

EFFECT OF INFORMATION TECHNOLOGY ON TEACHER EDUCATION IN NIGER STATE COLLEGE OF EDUCATION, NIGERIA

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ABSTRACT

This study aims at assessing the effectiveness of information technology on teacher education in college education in Minna, Niger state. The study adopted a descriptive survey design. The study employs empirical and qualitative data collection approaches. A total of 120 questionnaires were administered to the lecturers while the average response rate was 90.0%. The results of the study revealed the following major findings: there are poor lecturers' accessibility to the information technology laboratory gadgets for teaching prospective lecturers (students) in the college; appreciable level of lecturers' expertise on information technology integration in teaching and learning process in the college but there are still need for capacity building in this regard; most lecturers in the college within their capacities integrate information technology in the other ways but little in the actual teaching and learning process by lecturers; there is an insignificant implementation of the State Ministry of Education policy on information technology integration in the college. Conclusively, there is a low extent of information technology integration by the lecturers and the implementation of information technology integration policy was hindered by numerous challenges that need to be addressed. Meanwhile, the government's lack of commitment and poor policy is at blame for the majority of these challenges.

Keywords: Teacher Education, Information Technology, Teaching, Expertise

1.0 Introduction

Effective teaching brings into line the three major components of instruction: learning objectives, assessments, and instructional activities which form the main focuses of teacher education (Remesh, 2013). Teacher education is the programs, measures, and facility designed to prepare prospective lecturers with the knowledge, attitudes, behaviour, and skills they require to perform their tasks excellently in the classroom, school, and wider community (Osamwonyi, 2016). Aglazor (2017) viewed teacher education as a programme that is related to the improvement of lecturers' skill and ability that would aid them to meet the requirements of the career and face the tasks therein. According to Usman (2016) teacher education is all the formal and non-formal activities and skills that help to qualify a person to take up duties of teaching or to carry out the responsibilities more efficiently according the objectives.

The main objective of teacher education is to develop a skill to inspire experience in the taught, under an artificially created environment, less with material resources and more by the creation of an emotional atmosphere (Agabi, 2010). The teacher should develop an ability to do, observe, deduce and to take a broad view. Hence, a teacher is expected after teacher education to have acquired adequate knowledge, skills, interests and attitudes towards teaching profession (Harackiewicz *et al.*, 2016). Teacher 's work is continuously becoming tasking and technical in view of the new theories of psychology, philosophy, sociology, abstractness of some field of study, modern media and materials. So, the recent educational needs gradually growing beyond the proficiency of modern lecturers.

As no education needs of any nation has ever rise beyond the quality of its lecturers and the training facilities, then, teacher education and the training facilities are should be unceasingly given priority in all educational planning and development in Nigeria (Okoli, 2011). In this case, the provision of teacher education goes along with provision of adequate information technology to enhance effective teaching and learning at all levels of education (Ghavifekr and Rosdy, 2015).

Information technology is an aspect of education that is concern with analysing, designing, developing, implementing, and evaluating the instructional environment and learning materials to improve teaching and learning (Davies *et al.*, 2014). Information technology can be considered either as a designed science or as a collection of difference research interested in addressing fundamental issues, of learning, teaching and social organizations (Linda *et al.*, 2020). Also, Linda *et al.* (2020) enumerate the importance of information technology to includes; improved open access to education, including access to full degree programmes, it also develops once designs proper and accurate curriculum for the attainment of specific goals, it also analyses and evaluate the teaching learning processes.

Meanwhile, according to Hayes and Bulat (2017) the functions of the information technology include: identification of educational goals and objectives of the community; development and designing of proper and accurate curriculum for the fulfilment of specific learning goals, analysis and evaluation of teaching learning process; development and organizations of suitable instructional materials for teaching and learning process. Thus, exposing to information technology as part of teacher education should be emphasized at all times as it appears presently to be only available vehicle for solving lingering education problems (Johnson *et al.*, 2016). It is against this background that this study tends to look at the effect of information technology on lecturers' education in Nigeria.

1.1 Purpose of the study

The purpose of this study is to examine the effect of information technology in teacher education in Niger State College of Education, Nigeria. The specific objectives are as follows:

- i. To determine the extent of accessibility of information technology to lecturers in Niger State College of Education.
- ii. To determine the level of lecturers' expertise on information technology integration in teaching and learning process in Niger State College of Education.
- iii. To determine the ways in which information technology is integrated in teaching and learning process by lecturers.
- iv. To determine the extent of implementation of the Ministry of Education policy on information technology integration in Niger State College of Education.

1.2 Research Questions

- i. What is the extent of accessibility of information technology to lecturers in Niger State College of Education?
- ii. What is the level of lecturers' expertise on information technology integration in teaching and learning process in Niger State College of Education?
- iii. In which ways do lecturers integrate information technology in the teaching and learning process?
- iv. To what extent has the Ministry of Education information technology integration policy objectives been implemented by schools in Niger State College of Education?

2.0 METHODOLOGY

2.1 Research Design

A research design is the structure of research. It holds all the elements in a research project together. It shows how all the major parts of the research project work together to try to address the central research question (Jongbo, 2014). The study adopted a descriptive survey design. Lau (2017) defines descriptive survey as a method of collecting information by administering a questionnaire to a sample of individuals in order to secure evidence concerning all existing situations, and comparing the present conditions for the next cause of action. Descriptive survey is suitable since this study seek to determine the effect of information technology on teacher education in Nigeria.

2.2 Population of the Study

Niger State College of Education run NCE, B. Ed, PGDE and PDE programmes and all have of information technology as component. The target population is all lecturers participating in the mentioned programmes in the College.

2.3 Sample Size and Sampling Procedure

A sample size is a small group obtained from the accessible population while sampling is a research technique used for selecting a given number of subjects from a target population as a representative of that population Martínez-

Mesa *et al.*, (2016). Romao *et al.* (2010) argue that if the population is less than 10,000 and that there is no estimate available of the proportion in the population assumed to have the characteristic of interest than 50 % can be used with a corresponding statistic of 1.96 and precision value of plus or minus 5%. The population of the lecturers for this study is each less than 10,000. Hence, the study will adopt the formula for determining the sample size as follows:

$$n_f = \frac{n_o}{[1 + \frac{n_o}{N}]}$$

Where: n_f = is the desired sample (when population is less than 10,000), n_o = sample size to be adjusted size (Treated as a constant), N = estimates of population size

2.4 Instrument for Data Collection

The study employs empirical and qualitative data collection approaches. Data will be collected from the Niger State College of Education using three sets of questionnaires. An observation checklist will be used to confirm some facts on the questionnaires. The questionnaires are divided into two sections covering demographic information, access and usage of information technology as well as attitudes and challenges on information technology use. Both open and close ended questions are used. Close ended questions restrict the respondents to yes or no responses. The open ended questions allow the respondents to give an in depth response to the subject of study.

2.5 Method of Data Analysis

Data analysis techniques are statistical methods which are used to analyse data so that it could be interpreted. The data collected from the respondent is both quantitative and qualitative in nature. Quantitative data will be coded tallied and analyzed using descriptive statistics such as mean, frequency and percentages. The result of data analysis will be reported in summary form using frequency tables, bar graphs and pie charts. Qualitative data analysis for the open ended questions will be done using content analysis where ideas are grouped into themes. The frequencies of different descriptions will be generated by categorizing and coding pieces of data into themes. Frequency distribution and percentages will be obtained using Statistical Package for Social Sciences (SPSS).

3.0 RESULTS AND DISCUSSION

3.1 Results

Answers to the Research Questions

Research Question1: What is the extent of accessibility of information technology gadgets to lecturers in Niger State College of Education?

Table 1 shows the responses of the respondents to the extent of accessibility of lecturers to the information technology gadgets.

Table 1: The extent of accessibility of information technology gadgets to lecturers in Niger State College of Education

S/N	Information technology gadget	VO	OC	ST	NA	Mean	Standard deviation
1	Computer	22 21.4	21 20.4	36 30.1	29 28.2	2.35	1.109
2	Interactive board	-	20 19.4	13 12.6	75 68.0	1.52	0.803
3	Information technology studio	-	-	22 21.4	86 78.6	1.43	.824
4	CD Duplicator	21 20.4	9 8.7	10 9.7	68 61.2	1.88	1.231
5	Laser Printer	21 20.4	10 9.7	20 19.4	57 50.5	2.00	1.196
6	Dot Matrix Printer	11 10.7	10 9.7	22 21.4	65 58.3	1.73	1.021
7	Mixer (consul)	-	10 9.7	11 10.7	87 79.6	1.30	0.639
8	Educational recorded CDs	-	21	12	75	1.84	1.266

		-	20.4	11.7	68.0		
9	Colour Television	-	22	20	66	1.84	1.197
		-	21.4	19.4	59.2		
10	Video Cassette Recorder	11	20	10	67	1.81	1.094
		10.7	19.4	9.7	60.2		
11	DVD	42	10	10	46	2.52	1.37
		40.8	9.7	9.7	39.8		
12	Over Head Projector	46	40	12	10	3.09	.951
		39.8	38.8	11.7	9.7		
13	Slide and Slide Projectors	30	37	30	11	2.79	.987
		29.1	31.1	29.1	10.7		
14	Film and film projectors	10	10	48	40	1.90	.934
		9.7	9.7	41.7	38.8		
15	Public Address System	46	32	19	11	3.00	1.010
		39.8	31.1	18.4	10.7		
16	Microphones	46	22	30	10	2.91	1.039
		39.8	21.4	29.1	9.7		
17	Speaker	-	48	29	31	2.53	1.305
		-	41.7	28.2	30.1		
18	Still and Digital Camera (Photography)	10	21	31	46	2.00	1.000
		9.7	20.4	30.1	39.8		
19	White Board (Marker board)	-	77	21	10	3.60	.662
		-	69.9	20.4	9.7		
20	Models	-	21	46	41	1.81	.755
		-	20.4	39.8	39.8		
21	Three dimension objects	10	32	46	20	2.31	.897
		9.7	31.1	39.8	19.4		
22	Nature corner	-	-	23	85	1.22	.419
		-	-	22.3	77.7		
23	Flash Card	21	20	57	10	2.51	.928
		20.4	19.4	50.5	9.7		
24	Radio set and radio cassette	10	11	49	38	1.93	.932
		9.7	10.7	42.7	36.9		
25	Tape recorders	-	-	42	66	1.41	.494
		-	-	40.8	59.2		

Note: VO = very often, OC = occasionally, ST = sometimes and NT = not at all

Research Question 2:- What is the level of lecturers' expertise in information technology Integration in teaching and learning process?

Lecturers were asked to indicate their level of information technology training and their responses were as shown in Table 2

Table 2: Lecturers level of information technology training

Level of training	Frequency	Percentage
No training	40	37.0
Skilled	57	52.8
Diploma	11	10.2
Total	108	100

Table 4: Integration of information technology during training in their previous schools

	Frequency	Percentage
No	29	42.65
Yes	39	57.35
Neutral	40 (excluded)	-
Total	108	100

Table 4: Significance of the information technology training to teaching job

	Frequency	Percentage
Significant	7	18
Less significant	32	82
Neutral	69 (excluded)	-
Total	108	100

Table 5: Lecturers ability to choose appropriate educational technique

Task	Able	%	Not able	%	Total	%
Ability to use projector for presentation	65	60.1	43	39.9	108	100
Ability to use Interactive board	33	30.6	75	69.4	108	100
Ability to use video in teaching	10	9.3	98	90.7	108	100

Research Question 3: In which ways do lecturers integrate information technology in the teaching and learning process?

Lecturers were asked to indicate if their department possessed some listed basic facilities that support information technology integration and their responses were as summarized in Table 6

Table 6: Possession of some information technology facilities by the college

Facility	Yes	%	No	%	Total	%
Electronic whiteboards	26	24.1	82	75.9	108	100
Software for timetabling/result computation	73	67.6	35	32.4	108	100
Software of courses	25	23.1	83	76.9	108	100
Digital curriculum	28	25.9	80	74.1	108	100
Local area network	38	35.2	70	64.8	108	100
Video conferencing technologies	23	21.3	85	78.7	108	100
Laptops/desktops	71	65.7	37	34.3	108	100

Level of information technology usage in the college

Lecturers were asked to generally rate on a Likert scale of very high, fair, low and very low the college's level of information technology usage (e-learning) in teaching and learning process as opposed to the traditional methods of talk, chalk, blackboard, text book and hand written notes. Table 7 shows the summary of their responses.

Table 7: Lecturers' rating of information technology usage in the college level

Level of information technology usage	Frequency	%	Cumulative %
Very high	8	7.4	7.4
Fair	20	18.5	25.9
Low	45	41.7	67.6
Very low	35	32.4	100
Total	108	100	100

Use of information technology gadgets by lecturers in preparing learning materials

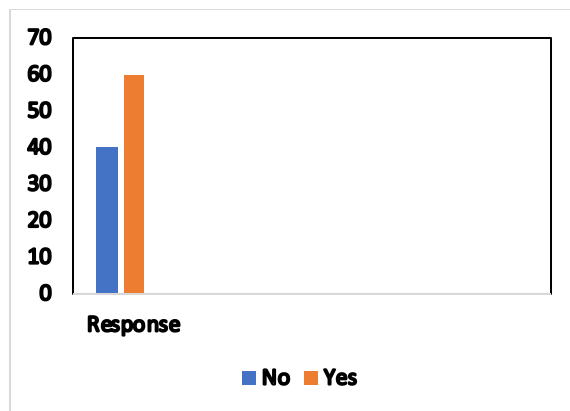


Figure 1: Lecturers use of the information technology gadgets in preparing learning materials. As shown in figure 4.1 the majority of lecturers 65 (60.2%) indicated that they did make use of the internet in preparing the teaching notes.

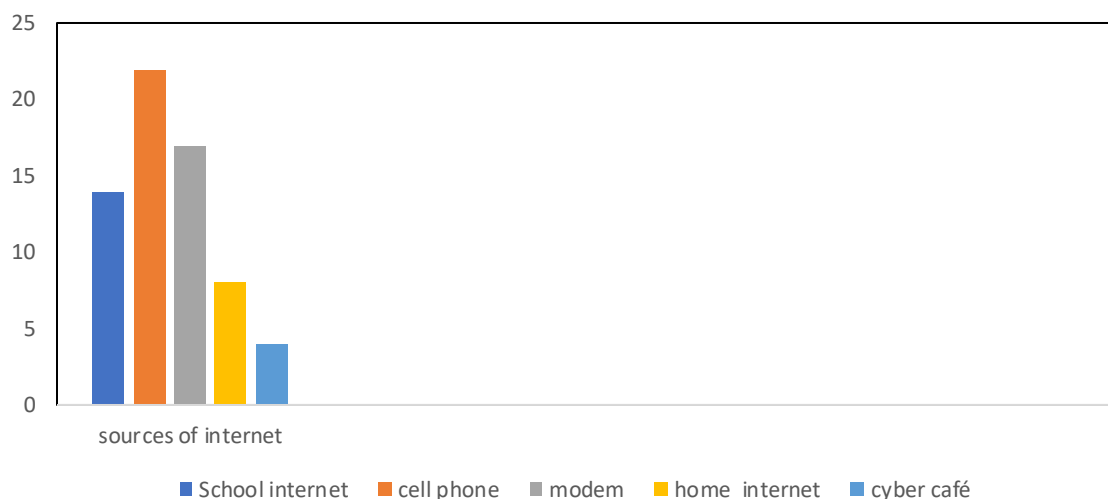


Figure 2: Sources of internet access by lecturers

Mean hours per week that lecturers make use of information technology gadgets in teaching and learning
Table 8: mean hours per week of information technology gadgets use by lecturers

Hours	Frequency	Percentage	Cumulative %
Less than 5	95	88	88
5 – 10	11	10	98
11 – 20	2	2	100
Total	108	100	100

To determine exactly how and the frequency with which lecturers make use of information technology gadgets in their task, the lecturers were asked to rate their frequency of using information technology gadgets on a Likert scale of often, sometime and never against some teaching and learning related tasks. Some of the tasks included, preparing lesson notes/records of work, keeping student information, preparing continuous assessment and Lesson presentation using projector. Summary of their responses is presented in table 4.9.

Table 9: Frequency of using information technology by lecturers in some basic teaching role

Tasks	Always	Often	Sometimes	Never	Total
Preparing lesson notes/records of work	30	15	49	14	108

Keeping student information	50	15	28	15	108
Preparing continuous assessment	49	23	29	7	108
Preparing examination result	22	37	36	13	108
Lesson presentation using projector	7	37	8	56	108

Research questions 4: To what extent has the Ministry of Education information technology integration policy objectives been implemented by schools in Niger State College of Education?

Lecturers were asked several questions concerning basic educational technologies integration policies in the college.

This was intended to establish level of implementation of these policies:

- i. To establish functional microteaching laboratories in the state higher institutions.
- ii. To equip higher institutions in the state with digital equipment and internet facilities.
- iii. To encourage the integration of information technology in various courses in the college

Table 10: Source of Information technology Gadgets in the College

Source of Information technology Gadgets	Frequency	%	Cumulative %
College management	49	45.4	45.4
State government intervention	11	10.2	55.6
Private sector intervention	28	25.9	81.5
All of the above	20	18.5	100
Total	108	100	100

Challenges facing information technology integration in the college

Table 11: Rating of various information technology challenges by lecturers

Information technology related challenges	Major	%	Minor	%	Total	%
Insufficient number of gadgets	72	66.7	36	33.3	108	100
Lack of skills in educational technology	52	48.1	56	51.9	108	100
Lack of adequate teaching laboratory	71	65.7	37	34.3	108	100
Lack of lecturers' interest in educational technology	57	52.8	51	47.2	108	100
Lack of policy on information technology	51	47.2	57	52.8	108	100

3.2 Discussion of the Findings

From Table 1, the rating is as follows: White Board (Marker board) (3.60) was ranked highest by the mean score, and was followed by Over Head Projector (3.09), Public Address System (3.00), Microphones (2.91), Slide and Slide Projectors (2.79), Speaker (2.53), DVD (2.52), Flash Card (2.51), Computer (2.35), Three dimension objects (2.31), Laser Printer (2.00), Still and Digital Camera (Photography) (2.00), Radio set and radio cassette (1.93), Film and film projectors (1.90), CD Duplicator (1.88), Educational recorded CDs (1.84), Colour Television (1.84), Video Cassette Recorder (1.81), Models (1.81), Dot Matrix Printer (1.73), Interactive board (1.52), Information technology studio (1.43), Tape recorders (1.41), Mixer (consul) (1.30) and lastly by Nature corner (1.22).

Table 1 showed a weighted mean of 2.13 out of the maximum obtainable 4.00, which is less than the standard mean of 2.50. This indicates that the lecturers' extent of accessibility to the information technology laboratory gadgets for

teaching prospective lecturers (students) in the college is poor. Hence, the lecturers have poor access to the available information technology gadgets for teaching and learning in the college as a higher institution.

Table 2 reveals that the most of the lecturers 57 (52.8%) had skilled level of training (workshop, seminar, apprenticeship) only 11 (10.2%) possess higher training experience on educational technology. 40 (37.0%) have not undergone any form of training. Appropriate training on information technology is important for all lecturers as being trainers to influence college information technology plan and funding.

From the Table 3, it was revealed that out of those who had undergone technology training in their previous schools they attended; only 39 (57.35%) as shown in table 3 had received information technology integration related training.

Meanwhile, when those who agreed to have undergone information technology integration were further asked to rate their information technology integration training in regards to equipping them with skills in their subjects like lesson planning, lesson delivery and lesson presentation as shown in Table 4. Most of the respondents 82% indicated it was less significant while 18% indicated it was significant. The outcomes of the study aligned with those obtained by Charles (2012) who reported that most lecturers did not receive any prior information technology training during the foundational period at their various previous institutions before coming into teaching profession.

Table 5 shows that utmost ability by lecturers was demonstrated in presentation using projector 65 (60.1%). This possibly show that lecturers could have had experience on presentation using projector for their students but did not seem to have had much experience for the other two abilities tested. Table 6 shows that only software for timetabling and result computation and laptops/desktops are possessed by the colleges. All the other facilities despite being essential are lacking in the college.

Table 7 indicates that cumulatively 80 (74.1%) of the lecturers rated the college's level of information technology usage as between low and very low, further when they were asked to indicate in which courses information technology were being used in the college, most showed that information technology were being generally employed in all courses in examination analysis but classroom application of information technology was more frequent in the teaching of computer studies than in any other course.

Among the lecturers that were using the internet as shown by Figure 1, most of them (22) indicated that they gain access to the internet through their cell phone, these showed that cell phones have become handy tools to access internet and download information by lecturers, cyber café were least used at possibly due to the fact the college cyber café is not accessible.

As shown in table 8, when asked the number of mean hours that they accessed internet and work on computers, the most of lecturers, 95 (88%) indicated less than 5 hours per week while only 11 (10%) indicated a range between 11-20 hours per week. This shows that lecturers in the college spend most of their teaching time using traditional method as opposed to information technology improved methods that would necessitate the use of computer or access to the internet.

As shown in Table 9 most of lecturers did not use information technology in lesson presentation using projector: The tasks that most lecturers reported to had used information technology gadgets either always, often or sometimes in preparing lesson notes/records of work, keeping student information, preparing continuous assessment and Preparing examination result. This finding implies that the level of information technology integration in most teaching and learning activities was very low compared to traditional methods.

From the Table 10, it shows that most information technology gadgets were provided by the college management 45.4% followed by private sector intervention 25.9% and government donation is least at 10.2%. This reveals inadequate contribution of the state government in provision of information technology gadgets in the college.

This finding was consistent with the outcome of studies carried out by Laleye, (2015) on effective service delivery in educational training and research in Nigeria using information technology which indicates. He discussed how information technology gadgets could be used effectively in educational training and also reported that lack adequate government intervention is a major constraint to effective use of the gadgets to enhance service delivery in educational settings by integrating educational technology.

Also, the finding shows the involvement of private sector investment in educational technology. It also indicates that the college upon limited fund at her disposal was able to purchase information technology gadgets. This may result to inadequate funds to take care many other demanding needs, thus emphasize the need for intensified government support to the college. To establish the challenges to information technology integration in the college, lecturers were asked to rate on a Likert scale of major, minor or not a challenge a number of potential challenges. Their responses were as summarized in Table 11.

Table 11 shows that most lecturers were of the view that lack of adequate teaching laboratory and insufficient number of gadgets were challenges to information technology integration. While lack of skills in information

technology, lack of lecturers' interest in information technology as well as lack of policy on information technology were seen as minor challenges. Generally, the findings imply that added to the poor policies of the state government towards information technology integration policy in the college, there are other obstacles to the implementation. A majority of all the lecturers reported to have received some information technology training. It was further established that most lecturers had information technology literacy training. However, when tested on their skills to operate with various applications most lecturers demonstrated low level of confidence indicating that there are still capacity building gaps that should be addressed.

The study revealed that most lecturers in the college do use the internet or computers to prepare learning materials. This indicates that most lecturers do not spend most of their time using tradition methods like text books, chalkboards, and handwritten notes as opposed to technology enhanced methods. Findings of this study revealed that most information technology integration policies have only been implemented partially in the college. The main policy was to increase information technology integration in teaching and learning which is still very low in the college. The implementation of information technology integration in education is faced by various challenges including inadequate relevant e-content, insufficient lecturer's time, insufficient number of computers and lack of internet connection. These challenges need to be addressed.

Addressing the challenges faced by implementation of information technology is a complex process because it involves participation of various stakeholders (learners; lecturers; planners; institutional leadership; and the affected public). During the implementation process of educational technology, the consultation with the stakeholders that are affected by it, is significant (Mora, 2013). Fullan (2000) indicates each stakeholder group brings to the development process a certain culture, filled with assumptions, values, prior experiences, calculations of costs and benefits, and the like'. Thus, wide consultation with these groups is vital to reach a successful implementation.

3.3 Implications of the Study

Therefore, as far as information technology is concerned, it has origin and a long-time part of Nigeria education system. Considering this, it should be noted that it has become part of its development that necessitate its incorporation in teaching and learning in all institutions including Niger State College of Education. Therefore, it is part of the challenges for the lecturers of every institution of learning to be up to date and be familiar with the educational technology. So that it could be helpful to them because of the numerous advantages attached to it and they should also be accustomed with their present time advancement.

4.0 Conclusion and Recommendations

4.1 Conclusion

Lecturers are required in the teaching-learning process, thus it is envisaged that advancements will be fostered and difficulties will be addressed. As a result, they contribute significantly to the achievement of educational goals and objectives in all countries. Teacher education in Nigeria has been beset by a skid of problems related to modern-day technologies for transferring knowledge in the teaching and learning process. Thus, the findings of this study, it is obvious that though Niger State College of Education had to some extent installed information technology gadgets and related facilities but they were not sufficient for effective integration of information technology in the teaching and learning process due to the fact that in many departments some information technology facilities were very few to care of number of students. Also, limited number of lecturers reported to have had some form of information technology training and thus demonstrated low level of confidence in performance of several skills needed for effective teaching and learning. Generally, there is low extent of information technology integration by the lecturers and the implementation of information technology integration policy was hindered by numerous challenges that need to be addressed. Meanwhile, government's lack of commitment and poor policy is at blame for the majority of these challenges.

4.2 Recommendations

The following are the recommendations of the study:-

- i. The college management need to create more facilitation for more information technology integration not only in the micro-teaching laboratory but also in the classrooms including ensuring that all the classes have appropriate infrastructure for information technology gadgets.
- ii. The college should not only incorporate and strengthen information technology integration training in their teacher education programs but should also make sure that such training is based on equipping the student lecturers with skills on actual integration of information technology in their individual course of study.
- iii. College management and other education stakeholders in the state should cultivate approaches concerning increasing the use of information technology in teaching and learning through addressing the various challenges acknowledged that are hindering full application of information technology integration.

- iv. There is serious need for government funding to the college towards procurement and maintenance of information technology gadgets and facilities.

5.0 References

- i. Agabi, C. O. (2010). Prudential Approach to Resource Management in Nigeria Education: A Theoretical Perspective. *International Journal of Scientific Research in Education*, 3, 2, 9-106.
- ii. Aglazor, G. (2017). The Role of Teaching Practice in Teacher Education Programmes: Designing Framework for Best Practice. *Global Journal of Educational Research*, 16, 101-110.
- iii. Charles, B. (2012). Factors influencing lecturers' adoption and integration of information and communication technology into teaching: A review of the literature. *International Journal of Education and Development using Information and Communication Technology*, 8(1), 136-155.
- iv. Davies, R. S., & West, R. E. (2014). Technology integration in schools. In Handbook of research on educational communications and technology (4th ed., pp. 841–853). Springer New York.
- v. Fullan, M. (2000). 'The three stories of education reform', Phi Delta Kappan: 581-584.
- vi. Ghavifekr, S. & Rosdy, W.A.W. (2015). Teaching and learning with technology: Effectiveness of ICT integration in schools. *International Journal of Research in Education and Science (IJRES)*, 1, 2, 175-191.
- vii. Harackiewicz, J. M., Smith, J. L., & Priniski, S. J. (2016). Interest Matters: The Importance of Promoting Interest in Education. *Policy insights from the behavioural and brain sciences*, 3, 2, 220–227. <https://doi.org/10.1177/2372732216655542>.
- viii. Hayes, A. M. & Bulat, J. (2017). Disabilities Inclusive Education Systems and Policies Guide for Low- and Middle-Income Countries [Internet]. Research Triangle Park (NC): RTI Press:doi: 10.3768/rtipress.op.0043.1707.
- ix. Johnson, A. M., Jacovina, M. E., Russell, D. E., & Soto, C. M. (2016). Challenges and solutions when using technologies in the classroom. *Adaptive educational technologies for literacy instruction* (pp. 13-29). New York: Taylor & Francis.
- x. Jongbo, O.C. (2014). The Role of Research Design in A Purpose Driven Enquiry. *Review of Public Administration and Management*, 3, 6, 87-94.
- xi. Laleye, A. M. (2015). Information technology for effective service delivery in educational training and research in Nigeria. *Procedia - Social and Behavioural Sciences*, 176, 398 – 404.
- xii. Lau, F. (2017). Chapter 13 Methods for Survey Studies. *Handbook of eHealth Evaluation: An Evidence-based Approach* [Internet]. Victoria (BC): University of Victoria; 2017 Feb 27. www.ncbi.nlm.nih.gov/books/NBK481602.
- xii. Linda, D., Lisa, F., Channa, C., Brigid, B., & David, O. (2020). Implications for Educational Practice of the Science of Learning and Development, *Applied Developmental Science*, 24, 2, 97-140.
- xiv. Martínez-Mesa, J., González-Chica, D. A., Duquia, R. P., Bonamigo, R. R., & Bastos, J. L. (2016). Sampling: How to Select Participants in My Research Study? *Anais brasileiros de dermatologia*, 91(3), 326–330, doi.org/10.1590/abd1806-4841.20165254.
- xv. Mora, R. R. (2013). Implementation process of technology in education: the case of blackboard 9.1 in the University of Manchester. *Actualidades Investigativas en Educación*, 13(3), 150-167.
- xvi. Okoli, N. (2011). Towards a Revolutionary Education and Teacher Development in Some Selected African Countries. *A Journal of Contemporary Research*, 8, 1, 24-34.
- xvii. Osamwonyi, E. F. (2016). In-Service Education of Lecturers: Overview, Problems and the Way Forward. *Journal of Education and Practice*, 7, 26, 83 – 87.
- xviii. Remesh, A. (2013). Microteaching, an efficient technique for learning effective teaching. *Journal of research in medical sciences: The Official Journal of Isfahan University of Medical Sciences*, 18, 2, 158–163.
- xix. Romao, X., Delgado, R. & Costa, A. (2010). An empirical power comparison of univariate goodness-of-fit tests for normality. *Journal of Statistical Computation and Simulation*, 80, 5, 545-591.
- xx. Usman, Y. D. (2016). Educational Resources: An Integral Component for Effective School Administration in Nigeria. *Research on Humanities and Social Sciences*, 6, 13, 27 – 37.