	Agree
Professional development of teachers on quality use of ICTs	2.54	1.015	Agree
Expanding access to learning to take place at all times and locations with ICT tools	3.00	0.836	Agree
Enhancing teachers-learners contact with ICT resources	2.53	1.882	Agree
Maintaining continuous education for teachers to be current with the use of ICTs	2.51	1.857	Agree
Promoting and encouraging sharing of knowledge with ICTs among students	2.61	1.127	Agree

Key: SD = Standard Deviation**; Rmk** = Remark

Discussion

The availability of learning resources has a considerable impact on teaching and learning. Availability of ICT facilities refers to the provision made in this regard by and or to the secondary schools for effective teaching and learning (Ezeuwa, 2014). Findings showed that the types of ICT available to students were desktop computers, the internet, laptops, smartphones and televisions. The availability of these facilities was attributed to the wide range of functions they offer, especially their use for academic purposes. This finding is in line with that of Ayeni and Ogunbameru (2013) which shows that computer sets, bulletin boards, phones, printer scanners and the internet were available in secondary schools in Ondo State. Similarly, Ajeigbe et al. (2015) reported the availability of computers, printers and laptops in secondary schools in Osun State. A study by Ezeuwa (2014) in Ebonyi State public secondary school showed the availability of ICT facilities such as computers, cell phones, electronic whiteboards, cable satellites, overhead projectors and storage devices. Findings also showed that digital cameras, e-book readers and presentation tools were not available to most of the respondents. This was attributed to the high cost of these devices resulting in the students' inability to acquire and use them for academic purposes. However, there is an indication that the devices are gradually gaining popularity among students. Supporting this finding, Ikwuanusi et al. (2016) reported that smart boards, computer software, projectors, camera, e-library and cable networks were not available in secondary schools in Owerri Municipal Council of Imo State.

Utilization of ICT facilities is as important as making them available,

however, the availability of the facilities may not be a guarantee for their proper utilization (Ezeuwa, 2014). This notwithstanding, the findings of this study showed a high utilization of a good number of the ICT tools such as tablets, the internet, radio, gaming devices, laptops, television, smartphone and storage devices among others. These ICT tools provide and allow students to have swift and direct access to a wide variety of information and educational resources (Computeam Climate Project, 2023). Supporting the findings, a study by Al-Hariri and Al-Hattami (2016) showed that laptops, phones, tablets and desktop computers were the most used technological devices by the participants. In contrast, a study by Ezeuwa (2014) showed low utilization of ICT facilities such as the internet, e-mail, fax, video conferencing, cable satellite, electronic whiteboard, radio cassette recorders, overhead projectors, flash drives, diskettes and CD ROM. Obuezie et al. (2018) reported that Information Communication tools are being increasingly utilized by students in Nigeria because it enables them to have access to timely, accurate and relevant materials. The internet, for instance, provides links to various library sites, specializing in almost every topic and they can be accessed directly from any part of the world. Nasir et al. (2011) indicated that ICT is very essential to improve the educational efficiency of students because they are helpful for the students to better prepare their assignments and projects. Findings also showed low utilization of digital cameras, presentation tools and e-book readers. This was attributed to the fact that these advanced ICT facilities are still not very popular in many developing countries like Nigeria, thereby limiting their use (Almarabeh et al., 2005; Kpangban & Adomi, 2010). According to Hailegebreal et al. (2022), the use of educational technologies in teaching and learning activities is still in its infancy in most African countries.

The barriers to ICT usage are those factors that hinder the effective and efficient adoption of ICT in the teaching and learning process. From the result of the findings on barriers to ICT usage, poor access to ICT devices, lack of ICT training, high cost, lack of time, poor electric power supply, insufficient number of technological devices for students, poor internet connectivity, substandard quality of ICT tools and poor educational funding were identified as barriers to ICT usage. A similar finding by Onodugo (2016) identified the poor implementation of policies on ICT, the problem of connectivity, the non-reliability of public electricity, inadequate funding of ICT infrastructure and poor maintenance of available facilities. In Nigeria, most academic institutions are yet to fully harness these technologies for better delivery of materials in the teaching and learning process; and lack of funds has been identified to be at the root of these problems according to Obuezie et al. (2018). The result of this study is in agreement with the position of Damkor et al. (2015) concerning the lack of ICT tools and electricity in teaching and learning. Ezeji et al. (2015), also pointed out that the major challenge that affects students in the use of internet resources is inadequate power supply. For instance, one may be in the middle of an important work and suddenly there is a

power outage which results in wasted efforts, time and frustration may set in. Furthermore, the lack of training staff in the use of computers and associated technologies was identified by Onuoha (2013) as a challenge that hinders the effective delivery of school materials through the use of ICT. These barriers inhibit the successful integration of ICT in teaching and learning environments.

Information and communication technology is an indispensable tool for attaining the objective of rapid national development in the world; hence, ICT tools in instructional delivery have positively and maximally influenced the field of education. Findings on ways of improving students' utilization of ICT for their studies showed the use of internet-based learning activities, provision of computer laboratories and encouraging students to share knowledge using ICT tools. According to Idele and Paul-Mgbeafulike (2018), some strategies for improving the quality use of ICT tools include acceptance of the belief that system that technology can improve the efficiency and effectiveness of student learning, curriculum enrichment to incorporate ICTs instructional contents, Internet-based instructional delivery of the curriculum content that is enriched with the environment for learning, acceptance of the flexibility of ICTs in teaching and learning, professional development of teachers on quality use of ICTs, enhancing teachers-learners contact with the ICT resources, maintaining continuous education for the teachers to be current with quality use of ICTs and create just-in-time training for the teachers on the emergence of new technologies. Oluoch (2016) also suggested organizing workshops on IT and educating the staff on the importance of ICT in the learning process, looking for grants from the government to buy computers, seeking ICT grants from NGOs and using parents' contributions for buying computers.

Conclusion

The study investigated the availability and utilization of information communication technology by senior secondary school students in Nsukka local government area. The study established the availability of ICTs such as desktop computers, the internet, laptop, smartphone and television for the students. High utilization of the majority of the ICT facilities was also indicating that secondary school students in Nsukka local government area have adequate access to, and are taking advantage of various ICT devices. However, they face several barriers to the optimal use of ICT such as the high cost of new ICT devices and internet data bundles, teachers' lack of technological skills, school administrators' dismissive attitude towards learning through computers, poor electric power supply, a large number of students in a class, poor internet access, substandard quality of existing ICT tools and poor educational funding by the government. Students' utilization of ICT for their studies can be improved through the provision of computer laboratories and by encouraging students to share knowledge using ICTs.

Recommendations

Based on the findings of the study, to improve the integration of ICT in the

teaching and learning process, the following recommendations were made.

1. ICT tools and funds for maintaining them should be provided to schools by the federal and state government.
2. Constant power supply and internet access should be provided in secondary schools to maximize the use of ICT for academic purposes.
3. Training, workshops, seminars and conferences should be organized for teachers on ICT skills so that they will keep improving their knowledge of ICT and its usage and effectively apply it in the teaching and learning process.
4. Government should look into improving teachers' remuneration and creating an environment that will motivate them to acquire ICT skills and utilize them in the teaching and learning process.

References

Aina, J.K. (2013). Effective teaching and learning in science education through information and communication technology (ICT). *IOSR Journal of Research and Method in Education (IOSR-JRME), 2*(5), 43-47. https://www.researchgate.net/publication/263654200_Effective_Teaching_and_Learning_in_Science_Education_through_Information_and_Communication_Technology_ICT

Ajayi, O.O., & Ajayi, O.E. (2014). E-learning: A key to actualizing sustainable educational development in Africa. *International Journal of Computer Science and Engineering, 3* (3), 109-116. ISSN (P): 2278-9960; ISSN (E): 2278-9979. https://www.researchgate.net/publication/280300295_elearning_a_key_to_actualizing_sustainable_educational_development_in_africa

Ajeigbe, T., Ogunsakin, I.B., & Shogbesan, Y.O (2015). Assessment of availability and utilization of ICT facilities for effective teaching of computer studies in secondary schools in Osun State, Nigeria. *African Journal of Theory and Practice of Educational Research (AJTPER), 12*(2), 95-105. https://Www.Academia.Edu/35962693/Assessment_Of_Availability_And_Utilization_Of_Ict_Facilities_For_Effective_Teaching_Of_Computer_Studies_In_Secondary_Schools_In_Osun_State_Nigeria

Al-Hariri, M. T., & Al-Hattami, A. A. (2016). Impact of students' use of technology on their learning achievements in physiology courses at the University of Dammam. *Journal of Taibah University Medical Sciences*, *12*(1), 82–85. https://doi.org/10.1016/j.jtumed.2016.07.004

Almarabeh, T., Majdalawi, Y., & Mohammad, H. (2016) Internet usage, challenges, and attitudes among University students: Case study of the University of Jordan. *Journal of Software Engineering and Applications*, *9,* 577-587. doi: 10.4236/jsea.2016.912039.

Amuche, A.A (2015). Availability and utilization of ICT resources in teaching and learning in secondary schools in Ardo-Kola and Jalingo, Taraba State. *Journal of Poverty, Investment and Development, 8*, 94-100. https://www.iiste.org/Journals/index.php/JPID/article/view/19293/19716

Ayeni, A.J., & Ogunbameru, M. (2013). Effective utilization and maintenance of ICT facilities for quality teaching and learning outcome in secondary schools in Ondo State, Nigeria. *International Journal of Research Studies in Educational Technology, 2*(2), 27-40. DOI: 10.5861/ijrset.2013.304

Chen, A.N., McMurtrey, M., McCalman, D., Castillo, J., & Ligon, K. (2015). Information and communication technologies (ICT): Components, dimensions, and its correlates. *Journal of International*

Technology and Information Management, 24(4), 25-46. https://core.ac.uk/download/pdf/55335022.pdf

Computeam Climate Project (2023). *What are the key advantages of ICT in education?* Computeam. Retrieved 5th June, 2023 from https://www.computeam.co.uk/videos-and-blog/article/what-are-the-key-advantages-of-ict-in-education

Damkor, M., Irinyang D. J., & Haruna, M. (2015). The role of information communication technology in Nigeria educational system. *International Journal of Research in Humanities and Social Studies*, *2*(2), 64-68. https://www.ijrhss.org/pdf/v2-i2/8.pdf

Duruji, M.M., & Azuh, D., & Oviasogie, F. (2014). *Learning environment and academic performance of secondary school students in external examinations: A study of selected schools in Ota.* EDULEARN14 Proceedings of the 6th International Conference on education and new learning technologies (pp. 5042-5053). Barcelona, Spain. https://core.ac.uk/download/pdf/32224685.pdf

Enujuba, A. (2019). *Primary and secondary schools in Enugu rural communities: The claims and the realities.* Radio Nigeria Enugu. Retrieved 24th May, 2022 from https://radionigeriaenugu.gov.ng/all-news/local-news/primary-and-secondary-schools-in-enugu-rural-communities-the-claims-and-the-realities/

Ezeji, H.A., Ugwoke, E.O., Nathaniel, I.E., & Okanazu, O.O. (2015). Business education: A tool for poverty alleviation in Enugu State. *American Journal of Industrial and Business Management, 5*, 601-609. https://www.scirp.org/journal/paperinformation.aspx?paperid=59964

Ezeuwa, L. (2014). Availability and utilization of ICT facilities as panacea for effective management of education in Ebonyi state public secondary schools. *Knowledge Review, 31*(2), 1-7. https://globalacademicgroup.com/journals/knowledge%20review/availability%20and%20utilization%20of%20ict%20facilities.pdf

Ghavifekr, S., & Rosdy, W.A.W. (2015). Teaching and learning with technology: Effectiveness of ICT integration in schools. *International Journal of Research in Education and Science (IJRES), 1*(2), 175-191. https://files.eric.ed.gov/fulltext/EJ1105224.pdf

Hailegebreal, S., Sedi, T. T., Belete, S., Mengistu, K., Getachew, A., Bedada, D., Molla, M., Shibiru, T., & Mengiste, S. A. (2022). Utilization of information and communication technology (ICT) among undergraduate health science students: a cross-sectional study. *BMC medical education*, *22*(1), 215. https://doi.org/10.1186/s12909-022-03296-9

Hue, L. T., & Ab-Jalil, H. (2013). Attitudes towards ICT integration into curriculum and usage among university lecturers in Vietnam. *International Journal of Instruction, 6*(2), 53-66. https://www.researchgate.net/publication/288407376_Attitudes_towards_ICT_Integration_into_Curriculum_and_Usage_among_University_Lecturers_in_Vietnam

Hussain, I., Suleman, Q., Din, M.N., & Shafique, F. (2017). Effects of information and communication technology (ICT) on students' academic achievement and retention in chemistry at secondary level. *Journal of Education and Educational Development, 4*(1), 73-93. https://files.eric.ed.gov/fulltext/EJ1161529.pdf

Idele, E.F., & Paul-Mgbeafulike, V.S. (2018). Strategies for improving quality use of ICT tools in office technology and management programme in polytechnics in Delta state for national development. *Nigerian Journal of Business Education (NIGJBED), 5*(2), 77-85.

http://www.nigjbed.com.ng/index.php/nigjbed/article/view/243/242

Ikwuanusi, E.D., Nwoke, B.I., & Uzoma, P.O. (2016). Availability and utilization of information and communication technology (ICT) facilities in teaching science in secondary schools in Owerri municipal council of Imo state. *International Journal of Academia, 2*(1), 1-10. ISSN: 2505-0540. https://www.researchgate.net/publication/343540032_availability_and_utilization_of_information_and_communication_technology_ict_facilities_in_teaching_science_in_secondary_schools

Khan, M. S., Khan, I., Din, S., Hafiz, M., Khattak, R., & Jan, R. (2015). The impacts of ICT on the students' performance: A review of access to information. *Research on Humanities and Social Sciences, 5*(1), 85-94. https://www.researchgate.net/publication/313768677_The_impacts_of_ICT_on_the_students'_Performance_A_Review_of_Access_to_Information

Kpangban, E., & Adomi, E.E. (2010). Application of ICTs in Nigerian secondary schools. *Library Philosophy and Practice (e-journal), 345*, 1-8. https://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=1353&context=libphilprac#:~:text=ICTs%20have%20the%20potential%20to,Lemke%20and%20Coughlin%2C%201998%3B%20cited

Markovac, V., & Rogulja, N. (2009). Key ICT competences of kindergarten teachers. *In 8th special focus symposium on Information, Communication and Economic Sciences in the Knowledge Society*, *2*(3), 72-77. file:///C:/Users/DELL/Downloads/465036.Markovac_Rogulja_2009.pdf

Mewcha, A. G., & Ayele, A. F. (2015). Assessing teachers' perception on integrating ICT in teaching-learning process: The case of Adwa college. *Journal of Education and Practice, 6*(4), 114-124. https://files.eric.ed.gov/fulltext/EJ1083759.pdf

Nasir, M. N., Munir, E. U., & Ali-shasd, S. (2011). Usage and impact of ICT in education sector: A study of Pakistan. *Australian Journal of Basic and Applied Sciences, 5*(12), 578-583. https://arxiv.org/ftp/arxiv/papers/1206/1206.5132.pdf

Nnamani, A., Ukoha, E.O., & Nwachukwu, V.N. (2019). Availability and utilization of information and communication technology (ICT) resources for English language teaching and learning in secondary schools in Nsukka Urban: Implication for national security. *International Journal of Integrated Research in Education,* 210-217. DOI-10.36265/ijired.2019.010129

Obuezie A.C., Osuchukwu N.P., & Ani C.O. (2018). Use of information communication technology (ICT) for academic purposes among undergraduates of Madonna University-Nigeria, Anambra state. *Journal of Applied Information Science and Technology, 11*(1), 139-148. https://www.jaistonline.org/11vol1/17.pdf

Okoro, C. O., & Ekpo, E. E. (2016). Effects of information and communication technology application on academic achievement of students in Christian religious studies in Cross River state. *International Journal of Interdisciplinary Research Method, 3*(2), 14-24. https://files.eric.ed.gov/fulltext/EJ1161529.pdf

Olelewe, C. J., & Nzeadibe, A. C. (2014, March 21-24). *Challenges facing the availability and utilization of ICT resources in post primary schools in Nsukka educational zone of Nigeria* [Paper presentation]. International Conference on ICT for Africa, Makerere University Business School, Kampala, Uganda. https://www.researchgate.net/publication/281005844_Challenges_facing_the_Availability_and_Utilization_of_ICT_resources_in_Post_Primary_Schools_in_Nsukk

a_Educational_Zone_of_Enugu_State_Nigeria

Oluoch, D. (2016). Strategies of enhancing ICT use in the delivery of management services in public secondary schools in Siaya county in Kenya. *European Scientific Journal, 12*(28), 375-396. ISSN: 1857-7881 (Print) e-ISSN 1857-7431-375. https://doi.org/10.19044/esj.2016.v12n28p375

Onodugo, I. C. (2016). Impact of ICT on teaching and learning in Nigerian tertiary institutions. *International Journal of Multidisciplinary Education and Research, 1*(1), 1-6. https://www.bsum.edu.ng/journals/files/jem/vol1n2/article3.pdf

Onuoha, U. D. (2013). Librarians' use of social media for professional development in Nigeria. *Information Management and Business Review, 5*(3), 136-143. https://doi.org/10.22610/imbr.v5i3.1037

Post-Primary School Management Board (2018). *Secondary school population report.* Nsukka zonal office, Enugu state. https://ppsmbenugu.com.ng/school-directory?search=&zone=4&per_page=25

Ratheeswari, K. (2018). Information communication technology in education. *Journal of Applied and Advanced Research, 3*(1), 45–47. https://dx.doi.org/10.21839/jaar.2018.v3S1.169

Selwyn, N. (2004). Reconsidering political and popular understandings of the digital divide. *New Media and Society*, *6*(3), 341-362. https://doi.org/10.1177/1461444804042519

Shankar, A. (January 24, 2018). *How the educational sector can embrace digital transformation in 2018: Doing their homework right.* Suyati. Retrieved from https://suyati.com/blog/how-education-sector-embrace-digital-transformation-in-2018/

West, M., & Chew, H.E. (2014). *Reading in the mobile era: A study of mobile reading in developing countries*. UNESCO. https://unesdoc.unesco.org/ark:/48223/pf0000227436