Impact of Information and Communication Technology on Academic Performance of Mathematics Students of College of Education, Ikere-Ekiti, Ekiti State, Nigeria

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ABSTRACT: *The study investigated the impact of Information Communication Technology on academic performance of Mathematics students of College of Education, Ikere-Ekiti, Ekiti State, Nigeria.The study adopts descriptive survey of research design. The population for this study consists of all students in College of Education, Ikere-Ekiti, Ekiti State, Nigeria. Stratified random sampling technique was used to select 15Mathematics students each from part I, part II and part III respectively among the students of College of Education, Ikere-Ekiti, Ekiti State of Nigeria. A total of forty five (45) NCE Mathematics students were used as samples for the study. Three research questions were raised and tested at 0.05 level of significance. The instrument forthe study was self-designed questionnaire.The instrument forthe study was self-designed questionnaire.The instrument was subjected to validity and reliability mechanism. The face and content validity as well as reliability of the research instrument were carried out and reliability coefficient of 0.87 was obtained. The data collected were analysed using Chi-Square (X^2) statistical analysis package. The results of the analyses showed that availability of ICT facilities influences academic performance of students in Mathematics in College of Education, Ikere-Ekiti, Ekiti State. The result also showed that utilization of ICT facilities influences academic performance of students in Mathematics in College of Education, Ikere-Ekiti, Ekiti State, Nigeria. Finally, analysis of the data collected also revealed that utilization of ICT facilities influences academic performance of students in Mathematics in College of Education, Ikere-Ekiti, Ekiti State, Nigeria. Based on the findings of the study, conclusion and recommendations were made.*

Key Words: *Information, Communication, Technology, ICT and College of Education*

Introduction

Information as a concept bears a diversity of meanings, from everyday usage of technical settings. Generally speaking, the concept of information is closely related to notions of constraint, communication, control, data, form, instruction, knowledge, meaning, and mental stimulus. Information is a message received and understood, and knowledge acquired through study or experience or instruction. On the contrary, communication is the activity of communicating, the activity of conveying information.

Communication is a process that allows organisms to exchange information by several methods. It is the concept or state of exchanging information between entities; the potential for information exchange; a message; the essential data transferred in an act of communication; the body of all data transferred to one or both parties during an act of communication. It is the exchange of ideas, opinions and information through written or spoken words, symbols or actions. Communication is the ability to make understood wants and needs using verbal language, sign language, gestures, facial expression, computers, etc. It is the process whereby knowledge is codified into information by the transmitter, passed through a medium to a receiver, who then reconverts that information into new knowledge.

More so, technology is human innovation in action that involves the generation of knowledge and processes to develop systems that solve problems. It is the machinery, tools and materials required to produce a media text. In media literacy terms, technology greatly impacts upon the Construction and connotation of a text.

Technology is a body of knowledge used to create tools, develop skills, and extract or collect materials; the application of science (the combination of the scientific method and material) to meet an objective or solve a problem. It is the practical application of science to commerce or industry.

The mandate of the teacher training programme at the Nigeria Certificate Education (NCE) level, which is the recognized minimum teaching qualification in Nigeria, is to produce quality teachers for the Basic Education (NCCE, 2012). The philosophy of the Nigeria Certificate Education(N.C.E),Mathematics is

inspired by the desire to help students become intellectually informed in mathematical ideas, notations and skills of logical reasoning, scientific enquiry and for the pursuit of techno – scientific education. The need to produce non-graduates but well groomed and qualified professional teachers of mathematics for the Basic Education Levels.. According to NCCE (2012) the products should be able to apply acquired knowledge to Information Technology and real life situations and also to use Information Technology (IT) effectively to support pupils/students learning Mathematics.

According to Nigeria certificate in Education minimum standard for mathematics (2012), the objectives NCE Mathematic education, by the end of the programme the students should be able to:

a) Discuss with confidence the historical development of mathematics as a discipline
b) Solve abstract problems through the use of mathematic skills and ideas
c) Stimulate pupils interests in mathematics by the use of appropriate teaching/learning strategies particularly at the Basic education levels
d) Make learners appreciate the use of computers in solving mathematical problems
e) Use mathematics to solve day to day problems
f) Teach mathematics in a way that learners can apply mathematics principles in solving daily problems
g) Make the teaching of mathematics learner friendly through games and simulations
h) Set up a mathematics laboratory
i) Improvise materials for effective teaching/learning of mathematics
j) To prepare the learners for further studies ion mathematics and related courses

Awodun & Ajisola (2016), the entire world has been metermorphonized into a global village by Information and Communication Technology (ICT). Nwachukwu (2004) viewed information and communication technology in three categories: computer, storage media and telecommunication.Information and Communication Technologies (ICTs) are now of no doubt, being accepted as part of our contemporary world as they are perceived as tools for rapid changes in technology, schools, political and global economic transformation. The penetrating influence of ICT is not only limited to these spheres of human endeavor but also to the field of education where it is perceived as a transforming agent in education delivery and educational methodology. The use of Information and Communication Technology (ICT) is becoming an integral part of Education in many parts of the globe. Nigeria is not left behind as ICT gradually finds its way into the Educational systems despite limitations brought about by economic disadvantages.

Kwache (2007) cited in Awodun & Ajisola (2016) perceived information and communication technology to have the potential to accelerate, enrich and deepen skills; to motivate and engaged students in learning; to help create economic viability for tomorrow workers; contribute to radical changes in schools; to strength teaching and to provide opportunities for connecting between the schools and the world.Information Technology is the use of electronic devices or equipment, most especially computers, for storing, analyzing and sending out data. Communication is the activity or process of expressing or sending ideas and feelings or of giving people information.

Similarly, Adamu (2004) cited in Awodun & Ajisola (2016) asserted that Information and Communication Technology (ICT) is a diverse set of technological tools and resources used to communicate, disseminate, store and manage information. He further stressed that information and communication technology includes the prints (magazines, newspapers, book etc) and the electronics (radio, television, video tapes, internet, tape players and recorders, fax machines, telephone, satellite device computer) etc.Information and Communication Technology (ICT) comprises the method and technical means of capturing, storing, processing, receiving, and transmitting both the data and information.

Mathematics students' learning ability and performance in Mathematics hinges seriously on the ability of Mathematics teachers in the utilization of modern gadgets in Information and Communication Technology.There is the need for Mathematics teacher to be exposed to the ICT in other for him to be able to teach and guide the students.ICT can be used in teaching different areas of Mathematics likegeometry, measurement, solids properties, simple equations, plane shapes, geometrical transformations, sequences and series, probability etc if students are exposed todifferent ICT materialsduring the cause of teaching, it will help the students tobe moreproductive.The view is that it will lead to more effective and efficiency in every educational process. According to Iyobhebehe and Okepurukhro (2011) application of ICT to the teaching of physics in higher institution will only be successful, if some of these challenges are tackled like ICT equipment, trained and quality teachers and personnel, preparedness by education stakeholders and infectiveness of power supply.

The potential for ICT to improve the quality of instruction, transform the schools, improve school management, increase access to education, improved in teacher education among others have been emphasized by several studies (Yusuf & Yusuf, 2009). ICT holds management the opportunity to revolutionize pedagogical methods, expand access to quality science education and improve the management of education system (World Bank, 2002).

ICT has the potential for enhancing the tools and environment for learning as it allows materials to be presented for enhancing the tools and environment for learning as it allows materials to be presented in multiple media, motivate and engage students in learning process, foster enquiry and exploration, and provides access to world wide information resources among others (Yusuf & Yusuf, 2009).Through the internet, students and teachers alike can gain access to a rich source of information to keep abreast of new sources of knowledge.

The education reform act of 2007, FME (2007) clearly highlighted the need to improve the quality of instruction of Nigerian schools, provide enriched learning environment, need to provide more aces sot education and provide the students with knowledge and skills necessary for the 21st century workplace. This can be achieved through proper integration of ICT into the educational system. Through the internet, digital libraries, teachers can easily get access to relevant and current resources in their areas.

The quality of students learning will be enhanced through their access to needed content through ICT facilities (the internet). Through ICT, science teachers, students libraries, and schools can communicate with one another and share information to enhance understanding access and view documents richly form textbooks and pictures connect colleagues, schools, friends, friends, resource person in almost all part of the world.

Okorodudu (2010) noted that wide spread availability of the internet and common access to information, freely available novel technologies and types of social interactions have inevitable impacts in learning and teaching. He asserted that e-learning using electronic devices and now technologies is a modern learning method and that e-learning system of other learning technologies are used as a supporting tool for traditional (classroom) learning without any policies.

Awodun & Ajisola (2016) affirms that ICT provides a bridge between-students' prior knowledge and the learning of new physical concepts, helping students develop scientific understanding through an active reformulation of their misconceptions. Specifically, they are developing their understanding about physical laws through a process of hypothesis making, and ideas testing and isolate and manipulate parameters and therefore helping them to develop an understanding of the relationships between physical concepts, variables and employ a variety of representation (pictures, animation, graphs, vectors and numerical data displays) which are helpful in understanding the underlying concepts, relations and processes and express their representations and mental models about the physical world investigate phenomena's which are difficult to experience in a classroom or lab setting because it is extremely complex, technically difficulty or dangerous, money-consuming or time consuming, or happen too fast.

The Concept of education which is catching the attention of government revolves around the application of Information and Communication Technology (ICT) to accelerate the attainment of national education goals.

Mathematics teacher education, therefore, must be part of this drive. ICT has competencies-oriented learning which in turn has relative impacts on educational programmes and content of instruction, affecting the learning environment. ICT is a potent mechanism for the development of quality teaching and learning in business education. It is the catalyst for rapid transformation in existing school practices and the foundation for efficient educational service delivery in business education.

In spite of the enormous role that Mathematics plays in national development and the efforts of government in the provision necessary science equipments in schools with good teachers and other stakeholders like parents/guardians in providing for their children/wards at improving science education, Mathematics results in the examination conducted by most certified examination bodies like the West African Examinations Council (WAEC) and National Examinations Council (NECO) have not been satisfactory. Therefore, this study therefore investigated the impact of Information Communication Technology on academic performance of Mathematics students of College of Education, Ikere-Ekiti, Ekiti State, Nigeria.

Research Questions

The following research questions were raised to guide the study:

1. Would the availability of ICT facilities influence academic performance of students in Mathematics in College of Education, Ikere-Ekiti?

2. Would the utilization of ICT facilities influence academic performance of students in Mathematics in College of Education, Ikere-Ekiti?
3. Would the compliance in the use of ICT facilities influence academic performance of students in Mathematics in College of Education, Ikere-Ekiti?

Methodology

A descriptive survey research design was adopted for this research study on the impact of information communication technology on academic performance of NCE Mathematics students of Ikere College of Education, Ikere-Ekiti, Ekiti State, Nigeria.

The population for the study consists of all students of College of Education, Ikere-Ekiti, Ekiti State, Nigeria.Stratified Simple random sampling technique was used to select 15Mathematics students each from part I, part II and part III respectively among the students of College of Education, Ikere-Ekiti, Ekiti State of Nigeria.A total of forty five (45) Mathematics students were used as samples for the study. The instrument forthe study was self-designed questionnaire.The instrument used for the study was subjected to validity and reliability mechanism. The face and content validity as well as reliability of the research instrument were carried out and reliability coefficient of 0.87 was obtained.

The researchers personally administered the instrument (questionnaire) on the selected sample to elicit the relevant information needed for the study. Three research questions were raised and tested at 0.05 level of significance.The data collected were analysed using Chi-Square (X^2) statistical analysis package.

Results and Discussion

Research Question 1

Would the availability of ICT facilities influence academic performance of students in Mathematics in College of Education, Ikere-Ekiti?

Table 1: Chi-Square Analysis of data on the influence of availability of ICT facilities on academic performance of students in Mathematics in College of Education, Ikere-Ekiti.

S/N	ITEMS	X^2-Cal	X^2-tab	df	Remark
1	ICT facilities are not available in the College	12.34	7.82	3	*
2	School library are not well equipped with ICT facilities				
3	Mathematics laboratories/workshop and classrooms are not well-equipped with ICT facilities				
4	Availability of ICT facilities has nothing to do with learning of Mathematics				
5	Availability of ICT facilities in the College ICT centre inspired me to study Mathematics.				
6	College in general lacks modern ICT facilities.				
7	Inadequate ICT facilities in the College are affecting me negatively.				

P< 0.05 , * = Significant

Research Question 2

Would the utilization of ICT facilities influence academic performance of students in Mathematics in College of Education, Ikere-Ekiti?

Table 2: Chi-Square Analysis of data on the influence of utilization of ICT facilities on academic performance of students in Mathematics in College of Education, Ikere-Ekiti.

S/N	ITEMS	X^2-Cal	X^2-tab	df	Remark
1	Use of ICT facilities helps in effective learning of Mathematics.	23.61	7.82	3	*
2	Use of ICT facilities gives effective mastering of concepts in Mathematics.				
3	Use of ICT facilities stimulates my interest in Mathematics.				
4	Use of ICT facilities helps my better understanding of Mathematics.				
5	Use of ICT facilities in the College inspired me to study Mathematics.				
6	Use of ICT facilities in the College cater for individual differences learning of Mathematics.				
7	Use of ICT facilities in the College assists my academic performance in Mathematics.				

P< 0.05 , * = Significant

Research Question 3

Would the compliance in the use of ICT facilities influence academic performance of students in Mathematics in College of Education, Ikere-Ekiti?

Table 3: Chi-Square Analysis of data on the influence of compliance in the use of ICT facilities onacademic performance of students in Mathematics in College of Education, Ikere-Ekiti.

S/N	ITEMS	X^2-Cal	X^2-tab	df	Remark
1	ICT facilities expose Mathematics students to some practical aspects of Mathematics.	11.86	3.84	3	*
2	ICT facilities attract Mathematics students to the learning of Mathematics.				
3	ICT facilities stimulate my interest in Mathematics.				
4	ICT facilities promotes students' attitude towards Mathematics.				
5	With the frequent use of ICT facilities in the learning of Mathematics aids retention in learning.				
6	Mathematics could be learnt better with the use of ICT facilities..				
7	Use of ICT facilities assists my academic performance in Mathematics.				

P< 0.05 , * = Significant

Discussion

A cursory look at table 1 reveals that x^2-calculated was 12.34 and x^2- critical was 7.82 in research question one. Showing that x^2-calculated is greater than x^2-table value at 0.05 and df = 3 (i.e.. $x^2_{-Cal} > x^2_{-tab}$). The result is significant; this implies that availability of ICT facilities influences academic performance of students in Mathematics in College of Education, Ikere-Ekiti, Ekiti State, Nigeria.This result agrees with the findings of Kwache (2007) cited in Awodun and Ajisola (2016) that information and communication technology to have the potential to accelerate, enrich and deepen skills; to motivate and engaged students in learning; to help create economic availability for tomorrow workers; contribute to radical changes in schools; to strength teaching and to provide opportunities for connecting between the schools and the world. The result also agrees with the findings of Iyobhebehe & Okepurukhro (2011) that application of ICT to the teaching of Mathematics in higher institution will be successfulif some challenges like ICT equipment, trained and quality teachers and personnel, preparedness by education stakeholders and infectiveness of power supplyare tackled.

Similarly, a cursory look at table 2 reveals that x^2-calculated was 23.61 and x^2- critical was 7.82 in research question one. Showing that x^2-calculated is greater than x^2-table value at 0.05 and df = 3 (i.e.. $x^2_{-Cal} > x^2_{-tab}$). The result is significant; this implies that utilization of ICT facilities influences academic performance of students in Mathematics in College of Education, Ikere-Ekiti, Ekiti State, Nigeria. This result agrees with the findings of Kwache (2007) that information and communication technology to have the potential to accelerate, enrich and deepen skills; to motivate and engaged students in learning; to help create economic availability for tomorrow workers; contribute to radical changes in schools; to strength teaching and to provide opportunities for connecting between the schools and the world. The result also agrees with the findings of Iyobhebehe & Okepurukhro (2011) that application of ICT to the teaching of Mathematics in higher institution will be successfulif some challenges like ICT equipment, trained and quality teachers and personnel, preparedness by education stakeholders and infectiveness of power supplyare tackled.

Finally, a superficial look at table3 reveals that x^2-calculated was 11.86 and x^2- critical was 7.82 in research question one. Showing that x^2-calculated is greater than x^2-table value at 0.05 and df = 3 (i.e.. $x^2_{-Cal} > x^2_{-tab}$). The result is significant; this implies that compliance in the use of ICT facilities influences academic performance of students in Mathematics in College of Education, Ikere-Ekiti, Ekiti State, Nigeria. This result agrees with the findings of Kwache (2007) that information and communication technology to have the potential to accelerate, enrich and deepen skills; to motivate and engaged students in learning; to help create economic availability for tomorrow workers; contribute to radical changes in schools; to strength teaching and to provide opportunities for connecting between the schools and the world. The result also agrees with the findings of Iyobhebehe & Okepurukhro (2011) that application of ICT to the teaching of Mathematics in higher institution will be successfulif some challenges like ICT equipment,

trained and quality teachers and personnel, preparedness by education stakeholders and infectiveness of power supplyare tackled.

Conclusion

Based on the results of this study, the findings revealed that: there was statistical significant relationship between the availability of ICT facilities and academic performance of students in Mathematics in College of Education, Ikere-Ekiti, Ekiti State, Nigeria. Also, there was statistical significant relationship between the utilization of ICT facilities academic performance of students in Mathematics in College of Education, Ikere-Ekiti, Ekiti State, Nigeria. Finally, there was statistical significant relationship between the compliance in the use of ICT facilities and academic performance of students in Mathematics in College of Education, Ikere-Ekiti, Ekiti State, Nigeria. The results of the findings strongly suggest that, ICT will significantly enhance easy delivery of Mathematics education, teaching and learning. Also ICT will significantly provide necessary Mathematics information for the learners on students. Furthermore ICT will significantly help the Mathematics students to avail themselves with the opportunity of current knowledge and skills.

Recommendations

Based on the findings of this study, the following recommendations were made:

- Students should develop more interest in the learning of Mathematics through the use of ICT facilities;
- the Federal and State Government should review its National ICT policies in order to ensure effective, qualitative Mathematics education;
- the school management should make a provision for all Mathematics students to have access to the free internet facilities;
- the school management should be able to provide infrastructure facilities, most essentially into the Mathematics laboratories (equipment such as projector, white board etc.);
- the ministry of education should integrate ICT into Tertiary Institutions Curricula; and
- finally, government should address the problem of irregular supply of electricity in the country in order to take full advantage of the opportunities offered by ICT for qualitative Mathematics education in Nigeria tertiary institutions.

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