



**ASSESSMENT OF THE KNOWLEDGE AND UTILIZATION OF INFORMATION AND
COMMUNICATION TECHNOLOGY (ICT) AMONG RADIOGRAPHY STUDENTS IN SOUTH
EAST NIGERIA**

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ABSTRACT

Information and communication technology (ICT) has been the most fascinating phenomena that have characterized the 21st century. The growth of these technologies has over the years being accrued to researchers in the field of science and technology. The objective of this research was to determine the knowledge and utilization of ICT among radiography students in south east Nigeria. It is a survey research which involved the population of radiography students in university of Nigeria, Enugu campus and Nnamdi Azikiwe University, Nnewi campus. The sampling was by convenience sampling and the sample size was determined by Yaro Yamane method (1973) which resulted to 400 sample size. The data collection was by questionnaire administered randomly and analyzed with frequency and percentage table. Chi-square was used to test the hypothesis in the research. Among the 400 questionnaires distributed, 380 were returned 8 were wrongly filled and 16 were not returned. The research was analyzed to bring out the students' knowledge, the availability of ICT to the students and the students' utilization of ICT. The research revealed that most of the students in the research population had good knowledge of information and communication technology (ICT) and had received training. Most of their knowledge of ICT was based on Microsoft office. Almost all the Radiography students in South East Nigeria had one ICT facility or the other and their ownership increased with their level of study. However gender differences in the ownership of ICT facilities among the students were insignificant. Radiography students in University of Nigeria, Enugu Campus had more ICT facilities available to them than those in Nnamdi Azikiwe University, Nnewi Campus and these ICT facilities were of better quality in UNEC than in NAU, Nnewi Campus. Males had more intensive use of ICT internet facilities than females in the research population but there were no significant gender differences in the general utilization of ICT facilities. Most of the Radiography students in South East Nigeria use ICT facilities for class assignments and social networking/recreation.

KEYWORDS: Knowledge, Utilization, Information and Communication Technology, Radiography students, South East Nigeria.

INTRODUCTION

A basic understanding of information and communication technology (ICT) in education is vital in keeping abreast of rapidly changing technologies. However, investments in ICT in Nigerian education have not yielded reasonable expectations compared to similar investments made in Global System for Mobile Communication (GSM). In educational institutions, especially higher institutions, the mode of delivery of knowledge and curriculums are not yet ICT-enhanced.

It is obvious that ICT is still in the emerging phase in the Nigerian educational system.

There are many definitions of ICT according to different authorities. The definition of ICT from Whatis.com is an umbrella term that includes any communication devices or application, encompassing: radio, television, cellular phones, computer and network hardware and software, satellite system and so on, as well as the various services and applications associated with them, such as videoconferencing and distant learning.

Also ICT encompasses a range of rapidly evolving technologies (telephone, cables, satellite, TV and radio, computer-mediated conferencing, videoconferencing) as well as digital technology (computers, information networks, World Wide Web, intranets and extranets) and

software applications (Cisco Networking Academy, 2008). Another definition of ICT is given as: "ICTs are diverse set of technological tools and resources used to communicate, and to create, disseminate, store and manage information" (Cisco Networking Academy, 2008). According to Wikipedia on-line, information technology is the use of computers and software to manage information, store information and transmit the information as necessary.

Knowledge of ICT among students no doubt plays an important role in developing a nation. The knowledge, skills and confidence with computer technologies are assets for those who want to enter into the competitive market. Furthermore, with the increasing use of ICT in education all over the world, new skills and competences among the students are necessary for them to learn effectively. Students who are not well exposed to computers and the internet technology are likely to get further behind their peers who did have such exposure (Teck and Lai, 2011). They will potentially miss out the 70% of jobs which require moderate or high level of computer and eventually end up in the 10% low-pay jobs that do not require technical knowledge (Teck and Lai, 2011).

Although with students' increasing access to personal computers (PCs) and the internet than ever before, there are assumptions that the computer literacy training provided by tertiary institutions may become unnecessary. So, with increasing use of ICT in schools, it becomes imperative that students should be equipped with digital literacy competencies in order to exploit information resources that the electronic age engenders (Jeff Haywood *et al.*, 2003).

The utilization of information and communication technology (ICT) among students of tertiary institutions simply involves the full integration of ICT in the academic and social activities of the students. This involves the use of ICT in literature search, assignments, studies, social networking, and e-mail and so on. However, the level of ICT usage varies significantly from different institutions and from different students. Certainly, the importance of the utilization of ICT among students in tertiary institutions cannot be over emphasized considering that it increases the students' ability to embrace the rapidly changing technology and keeps them aware of innovations and inventions in their field of study. ICT utilization remains paramount, if a student must develop his or her technological competencies and remain relevant in her field of study, as well as compete favourably in any global setting. The key thing is not in ICT itself, but in understanding ICT and effectively employing it in learning and research.

The utilization of the internet and other forms of information technology system puts the student on the driving seat on the highway of learning. Learning is personalized by the student and the geographical barriers to learning are removed.

Several authorities have called for the establishment of different ICT projects (wireless LAN, e-library, cyber cafés etc.) and e-learning programs in the various institutions of higher learning in Nigeria so as to offset the cost of using ICT facilities by students and increase its availability. However, government has made frantic effort to infuse information technology in all its sectors including the education sector.

This was brought to limelight when Nigeria started implementing its ICT policy in April 2001 after the Federal Executive Council approved it by establishing the National Information Technology Development Agency (NITDA), the implementing body. The policy empowers NITDA to enter into strategic alliance and joint ventures and to collaborate with the private sector to realize the specifics of the country's vision of, "making Nigeria an IT capable in Africa and a key player in the information society by the year 2005 through using IT as an engine for sustainable development and global competitiveness" Nigerian National Policy for Information Technology (IT), National Information Technology Development Agency, 2005. This vision is yet to be fulfilled.

However, this research is triggered by the fact that the level of knowledge and utilization of ICT among Nigerian students' needs to be assessed; hence the researchers study of South-Eastern Radiography students as a case study. This work will also give an insight into the availability of some ICT equipment in University of Nigeria, Enugu Campus and in Nnamdi Azikiwe University, Nnewi Campus as well as the individual ownership of ICT facilities among the Radiography students.

AIM

To determine the knowledge and utilization of ICT among Radiography students in South East Nigeria.

Specific Objectives

1. To find out the various forms of ICT training received by the Radiography students in South East Nigeria.
2. To assess the availability of information and communication technology facilities to the Radiography students in South East Nigerian Universities.
3. To determine the reasons for the use of ICT by the students.
4. To determine the institutional and gender differences in the availability and use of ICT facilities in the population under study.

MATERIALS AND METHODS

Research Design

A survey research method was adopted for this research. This survey was centred on the knowledge and utilization of information and communication technology

(ICT) among South East Radiography students. Therefore, the research is in two parts:

- 1) The assessment of the knowledge of ICT among the students.
- 2) The utilization of ICT among the students.

It is a questionnaire study which will involve the distribution of questionnaire to the research population.

Study Population

The population of this study consisted of undergraduate Radiography students of University of Nigeria, Enugu Campus (UNEC), Enugu and Nnamdi Azikiwe University (NAU), Nnewi Campus, Anambra State, all in Nigeria. It concentrated on the second, third, fourth and fifth year students of Radiography. The first year students are excluded because they are still pre-medical students and as such don't do any radiography course. Therefore their utilization of ICT at this level may not really be for their course of study. Apart from that, the first year students do their premedical studies at a different campus from the upper years.

The population used for this study is 500 which consist of 360 Radiography students in UNEC and 140 Radiography students in NAU. This information was obtained from the class representatives, and confirmed by departmental administrative staff.

Sampling Procedure

Four classes out of five classes in the department of Radiography UNEC and three classes out of five from NAU were selected using convenience sampling. Then the number of questionnaire given to each class was determined by quota sampling. Radiography students at each level selected was randomly presented with a questionnaire.

The sample size was determined using Yamane method (1973)

$$n = \frac{N}{1 + Ne^2}$$

Where
 n = sample size
 N = population of study
 e = Tolerance error 5%

Therefore
 $n = \frac{500}{1 + 500(0.05)^2} = 399$

The total sample size (399) was used, but for the sake of convenience, 400 sample sizes was used. This represents a reasonable percentage of the total population of the study (500).

Instrumentation

The study used a questionnaire, with twenty one (21) questions spread over four sections:

- a) Personal information of the respondent
- b) Students' ICT knowledge
- c) ICT availability to students and
- d) Students' ICT utilization.

To facilitate quantification and analysis of data, a mainly close-ended question was used. Also to capture response and to have fewer missing responses, option such as "others specify" was included.

Data Collection

Data on the students' ICT knowledge, ICT availability to students, students' ICT utilization as well as the personal information of the students were collected. This was done using a questionnaire administered randomly to three hundred (300) Radiography students in UNEC and one hundred (100) Radiography students in NAU. This is determined from simple ratio of the population of Radiography students in UNEC and NAU (3:1). After the distribution of questionnaires, sufficient time was given to allow respondents to study and fill their responses. The data were collected, studied, edited, tabulated and analysed.

Analytical Procedure

The ICT knowledge level of the Radiography students was analyzed by determining how many of them have undergone any form of training. Also, the assessment of their ICT knowledge which range from poor to excellent was able to describe the students' ICT knowledge. Other areas described in the analysis are; the availability of ICT facilities to students, both the school based and the personally acquired facilities, the extent of utilization of ICT among the male and female Radiography students in South East and the factors hindering it. Major reasons for the students' use of ICT was analysed at descriptive level.

Chi-square test was used as an inferential statistical tool to test the proposed hypothesis which validated if gender determines the extent of use of ICT, also if the quality of ICT facilities in the different institutions determines the students' ICT skills. The data collected was presented on a frequency and percentage table and analysed as appropriate. Bar chart and pie chart were utilized for presentation and analysis of some data.

RESULT

Table 1: Demographic Data.

Age (years)	Gender		Total
	Male	Female	
16-18	7 (2.8%)	11 (8.4%)	18 (4.7%)
19-21	58 (23.3%)	48 (36.6%)	106 (27.9%)
22-24	118 (47.4%)	49 (37.4%)	167 (43.9%)
25 and above	66 (26.5%)	23 (17.6%)	89 (23.5%)
Total	249 (100%)	131 (100%)	380 (100%)

The above table showed that 249 respondents were males while 131 respondents were females which make a total of 380 respondents. Also, 18 students which represent 4.7% of the population were between the ages of 16-18years, out of which 7(2.8%) were males and 11(8.4%) were females. There were 167 students between the ages of 22-24 years, this make up about 43.9% of the entire

population of which 118 (47.4% of all the males) were males and 49 (37.4% of females) were females. However, 89 (23.5%) of the students were 25 years and above of which 66 (23.5%) were males and 23 (17.6%) were females.

Table 2: Students response to knowledge and training on ICT.

Response	Yes	No	Total
Do you have any knowledge of ICT	361 (95%)	19 (55%)	380 (100%)
Have you received any ICT training	344 (90.5%)	36 (9.5%)	380 (100%)

In the table above, 361 respondents which represent 95% of the population indicated that they have knowledge of ICT whereas 19 respondents which represent 5% of the population have no knowledge of ICT. Also the above table shows that 344 (90.5%) of the students have received ICT training while 36 (9.5%) student have not received any training on ICT.

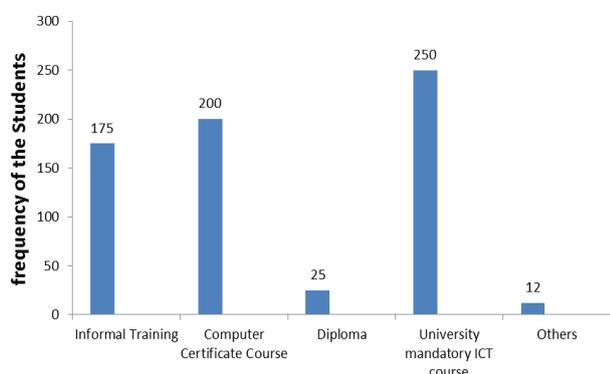


Fig I: Forms of ICT training received by the students.

The simple bar chart above represents the forms of ICT training received by the students. From the chart, 175 students received informal training in ICT, 200 students had gone for a computer certificate course, 25 students had diploma in ICT, and 250 students had done the University mandatory ICT course. Other students who had gone for other training in ICT are 12.

Table 3: The ICT packages done by the students.

Variables	Frequency	Percentage
Microsoft Office	320	84.2
Desktop Publishing	75	19.7
Software Installation and Development	21	5.5
Website Design	5	1.3
Computer Programming	2	0.5
Others	15	3.9

From the above table, 320 students which represents 84.2% of the population did Microsoft office as a package in their ICT training, 75 student had done desktop publishing and this represents 19.7% of the

population, 21 students had knowledge of software installation and development and this is about 5.5% of the population. Also, website design (1.3%) and computer programming (0.5%) were rarely done by the student where as 15 students (3.9%) had received training in other ICT packages.

Table 4: Students mode of ICT training.

Variable	Frequency	Percentage
Practical	14	4.1
Theoretical	30	8.7
Both	300	87.2
Total	344	100%

Above is a Table representing the basis for the students' ICT training. Out of the 380 students in the Population, only 344 of them had received ICT training. From the 344 students, 300 of them had both practical and theoretical knowledge of ICT, 30 students had only theoretical knowledge while 14 students had only practical knowledge.

Table 5: Rating Of the Students' ICT Knowledge.

Variables	Frequency	Percentage
Poor	35	9.2
Fair	117	30.8
Good	140	36.8
Very good	66	17.4
Excellent	22	5.8
Total	380	100%

Out of the 380 students in the population, 35 (9.2%) had poor knowledge of ICT, 117 (30.8%) had fair knowledge, 140 (36.8%) had good knowledge of ICT, 66 (17.4%) students had very good knowledge of ICT, while 22 (5.8%) of the students agreed to have excellent knowledge of ICT. This is according to the students' self-assessment of their ICT knowledge.

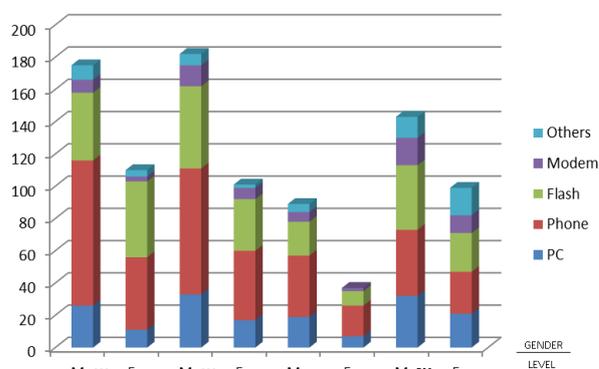


Fig. II: Availability of ICT facilities to students.

The bar chart represents the differences in gender and level of study in the ownership of ICT facilities. Ownership rate increased with the level of study. About 98% of all the students at each level own a mobile phone while ownership of personal computer is increased

among 500 level students with 32 males and 21 females having their personal computer.

Table 6: ICT Facilities Available In the Institutions.

Variable	Frequency		Total
	NAU	UNEC	
Internet wireless LAN	29(20.3%)	215 (90.3%)	244 (64.2%)
Computer Laboratory	126 (90.2%)	69(29.1%)	195 (51.3%)
E-learning facilities	44(30.8%)	184 (77.6%)	228 (60.0%)
Online Public Access Catalogue	5(3.5%)	32 (13.5%)	37 (9.7%)
Others	2(1.4%)	13 (5.5%)	15 (3.9%)

The table above represents the distribution of the ICT facilities available in the two institutions in the research population. That is, Nnamdi Azikiwe University, Nnewi Campus and University of Nigeria Enugu, Campus. The table shows that 29 (20.3%) NAU students indicated to have internet wireless LAN while only 215(90.7%) UNEC students indicated the same for their school. On the other hand 126 (90.2%) of NAU students indicated to have a computer laboratory while 69(29.1%) of UNEC students confirmed the same for their school.

Table 7: Thequality of ICT facilities in the institutions.

Variables	Frequency		Total
	NAU	UNEC	
Poor	72 (50.3%)	78 (32.9%)	150 (39.5%)
Fair	37 (25.9%)	47 (19.8%)	84 (22.1%)
Good	16(11.2%)	69(29.1%)	85 (22.4%)
Very Good	11(7.7.8%)	28(11.8%)	39 (10.3%)
Very High	7 (4.9%)	15 (6.3%)	22 (5.8%)
Total	143 (100%)	237 (100%)	380 (100%)

The table above is the result of the students’ assessment of the quality of ICT facilities in their schools. Here, 50.3% of NAU student said their schools’ ICT facilities were poor while 32.9% of UNEC students also said they have poor ICT facilities in their school. However, 16(11.2%) of NAU students confirmed that their ICT facilities were good while just 69(29.1%) of UNEC students confirmed to have good ICT facilities in their school.

Table 8: Gender distribution of students’ ICT utilization.

Variables	Male	Female	Total
Very low	25 (10.0%)	10 (7.6%)	35 (9.2%)
Low	39 (15.7%)	44 (33.6%)	83 (21.8%)
Fair	92 (36.9%)	53 (40.5%)	145 (38.2%)
High	76 (30.6%)	21 (16.0%)	97 (25.5%)
Very High	17 (6.8%)	3 (2.3%)	20 (5.3%)
Total	249 (100%)	131 (100%)	380 (100%)

The table above represents the extent at which the students utilize ICT. It can be seen that 39 (15.7%) males and 44 (33.6%) females had low use of ICT, 92 (36.9%) males and 53 (40.5%) females had a fair use of ICT. However, 76 (30.6%) males and 21 (16.0%) females indicated to have a high use of ICT.

Table 9: Students weekly use of ICT internet facilities in hours.

Variables (hrs)	Male	Female	Total
1-5	45 (18.2%)	71 (54.2%)	116 (30.5%)
5-10	19 (7.6%)	24 (18.3%)	43 (11.3%)
15-20	78 (31.3%)	19 (14.5%)	97 (25.6%)
20-25	90 (36.1%)	13 (9.9%)	103 (27.1%)
25 and above	17 (6.8%)	4 (3.1%)	21 (5.5%)
Total	249 (100%)	131 (100%)	380 (100%)

On asking the students how many hours they utilize ICT internet facilities in a week, 45 (18.2%) of the males responded to use ICT internet facilities between 1-5hours in a week while 71 (54.2%) females use it between 1-5hours per week. Also, 78 (31.3%) males and 19 (14.5%) females use internet ICT between 15-20 hours per week while 90 (36.1%) males and 13 (9.9%) females use internet ICT between 20-25hours per week. Few students use ICT internet facilities above 25 hours per week.

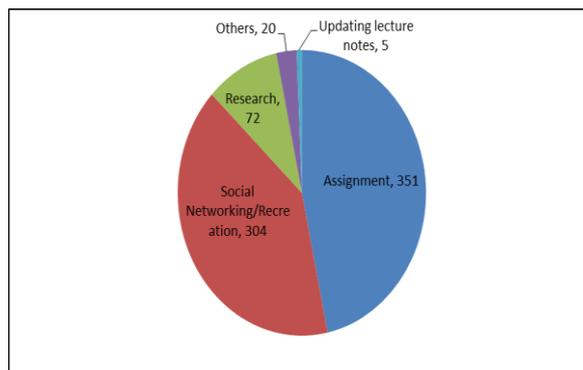


Fig III: Major reasons for the Students’ use of ICT facilities.

The pie chart above demonstrates major reasons for the students’ use of ICT. Exactly 351(92.4%) students indicated to use ICT facilities for assignments and some majority for social networking/recreation (80%). However, use of ICT facilities for updating of lecture notes and research were infrequent. Others reasons specified includes searching information, printing etc. These frequencies are represented in an angular pattern as seen above.

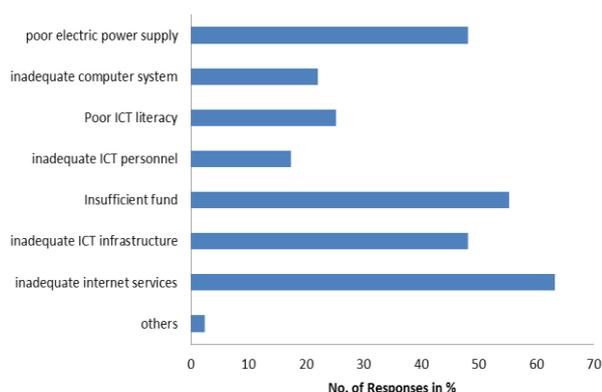


Fig IV: Factors hindering the Students' use of ICT facilities.

The simple bar chart represents the factor hindering the students' use of ICT facilities among which inadequate internet access ranked highest with 66.3% of the student indicating that. This is followed by insufficient fund (55.3%), poor electric power supply (48.2%), inadequate ICT infrastructure (48.2%), poor ICT literacy (25.3%), inadequate computer system (22.1%) and inadequate ICT personnel (17.4%). Other hindrances to the use of ICT facilities were specified by 2.4% of the students.

DISCUSSION

This study "assessment of the knowledge and utilization of information and communication technology among Radiography students in South East Nigeria" was triggered by the researchers interest in ICT and to assess the level of knowledge and utilization of ICT among the students. She observed that many students own and use various ICT facilities but their level of use and their proficiency in the ICT facilities were not clear. The following were revealed by the research.

It was discovered that almost all the students (95%) had some level of knowledge in ICT and this corresponds to what was discovered in the study carried out by Teck S.W et al, 2011. Among this population, majority of them (90.5%) had received ICT training.

The result of this study showed that among the 380 students in the research population, over half (n=250) had under gone the university mandatory ICT course, implying that majority of the students had knowledge of ICT. In addition some of the students (n=175) had informal training in ICT, 200 students had done a computer certificate course while 25 students had diploma in ICT. Generally this shows that the students have various levels of knowledge in ICT. The study also revealed that (84.2%) of the students did Microsoft Office package during their ICT training. While very few did website design (1.3%) and computer programming (0.5%). This must be as a result of the lack of comprehensive inclusion of different ICT packages in the students' curriculum as stated in a survey done among

medical students of VSS medical college Burla 2009, India.

Also in line with the work done by Olatokun et al. (2008) it was observed that 87.2% of the students had both practical and theoretical knowledge during their ICT training. However, on rating their ICT knowledge, 36.8% of the students had good knowledge of ICT, 30.8% indicated to have fair knowledge of ICT while few had poor (9.2%) and excellent (5.8%) knowledge of ICT. This indicates that the students in the research population had fair knowledge of information and communication technology.

The result also show that there was significant variation in the ownership of ICT facilities among the gender and different levels of study of the students, this was in line with the study done by Nachmias et al. (2008). The result showed that the ownership of personal computer increased with the level of study of the students from 26 male and 11 female students in 200 levels to 35 male and 21 female students in 500 levels. However, 98% of all the students at each level own a mobile phone and there were no significant difference in the ownership of flash drive across the different levels as 42 male and 27 female students own a flash drive in 200 levels while 40 male and 24 female owns it in 500 levels. There were little differences in the ownership of modems across the different levels of study and gender. Generally the research showed that ownership of ICT facilities among the students increased with the level of study of the students and there were little variations in the ownership of ICT facilities among the gender.

The result of the study also showed the ICT facilities that were available to the institutions in the research population (NAU and UNEC); about 23.3% of NAU students agreed to have internet wireless LAN while just 90% of UNEC students indicated that they had internet wireless LAN. Greater number of students in NAU (90.2%) agreed to have a computer laboratory while few students (21.9%) in UNEC indicated that they have computer laboratory in their school. Less than half (30.8%) of NAU students and over half (77.6%) of UNEC students confirmed the presence of e-learning facilities in their schools. Very few students in the two universities indicated they have On-line Public Access Catalogue. About 1.4% of NAU students and 3.5% of UNEC students stated other ICT facilities that were available in their schools. This ranged from internet cyber cafes to distant learning facilities and e-library. However, the research showed that UNEC had more ICT facilities than NAU, Nnewi Campus and their students enjoyed better ICT facilities than their colleagues in NAU, Nnewi Campus. This significant variation in the ICT facilities available in the two institutions is in line with the findings from the research done by Iloanusi and Osuagwu (2009).

The study revealed that half (50.3%) of NAU students said the quality of ICT facilities in their school were poor while less than half (32.9%) of UNEC students agreed they had poor ICT facilities in their school. Fewer UNEC students responded that their school's ICT facilities were fair in quality while 25.9% NAU students indicated same for their school. Just 11.2% of NAU students confirmed that their ICT facilities were of good quality while 29.1% UNEC students also agreed that their ICT facilities were good. Very few students in both schools agreed that their ICT facilities were 'very good' and 'high' quality. However, the results confirmed that the quality of ICT facilities in UNEC was higher than that of NAU, Nnewi Campus.

The result of the research revealed that 36.9% of the male students in the research population indicated 'fair' in their extent of usage of ICT while 40.5% of the female indicated same. Very few male (10%) and female (7.6%) students in the population were very low users of ICT. While about 6.8% male and 2.3% female students were very high users of ICT. This generally confirms the findings of Teck and Lai (2011) that there is no significant gender difference in the extent of utilization of ICT.

However the weekly use of ICT internet facilities among the different gender in the research population revealed that 18.2% of the males used internet facilities between 1-5 hours per week while 54.2% of the females used internet facilities within the same time range. Exactly 36.1% of the male students used internet facilities for 20-25 hours per week while just 9.9% of the female students used internet facilities for the same time frame. Very few, of the students used internet facilities above 25 hours per week for males (6.8%) and females (3.1%).

The research however, revealed that males had more intensive use of ICT internet facilities than females. This is also in line with the work done by Nachmias *et al.* (2008).

The result of the study showed that the major reasons for the use of ICT facilities among the students were assignments (90%) and social networking /recreation (85%). However few others indicated research (19%) and updating of lecture note (2%) as their reasons for the use of ICT facilities. Other reasons stated by the respondents includes: browsing for information, printing, scanning etc.

The major factors hindering the students' use of ICT facilities as revealed by the research were inadequate internet facilities (63.2%) followed by insufficient fund (55.3%) and poor electric power supply (48.2%). Inadequate ICT infrastructures (48.2%) were also indicated by the students as a factor. Fewer numbers of the students indicated inadequate ICT personnel (17.4%), poor ICT literacy (25.3%) and inadequate computer system (22.1%) as part of their hindrances to their use of

ICT facilities. Other factors stated by the students were lack of computer culture and time.

CONCLUSION

Most Radiography students in South East Nigeria had knowledge of ICT and their level of knowledge was relatively good. Majority of the students in the research population had access to ICT facilities, but the quality of these facilities varies significantly among the two institutions. Also, there were no significant gender difference in the use of information and communication technology among the South East Nigerian Radiography students but the extent of their use of these facilities were relatively good. Lastly, the major hindrances to the full utilization of ICT by the Radiography students were inadequate internet access and insufficient fund.

However, the researcher strongly believes that if the recommendations made in this research are adopted, the knowledge and utilization of information and communication technology (ICT) among the Radiography students in South East Nigeria will be greatly improved.

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