LECTURERS' PERCEIVED INFLUENCE OF TRANSFORMING INFORMATION AND COMMUNICATION TECHNOLOGY (ICT) INNOVATION ON EFFECTIVE TEACHING AND LEARNING OF BIOLOGY EDUCATION AT TERTIARY INSTITUTIONS IN KOGI STATE, NIGERIA

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Abstract

In order to metamorphose into a positive shift in technology and innovation, the study examined lecturers' perceived influence of transforming Information Communication Technology (ICT) innovation on effective teaching and learning of Biology Education at the tertiary institutions in Kogi State. A descriptive survey research design was used for the study. The population comprised of forty (40) Biology Education lecturers across Kogi State using the sample size of thirty (30) lecturers. Two research questions were asked and guided the study. Instrument used for collection of data was questionnaire and was face content validated by three experts, two from department of Science Education and one from measurement and evaluation. Direct method was used to administer the questionnaire by the researcher. Mean and standard deviation was used to answer two research questions. Findings indicated that Biology Education lecturers are of the perception that ICT facilities has positive influence on innovative teaching and learning of Biology Education courses at the tertiary institutions in Kogi State. Again Biology Education lecturers perceived that a lot of problems affect the utilization of ICT facilities at the tertiary level in the State generally. Based on the findings it was concluded that, the lecturers were of the perception that problems such as limited accessibility and bad network connectivity affect teaching and learning of Biology Education at the tertiary level, lack of ICT training programmes, lack of skills among others. Based on the finding of this study recommendations were proffered

Keyword: Transformation, Information Communication Technology (ICT), Teaching, Learning, Biology- Education, Tertiary-Institutions

Introduction

Transformation is a process and an act of change or shift in form, composition, nature or appearance which may result in an improvement. It is also a structural process of expression and function which is converted into another one of similar value (Qwamoyo, 2021). Transformational teaching and learning is an approach to classroom instructions used by lecturers that involves increasing students mastery of key course concepts taught which may bring innovation.

Innovation refers to any new programme change, fixations in the teaching and learning process that marks positive departure from existing practices. Innovation also involves deliberate application of information, imagination and values from resources which include all processes by which new ideas are generated and converted into useful products (Orji 2021).Innovation processes are structured actions that are remarkably easy to implement and such implementation begins with a problem and ends with a profit (Ibe, 2021). Innovative teaching strategies includes: active learning, flexibility and adaptability, technology integration, collaborative learning, problem solving, continuous assessment, creative encouragement, individualized learning, feedback- oriented approach through ICT (Ezehora, Ibe Obikezie 2021).

Information and Communication Technology ICT has become one of the most applied innovations on education in the society. Mikre (2021) defines information and communication technology as the use of technology in managing and processing information with the use of computer system and software to connect, store, protect, process, transmit and retrieve information in teaching and learning during Science Education courses. Adeyemo (2022) defines ICT as to consist of hardware, software, storage and processing, transmitting and presenting information.ICT simply includes all technical ways of handling information and communication gadgets comprising of computers and network, hardware as well as other important software. Information Communication and Technology is also one experience with enormous potential that has prompted the Federal Government of Nigeria overtime to review the mode of delivery of knowledge through curriculum development by enhancing ICT element with a view to establishing minimum standard through the development of an integrated national policy on ICT in education (Ibrahim, 2023). ICT refers to technologies that provide access to information through

telecommunication; this includes the internet, wireless network, cell phones and other communication mediums (Hilbert, 2020). Modern Information and Communication Technologies ICT have created a global village in education in which lecturers can communicate with students at the tertiary institutions across Kogi State during teaching and learning of courses. Such ICT technologies, speed the role of communication and the integration of telecommunication and computers as well as other necessary enterprise software, middle ware, storage, audio-visual, visual system that may enable lecturers of Biology Education especially to access, store, transmit, transfer and manipulate information for the enhancement of teaching and learning of Biology Education courses at the tertiary institutions (Simon & Hans, 2020).

The various teaching and learning materials include audio-visual, telephone networks through a single cable or link system. Teaching simply means to impact, transfer knowledge from known to unknown. It is an aspect of the curriculum for which lecturers at the tertiary institutions of learning take responsibility to share knowledge to students using ICT gadgets and to teach which involves engaging with students and guiding them on concepts to learn through applications of knowledge and processes. This may include to design content, select, deliver, assess and reflection (Husain, 2022). A lecturer is someone that teaches and deliver ideas to students generally and he/she is requires not only to have knowledge of subject matter, but meaningful knowledge and skills of how to make students learn adequately and transform ideas into active learning to avoid rote learning with quality teaching which would requires total commitment to systematic understanding of learning. Learning is an active process of gaining knowledge or skills by receiving, studying, practicing, being taught or experiencing something new. Learning can may occur in students when there is a change in behavior alsothat may be able to bring about what students acquire new, but not about what lecturers do at the tertiary institutions during teaching and learning of Biology Education courses

Teaching is therefore, fundamentally about creating the skills, social and ethical conditions under which tertiary education students may agree to take charge of their own learning or collectively in their various institutions especially Kogi State for the learning of Biology Education.

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Biology as a subject is defined by Ramalingam (2008) is a science subject that deals with study of life. It has branches as Zoology which is the study of animals and Botany that deals with study of plants. Other branches include entomology, parasitology, anatomy, physiology, genetics, embryology, evolution and others. It is important in the various areas as manufacturing, processing, medicine, food production, pharmacology among others.

Science Education especially Biology is therefore the bedrock of technological breakthrough which advanced countries of the world including Nigeria attain their status through the stock of science educators, scientists and technicians as a science subject in the tertiary education curriculum. Biology Education is designed to produce individuals of who may take Biology Education in their professional pursuits. It is however, that Biology Education acquired at the tertiary institutions would be of immense value in their education (Adeyemo, 2021). Biology Education teaching and learning must be effective if the right skills such as ICT are employed and this could allow the tertiary students acquire basic scientific skills and concepts with understanding of the world around them. The need for Biology Education via internet, Biological knowledge has also been expanded to tertiary institutions (Mikre, 2021).

Tertiary institution is viewed as education leading to the award of academic degrees. Tertiary institution of learning also is a post- secondary education, third- level which is an optional final stage of formal learning that occurs after completion of secondary education. Research shows that employers use educational credentials such as degree classifications and grade point averages to sort applicants (Piopiunik et al, 2020). The education given includes: Universities, Polytechnics, Monotechnics, Colleges of education and those institutions offering correspondence courses using ICT and other technologies could bring a dividing force for strong socio- economic, political, cultural, healthier and industrial development of the Kogi-State and Nigeria tertiary educational institutions which is key mechanisms increasingly recognized as wealth and human capital producing industries. The academic year typically runs differently and most universities use semester system.

At the tertiary institutions curriculum, the use of ICT in teaching and learning is relevant and is a functional way of providing education to students that will assist in imbibing the required capacity of the world through acquisition of skills. The introduction of ICT in the tertiary institutions in Kogi State is expected to create a huge difference in the experiences of both lecturers and the students in their

classroom. Teaching and learning of science education courses generally is expected to widen the experiences of the students in understanding various concepts and other abstract ideas involved in Biology education using ICT in sharing knowledge and reducing burden. Well researched and packaged teaching and learning materials can be prepared by lecturers and delivered to students using e- learning devices such as power point presentation, video tutorials, e-books, computer-based training and web based training (Selwyn, 2023).

In spite of the above huge importance of ICT in education, there are various problems still hindering the use of ICT in teaching and learning, such as lecturers' inability to make use of ICT facilities at their doorstep at some tertiary institutions especially in Kogi State. Zuppo, (2022), observed that some of the lecturers cannot operate the computers or delivering their lesson but lecturers' effectiveness is a crucial factor in acquisition of scientific literacy which is a useful catalyst (Husain, 2022). The integration of ICT and its introduction at different levels and various types of education is one of the most challenges undertaking. The question of this study is the Teachers' influence of Information and Communication Technology ICT innovation on Teaching and Learning of Biology Education at the Tertiary Institutions. The researcher also intends to find out the problems associated with lecturers' use of ICT facilities in teaching and learning of Biology Education and possible solutions to take.

Purpose of the Study

- To determine the lecturers' Perceived influence of ICT innovation in teaching and learning of Biology Education courses at the tertiary institutions in Kogi State.
- To ascertain the problems encountered in the use of ICT innovation in teaching and learning of Biology Education courses.

Research Questions

The following research questions were posited to guide the study:

1. What are the lecturers Perceived' influence of ICT innovation on teaching and learning of Biology Education courses at the tertiary institutions in Kogi State?

2. What are the lecturers' perceived problem encountered in the use of ICT on teaching and learning of Biology Education courses at the tertiary institutions in Kogi State?

Methodology

A descriptive survey research design was adopted for the study. The survey design was considered fit for the study because it would enable the researcher to obtain responses from Biology Education lecturers on perceived influence of ICT on teaching and learning of Biology Education courses at the tertiary institutions across Kogi State. Population of the study comprised of forty (40) Biology Education lecturers at the tertiary institutions in Kogi State. Simple random sampling using hat and draw was used to select (30) lecturers across tertiary institutions. The instrument for data collections was questionnaire titled Lecturers' Perceived Influence of ICT Innovation on Teaching Biology Education at Tertiary Institution (L PIITBETI) Was face- content validated by three experts and the researcher administered the instrument, data was collected accordingly. Croncbach Alpha method was used in computing the reliability estimate that yielded (0.81). Mean and standard deviation were used to answer research questions. Any mean below 1.5 is regarded as low extent while any mean above is regarded as agree or high extent.

Results

Research Question 1: What are the lecturers' perceived influence of ICT innovation in the teaching and learning of Biology Education at the tertiary institutions in Kogi state?

Table 1: Mean scores of lecturers and standard deviation on their influence of ICT innovation in teaching and learning of Biology Education at tertiary institutions.

S/N	ITEMS	SA	A	D	SD	Total	MEAN	SD	DECISION
1.	The use of ICT has helped the students in carrying out assignment on Biology Education courses.	2	16	9	3	30	2.57	0.77	Agreed
2.	ICT has helped the lecturers for easy assessment on Biology Education courses.	3	12	12	3	30	2.50	0.82	Agreed
3.	The use of computers especially the Corel draw application has helped in the drawing of some biological diagrams that improve students' learning to optimal level.	7	13	7	3	30	2.80	0.92	Agreed
4.	ICT facilities such as handsets, computer, tablets, iPhone, ipad has helped two lecturers in browsing of assignments in Biology Education courses such as Biology for integrated science and other Science Education Course (SED).	6	18	6	-	30	3.00	0.64	Agreed
5.	ICT has helped the lecturers to pass information on Biology Education everywhere they are.	9	15	6	-	30	3.10	0.71	Agreed
	Cluster mean and standard deviation.						2.79	0.77	Agreed

Table 1 showed that the mean ratings for five (5) items range from 2.50 to 3.10 while the standard deviation ratings range from 0.64 to 0.92. The mean ratings for items 1, 2, 3, 4 and 5 are 2.57, 2.50, 2.80, 3.00 and 3.10 with standard deviation ratings of 0.77, 0.82, 0.92, 0.64 and 0.71 respectively. The small values of items standard deviation indicated that the lecturers' responses appeared to be similar. The mean ratings for individual items and the cluster mean ratings are equal and above the cut- off point (2.50) which means that Biology Education lecturers agreed that ICT facilities innovation has transformed in all the areas listed in the table.

Research Question 2: What are the lecturers problems encountered in the use of ICT in teaching and learning of Biology Education at the tertiary institutions in Kogi State?

Table 2: Mean scores of teachers and standard deviation on their perception of problems encountered in the use of ICT in teaching and learning of Biology Education courses at the tertiary institution.

S/N	ITEMS	SA	A	D	SD	T		SD	Decision
1.	Minimal accessibility and network connectivity for teaching and learning of Biology Education.	20	9	1	-	30	3.63	0.56	Agreed
2.	Lack of qualified ICT technical support staff in the teaching and learning of Biology Education.	23	7	-	-	30	3.77	0.43	Agreed
3.	Scarcity of training skills among Biology Education lecturers in the use of ICT.	21	9	-	-	30	3.70	0.47	Agreed
4.	Lack of competence among some Biology Education lecturers in the use of ICT.	19	11	-	-	30	3.63	0.49	Agreed
5.	Lack of funds to support the purchase of ICT gadgets.	21	8	1	-	30	3.67	0.55	Agreed
6.	Lack of lecturers- students' orientation on the use of ICT in the teaching and learning of Biology Education.	20	10	-	-	30	3.67	0.48	Agreed
	Cluster mean and standard deviation.						3.68	0.50	Agreed

Table 2 indicated the mean ratings for (six) 6 items ranging from 3.63 to 3.77 while the standard deviation ratings ranges from 0.43 to 0.56. The mean ratings for items 1, 2, 3, 4, 5 and 6 are 3.63, 3, 77, 3.70, 3.63, 3.67 and 3.67 with standard deviation ratings of 0.56, 0.43, 0.47, 0.49, 0.55 and 0.48 respectively. The cluster mean rating and cluster standard deviation ratings are 3.68 and 0.50 respectively. The small values of items of standard deviation indicated that lecturers 'responses give a similar way. The mean ratings for individual items and the cluster mean ratings are above the cut- off point (2.50) which means that Biology Education lecturers agreed that the items in the table above constitute the problems faced in the use of ICT in

teaching and learning of Biology Education at the tertiary institutions across Kogi State.

Discussion of Findings

Lecturers' perceived influence of ICT innovation in the teaching and learning of Biology Education at the tertiary institutions across Kogi State. Table 1 indicated that, the lecturers agreed to all the five items. This implies that the lecturers' influence in all the five items is to be the various influences of ICT innovation in the teaching and learning of Biology Education at the tertiary institutions. That, the use of ICT has helped the students in carrying out their assignment on Biology Education courses. ICT has also made easy lecturers' assessment on Biology Education courses. The various uses of computer application such as Corel draw has helped in drawing of some biological diagrams with different colors which may enhance student improvement generally. The various uses of ICT facilities such as handsets, computers, tablets, ipad, iphones has helped the lecturers and students in (browsing) learning and teaching for more improvement in Biology Education. There is also a good communication between lecturers and students with the views of Watson (2011). Watson stressed that ICT is a dependable tool in enhancing effective teaching and learning generally. Similarly, (Efiom, 2020) found in a study on the use of ICT in Chemistry Education that the use of ICT in the teaching and learning of Chemistry improves teaching and learning as well as promotes students' interest in learning. Adeyemi (2021) agreed that using ICT in the teaching and learning of Chemistry promotes effective teaching and learning of Chemistry both in the theoretical aspects and in the laboratory.

Lecturers' problems encountered in the use of ICT in the teaching and learning of Biology Education at the tertiary institutions in Kogi State. Table 2 shows that lecturers agreed to all the items in the table. This implies that the lecturers encountered all the problems in teaching and learning of Biology Education at the tertiary level as revealed by this study. Minimal accessibility and network connectivity for teaching and learning of Biology Education, lack of qualified ICT technical support staff in the teaching and learning of Biology Education, scarcity of training skills among Biology Education lecturers in the use of ICT, lack of competence among some Biology Education lecturers in the use of ICT, lack of funds to support the purchase of ICT gadgets, lack of lecturers- students' orientation on the use of ICT in teaching and learning of Biology Education.These findings

agreed with those of (Marlhur, 2021) who conducted a study on students perception of the factors affecting the effective utilization of ICT in teaching and learning of Chemistry and found that Chemistry teachers had the perceptions that factors such as lack of training and motivation of teachers, lack of technical support staff and lack of funds among others affect their effective utilization of ICT in teaching Chemistry.

In a similar study Ibrahim (2023) opined that availability and lack of access to ICT facilities are the largest hindrance to the effective use in the teaching and learning of Biology in secondary school level.(Mayer, 2022s), found that barriers to lecturers use of ICT facilities in teaching and learning include lack of teacher, ICT skills; lack of appropriate educational software; limited access to ICT gadgets; poor educational system attached,. Hence, this study lecturers influence of Information and Communication Technology (ICT) innovation on teaching and learning of Biology Education at the tertiary institutions in Kogi State.

Educational Implications

The findings of this study may have implication to the Government, Lecturers at the tertiary institutions and students. Information and Communication Technology is a vital tool in promoting teaching and learning of Biology Education courses at the tertiary education level. ICT would be of great importance to the government through the Federal Ministry of Education to ensure the purchase, distribution and availability of ICT facilities at the tertiary institution across Kogi State. The government also will endeavor to fully train lecturers to become ICT compliance to meet up with the 21st century, and set opportunities as well as display effective teaching and learning of Biology Education and Science Education courses generally.

Conclusion

Base on the findings of this study, it is concluded that some ICT innovative facilities are lacking at some tertiary institutions in Kogi State. Some respondents agreed that ICT facilities influence lecturers' urge in teaching Biology Education properly and some lecturers also encountered various problems in the use of ICT.

Recommendations

Based on the findings of the study it was recommended that

1. Lecturers should be trained and retrained on how to use ICT in teaching and learning Biology Education Courses.

2. The use of ICT should be promoted on disseminating of knowledge to the students on how to skillfully carry out class assignment and meet counterparts in other universities
3. Federal Ministry of Education should make provision for supply of enough ICT equipment across Tertiary Institution in Kogi State
4. E-Classroom should be encouraged among lecturers when the ICT gadgets are provided across tertiary institutions in Kogi State to boost education.

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