

*Full Length Research Paper*

# Evaluation of anatomy students' knowledge of information communication technology in Nigerian universities

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Received 29 July, 2014; Accepted 17 June, 2015

**Information and Communication Technology (ICT) has accelerated many aspects of medical education acquisition, driving it towards more evidence-based platforms. We undertook to evaluate anatomy students' knowledge of computers and information communication technology application in the various departments of anatomy in medical schools. This survey was implemented using questionnaire research instrument and involved 300 students who attended the 12th Annual Conference of the Society of Experimental and Clinical Anatomist of Nigeria (SECAN) in March, 2012. Data were collected, analyzed and represented in percentages and tables. Two hundred and twenty five (90%) respondents have heard of ICT before, while 198 (79.2%) agreed to the use of ICT in their school. The most common uses of ICT in the various schools included internet-based registration of courses 144 (72.7%), surfing of the net at internet café 111 (56.1%), and power point lecturing 88 (44.4%). A total of 210 (84%) thought ICT leads to better understanding of lectures, 225 (90%) said it leads to better class participation and interaction while 237 (94.8%) were of the view that it makes it easier to demonstrate and understand diagrams. Many thought that poor and irregular electricity supply 244 (97.6%) and inadequate ICT equipment 172 (68.8%) were amongst factors that discouraged ICT usage in Anatomy Departments of Medical Schools in Nigeria. While ICT awareness was high amongst respondents, poor infrastructure like electricity remained a major challenge.**

**Key words:** Information Communication Technology (ICT), medical, anatomy, students.

## INTRODUCTION

Empirical evidence supports the potential of information communication technology (ICT) to introduce students to

advanced graphical representations but the studies also stress the importance of prior knowledge and the need

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for real-life tactile and practical experiences (Valcke and Wever, 2006). The medical profession and training has become increasingly complex and the challenges faced by medical education systems are becoming even greater. This is because higher levels of technical and scientific knowledge are required as well as effective communication and management skills (Healy et al., 2005) by the prospective trainees. With online data available, lectures are now more student-friendly and clinically oriented with graphic presentations. The students can see and grasp so many things at a glance. Within the educational sector, ICT usage has begun to have a domineering presence but the impact has not been as extensive as in other fields. A number of authors have attempted to explore this lack of activity and influence (Soloway and Prior, 1996; Collis, 2002) in their various researches.

In anatomy, traditional anatomical atlas books and illustrations can be made more illustrative and interactive with various imaging techniques all driven by ICT related platforms (El-Khalili, 2005) and this can facilitate the better understanding of the discipline by the students. The use of ICT in education lends itself to more student-centered learning settings and with the world moving rapidly into digital media and information, this role is becoming more and more important (Starr, 2001). However, many factors have been advocated as responsible for the poor capacity utilization of ICT-driven platforms in many academic settings (particularly tertiary medical education system in Nigeria). These include lack of adequate IT knowledge and skills, limited IT infrastructure, poor electricity supply amongst others. Taken together, one is tempted to adduce that the end users of ICT-driven teaching and learning efforts (the students) would be the ultimate recipient of a parlous configuration of which its outcome would negatively impede academic and national human capital development. But in recent times, factors have emerged which have strengthened and encouraged moves to adopt ICTs into classrooms and learning settings.

The explosion of knowledge and application of various IT-driven facilities in different departments of anatomy globally (from 2-D to 3-D imaging) have stimulated progress in various software and tools for learning (El-Khalili, 2005). These approaches are striving to transform a subject like anatomy into a more realistic and friendly subject. Our study investigated the awareness and perception of students in Anatomy on the benefits of using ICT in teaching and learning, the level of ICT application as well as the constraints affecting the use of ICT in Anatomy departments of the medical schools.

## MATERIALS AND METHOD

This was a cross-sectional study with sample population consisting

of anatomy students from various medical schools who attended the 12th Annual Conference of the Society of Experimental and Clinical Anatomy of Nigeria (SECAN) held at the International Conference Center, University of Technology, Owerri, Imo state, South Eastern Nigeria, 24th to 26th March, 2012. An information sheet (of consent to participate) was distributed to respondents alongside the questionnaire. This contained the objectives of the survey and stated that information given by respondents would be handled with utmost confidentiality and strictly for research purpose, would not be disclosed to external parties except with due permission of respondent. Approval was obtained from the Postgraduate Committee of the Department and Faculty of Basic Medical Sciences prior to commencement of study. The questions were designed to get survey collected basic demographic data; of participants as well as information on their awareness of ICT-based learning, their use of various ICT learning aids, their proficiency in the use of computer and internet, the level of ICT usage in their schools, access to internet, and attitude towards the use of internet to improve anatomy education. The questionnaire was first pretested and validated among a small number of students in the Department of Anatomy, Faculty of Basic Medical Sciences, University of Uyo, Nigeria. The questionnaires were distributed to students while they were seated at the auditorium and retrieval of completed questionnaires was done at the end of its completion. The questionnaire was first pretested and validated among a small number of students in the Department of Anatomy, Faculty of Basic Medical Sciences, University of Uyo, Nigeria. Three hundred survey instruments (questionnaires) were self-administered to the students who consented to participate in the study. Two hundred and fifty surveys were completed and their questionnaires returned and it formed the basis for this report. Analysis was done using simple descriptive statistics and presented as percentages and frequency tables.

## RESULTS

Majority of the students 212 (84.8%) were between 16 to 26 years while only 38 (15.2 %) were between 27 to 37 years. 240 (96 %) were single and 10 (4 %) were married. They were more females 138 (55.2 %) than males 112 (44.8 %). Institutional spread was as follows; 48 (19.2%) respondents were students offering anatomy at the Federal University of Technology, Owerri (FUTO), 34 (13.6%) were from the University of Port Harcourt (UNIPORT), 23 (9.2%) from the University of Uyo (UNIUYO), 19 (7.6%) were from the University of Calabar (UNICAL), 23 (9.2%) from Ebonyi State University (EBSU), (24 (9.6%) from Anambra State University (ANSU), 5 (2.0%) from Nnamdi Azikiwe University (NAU), 6 (2.4%) from University of Nigeria Enugu Campus (UNEC), 6 (2.4%) from Madonna University (MADONA), 4 (1.6%) from Niger Delta University Amassoma (NDU), 8 (3.2%) from Imo State University Owerri (IMSU), 5 (2.0%) from the University of Benin (UNIBEN), 5 (2.0%) from Abia State University (ABSU) and 3 (1.2%) from College of Medicine, Ambrose Ali University, Ekpoma (AAU), and 37 (14.8%) respondents did not include their institution. Of the 225 (90%) of respondents that have heard of ICT, 69 (30.7%) heard of it through seminars, 50 (22.2%)

**Table 1.** Types of ICT applications used by respondents.

Internet application used	Yes		No	
	frequency	%	frequency	%
Power point lecturing	88	44.4	110	55.6
E- books	27	13.6	171	86.4
E- library	44	22.2	154	77.8
Internet café surfing for assignments	111	56.1	87	43.9
Internet based registration of courses	144	72.7	54	27.3
e- notes from lecturers to students	35	17.7	163	82.3
Mobile phone based learning	42	21.2	156	78.8
CD copies of lecture materials and books	59	29.8	139	70.2
Transparency slides	9	4.5	189	95.5
ICT interactive boards	7	3.5	191	96.7

**Table 2.** Constraints to ICT usage in anatomy departments of universities sampled.

Constraint to ICT usage	Yes		No	
	frequency	%	frequency	%
Unavailability of IT equipment	160	64.0	90	36
Inadequate IT equipment	172	68.8	78	31.2
Poor and irregular electricity supply	244	97.6	6	2.4
Lack of training	117	46.8	133	53.2
Lack of encouragement	99	39.6	151	60.4
Lack of maintenance	98	39.2	152	60.8
Lack of support staff	46	18.4	204	81.6
Lack of funds	128	51.2	122	48.8

through friends, 56 (24.9%) through the television, 8 (3.6%) through the radio, 16 (7.1%) through the newspapers and 26 (11.6%) did not state how they heard about ICT. One hundred and ninety eight (79.2%) agreed to the use of ICT for the study of Anatomy in their school, 49 (19.6%) did not and 3 (1.2%) did not respond.

The types of ICT-based applications utilized as indicated by the students are shown in Table 1. When asked about the advantages of IT-based lecturing over other traditional teaching methods, 210 (84 %) thought it leads to better understanding of lectures by students, 225 (90%) were of the view that it leads to a better class participation and interaction, 237 (94.8 %) were of the view that it will make it easy to demonstrate and understand diagrams. Responses on factors that impede ICT usage in the learning of anatomy in the various departments are presented in Table 2. The level of internet proficiency of the respondents varied; 9.6% had none, 20.4% said it was low, 51.2% said it was moderate and only 6.8% said it was high whereas 12% did not respond. 43.6% of the respondents had email addresses,

3.6% did not and 52.8% failed to respond. In addition, two respondents (0.08%) had web pages, 55.6% did not and 43.6% did not respond to this question. Access to perform internet-based activities were from laptops and modem 7 (2.8%), patronage of cyber cafés 170 (68%), and school library with free to air access (Wi-Fi) in their schools 23 (9.2%) while 50 (20%) failed to respond to the question. The frequency of internet surfing was daily 34 (13.6%), every other day 31 (12.4%), weekly 13 (5.2%), monthly was 109 (43.6%) whereas 63 (25.2%) rarely did surf the net.

Types of internet-based activities performed by students are shown in Table 3.

## DISCUSSION

This study has shown that the awareness of anatomy students on ICT applications was high but on the contrary only 2.8% had laptops of their own coupled with very low frequency of access to internet services by the students.

**Table 3.** Types of internet-based activities carried out by respondents.

Internet activity carried out	Yes		No	
	Frequency	%	Frequency	%
Internet based learning	64	25.6	186	74.4
Sending and receiving of e-mails	180	72.0	70	28
Sending of bulk sms	36	1.4	214	98.6
School registration	186	74.4	64	25.6

N = 250.

This relatively lower proportion of access and usage of computer facilities by students may be a reflection of the high cost of acquisition in the country as similar trend has been reported by Ajuwon (2003).

It is pertinent to stress the need for a strong infrastructural support with the needed hardware (computer) and software platforms for effective learning and access to relevant literature. More so, the need that students have the capacity to and be familiar with the various aspects of such deployed technology cannot be underscored. Although in this study, the bulk of the ICT-based activities by the students were dominated by internet-based school registration, surfing the internet for assignments as well as power point lectures by the teachers, other forms of ICT driven facilities were also utilized. This implies that the students were very familiar with these ICT application platforms just akin to previous studies in Malaysia and Nigeria where a greater percentage of the medical students reported adequate skills in browsing the internet and using the emails (University College Hospital Hand Diary, 2002; Virtanen and Nieminen, 2002). It is not uncommon that students in the health sciences regularly obtain health-related information and literature from the internet. This is pertinent because libraries in many developing countries are filled with old and outdated books and journals making access to relevant and current literature solely restrictive and at the mercy of those who can access the internet-driven, online data bases like HINARI (Ameh et al., 2008).

Despite concerted efforts at international organizations towards equipping some of the libraries in tertiary institutions access to many online data bases require financial commitments of which the students may not be able to afford. However, we must highlight here that while computer literacy and use of internet services are not synonymous, but from the result, it is more likely that half of the students may probably not be proficient in internet usage as depicted in the pattern of use of internet services (frequency, proficiency, services assessed and where this was used). The optimal utilization of computers may also be hampered by lack of computer

knowledge and internet access (Ameh et al., 2008) on the part of the students as well as other contributory factors that might have been identified in this study. Nonetheless, computer knowledge and competence, which was previously not included in the curriculum for anatomy training, has become incorporated in the first year of the students in many of the universities. This inclusion we believe should become holistic with all the tertiary institutions structuring into their curriculum ICT skills/training for the students because the future relevance in aiding in dissertation preparation, assessing literatures as well as research far outweighs its non-inclusion.

The use of power point lectures and other e-learning services was low in the results of this survey. Power point usage has been shown to encourage active learning and increase effectiveness (Seth et al., 2010) of lectures and the clarity of teaching materials as well as improve interaction during presentation (Lowry, 1999). The flexibility of the system allows a lecturer to update and upload data/literatures as it becomes necessary (Healy et al., 2005) and this can be made available to students (some of whom may not be financially capable to have access to these newer information) during lectures. Various studies have shown the multifaceted problems militating against the effective use of ICT in the teaching learning process in schools (tertiary education inclusive). Some of these factors have equally been highlighted by the students in this study including poor and irregular electricity supply (Ofodu, 2007), inadequate funding (Nwite, 2007) and paucity of ICT infrastructure (Iloanusi and Osuagwu, 2009).

Many other hurdles remain in the infusion of ICT in medical educational institutions in Nigeria including lack of training, lack of maintenance and lack of support staff and incentives. Ossai-Ugbah et al. (2012) highlighted some of these factors discouraging the use of audio visuals for learning library science in Nigerian university in their study and this is similar to what has been reported by the observations of the students as regards application of ICT related services towards anatomy training in the various departments. It is suggested that

collaborative partnerships be established between the various institutional frameworks and international agencies towards capacitating the departments towards better ICT-driven initiatives.

### Limitation of study

Institutional geographical spread of the various respondents sampled clearly shows that they represent universities within the southern part of Nigeria (more than 14 universities excluding those that failed to indicate their institution in the questionnaire), therefore, this is identified as a possible limitation to the generalization of this study. However, while there may be variation in the ICT acquisition across universities in the northern landscape, we do not feel this may be completely different from the scenario recorded here.

### Conflicts of interest

Authors have none to declare.

### Conclusion

A well-balanced ICT environment enables students to feel the intrinsic motivation and to stay motivated throughout the learning process. The study has shown that ICT though important in the study of Anatomy, is still poorly utilized amongst anatomy departments in medical schools represented in this study. There is therefore the greater need in developing countries without technological structures to provide facilities such as wireless web access with low-cost computers for information accessibility, constant electricity supply and visual aids required to improve learning in anatomy departments amongst medical schools.

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