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INFORMATION AND COMMUNICATION TECHNOLOGY INTEGRATION IN HIGHER EDUCATION: INEQUITABLE ACCESS IN NIGERIA

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ABSTRACT: *The study was designed to investigate the availability of Information and Communication Technology facilities among undergraduate students. Descriptive survey method of the cross-sectional research design was used for the study. A stratified random sampling technique was used to select a sample of 600 from the population of undergraduate students in Rivers state Nigeria. A self-assessment instrument, ICT Facilities Availability Inventory – IFAI, developed by the researcher was used to collect data from the sample. The reliability of the instrument was determined through the test-retest method and a reliability coefficient of 0.82 was obtained. Three experts in the field of Educational Technology and two in Measurement and Evaluation confirmed the face and content validity of the instrument. Six research questions were answered using frequency and percentage while five hypotheses were tested with Chi-Square at 0.05 alpha. The results showed that undergraduate students had more access to laptops and mobile phones and less access to tablet PC and broadband connectivity. Also, over thirteen percent of students do not have access to ICT facilities. There was significant difference found on gender, modes of study, age, level of study and course of study. The conclusion is that there is inequitable access to ICT facilities among undergraduate students.*

KEYWORDS: Information and Communication Technology, Access, Computing device, Internet facilities, Higher education

INTRODUCTION

Higher education has the responsibility of developing the highest level of human capacity required for the economic development of a nation. Also, it is responsible for providing the enabling environment for the scientific production of further knowledge and expanding the frontiers of knowledge through rigorous empirical research activities for the growth of the society. To achieve this goal, the higher education system needs to take full advantage of the potentials and affordances of Information and Communication Technologies (Kpolovie & Iderima, 2016a). Information and Communication Technology (ICT) has revolutionized the way we conduct our business, organize our social lives and perform our instructional activities in our various education institutions. Business transactions have taken new dimensions, social interactions have transformed in so many ways while teaching and learning activities have taken new modalities (Vikoo, 2013). Information and Communication Technology has taken the learning activities beyond the classroom and provided alternative channels of learning at all levels.

Information and Communication Technology integration in education enables the provision of high quality content and learning experiences to all learners in different locations. ICT integration extends learning opportunities to learners to access educational resources not available in their local schools but made available on the Internet in locations outside the

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classrooms. Learners can also have access to experts in various disciplines and mentors including counselors far from their locality using Information and Communication Technology. There is no doubt that online resources including Open Educational Resources (OER) can transform the entire educational landscape including e-learning in tertiary institutions (Vikoo, 2016). Information and Communication Technology has the potential to expand access to quality education and can be used as a tool to combat illiteracy and poor quality of education (Kpolovie & Iderima, 2016b).

U.S. Department of Education (2017) outlined some ways technology can improve and enhance learning, both in formal learning and in informal settings:

1. Technology can enable personalized learning or experiences that are more engaging and relevant. Mindful of the learning objectives, educators might design learning experiences that allow students in a class to choose from a menu of learning experiences—writing essays, producing media, building websites, collaborating with experts across the globe in data collection—assessed via a common rubric to demonstrate their learning. Such technology-enabled learning experiences can be more engaging and relevant to learners.

2. Technology can help organize learning around real-world challenges and project-based learning – using a wide variety of digital learning devices and resources to show competency with complex concepts and content. Rather than writing a research report to be read only by her biology teacher and a small group of classmates, a student might publish her findings online where she receives feedback from researchers and other members of communities of practice around the country. In an attempt to understand the construction of persuasive arguments, another student might draft, produce, and share a public service announcement via online video streaming sites, asking his audience for constructive feedback every step of the way.

3. Technology can help learning move beyond the classroom and take advantage of learning opportunities available in museums, libraries, and other out-of-school settings. Coordinated events such as the Global Read Aloud allow classrooms from all over the world to come together through literacy. One book is chosen, and participating classrooms have six weeks in which teachers read the book aloud to students and then connect their classrooms to other participants across the world. Although the book is the same for each student, the interpretation, thoughts, and connections are different. This setting helps support learners through the shared experience of reading and builds a perception of learners as existing within a world of readers. The shared experience of connecting globally to read can lead to deeper understanding of not only the literature but also of their peers with whom students are learning.

4. Technology can help learners pursue passions and personal interests. A student who learns Spanish to read the works of Gabriel García Márquez in the original language and a student who collects data and creates visualizations of wind patterns in the San Francisco Bay in anticipation of a sailing trip are learning skills that are of unique interest to them. This ability to learn topics of personal interest teaches students to practice exploration and research that can help instil a mindset of lifelong learning.

5. Technology access when equitable can help close the digital divide and make trans-formative learning opportunities available to all learners. An adult learner with limited

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physical access to continuing education can up skill by taking advantage of online programs to earn new certifications and can accomplish these goals regardless of location.

6. Technology can be used to transform assessment: Technology can help us imagine and redefine assessment in a variety of ways. These tools can provide unobtrusive measurements for learners who are designing and building products, conducting experiments using mobile devices, and manipulating parameters in simulations. Problems can be situated in real-world environments, where students perform tasks, or include multi-stage scenarios that simulate authentic, progressive engagement with the subject matter. Teachers can access information on student progress and learning throughout the school day, which allows them to adapt instruction to personalize learning or intervene to address particular learning shortfalls.

However, to realize the full benefits of technology in our education system, educators and relevant authorities need to provide the right environment and necessary conditions to use technology effectively in the school system. For instance, ISTE (2017) identified fourteen conditions, necessary to effectively leverage technology for learning. They are: Shared Vision, Empowered Leaders, Implementation Planning, Consistent and Adequate Funding, Equitable Access, Skilled Personnel, Ongoing Professional Learning, Technical Support, Curriculum Framework, Student---Centered Learning, Assessment and Evaluation, Engaged Communities, Support Policies and Supportive External Context.

Farrell (1997) recommended three conditions for the effective integration of ICT in education: Access to Networks, Access to Appliances and Development of User Skills. On his part, Ely (1999) listed eight conditions to ICT integration

1. Dissatisfaction with the status quo
2. Sufficient knowledge and skills
3. Availability of resources
4. Availability of time
5. Reward or incentives
6. Participation
7. Commitment, and
8. Leadership

To effectively harness the power of the new information and communication technologies (ICTs) to improve learning, UNESCO (2002) stated that the following very essential conditions must be met:

- Students and teachers must have sufficient access to digital technologies and the Internet in their classrooms, schools, and teacher education institutions.
- High quality, meaningful, and culturally responsive digital content must be available for teachers and learners.

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- Teachers must have the knowledge and skills to use the new digital tools and resources to help all students achieve high academic standards.

U.S. Department of Education (2017) posited that the essential components of an infrastructure capable of supporting transformational learning experiences include the following:

- Ubiquitous connectivity. Persistent access to high-speed internet in and out of school
- Powerful learning devices. Access to mobile devices that connect learners and educators to the vast resources of the internet and facilitate communication and collaboration
- High-quality digital learning content. Digital learning content and tools that can be used to design and deliver engaging and relevant learning experiences
- Responsible Use Policies (RUPs). Guidelines to safeguard students and ensure that the infrastructure is used to support learning

The conditions enumerated above are very crucial for effective integration of ICT in education. One of the critical conditions that must be met for successful ICT integration (Kpolovie & Iderima, 2013) as stated above and which is the focus of this study is that of access to the technology. ICT facilities in this study are divided into two categories – computing devices and Internet facilities. The computing devices include: desktop, laptop, tablet Pc and smart phone while the Internet facilities include: modem, broadband, cyber café and smart phone.

Several studies have been done to investigate the level of access students have to ICT facilities. For example, Adetimirin (2012) investigated the availability, use of Information and Communication Technology and the ICT literacy skills of undergraduates in seven Nigerian universities and found that the percentage of undergraduates that used ICT facilities ranged from 66.1% to 98.8% across the selected universities. The study also revealed that among the ICT facilities commonly used by the undergraduates which include computer, the Internet and telephone, telephone had the highest frequency of use and 300 level respondents were the highest users of the computer and the Internet.

Oliver and Goerke (2008) reported a study they did on undergraduates' adoption of handheld devices as supplementary learning tools. The report shows that 91% had access to the Internet, 45.3% to laptop, 7.7% to handheld (Tablet Pc), 96.4% to Mobile devices. EDUCAUSE (2018) investigated what technologies college and university students own, what they use both inside and outside the classroom, and their skill with the technologies. The study found that, 91% own laptop, 95% own smartphones, less than 1% own none. More males than females have access to these ICT facilities. Ejechi (2016) studied the use of ICT by Nigeria's university student. Information on possession or access to laptop, desktop and cell phones and the use was obtained from 1500 students with a structured questionnaire. Prevalence of ownership/access was 100%, 30.9% and 1.0%, for cell phones, laptops and desktops, respectively.

Siddiquah and Salim (2017) investigated the ICT facilities, skills, usage, and the problems faced by the students of higher education while using these facilities. The study found that 78.8% use Computer at home, 76.8% at school; 86.4% use laptop at home, 28.4% at school. Also, Foy (2005) conducted a study to determine high school students' ownership and use of computers and technology by gender, ethnicity, socio-economic status (based on free-and-

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reduced lunch), and grade in school. The findings of this study included: (a) The relationship between having a computer in the home and ethnicity was found to be statistically significant. (b) The relationship between having Internet in the home and ethnicity, income, gender, and grade was significant

Nwankwoala (2015) investigated the use of ICTs in Nigerian university education system and found that the gender of students significantly influenced their usage of ICT in universities. The mean difference though relatively close was in favour of the male students. Atsumbe, Raymond, Enoch, and Duhu (2012) investigated the availability and utilization of e – learning infrastructures in Federal University of Technology, Minna to determine the level of ICT implementation. They found out that e- learning infrastructures are not adequate in the university for teaching and learning and management's efforts towards the development of Information and Communication Technology (ICT) is mainly for administrative purposes. In addition, lecturers and students both have computers and laptops and can access the internet but, they do not use them for teaching and learning.

Research studies on the level of access to ICT facilities by undergraduate students are very important because in the 21st century. Access to ICT facilities is not only necessary but required to succeed in any academic or social endeavour. Many of the academic work done today in the education system require the use of ICT facilities. The learning activities, collaboration and interaction in school and outside school require the use of ICT facilities. Though, there are several studies that have investigated the availability of ICT facilities to students, only very few have considered factors other than gender, utility and place. This study has gone further to include variables such as: mode of study, level of study, course of study and age.

Purpose of the study

The aim of the study was to assess the availability of ICT facilities among undergraduate students. The following Research Questions were raised:

1. Will there be any difference in the availability of ICT facilities among undergraduate students?
2. Will there be any difference in the availability of ICT facilities among male and female students of different?
3. Will there be any difference in the availability of ICT facilities among students of different modes of study?
4. Will there be any difference in the availability of ICT facilities among students of different age brackets?
5. Will there be any difference in the availability of ICT facilities among students of different levels of study?
6. Will there be any difference in the availability of ICT facilities among students of different courses of study?

Hypotheses

The following null hypotheses were tested at 0.05 level of significance;

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1. There will be no significant difference in the availability of ICT facilities among male and female students.
2. There will be no significant difference in the availability of ICT facilities among students of different modes of study.
3. There will be no significant difference in the availability of ICT facilities among students of different ages.
4. There will be no significant difference in the availability of ICT facilities among students of different levels of study.
5. There will be no significant difference in the availability of ICT facilities among students of different courses of study.

METHOD

The study adopted a cross-sectional survey research design using the descriptive survey method. According to Nwankwo (2006), a descriptive survey research is that in which the researcher collects data from a large sample drawn from a given population and describes certain features of the sample which are of interest to the researcher. He further stated that usually, the findings from the sample are generalized to the population from which the sample was drawn.

A descriptive survey research involves the gathering of facts about an investigative situation, state or event. It uses questionnaire which is usually graded in frequency or percentage on identified variables. It is a developmental field study that systematically collects, analyse and synthesize quantitative data on a large representative sample of a given population (Osaat, 2009; Kpolovie, 2010).

The population of the study comprised all the undergraduate students in Rivers State. A stratified random sampling technique was used to draw the sample of 600 undergraduate students from the four different modes of study (Full-Time, Part-Time, Distance and Sandwich programmes) included in this study.

The study used a questionnaire (ICT Facilities Availability Inventory – IFA) developed by the researcher to collect data from the respondents. The instrument had two parts – the first part for collecting demographic data and the second part was designed to collect data on the computer devices and Internet facilities that the respondents use to enhance learning.

Face and content validity of the instrument were determined by three experts in the field of Educational Technology and two experts in the field of Measurement and Evaluation. The reliability of the instrument was determined through test-retest method. The initial and the re-test scores of the sample were correlated using Pearson Product moment and a stability coefficient of 0.82 was obtained

The statistical analysis of the data was conducted using the computer software for statistical analysis, the Statistical Package for Social Science (SPSS) version 22. The research questions were answered using frequency and percentage while the hypotheses were tested with Chi-Square analysis at 0.05 significance level.

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RESULTS PRESENTATION

Table 1. Demographic characteristics of the research sample

VARIABLE	CATEGORIES	FREQUENCY	PERCENTAGE
Mode of Study	Full-Time	250	41.67
	Part-Time	150	25.00
	Sandwich	100	16.67
	Distance	100	16.67
Gender	Male	247	41.17
	Female	353	58.83
Age	15 – 20	61	10.17
	21 – 25	194	32.33
	26 – 30	170	28.33
	31 – 35	92	15.33
	36 – 40	53	8.83
	Above 40	30	5.00
Level of Study	100	106	17.65
	200	164	27.33
	300	153	25.50
	400	148	24.67
	500	29	4.83
Course of Study	Science and Engineering	99	16.50
	Humanities and Law	71	11.83
	Social and Management Sciences	263	43.83
	Education	167	27.83

Table 1 shows the distribution of the sample of the study based on the variables used in the study – Mode of study, Gender, Age, Level of study and Course of study.

Table 2. Access to computer devices among undergraduate students

COMPUTER DEVICE	Frequency	Percentage
DESKTOP	29	4.8
LAPTOP	214	35.7
TABLET	21	3.5
SMART PHONE	190	31.7
NONE	79	13.2
MULTIPLE DEVICES	67	11.2
TOTAL	600	100

Table 2 show that 4.8% of students use Desktop computers while 35.7% of them use Laptop computers. Also, 3.5% and 31.7% of the students reported using Tablet PC and Smart phone respectively. However, 13.2% of the respondents do not use computers at all while 11.2% use more than one computer device. The result shows that 13.2% of the students do not have access to a computer device.

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Table 3. Access to Internet facilities among undergraduate students

INTERNET FACILITIES	Frequency	Percentage
MODEM	118	19.7
BROADBAND	31	5.2
CAFÉ	59	9.8
SMART PHONE	245	40.8
NONE	102	17.0
MULTIPLE DEVICES	45	7.5
TOTAL	600	100

Table 3 show that 19.7% of students use Modem while 5.2% of them use Broadband. Also, 9.8% and 40.8% of the students reported using Cyber Cafe and Smart phone respectively. However, 17.0% of the respondents do not have access to the Internet while 7.5% use more than one Internet facility. The result shows that 17.0% of the students do not have access to Internet facility.

Table 4. Access to computer devices among male and female students

GENDER	MALE		FEMALE	
COMPUTER DEVICES	F	%	F	%
DESKTOP	12	4.9	17	4.8
LAPTOP	109	44.1	105	29.7
TABLET	4	1.6	17	4.8
PHONE	63	25.5	127	36.0
NONE	30	12.1	49	13.9
MULTIPLE DEVICES	29	11.7	38	10.8
TOTAL	247	100	353	100

Table 4 show that among the male students: 4.9% use Desktop computers, 44.1% use laptop computer, 1.6% use Tablet Pc, 25.5% use Smart Phone, 12.1% have none and 11.7% use multiple devices. For the female students: 4.8% use Desktop, 29.7% use Laptop, 4.8% use Tablet, 36.0% use Smart Phone, 13.9% have none and 10.8% use multiple devices. The results show that 12.1% male and 13.9% female students respectively do not have access to computer device.

Table 5. Access to Internet facilities among male and female students

GENDER	MALE		FEMALE	
INTERNET FACILITIES	F	%	F	%
MODEM	62	25.1	56	15.9

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BROADBAND	12	4.9	19	5.1
CAFÉ	23	9.3	36	10.5
PHONE	87	35.2	158	44.8
NONE	40	16.2	62	17.6
MULTIPLE FACILITIES	23	9.3	22	6.2
TOTAL	247	100	353	100

Table 5 shows that among the male students: 25.1% use Modem, 4.9% use Broadband, 9.3% use Cyber cafe, 35.2% use Smart Phone, 16.2% have none and 9.3% use multiple Internet facilities. For the female students: 15.9% use Modem, 5.1% use Broadband, 10.5% use Cyber cafe, 44.8% use Smart Phone, 17.6% have none and 6.2% use multiple devices. The results show that 16.2% male and 17.6% female students respectively do not have access to Internet facilities.

Table 6. Access to computer devices among students of different modes of study

MODE OF STUDY	FULLTIME		PARTTIME		SANDWICH		DISTANCE	
COMPUTER DEVICE	F	%	F	%	F	%	F	%
DESKTOP	2	0.8	13	8.7	5	5.0	9	9.0
LAPTOP	74	29.6	77	51.3	18	18.0	45	45.0
TABLET	13	5.2	4	2.7	0	0.0	4	4.0
SMART PHONE	114	45.6	25	16.7	36	36.0	15	15.0
NONE	21	8.4	12	8.0	37	37.0	9	9.0
MULTIPLE DEVICES	26	10.4	19	12.7	4	4.0	18	18.0
TOTAL	250	100	150	100	100	100	100	100

Table 6 shows that among the Fulltime students: 0.8% use Desktop computers, 29.6% use laptop computer, 5.2% use Tablet Pc, 45.6% use Smart Phone, 8.4% have none and 10.4% use multiple devices. For the Part-time students: 8.7% use Desktop, 51.3% use Laptop, 2.7% use Tablet, 16.7% use Smart Phone, 18.0% have none and 12.7% use multiple devices. For the Sandwich students: 5.0% use Desktop, 18.0% use Laptop, 0.0% use Tablet, 36.0% use Smart Phone, 37.0% have none and 4.0% use multiple devices. For the Distance students: 9.0% use Desktop, 45.0% use Laptop, 4.0% use Tablet, 15.0% use Smart Phone, 9.0% have none and 18.0% use multiple devices. The results show that more of the Sandwich students (37.0%) do not have access to computer device.

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Table 7. Access to Internet facilities among students of different modes of study

MODE OF STUDY	FULLTIME		PARTTIME		SANDWICH		DISTANCE	
INTERNET FACILITIES	F	%	F	%	F	%	F	%
MODEM	42	16.8	44	29.3	3	3.0	29	29.0
BROADBAND	2	0.8	12	8.0	2	2.0	15	15.0
CAFÉ	25	10.0	19	12.7	5	5.0	10	10.0
PHONE	141	56.4	41	27.3	33	33.0	30	30.0
NONE	20	8.0	17	11.3	54	54.0	11	11.0
MULTIPLE DEVICES	20	8.0	17	11.3	3	3.0	5	5.0
TOTAL	250	100	150	100	100	100	100	100

Table 7 shows that among the Fulltime students: 16.8% use Modem, 0.8% use Broadband, 25 10.0% use Cyber cafe, 56.4% use Smart Phone, 8.0% have none and 8.0% use multiple Internet facilities. For the Part-time students: 29.3% use Modem, 8.0% use Broadband, 12.7% use Cyber cafe, 27.3% use Smart Phone, 11.3% have none and 11.3% use multiple Internet facilities. For the Sandwich students: 3.0% use Modem, 2.0% use Broadband, 5.0% use Cyber cafe, 33.0% use Smart Phone, 54.0% have none and 3.0% use multiple Internet facilities. For the Distance students 29.0% use Modem, 15.0% use Broadband, 10.0% use Cyber cafe, 30.0% use Smart Phone, 11.0% have none and 5.0% use multiple Internet facilities. The results show that more than halve of the Sandwich students (54.0%) do not have access to Internet facilities.

Table 8. Access to computer devices among students of different ages

AGE (YEARS)	15 - 20		21 - 25		26 - 30		31 - 35		36 - 40		ABOVE 40	
COMPUTER DEVICES	F	%	F	%	F	%	F	%	F	%	F	%
DESKTOP	2	3.3	7	3.6	9	5.3	7	7.6	1	1.9	3	10.0
LAPTOP	11	18.0	68	35.1	72	42.4	37	40.2	18	34.0	8	26.7
TABLET	4	6.6	11	5.7	2	1.2	1	1.1	2	3.8	1	3.3
PHONE	35	57.4	71	36.6	38	22.4	20	21.7	19	35.8	7	23.3
NONE	4	6.6	11	5.7	24	14.1	18	19.6	12	22.6	10	33.3
MULTIPLE DEVICES	5	8.2	26	13.4	25	14.7	9	9.8	1	1.9	1	3.3
TOTAL	61	100	194	100	170	100	92	100	53	100	30	100

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Table 8 shows that among the students, age 15-20: 3.3% use Desktop computers, 18.0% use laptop computer, 6.6% use Tablet Pc, 57.4% use Smart Phone, 6.6% have none and 8.2% use multiple devices. For the students age 21-25: 3.6% use Desktop, 35.1% use Laptop, 5.7% use Tablet, 36.6% use Smart Phone, 5.7% have none and 13.4% use multiple devices. For the students age 26-30: 5.3% use Desktop, 42.4% use Laptop, 1.2% use Tablet, 22.4% use Smart Phone, 14.1% have none and 14.7% use multiple devices. For the students age 31-35: 7.6% use Desktop, 40.2% use Laptop, 1.1% use Tablet, 21.7% use Smart Phone, 19.6% have none and 9.8% use multiple devices. For the students age 36-40: 1.9% use Desktop, 34.0% use Laptop, 3.8% use Tablet, 35.8% use Smart Phone, 22.6% have none and 1.9% use multiple devices. For the students age above 40: 10.0% use Desktop, 26.7% use Laptop, 3.3% use Tablet, 23.3% use Smart Phone, 33.3% have none and 3.3% use multiple devices. The results show that one-third of the students with age above 40 do not have access to computer device.

Table 9. Access to Internet facilities among students of different ages

AGE	15 – 20		21 - 25		26 - 30		31 - 35		36 - 40		ABOVE 40	
INTERNET FACILITIES	F	%	F	%	F	%	F	%	F	%	F	%
MODEM	9	14.8	45	23.2	36	21.2	16	17.4	8	15.1	4	13.3
BROADBAND	1	1.6	8	4.1	10	5.9	8	8.7	0	0.0	4	13.3
CAFÉ	3	4.9	29	14.9	13	7.6	6	6.5	3	5.7	5	16.7
PHONE	42	68.9	84	43.3	67	39.4	24	26.1	21	39.6	7	23.3
NONE	3	4.9	13	6.7	28	16.5	30	32.6	18	34.0	10	33.3
MULTIPLE DEVICES	3	4.9	15	7.7	16	9.4	8	8.7	3	5.7	0	0.0
TOTAL	61	100	194	100	170	100	92	100	53	100	30	100

Table 9 shows that among the students age 15-20: 14.8% use Modem, 1.6% use Broadband, 4.9% use Cyber cafe, 68.9% use Smart Phone, 4.9% have none and 4.9% use multiple Internet facilities. For the students age 21-25: 23.2% use Modem, 4.1% use Broadband, 14.7% use Cyber cafe, 43.3% use Smart Phone, 6.7% have none and 7.7% use multiple Internet facilities. For the students age 26-30: 21.2% use Modem, 5.9% use Broadband, 7.6% use Cyber cafe, 39.4% use Smart Phone, 16.5% have none and 9.4% use multiple Internet facilities. For the students age 31-35: 17.4% use Modem, 8.7% use Broadband, 6.5% use Cyber cafe, 26.1% use Smart Phone, 32.6% have none and 8.7% use multiple Internet facilities. For the students age 36-40: 15.1% use Modem, 0.0% use Broadband, 5.7% use Cyber cafe, 39.6% use Smart Phone, 34.0% have none and 5.7% use multiple Internet facilities. For the students age above 40: 13.3% use Modem, 13.3% use Broadband, 16.7% use Cyber cafe, 23.3% use Smart Phone, 33.3% have none and 0.0% use multiple Internet facilities. The results show that about one-third of students with age above 30 do not have access to Internet facilities.

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Table 10. Access to computer devices among students of different levels of study

LEVEL	100		200		300		400		500	
COMPUTER DEVICES	F	%	F	%	F	%	F	%	F	%
DESKTOP	8	7.5	6	3.7	1	0.7	10	6.8	4	13.8
LAPTOP	28	26.4	54	32.9	57	37.3	64	43.2	11	37.9
TABLET	3	2.8	8	4.9	6	3.9	3	2.0	1	3.4
PHONE	36	34.0	52	31.7	60	39.2	38	25.7	4	13.8
NONE	13	12.3	33	20.1	16	10.5	14	9.5	3	10.3
MULTIPLE DEVICES	18	17.0	11	6.7	13	8.5	19	12.8	6	20.7
TOTAL	106	100	164	100	153	100	148	100	29	100

Table 10 shows that among the students in level 1: 7.5% use Desktop computers, 26.4% use laptop computer, 2.8% use Tablet Pc, 34.0% use Smart Phone, 12.3% have none and 17.0% use multiple devices. For the students in level 2: 3.7% use Desktop, 32.9% use Laptop, 4.9% use Tablet, 31.7% use Smart Phone, 20.1% have none and 6.7% use multiple devices. For the students in level 3: 0.7% use Desktop, 37.3% use Laptop, 3.9% use Tablet, 39.9% use Smart Phone, 10.5% have none and 8.5% use multiple devices. For the students in level 4: 6.8% use Desktop, 43.2% use Laptop, 2.0% use Tablet, 25.7% use Smart Phone, 9.5% have none and 12.8% use multiple devices. For the students in level 5: 13.8% use Desktop, 37.9% use Laptop, 3.4% use Tablet, 13.8% use Smart Phone, 10.3% have none and 20.7% use multiple devices. The results show that a higher proportion of the students (20.1%) in level 2 do not have access to computer device.

Table 11. Access to Internet facilities among students of different levels of study

LEVEL	100		200		300		400		500	
INTERNET FACILITIES	F	%	F	%	F	%	F	%	F	%
MODEM	25	23.6	19	11.6	33	21.6	35	23.6	6	20.7
BROADBAND	7	6.6	8	4.9	7	4.6	7	4.7	1	3.4
CAFÉ	12	11.3	12	7.3	12	7.8	18	12.2	5	17.2
PHONE	41	38.7	78	47.6	68	44.4	54	36.5	5	17.2
NONE	18	17.0	37	22.6	23	15.0	18	12.2	6	20.7
MULTIPLE DEVICES	3	2.8	10	6.1	10	6.5	16	10.8	6	20.7
TOTAL	106	100	164	100	153	100	148	100	29	100

Table 11 shows that among the students in level 1: 23.6% use Modem, 6.6% use Broadband, 11.3% use Cyber cafe, 38.7% use Smart Phone, 17.0% have none and 2.8% use multiple Internet facilities. For the students in level 2: 11.6% use Modem, 4.9% use Broadband, 7.3%

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use Cyber cafe, 47.6% use Smart Phone, 22.6% have none and 6.1% use multiple Internet facilities. For the students in level 3: 21.6% use Modem, 4.6% use Broadband, 7.8% use Cyber cafe, 44.4% use Smart Phone, 15.0% have none and 6.5% use multiple Internet facilities. For the students in level4: 23.6% use Modem, 4.7% use Broadband, 12.2% use Cyber cafe, 36.5% use Smart Phone, 12.2% have none and 10.8% use multiple Internet facilities. For the students in level 5: 20.7% use Modem, 3.4% use Broadband, 17.2% use Cyber cafe, 17.2% use Smart Phone, 20.7% have none and 20.7% use multiple Internet facilities. The results show that a higher proportion of the students in level 2 (22.6%) do not have access to Internet facilities.

Table 12. Access to computer devices among students of different courses of study

COURSE	Science and Engineering		Humanities and Law		Social and Management sciences		Education	
COMPUTER DEVICES	F	%	F	%	F	%	F	%
DESKTOP	7	7.1	1	1.4	15	5.7	6	3.6
LAPTOP	37	37.4	21	29.6	117	44.5	39	23.4
TABLET	3	3.0	4	5.6	11	4.2	3	1.8
SMARTPHONE	25	25.3	36	50.7	66	25.1	63	37.7
NONE	7	7.1	4	5.6	25	9.5	43	25.7
MULTIPLE DEVICES	20	20.2	5	7.0	29	11.0	13	7.8
TOTAL	99	100	71	100	263	100	167	100

Table 12 shows that among the students in Science and Engineering: 7.1% use Desktop computers, 37.4% use laptop computer, 3.0% use Tablet Pc, 25.3% use Smart Phone, 7.1% have none and 20.2% use multiple devices. For the students in Humanities and Law: 1.4% use Desktop, 29.6% use Laptop, 5.6% use Tablet, 50.7% use Smart Phone, 5.6% have none and 7.0% use multiple devices. For the students in Social and Management sciences: 5.7% use Desktop, 44.5% use Laptop, 4.2% use Tablet, 25.1% use Smart Phone, 9.5% have none and 11.0% use multiple devices. For the students in Education: 3.6% use Desktop, 23.4% use Laptop, 1.8% use Tablet, 37.7% use Smart Phone, 25.7% have none and 7.8% use multiple devices. The results show that a higher proportion of the students (25.7%) in Education do not have access to computer device.

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Table 13. Access to Internet facilities among students of different courses of study

COURSE	Science and Engineering		Humanities and Law		Social and Management sciences		Education	
INTERNET FACILITIES	F	%	F	%	F	%	F	%
MODEM	32	32.3	12	16.9	55	20.9	19	11.4
BROADBAND	3	3.0	1	1.4	24	9.1	3	1.8
CAFÉ	11	11.1	5	7.0	29	11.0	14	8.4
PHONE	33	33.3	47	66.2	105	39.9	60	35.9
NONE	9	9.1	1	1.4	31	11.8	61	36.5
MULTIPLE DEVICES	11	11.1	5	7.0	19	7.2	10	6.0
TOTAL	99	100	71	100	263	100	167	100

Table 13 shows that among the students in Science and Engineering: 32.3% use Modem, 3.0% use Broadband, 11.1% use Cyber cafe, 33.3% use Smart Phone, 9.1% have none and 11.1% use multiple Internet facilities. For the students in Humanities and Law: 16.9% use Modem, 1.4% use Broadband, 7.0% use Cyber cafe, 66.2% use Smart Phone, 1.4% have none and 7.0% use multiple Internet facilities. For the students in Social and Management sciences: 20.9% use Modem, 9.1% use Broadband, 11.0% use Cyber cafe, 39.9% use Smart Phone, 11.8% have none and 7.2% use multiple Internet facilities. For the students in Education: 11.4% use Modem, 1.8% use Broadband, 8.4% use Cyber cafe, 35.9% use Smart Phone, 36.5% have none and 6.0% use multiple Internet facilities. The results show more than one-third of the students in Education (36.5%) do not have access to Internet facilities.

HYPOTHESES

Hypothesis 1

Table 14: Chi-Square analysis on availability of computer devices among male and female students

Chi-Square Tests

	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	18.161[a]	5	.003
Likelihood Ratio	18.590	5	.002
Linear-by-Linear Association	4.311	1	.038
N of Valid Cases	600		

The result in table 14 shows that Chi-square = 18.161 with df = 5 and p value = 0.003. The value of P (0.003) is less than the value of alpha (0.05) which means that the difference is

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statistically significant. That is, there is a significant difference in the availability of Computer devices among male and female students. Since the difference is statistically significant, the null hypothesis is rejected.

Table 15: Chi-Square analysis on availability of Internet facilities among male and female students

Chi-Square Tests

	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	11.755[a]	5	.038
Likelihood Ratio	11.663	5	.040
Linear-by-Linear Association	2.830	1	.093
N of Valid Cases	600		

Table 15 shows that Chi-square = 11.755 with df = 5 and p value = 0.038. The value of P (0.038) is less than the value of alpha (0.05) which means that the difference is statistically significant. That is, there is a significant difference in the availability of Internet facilities among male and female students. Since the difference is statistically significant, the null hypothesis is rejected.

Hypothesis 2

Table 16: Chi-Square analysis on availability of Computer devices among students of different modes of study

Chi-Square Tests

	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	142.981[a]	15	.000
Likelihood Ratio	140.192	15	.000
Linear-by-Linear Association	.842	1	.359
N of Valid Cases	600		

The result in table 16 shows that Chi-square = 142.981 with df = 15 and p value = 0.000. The value of P (0.000) is less than the value of alpha (0.05) which means that the difference is statistically significant. That is, there is a significant difference in the availability of Computer devices among students of different modes of study. Since the difference is statistically significant, the null hypothesis is rejected.

Table 15: Chi-Square analysis on availability of Internet facilities among students of different modes of study

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	192.404[a]	15	.000
Likelihood Ratio	172.420	15	.000
Linear-by-Linear Association	1.524	1	.217
N of Valid Cases	600		

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Table 17 shows that Chi-square = 192.404 with df = 15 and p value = 0.000. The value of P (0.000) is less than the value of alpha (0.05) which means that the difference is statistically significant. That is, there is a significant difference in the availability of Internet facilities among students of different modes of study. Since the difference is statistically significant, the null hypothesis is rejected.

Hypothesis 3

Table 18: Chi-Square analysis on availability of computer devices s among students of different ages

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	80.198[a]	25	.000
Likelihood Ratio	81.778	25	.000
Linear-by-Linear Association	.409	1	.523
N of Valid Cases	600		

The result in table 18 shows that Chi-square = 80.198 with df = 25 and p value = 0.000. The value of P (0.000) is less than the value of alpha (0.05) which means that the difference is statistically significant. That is, there is a significant difference in the availability of Computer devices among students of different ages. Since the difference is statistically significant, the null hypothesis is rejected.

Table 19: Chi-Square analysis on availability of Internet facilities among students of different ages

Chi-Square Tests

	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	92.894[a]	25	.000
Likelihood Ratio	95.719	25	.000
Linear-by-Linear Association	3.822	1	.051
N of Valid Cases	600		

Table 19 shows that Chi-square = 92.894 with df = 25 and p value = 0.000. The value of P (0.000) is less than the value of alpha (0.05) which means that the difference is statistically significant. That is, there is a significant difference in the availability of Internet facilities among students of different ages. Since the difference is statistically significant, the null hypothesis is rejected.

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Hypothesis 4

Table 20: Chi-Square analysis on availability of computer devices among students of different levels of study

Chi-Square Tests

	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	47.034[a]	20	.001
Likelihood Ratio	48.282	20	.000
Linear-by-Linear Association	4.970	1	.026
N of Valid Cases	600		

The result in table 20 shows that Chi-square = 47.034 with df = 20 and p value = 0.001. The value of P (0.001) is less than the value of alpha (0.05) which means that the difference is statistically significant. That is, there is a significant difference in the availability of Computer devices among students of different levels of study. Since the difference is statistically significant, the null hypothesis is rejected.

Table 21: Chi-Square analysis on availability of Internet facilities among students of different levels of study

Chi-Square Tests

	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	38.101[a]	20	.009
Likelihood Ratio	38.221	20	.008
Linear-by-Linear Association	.001	1	.974
N of Valid Cases	600		

Table 21 shows that Chi-square = 38.101 with df = 20 and p value = 0.009. The value of P (0.009) is less than the value of alpha (0.05) which means that the difference is statistically significant. That is, there is a significant difference in the availability of Internet facilities among students of different levels of study. Since the difference is statistically significant, the null hypothesis is rejected.

Hypothesis 5

Table 22: Chi-Square analysis on availability of Internet facilities among students of different courses of study

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	73.646[a]	15	.000
Likelihood Ratio	70.216	15	.000
Linear-by-Linear Association	2.010	1	.156
N of Valid Cases	600		

The result in table 22 shows that Chi-square = 73.646 with df = 15 and p value = 0.000. The value of P (0.000) is less than the value of alpha (0.05) which means that the difference is

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statistically significant. That is, there is a significant difference in the availability of Computer devices among students of different courses of study. Since the difference is statistically significant, the null hypothesis is rejected.

Table 23: Chi-Square analysis on availability of Internet facilities among students of different courses of study

Chi-Square Tests

	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	101.633[a]	15	.000
Likelihood Ratio	99.193	15	.000
Linear-by-Linear Association	16.082	1	.000
N of Valid Cases	600		

Table 23 shows that Chi-square = 101.633 with df = 15 and p value = 0.000. The value of P (0.000) is less than the value of alpha (0.05) which means that the difference is statistically significant. That is, there is a significant difference in the availability of Internet facilities among students of different courses of study. Since the difference is statistically significant, the null hypothesis is rejected.

DISCUSSION

The results in tables 2 and 3 show that laptops and smart phones are the most popular computing devices used by undergraduate students for academic purposes. The result corroborates Atsumbe; Raymond, Enoch, and Duhu (2012) findings that lecturers and students both have computers and laptops. The findings are also agrees with the results of EDUCAUSE (2018), Ejechi (2016), OECD (2015) and Wilson, K.B., Tete-Mensah I. and Boateng K. A. (2014). The students are possibly responding to the portability of these devices when compared to the desktop computers. It is easier to move about with these devices which can enable learning to take place anytime and anywhere. This result is in agreement Adetimirin (2012) who found that most undergraduate students use telephones. Though, Tablet Pcs can achieve the same goal, their adoption is still very slow. However, a significant number of students (13.2%) still do not have access to any computing device. This is not very surprising since poverty and computer illiteracy is still very high in Nigeria. A high proportion of the students (close to half) use smart phones for their Internet connectivity. This is in agreement with Oliver and Goerke (2008) who stated that more students use smart phones than other devices. . Very few have access to broadband Internet connectivity and a significant proportion of students (17%) still do not have access to the Internet. Broadband connectivity is still unavailable in most places in Nigeria especially in most educational institutions.

Gender plays a major role in determining the access of students to ICT facilities as shown in tables 4, 5, 14 and 15. The findings of this study agree with Nwankwola (2015) and Mahmood (2012) who found that the gender of students significantly influenced their usage of ICT in universities. Also, the findings corroborate Foy (2005) who stated that the relationship of having Internet and gender was statistically significant. More male than female students have access to desktop and laptops while more females than males have access to tablets and smart phones. More males than females use modems for Internet connectivity while more females

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than males use broadband, cafes and smart phones. However, there are more females than males that do not have access to computing devices and Internet facilities.

Smart phones are used more by fulltime and sandwich students as computing devices and Internet facility while more part-time and distance students use laptops as computing devices and modems for Internet connectivity. Part-time and distance students invest more on laptops because of the role the laptop plays in their mode of learning. Also, these categories of students are more likely to afford the cost of a laptop which is more expensive than most smart phones. A significantly higher percentage of sandwich students do not have access to both computing device (37%) and Internet facilities (54%) compared to other categories of students. This may be due to the lack of ICT integration in secondary schools where the teachers who come for the sandwich programme are practicing. Broadband connectivity is used more by distance students.

The age of students has impact on the kind of ICT facilities that they use for their studies. Results in this study show that smart phones are used more by students of age 15-20, 21-25 and 36-40 while laptops are used more by students of age 26-30, 30-35 and above 40. However, students of age above 36 have the highest proportion of students who do not have access to computing device and Internet connectivity. Generally, more students use smart phones than any other Internet facility available for Internet connectivity with students age 15-20 having the highest percentage.

Students' level of study also has significant influence on the kind of ICT facilities that students use for learning. Students in levels 100 and 300 use more of smart phones while those in levels 200, 400 and 500 use more of laptops. Also, a greater proportion of students in all levels except level 500 use smart phones for Internet connectivity. More students in level 500 use modems for Internet connectivity. More students in level 200 compared to other levels do not have access to computing devices and Internet connectivity. This result corroborates Adetimirin (2012) who found that 300 level students were the highest users of the computer and the Internet.

There is a significant influence that course of study has on students' access to ICT facilities for learning. Students in Science and Engineering, and Social and Management sciences use more of laptops than any other computing device while students in Humanities and Law, and Education use more of smart phones for learning. However, more students in Education do not have access to both computing devices and Internet connectivity. Generally, more students in all the courses of study reported using smart phones for Internet connectivity. Modems are used more by students in Science and Engineering while Broadband is used more by Social and Management sciences students.

CONCLUSION

The use of Information and Communication Technology in education will enable schools to provide high quality learning experiences to the students and provide environment for students and teachers to interact and provide support to student anywhere and anytime. The students cannot harness these benefits if they do not have access to the facilities that will enable them use these services. Access to the ICT facilities is very paramount to the successful integration of ICT in education. The students need to have and know how to use the tools in order to

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benefit from the introduction of ICT resources in the education sector. There is a digital divide among male and female students in the university system in Nigeria. It was observed that a significant number of students still do not have access to computer devices and Internet facilities both at home and at school. There is inequity in the availability of ICT facilities among undergraduate students.

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