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**AVAILABILITY AND UTILIZATION OF ICT IN TEACHING AND LEARNING OF
SCIENCE EDUCATION STUDENTS IN COLLEGES OF EDUCATION IN LAGOS
STATE**

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Abstract

Information and communication technology play a crucial role in the teaching and learning process and it is a veritable tool for advancement of science education in Nigeria. The study investigated the availability and utilization of ICT in colleges of education in Lagos State, Nigeria. The purpose of the study was to examine the extent of availability, utilization and effect of ICT in teaching and learning process. Descriptive survey design was used and the population for the study comprised 534 lecturers of the colleges of education in Lagos state. A sample of 100 participants was chosen using stratified random sampling technique to cover the three selected institutions, both public and private. The instrument used for data collection was detailed structured questionnaire. Three research questions and one hypothesis were formulated to guide the study. Data collected were analysed using frequency tables, and the hypothesis was tested via Chi-Square χ^2 . The findings showed that though the available ICT resources were optimal, the extent of utilization by the lecturers was low. It was also discovered that. It was equally discovered that ICT impact positively on the teaching and learning process. The study therefore recommends Government at all levels should make ICT a matter of priority, provide the funds specifically needed for the training of teachers in ICT application and utilization in education.

Introduction

The World of science and technology in which we live today is enormous, driven by a never-ending stream of new findings, breakthroughs, and creations. According to Olagunju (1996), science is the systematic study of natural events and the body of established, organized information that has been gathered throughout time to help us better comprehend and relate to nature and the cosmos. Students can encounter the variety and joy of the natural world through science studies.

Harry (1904) defines education broadly as everything that disciplines and enlightens the understanding, corrects the temper, cultivates the taste, and shapes manners and habits. Education is essential because it not only provides humans with the knowledge and skills they need to survive, but it also enhances our ability to reason and think clearly. In order to get greater results, this in turn encourages us to continuously innovate and improvise. It is increasingly essential to educate and learn for oneself. Providing basic education to residents and allocating significant resources to meet each educational goal is one of the main goals that any government in the world today must aim to accomplish. The goal of science education is to produce students who can use scientific knowledge, understanding, and skills to increase their economic productivity.

The science content outlines the knowledge, comprehension, and skills that a person with a scientific background should possess after completing science courses. Students will learn science at schools that use the scientific curriculum by actively participating in topics that they find interesting and significant. According to Ozoji (2013), Because of their rapid evolution since the middle of the 20th century, convergence, and pervasiveness, ICTs have a substantial impact on development and globalization. Governments throughout the world have implemented a number of initiatives to improve education and training programs in order to make ICT education more accessible, Stake holders including schools, now see the efficacy for workers to utilize computers at work in order to capitalize on the opportunities presented by the continuously developing body of knowledge, information, and technology. This is due to the unprecedented problems that come with employing computers in the job, which encourage people's creativity, curiosity, and critical thinking (Kumar, Rose, and D'Silva 2018). Nwachukwu (2015) asserts that new media technology has made it possible to alter the ways in which information is accessed, stored, transmitted, and reproduced, as well as its forms, formats, and manifestations. For this reason, it is crucial that educators adjust to new roles and competencies in order to deal with the upcoming changes.

Statement of the Problem

Nigeria governments mandated computer technology generally for our educational systems (Hooker, Mwiyeria, and Verma, 2011). Unfortunately, in spite of the fact that computer- based learning existence in every educational setting, from primary to postsecondary, few professors in colleges of education are taking advantage of the resources because of their limited availability (Adeyinka, Adedegi, and Ayodele, 2020). The efficient use of ICT in Nigerian educational institutions is hampered by several issues. A primary challenge, among others, is the inadequate knowledge and utilization of information technology resources by instructors in academics for the purpose of training and studying. The absence of certified educators with the necessary training, power outages, and outdated computer gear and software are some of these difficulties. Other difficulties include instructors' indifference to new innovations and their lack of information regarding the curriculum's execution. ICT curriculum implementation in Nigeria is consistently hampered by the incompetence of ICT teachers (Pelgrum, 2021). Given that most students are more tech-savvy than their teachers, it has been noted that lecturers in Nigerian education colleges still use ICT extremely infrequently. This informed the researchers' decision to investigate the level of availability and usage of ICT in tutoring and teaching of science education students in colleges of education in Lagos State, Nigeria.

Research Purposes

The main purposes of this study are

1. Examine the level of availability of ICT resources in colleges of education in Lagos State.
2. Assess the extent of teachers' utilization of ICT resources in the teaching and learning process.
3. Evaluate the effect of ICT in the teaching and learning process in Colleges of Education

Research Questions

1. To what extent do ICT resources available in the selected colleges of education in Lagos?
2. To what extent do teachers utilize ICT resources in the teaching and learning process?
3. To what extent do ICT resources affect teaching and learning process?

Research Hypothesis

There is no significant effect of ICT in teaching and learning process in colleges of education

Methodology

Descriptive survey design approach was employed to obtain information on this study. The population comprised 534 lecturers from three (3) Colleges of Education (Federal, state and private) in Lagos State. Simple random technique was used to pick 100 respondents from the three colleges of education. Properly outlined, self-constructed questionnaire called 'Availability and Utilization of ICT Questionnaire' (AUIQ) was used to collect data. It was expected of the responders to provide their answer the items by checking the option that they believed best answers the assertions. Face validity and content were done by experts in education. The researcher personally administered the questionnaires to the lecturers by using simple random techniques, also collection was done in person. The questionnaire had a detailed letter of introduction stating the intention of the study and the expectations of the respondents. The data collected were presented using frequency tables and simple percentages while Chi-Square χ^2 method (inferential statistics) was used for hypotheses testing at 0.05 level of significance.

Results

Section A: Analysis of Questionnaire Items

Table 4.1 Analysis Participants' Demographic Data

Variables	Frequency	Percentage %
Gender		
Male	43	48
Female	47	52
Total	90	100
Rank		
Assistant Lecturer	15	17
Lecturer II	27	30
Lecturer I	23	26
Senior Lecturer	20	22
Professor	5	5
Total	90	100
Educational Qualification		
B.Sc./B. A/B.Ed.	9	10
M.Sc./M. Art/M.Ed.	60	67
Ph.D.	21	23
Total	90	100
Teaching Experience (in years)		
0 – 9 years	13	14

10-19 years	31	34
20-29years	35	39
30 years and above	11	12
Total	90	100

Source: Research Survey, 2023

Table 1 indicates that 43(48%) of the lecturers are males while 47(52%) were females. Meaning that there were more female lecturers.

Table 1 also shows that 15(17%) lecturers were Assistance Lecturer, 27(30%) were Lecturer II, 23(26%) were Lecturer I, 20(22%) were Senior Lecturer while 5(5%) were Professor. This implies that majority of the lecturers who filled the questionnaire were Lecturer I.

Table 1 shows that 9(10%) of the lecturers have B.Sc/B.Art/B.Ed., 60(67%) lecturers have M.Sc/M.Art./M.Ed while 21(23%) lecturers have Ph.D. Therefore, lecturers with teaching with M.Sc/M.Art./M.Ed were more as indicated in the table.

Table 1 shows that 13(14%) lecturers have between 0-9years of teaching experience; 31(34%) lecturers have between 10-19years of teaching experience, 35(39%) lecturers have between 20-29years of teaching experience while 11(12%) lecturers have been teaching for 30 years and above. This indicates that most of the lecturers have been in the teaching job for between 20- 29years.

Research Question 1

To what extent do ICT resources available in colleges of education?

Table 4.2: Availability of ICT Resources in Colleges of Education

S/N	ITEM	SA	A	SD	D	TOTAL
1	Several educational databases are available in my institution	41 (47)	30 (34)	9 (9)	10 (10)	90 (100)
2	Course Moodle, files and folders of lectures are available in my institution	39 (43)	41 (45)	5 (6)	5 (6)	90 (100)
3	Open educational resources and E-Library are available in my institution	44 (48)	35 (39)	4 (5)	7 (8)	90 (100)
4	Learning Management System (LMS) is available in my institution	33 (36)	34 (38)	9 (10)	14 (16)	90 (100)
5	Computer system and projectors are available in my institution	32 (35)	40 (43)	6 (7)	14 (15)	90 (100)

Source: Research Survey, 2023 (Figures in parenthesis represent percentage)

Table 2 above shows that 75 lecturers (45 and 30 respectively) agreed that several educational databases are available in their institution while 17 teachers (9 and 8 respectively) disagreed. These shows that majority of the lecturers agreed.

80 lecturers (39 and 41 respectively) agreed that Course Moodle, files and folders of lectures are available in their institution while only 10 teachers (5 and 5 respectively) disagreed. These shows that majority of the lecturers agreed.

79 lecturers (44 and 35 respectively) agreed that open educational resources and E-Library are available in their institution while 11 teachers (4 and 7 respectively) disagreed. These shows that majority of the lecturers agreed. 67 lecturers (33 and 34 respectively) agreed that Learning Management System (LMS) is available in my institution, while 23 lecturers (9 and 14 respectively) disagreed. This shows that majority of the lecturers agreed.

72 lecturers (32 and 40 respectively) agreed that computers and projectors are available in their institution while 20 lecturers (6 and 14 respectively) disagreed. This shows that that majority of the lecturers agreed.

Therefore, it can be deduced that ICT resources are available in colleges of education to a great extent.

Research Question 2

To what extent do lecturers utilize ICT resources in colleges of education?

Table 4.3: Extent of Utilization of ICT Resources in Colleges of Education

S/N	ITEM	SA	A	SD	D	TOTAL
6	I always use Course Moodle for teaching students for effective learning in my institution	37 (41)	29 (33)	10 (11)	14 (15)	90 (100)
7	I often post lecture note, activities and assignment on Learning Management System for students.	16 (18)	17 (19)	38 (42)	19 (21)	90 (100)
8	I always interact with my students through virtual classroom	15 (17)	20 (22)	34 (38)	21 (23)	90 (100)
9	I regularly use educational database like abstract and journals for my students	15 (17)	15 (17)	26 (29)	34 (37)	90 (100)
10	I frequently use computer and projector for teaching students	39 (43)	5 (5)	9 (10)	37 (42)	90 (100)

Source: Research Survey, 2023 (Figures in parenthesis represent percentage)

Table 3 above shows that 66 lecturers (37 and 29 respectively) agreed that they always use Course Moodle for teaching students for effective learning in their institution while 24 teachers (10 and 14 respectively) disagreed. This shows that majority of the lecturers agreed that they used course Moodles.

33 lecturers (16 and 17 respectively) agreed that they often post lecture note, activities and assignment on Learning Management System for students while 57 lecturers (38 and 19 respectively) disagreed. This shows that majority of the lecturers disagreed.

35 lecturers (35 and 20 respectively) agreed that they always interact with their students through virtual classroom while 55 lecturers (34 and 21 respectively) disagreed. These shows that majority of the lecturers disagreed. So, they do not use virtual classroom often.

30 lecturers (15 and 15 respectively) agreed that they regularly use educational database like abstract and journals for their students, while 60 lecturers (26 and 34 respectively) disagreed. This shows that that majority of the lecturers disagreed.

44lecturers (39 and 5 respectively) agreed that they frequently use Language/Science Laboratory to conduct practical concept for their students while 46 lecturers (9 and 37 respectively) disagreed. This shows that that majority of the lecturers disagreed.

Therefore, it can be deduced that the level of utilization of available ICT resources in colleges of education is very low to a great extent.

Research Question 3

To what extent do ICT resources affect teaching and learning process in colleges of education?

Table 4.4: Effect of ICT Resources on Teaching and Learning in Colleges of Education

S/N	ITEM	SA	A	SD	D	TOTAL
11	ICT promote students' active participation in the classroom, thereby making teachers' job effective	32 (35)	31 (34)	11 (13)	16 (18)	90 (100)
12	ICT resources facilitate effective teaching-learning process in the classroom	34 (38)	42 (47)	6 (7)	7 (8)	90 (100)
13	ICT resources promote students' learning retention rate	40 (44)	35 (39)	4 (5)	11 (12)	90 (100)
14	ICT resources reduce teachers' stress of teaching students, thereby making the teacher's job effective	28 (31)	34 (37)	12 (14)	16 (18)	90 (100)
15	ICT resources can be used to support students understanding of course concepts and their applications	33 (36)	27 (30)	17 (19)	13 (15)	90 (100)

Table 4 above shows that 63lecturers (32 and 31 respectively) agreed that ICT resources promote students' active participation in the classroom, thereby making teachers' job effective while 27lecturers (11 and 16 respectively) disagreed. This shows that majority of the lecturers agreed. 76lecturers (34 and 42 respectively) agreed that ICT resources facilitate effective teaching-learning process in the classroom while 13 lecturers (6 and 7 respectively) disagreed. This shows that majority of the lecturers agreed.

75lecturers (40 and 35 respectively) agreed that ICT resources promote students' learning retention rate while only 16lecturers (4 and 12 respectively) disagreed. This shows that majority of the lecturers agreed.

62lecturers (28 and 34 respectively) agreed that ICT resources reduce teachers' stress of teaching students, thereby making the teacher's job effective while 28 teachers (12 and 16 respectively) disagreed. This shows that majority of the lecturers agreed.

However, 60lecturers (33 and 27 respectively) agreed that ICT resources can be used to support students understanding of course concepts and their applications while 30lecturers (17 and 13 respectively) disagreed. This shows that majority of the lecturers agreed.

Therefore, it can be deduced that ICT resources improve teaching and learning process in colleges of education to a greater extent.

Test of Hypothesis

H₀₁: There is no significant effect of ICT in teaching and learning process in colleges of education

Table 4.5: ICT Resources and Teaching Effectiveness in Colleges of Education

Variable	N	X	SD	df	χ^2_{cal}	χ^2_{tab}	Decision
ICT Resources	90	16.07	10.92	12	16.91	21.03	H ₀ Rejected
Teaching Effectiveness		15.25	10.81				

From Table 6 above, the calculated Chi-square result (χ^2_{cal}) is 16.91 while the corresponding tabulated value (χ^2_{tab}) is 21.03 at 0.05 level of significance. Since the calculated Chi-Square value is higher than the tabulated value ($\chi^2_{cal} > \chi^2_{tab}$), then the null hypothesis is rejected while the alternate hypothesis is accepted. Therefore, there is significant effect of ICT on teaching and learning in colleges of education in Lagos State.

Summary of Findings

1. Availability of ICT resources for teaching and learning in colleges of education is adequate to a great extent.
2. Utilization of ICT resources for teaching and learning in colleges of education is very low to a great extent.
3. There is significant effect of ICT on teaching and learning process in college of education in Lagos State.

Discussion of Findings

The first finding showed that availability of ICT resources in colleges of education is adequate to a great extent. This finding disagrees with the finding of Owei (2019) who conducted research on the impact of teaching-learning resources on teachers' effectiveness in colleges of Education in Oyo State, Nigeria. It revealed that teaching and learning resources are not always available in colleges of education. Thus, he bemoaned the fact that educators have been gravely concerned about the paucity of teaching and learning tools. However, the finding of this study corresponds with that of Adeyemi (2014) whose findings revealed that availability and adequacy of teaching and learning materials in institutions of education in Nigeria.

The second finding showed that utilization of ICT resources in colleges of education is very low to a great extent. This finding disagrees with that of Usman (2014) who conducted research on utilization of teaching and learning resources on the effectiveness of staff in the colleges of education in Plateau State, North-Central, Nigeria. The findings of his study showed that teaching learning resources are optimally utilized by the lecturers. He concluded that these resources also improve teaching-learning process.

The third findings showed that there is significant effect of ICT resources in teaching effectiveness in colleges of education in Lagos State. This finding supports the findings of Garet (2020), who examined how instructional resources affected students' performance on the West Africa School Certificate Examinations (WASCE) and impact on teachers' effectiveness. The finding of his study showed that teaching learning resources improves students' academic performance and teachers' effectiveness.

Conclusion

In this study, it has been shown that the variables teaching and learning of science education students is dependent on the variables availability and utilization of ICT resources. Therefore, ICT resources play key role on teaching and learning effectiveness in colleges of education in Lagos State.

Recommendations

Based on the study's findings, the following suggestions were made:

1. All parties involved in the supply of ICT resources in all of the nation's colleges of education must make material and financial contributions, including the Federal, State, and Local Governments as well as the Private Sector.
2. Inadequate knowledge of ICT and technical constraints prevent most lecturers from optimally utilizing ICT resources at their disposal for teaching. It is thus necessary to the management of colleges of education to organize training and seminars for their lecturers on application and utilization of ICT in teaching-learning process.
3. To improve the efficient use of the available teaching and learning resources by all teachers/lecturers, management of education colleges and officials of the Ministry of Education should guarantee regular supervision.

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